

Contingency and Renegotiation of Financial Contracts: Evidence from Private Credit Agreements^{*}

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Using a large random sample of private credit agreements between US publicly traded firms and financial institutions, we show that over 90% of long-term debt contracts are renegotiated prior to their stated maturity, despite being designed with a number of contingencies that tie the contract terms to future verifiable events. Renegotiations result in material changes to the terms of the contract, and lead to an average effective maturity that is half of the average stated maturity. Our empirical model of the bargaining game occurring in renegotiation reveals that new information concerning creditor quality and investment opportunities are the primary determinants of renegotiation outcomes, though fluctuations in the macroeconomic environment and ex ante contingencies in the original contract also play a significant role. Overall, our results have important implications for several aspects of financial contracting research including security design, debt maturity structure, and corporate capital structure.

A large body of theoretical research in financial contracting focuses on the *contingency* and *renegotiation* of optimal contracts. Contingency corresponds to ex ante contractual terms that are an explicit function of future verifiable states of the world. For example, the rights of creditors to seize debtors' assets are typically contingent upon timely payment of interest and principal (e.g., Bolton and Scharfstein (1990) and Hart and Moore (1994)). Renegotiation corresponds to the ex post revision of contract terms that arises when a Pareto-inefficient state is reached under the initial terms of the contract. For example, long-term debt contracts are often renegotiated when ex post changes in the credit quality of the borrower lead to gains from trade (e.g., Hart and Moore (1998) and Gromb (1995)). Theoretical research suggests that the contingency and renegotiation of financial contracts affect a large number of important corporate decisions, including the choice of capital structure and the design of financial securities.¹

While theoretical research suggests that contingency and renegotiation are first order concerns in corporate finance, there are relatively few empirical studies that focus on the relationship between these two components. Even fewer studies provide evidence of renegotiation outside of default. Consequently, a number of important, and even basic, questions remain unanswered, such as: How often are financial contracts renegotiated? What are the primary outcomes of renegotiation? What factors trigger renegotiation? And, how is ex post renegotiation affected by the presence of ex ante contingencies?

In this study, we attempt to answer these questions by exploring the contingencies and renegotiations observed in a random sample of 1,000 private credit agreements between financial institutions and publicly listed U.S. firms from 1996 through 2005. These agreements, which govern the terms of syndicated and sole-lender loans, provide a useful empirical setting to examine financial contract theory for two reasons. First, the environment in which private credit agreements are written shares many similarities to the theoretical environment found in much of the security design literature. Second, the loans that are governed by private credit agreements form the largest source of external finance for corporations (e.g., Gomes and Phillips (2007)). Thus, our empirical analysis is performed in a setting that is closely related to the motivating

¹ Contingencies and renegotiation are an important part of: dynamic theories of debt as optimal contracts (Hart and Moore (1989, 1994, 1998), Bolton and Scharfstein (1990, 1996)), theories on the design of loan contracts (Hellwig (1977), Gorton and Kahn (2000), Rajan and Winton (1995), Garleanu and Zwiebel (2007)), and theories on the choice between bank loans and public bonds (Berlin and Mester (1992), Rajan (1992), Bolton and Scharfstein (1996), and Hackbarth, Hennessy, and Leland (2005))

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' quarterly SEC filings. We combine this renegotiation information with accounting data (Compustat), stock price data (CRSP), and origination terms (Dealscan and the contracts) in order to examine the determinants of these renegotiations and their implications for corporate behavior.

In our first set of results, we begin by showing that almost all credit agreements are renegotiated before they mature, despite being made contingent on a variety of future events. For example, approximately 75% of credit agreements contain pricing grids, which make future interest rates explicitly contingent on changes in accounting variables or credit ratings (Asquith, Beatty, and Weber (2005)). In addition, 20% of contracts contain a borrowing base, which makes the future amounts available under a revolving credit facility contingent on future collateral values. Finally, almost every credit agreement contains one or more financial covenants, which give creditors the right to accelerate the loan and terminate unused credit facilities if accounting benchmarks are not met.

Nonetheless, we find that 75% of private credit agreements have a major contract term (principal, interest, or maturity) renegotiated after origination, but before the stated maturity date. This figure increases to 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. Of these renegotiations, only 16% are due to a default event, such as a covenant violation, suggesting that renegotiation is much more common *outside* of default and bankruptcy. Additionally, contracts with longer stated maturities are not only more likely to be renegotiated, but they are also more likely to contain ex ante contingencies.

In our second set of results, we construct an empirical model of the bargaining game occurring in renegotiation in order to identify the determinants of renegotiation and its outcomes. Other than the stated maturity of the loan and the presence of financial covenants, no other contract features or firm characteristics at the time of origination are significantly correlated with the likelihood of renegotiation. For example, neither the number of syndicate members nor the presence of a pricing grid or borrowing base is correlated with the probability of renegotiation.

Instead, we find that renegotiation depends crucially on the revelation of new information regarding the borrower's credit quality and investment opportunities occurring after the loan origination. For example, improvements and deteriorations in cash flow are strong predictors of favorable and unfavorable renegotiation outcomes, respectively. A drop in the borrower's cash flow from the median to the 10th percentile almost triples the probability of a borrower-unfavorable renegotiation, and an increase in cash flow to the 90th percentile doubles the probability of a borrower favorable renegotiation. In addition, improvements in current and future investment opportunities increases the probability of renegotiations in which the amount and interest spread are both increased.

We also find that the probability of renegotiation is more sensitive to ex post changes in credit quality when the ex ante contract is made contingent on a measure of credit quality. 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. This interactive affect suggests that the function of ex ante contingencies is to determine when renegotiation occurs and its outcome, as opposed to whether or not renegotiation occurs.

Finally, even after controlling for borrower and lender characteristics, renegotiations show a strong cyclical pattern. For example, during the 2004 and 2005 period of high liquidity in the syndicated loan market, almost 45% of renegotiations are favorable to the borrower while less than 15% are unfavorable to the borrower. In contrast, during the recession of 2001, only 16% of renegotiations are favorable to the borrower while more than 40% of renegotiations in the recession of 2001 are unfavorable to the borrower. These results suggest that capital market liquidity plays an important role in shaping the outcome of renegotiations.

In addition to shedding light on previously unanswered questions, our findings have several important implications for financial contracting research. First, our findings question the traditional view of corporate debt as a fixed-life, fixed-income security that is contingent only upon timely repayment. Instead, a large fraction of corporate debt is best viewed as dynamic, state contingent contracts that often change through a combination of ex ante contingencies and ex post renegotiation. Consequently, there is a sharp distinction between the effective and stated maturity of debt contracts – a distinction that is crucially important for understanding debt maturity structure (e.g., Diamond (1991, 1993), Flannery (1986)). Our finding that long-term contracts are both more contingent and more likely to be renegotiated than short-term contracts

suggests that long-term contracts do *not* provide complete protection against liquidity risk or changes in loan terms.

Second, our findings suggest that the liquidity of the syndicated loan market has an important effect on the likelihood and outcome of renegotiation. This inference is consistent with recent evidence showing that the supply of capital has important implications for corporate capital structure (Faulkender and Petersen (2006), Lemmon and Roberts (2006), Sufi (2007a)). Our results provide novel insight into this burgeoning literature by showing that renegotiation is an important channel through which fluctuations in the supply of capital impacts financial policy.

Third, our findings provide insight into the literature on the optimal number of creditors (Bolton and Scharfstein (1996), Bris and Welch (2005)). In particular, our results show that loans with a large number of lenders are not less likely to be renegotiated, which has two potential implications. At a minimum, this result suggests caution when using features of the lending syndicate to explain contract structure or corporate behavior because the syndicate is not randomly chosen (i.e., syndicate structure is endogenous). Alternatively, the size of the lending syndicate is largely irrelevant for most renegotiations because the power wielded by lead arranges reduces the effective size of the syndicate to one lender.

Finally, our results shed light on the role of contingencies specified in ex ante financial contracts. Specifically, we show that in an incomplete contracting environment, contingencies are not used to “complete” debt contracts and reduce renegotiation. Instead, our evidence suggests that contingencies are used to allocate bargaining power in the ex post renegotiation game, and alter the default option in case renegotiation fails. In this sense, our findings are consistent with incomplete contracting models in which contracts specify ex post bargaining power and renegotiation default options in order to increase ex ante relationship-specific investments (e.g., Hart and Moore (1988), Rajan (1992), Aghion, Dewatripont, and Rey (1994), Harris and Raviv (1995), and Rajan and Winton (1995)).

Relative to previous empirical research, our paper is related to two literatures. First, it is related to studies that examine why borrowers and lenders write into contracts various contingencies, such as covenants (e.g., Malitz (1986), Begley (1994), Goyal (2001), Nash, Netter, and Poulson (2003), and 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 contractual design.

Our paper is also related to the literature examining renegotiation in the context of corporate default. Studies by Beneish and Press (1993, 1995), Chen and Wei (1993), Chava and Roberts (2007), Nini, Smith, and Sufi (2007), and Roberts and Sufi (2007) 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 (2007) study the outcome of ex post bargaining in payment default and bankruptcy. In contrast, our study focuses on *all* renegotiations of debt contracts, including those occurring *outside* of states of default or financial distress.² As we show below, renegotiations occurring outside of default or distress account for the large majority of renegotiations.

The remainder of the paper proceeds as follows. Section I describes our data. Section II presents our first set of results that document the facts regarding contingencies and renegotiation, as well as their implications. Section III develops our empirical model of the bargaining game occurring in renegotiation, after which we present our results identifying the factors behind renegotiation and its outcomes. Section IV summarizes the implications of our study and concludes.

I. Data

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 (2007).³ We focus on only 1,000 contracts because of the time involved in gathering and recording the renegotiation data (described below). The agreements are then matched to S&P's *Compustat* for accounting information and to Reuters LPC's *Dealscan* for loan origination terms. Given certain limitations in *Dealscan's* coverage of contingencies (Drucker and Puri (2007)),

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 (2007) 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.

data on pricing grids, financial covenants, and borrowing bases are collected directly from the contracts.

We obtain information on renegotiations by examining the quarterly SEC filings (10-Qs and 10-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 (2007b), Nini, Smith and Sufi (2007)). As a result of these regulations, firms almost always give detailed explanations of their debt agreements in their SEC filings. By following the explanations of debt agreements through time, we can detect whether terms are renegotiated.

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 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 In addition to changes in the existing agreement, we also consider as renegotiations situations in which the borrower prepays a portion of a loan or terminates a loan before maturity, though, empirically, these are relatively rare events. Finally, replacement of an existing credit agreement with a new credit agreement prior to the stated maturity is also considered a renegotiation, as long as the new agreement results in a change in the principal, interest spread, or maturity. However, 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.

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 data base 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

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.

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

Two limitations of the renegotiation data are worth noting. First, we only collect the initial renegotiation of the loan and, consequently, have no information on any subsequent renegotiations of the contract. Second, 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 the amount is either increased or decreased, but we do not know whether the interest spread changes.

We combine the borrower, loan origination, and renegotiation data to form two data sets. The first data set is a static dataset containing one observation per contract and information on the terms, borrower characteristics at origination, and renegotiation outcomes for the sample of 1,000 loans.

The second data set is a panel of contract-quarter observations, with each contract's time series beginning in the quarter of origination. The end of each contract's time series is the earliest quarter in which: (1) the loan matures, (2) the loan is renegotiated, (3) the borrower disappears from the sample, or (4) the fourth quarter of 2006 – the end of our sample frame. This data set allows us to track changes in the borrower's characteristics and macroeconomic environment over time. To be included in the contract-quarter data set, we require that the firm have data available on key financials from *Compustat* in the quarter before the maturity, renegotiation, or disappearance of the loan. After this limitation, the contract-quarter data set includes 944 contracts and 5,812 contract-quarter observations.

Table I presents summary statistics for the 1,000 private credit agreements in our sample. The average borrower in our sample has assets of \$2.9B, but the distribution is skewed toward very large borrowers. The median borrower has assets of \$650M. As a fraction of lagged assets,

⁵ See Nini, Smith, and Sufi (2007) and Roberts and Sufi (2007) for a description of financial covenant violation data.

the average loan deal in our sample is 0.334, which suggests that these agreements are an important part of the capital structure of these firms.⁶ Consistent with earlier studies examining bank loans, the average stated maturity of the deals in our sample is approximately three years.

II. Contingency and Renegotiation: Facts and Implications

This section answers some basic, but important, questions concerning contingency and renegotiation. In particular, we examine the prevalence of contingency and renegotiation in our sample of contracts, as well as the outcomes of renegotiation. In doing so, we also highlight the implications of these findings for theories of financial contracting, bank lending, and corporate debt maturity structure.

A. To What Extent Are Contracts Contingent?

Table II demonstrates that nearly all private credit agreements contain contingencies. Over 72% of the contracts in our sample contain a pricing grid, which makes the interest spread on outstanding borrowings a function of financial ratios or credit ratings.⁷ 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 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 a borrowing base. The most common collateral used in a borrowing base is either accounts receivable or inventories. In fact, over 90% of borrowing bases in our sample are a function of accounts receivable and/or inventories. With less frequency, borrowing bases are also a function of equipment or raw materials, such as oil and gas reserves.

⁶ Almost every loan deal in our sample includes revolving credit facilities, which on average are only 1/3 used at the end of a fiscal year (Sufi (2007b)). Therefore, the ratio of the deal size to total assets should not be interpreted as outstanding deal debt over total assets.

⁷ 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.

Perhaps the most important contingency in private credit agreements are 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 and terminate the unused portion of revolving credit facilities. In our sample, the most common financial ratios on which financial 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.

Table II suggests that creditors and borrowers have a large set of verifiable outcomes on which they often write contingencies. Indeed, 981 of the 1000 contracts in our sample make interest rates, principal amounts, or decision rights contingent on accounting variables or credit ratings. Our findings suggest that, even when contracts are likely to be incomplete, contracting parties often have access to and take advantage of a large set of contractible measures.

B. How Often and When are Contracts Renegotiated?

Table III presents evidence on the incidence of renegotiation for a subsample of 852 loans.⁸ The first row reveals that over 75% of our contracts are renegotiated before their stated maturity. This high frequency of renegotiations creates a fairly substantial wedge between the average *stated* and *effective* maturities. Specifically, the average stated maturity of our loans is 1,200 days. However, the average effective maturity, which is defined as the number of days between origination and the earlier of renegotiation or maturity, is 530 days. (The effective maturity for loans that mature is equal to the stated maturity.) The relative duration, which is measured as the effective maturity divided by the stated maturity, is 0.57. (The relative duration for a loan that matures is 1.) This measure reveals when renegotiation tends to occur during the stated life of the contract. Thus, the average loan is renegotiated just over halfway through the stated duration of the loan.

Table III also presents the distribution of renegotiations over relative duration. Conditional on being renegotiated, the large majority of renegotiations occur well before the

⁸ To ease the interpretation of the renegotiation results in Table III, 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 modeling below, we reincorporate these observations and appropriately address this censoring problem.

stated maturity. Only 6% of the observed renegotiations take place when the relative duration is greater than 90% or, equivalently, when only 10% of the original maturity remains on the contract. Instead, the bulk of renegotiations take place when the relative duration is between 10% and 75%. For example, more than one quarter of renegotiated contracts are renegotiated when only 10% to 25% of the stated maturity term has passed. This distribution suggests that few, if any, of our renegotiations correspond to a roll-over of existing debt.

C. What are the Outcomes of Renegotiation?

The results in Table III show that the most common renegotiation outcomes are (1) a maturity extension and (2) an increase in the loan amount. Interest spreads are modified, either increased or decreased, in just over 40% of the contracts. Despite the high frequency of renegotiations, only 8.6% of renegotiations result in a change of lender (or lead arranger). This result is particularly interesting given a fairly competitive lending market and relatively low search costs. Thus, relationships and reputational capital likely play an important role in the renegotiation process (Diamond (1984), Ramakrishnan and Thakor (1984)). This finding also suggests that contracting parties are, to a certain extent, “locked-in” with one another once a relationship begins. This suggests that ex ante relationship-specific investments are an important component of corporate lending environments, consistent with theoretical models by Rajan (1992) and Rajan and Winton (1995).

The bottom of Table III breaks out renegotiation outcomes into six mutually exclusive groups. 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 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.

We recognize that the borrower favorable/unfavorable classifications are, to some extent, 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 more favorable terms for the borrower; 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 relationships.

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. Almost 12% of contracts are renegotiated in a manner that is unfavorable to the borrower, and almost 14% are renegotiated to decrease the amount of the loan.

In sum, Tables II and III show that ex post renegotiation is quite common even in an environment where sophisticated contracting parties employ a broad spectrum of contingencies. In fact, each contract in our sample almost always contains a number of additional contingencies, beyond those presented in Table II, such as contingencies for changes in control, accounting rules, capital structure, and investment (Nini, Smith, and Sufi (2007)). Simply put, borrowers and lenders leave relatively little unspecified by the contract, which suggests that the notion of strategic ambiguity (Bernheim and Whinston (1998)) may be less relevant in this contracting environment. Yet, despite the pervasiveness of contingencies in these contracts, frequent and early renegotiation leads to an average effective maturity that is less than half the average stated maturity.

D. What are the Implications of Renegotiation for Theories of Debt Maturity?

Table III suggests that renegotiation leads to a substantial wedge between effective and stated maturity. Table IV begins our examination of the implications of this result for research on debt maturity. It relates contingencies and renegotiation to stated maturity by presenting averages for four samples of loans stratified by stated maturity. As is evident from the table, pricing grids, borrowing bases, and financial covenants on cash flow are all positively correlated with the stated maturity of the loan. Loans with a stated maturity of more than five years are almost 20 percentage points more likely to have a pricing grid. In particular, pricing grids on measures of

cash flow are very strongly correlated with the stated maturity of the loan. Borrowing bases are more likely on loans between 1 and 5 years in maturity, but loans with a stated maturity of more than 5 years are not more likely to have a borrowing base.

In addition to being more contingent, contracts with longer stated maturities are also significantly more likely to be renegotiated. Loans with a stated maturity of over 5 years are almost all renegotiated before maturity, whereas loans with a stated maturity of less than 1 year are only renegotiated 27% of the time. This positive correlation between stated maturity and renegotiation leads to a relatively flat relation between stated maturity and effective maturity. For example, long-term loans with stated maturities in excess of five years have an average stated maturity that is 1,601 days longer than short-term loans with a stated maturity of less than one year. However, the difference in the effective maturities between these two groups of loans is only 355 days.

In terms of the types of renegotiations, longer term contracts are more likely to experience a borrower-favorable renegotiation, an amount increasing renegotiation, or a borrower unfavorable renegotiation. It is particularly noteworthy that long term contracts experience a borrower unfavorable renegotiation more than twice as often as short term contracts. This finding is particularly relevant in the context of debt maturity theories since it suggests that long-term contracts may not provide complete protection against liquidity risk or adverse changes to the contract. Finally, changes limited to the maturity of the contract – extensions and reductions – show no relation to the stated maturity.

In Table V, we show that renegotiation has important implications for empirical research on the relationship between debt maturity and credit quality. For example, Scherr and Hulburt (2001) and Berger, et al (2005) examine the stated maturity of bank loan contracts and find an inverted “U-shaped” pattern: high and low credit quality borrowers have loans with a short stated maturity and intermediate borrowers have loans with a long stated maturity. The first row of Table V documents a similar finding in our sample for firms with a credit rating from Moody’s at the time of origination.⁹

The interpretation of this nonmonotonic relation between credit quality and stated maturity is that borrowers of intermediate credit quality reduce the risk of inefficient liquidation

⁹ In unreported results, we expand the analysis in Table IV to the full sample by estimating credit scores using a regression relating credit ratings to leverage, cash flow, cash flow variance, market to book, and cash holdings. Results using the estimated credit scores for the full sample are similar and are available upon request.

by borrowing long term, consistent with the central hypothesis in Diamond (1991). However, Table V suggests that longer-term contracts obtained by intermediate credit quality borrowers do not completely protect against changes in loan terms. While intermediate credit quality borrowers are slightly less likely to have pricing grids, they are more likely to have borrowing bases and financial covenants on cash flow. More importantly, intermediate credit quality borrowers are more likely to have their contracts renegotiated. In fact, when one examines the effective maturity of loans, the non-monotonic relationship between credit quality and maturity almost completely disappears. As the last row demonstrates, borrowers in the middle of the credit quality distribution are much more likely to experience an unfavorable renegotiation.

These findings suggest that long-term contracts to intermediate credit quality borrowers do not completely protect against changes in the terms of the contract going forward. In fact, intermediate credit quality borrowers with longer term contracts are significantly more likely to experience an unfavorable renegotiation. More generally, these findings also suggest that researchers should interpret the stated maturity of debt agreements with caution. Renegotiation and contingencies can make the effective maturity of debt agreements significantly shorter than the stated maturity, and this has economically important implications.¹⁰

While informative, these results also raise a number of questions. For example, what determines renegotiation and the different outcomes of renegotiation? Also, how do contracting parties use ex ante contingencies to reduce the negative effect of ex post renegotiation on relationship-specific investments (Hart and Moore (1988), Aghion, Dewatripont, and Rey (1994), Hart and Moore (1998))? In other words, do contracting parties use ex ante contingencies to reduce ex post renegotiation and its resulting negative effects on ex ante relationship-specific investments? Or, alternatively, do contracting parties use contingencies to shape renegotiation outcomes by affecting when renegotiation occurs and by appropriately allocating bargaining power once they do occur? The next section investigates these questions.

III. The Determinants of Renegotiation

A. An Empirical Model of Renegotiation

¹⁰ These findings suggest that any bank debt, regardless of the stated maturity of the loan, corresponds to short-term debt in the models of Flannery (1986) and Diamond (1991, 1993). In contrast, long-term bonds, which are in general less renegotiable, correspond more accurately to long-term debt in their models.

This subsection develops our empirical model of the bargaining game occurring in renegotiation. While our approach is ultimately reduced form in its implementation, the motivation for our approach is couched in the notion that both parties to a contract seek to maximize total surplus at each point in time.¹¹ Define the total surplus as

$$Total\ Surplus = U_{ltj} = U(Z_{ltj}),$$

where $l=1, \dots, L$ indexes the loans in our sample, $t=0, \dots, t$ indexes the quarters during which the loan is active, and $j=1, \dots, J$ indexes the outcomes of renegotiation. The outcomes of renegotiation include any and all changes to the terms of the contract, as well as no changes to the contract terms. That is, the decision not to renegotiate is simply another potential outcome where the parties decide that altering the terms of the contract does not lead to a Pareto improvement.

The function argument Z corresponds to a vector of characteristics relevant for the surplus maximization problem. For example, Z may include characteristics of the borrower or features of the contract. It may also include characteristics unique to each possible outcome, j , such as implied costs. The point is that Z encompasses all factors relevant for the contracting parties to make the decision of what action to take. Thus, parties will deterministically choose the outcome j where total surplus is highest, or

$$U_{ltj} > U_{lti}, \forall j = 1, \dots, J, j \neq i.$$

Of course, the econometrician does not observe all of the characteristics in Z , only a subset that we will denote by the vector X . This incomplete observation introduces an unobserved component into the surplus function, which may be written as:

$$U_{ltj} = V(X_{lt}, \beta_j) + \varepsilon_{ltj}. \quad (1)$$

There are several features to note about this specification. First, the observable characteristics are specific only to contract-quarters (lt) and not alternatives, j . To account for alternative specific costs and benefits of each outcome, we allow the parameters, β , to be alternative-specific. That is, the sensitivity of different renegotiation outcomes to various determinants varies by alternative. Second, from the perspective of the econometrician the outcome of renegotiation is uncertain because of the presence of ε .

¹¹ To be precise, this maximization of surplus is subject to any resource constraints. For example, the Pareto efficient frontier may be infeasible if borrowers are subject to credit constraints.

Finally, since total surplus, U , is unobservable, we must define the observable choice function as:

$$Y_{it} = j \text{ if } \left(V(X_{it}, \beta_j) + \varepsilon_{itj} \right) > \left(V(X_{it}, \beta_i) + \varepsilon_{iti} \right), \forall j = 1, \dots, J, j \neq i. \quad (2)$$

Equation (2) enables us to define the choice probabilities as

$$\Pr(Y_{it} = j) = F\left(\varepsilon_{iti} - \varepsilon_{itj} < V(X_{it}, \beta_j) - V(X_{it}, \beta_i); \forall j = 1, \dots, J, j \neq i\right), \quad (3)$$

where F is a proper distribution function coinciding with the joint distribution of the alternative specific unobserved components, ε_{itj} . The remainder of this section will investigate which determinants matter for renegotiation and how they matter by estimating the unknown parameters, β_j , via maximum likelihood.

B. The Determinants of Renegotiation

To ease the presentation and discussion of our findings, we categorize the determinants into two groups: (1) borrower, loan, and lender characteristics known at the time of loan origination (ex ante determinants), and (2) borrower characteristics known after origination but before renegotiation (ex post determinants).

B.1 Ex Ante Determinants of Renegotiation

In this sub-section, we examine how borrower, loan, and lender characteristics known *at the time of loan origination* impact the likelihood of renegotiation and its outcomes. We begin by looking at the dichotomous choice to renegotiate or not. Since these factors are static and the choice set is limited to two outcomes, our empirical model in equation (3) can be implemented as a cross-sectional probit regression.¹² That is, we model the choice probability as

$$\Pr(Y_{it} = j) = \Phi(X_i \beta), j \in \{0, 1\} \quad (4)$$

where Φ is the standard normal probability distribution, and $j=1$ (0) corresponds to a loan that is (is not) renegotiated before the stated maturity. All firm characteristics included in the vector of determinants are measured in the quarter prior to the quarter in which the loan is originated.

Column 1 of Table VI presents the maximum likelihood estimates of the marginal effects evaluated at the mean vector, and corresponding standard errors which account for within firm

¹² In unreported analysis we estimate a linear probability model and logit model, both of which produce qualitatively similar results.

dependence (i.e., clustered adjusted within firm). Consistent with Table IV, the stated maturity of a loan is strongly positively correlated with the likelihood of renegotiation. The coefficient estimate implies that a doubling of the stated maturity of the loan increases the likelihood of renegotiation by 30 percentage points. The only other characteristic that influences the probability of renegotiation in a statistically significant direction is whether the loan agreement has a financial covenant on cash flow. Inclusion of a financial covenant on cash flow increases the likelihood of ex post renegotiation by 20 percentage points.

Perhaps as important as what does predict renegotiation is what does *not* predict renegotiation. None of the firm characteristics have a strong effect on the incidence of renegotiation, suggesting that the ex ante contract does a good job of accounting for observable characteristics. Interestingly, neither the existence of a pricing grid or a borrowing base makes renegotiation less likely. In fact, given the small standard error of the estimate, we can reject at the 5% level the hypothesis that the pricing grid or borrowing base reduces the probability of renegotiation by 10 percentage points. In other words, we find no evidence that the presence of ex ante contingencies reduce (or increase) the likelihood of renegotiation. Similarly, none of the other loan terms are statistically significant at the 5% level. Finally, the number of lenders in the syndicate has a marginally significant (6% level) *positive* effect on renegotiation.

This last result has two potential interpretations. First, it may be a consequence of an endogeneity problem whereby the size of the lending syndicate is structured as a function of the likelihood of renegotiation. In this case, our results suggest caution when interpreting previous empirical studies, many of which implicitly assume that syndicate size is random with respect to other contract features. Alternatively, this result may suggest that large syndicates simply do not make renegotiation more costly. Rather, lead arrangers can renegotiate most loan terms independent of the size of the syndicate.

In column 2, we report estimates from a Cox proportional hazards model relating the probability of renegotiation at time t , conditional on not having renegotiated prior to time t , as a fraction of the stated maturity (or the relative duration of the loan agreement). This variable is censored if the loan matures and declines to zero as the time to renegotiation declines. Consistent with the probit estimated marginal effects, financial covenants on cash flow and the stated maturity of the loan have a negative effect on the relative duration of the loan. That is, longer

term loans and loans with a financial covenant tend to get renegotiated earlier in the life of the loan.

We now examine how ex ante factors impact the outcomes of renegotiation. We do this by expanding the choice set from two outcomes to eight mutually exclusive outcomes: (1) the loan matures, (2) favorable renegotiation, (3) amount increasing renegotiation, (4) amount decreasing renegotiation, (5) unfavorable renegotiation, (6) maturity only renegotiation, (7) disappear from EDGAR before maturity, (8) loan still active at end of sample period. This expansion of the choice set necessitates that we turn to a multinomial implementation. Because of the difficulty in evaluating high dimensional integrals of the normal density, we employ a cross-sectional multinomial logit regression to estimate the alternative specific parameters, β_j . Specifically, we model the choice probability as:

$$\Pr(Y_l = j) = \frac{\exp(\beta_j X_l)}{\sum_{k=1}^{k=8} \exp(\beta_k X_l)}, \quad j = 1, \dots, 8. \quad (5)$$

For identification purposes, we restrict the coefficients for outcome (0), a loan that matures, to be equal to zero. The estimated coefficients from equation (5) can be used to compute log odds ratios of each outcome relative to the baseline outcome (or other outcomes). In turn, the log odds ratios can be used to assess how a change in a covariate x affects the probability of an outcome relative to the baseline. However, we caution against interpreting the parameter estimates in a manner analogous to linear or binomial specifications. The marginal effect of each coefficient is a complex function of the other parameters and covariates in the specification. Consequently, neither the magnitude nor the direction of the effect can be easily inferred from the estimated parameter estimates.

In light of this warning, Panel A of Table VII presents the coefficient estimates and their corresponding standard errors for a subsample of the renegotiation outcomes.¹³ While the parameter estimates by themselves are of limited value, the standard errors are useful for identifying precisely which covariates have a statistically meaningful effect on renegotiation

¹³ Only outcomes (1) through (4) are reported given space considerations. Less than 5% of contracts experience a maturity only renegotiation (outcome 5). In addition, exploring the reasons why borrowers exit the EDGAR data base is beyond the scope of this paper (outcome 6). To avoid any potential biases, loans with any of the 8 outcomes are included in the estimation, but we do not report their coefficient estimates.

outcomes. The coefficient estimates on stated maturity of the loan and the financial covenant on cash flow indicator variable are statistically significantly positive across all four outcomes.

In order to assess the direction and magnitudes of the statistically significant factors, we compute the predicted probabilities of each renegotiation outcome across the factors' distribution, holding all other determinants fixed at their means. These results are presented in Panel B of Table VII. As Panel B shows, the effect of having a longer term contract sharply increases the probability of all types of renegotiation. The effects on favorable, amount increasing, and unfavorable renegotiations are particularly strong. The likelihood of experiencing an unfavorable renegotiation for a loan contract with a maturity of less than one year is only 3%. The likelihood increases to over 12% for a contract with a maturity of over 5 years. Even after controlling for all other covariates, longer term contracts are much more likely to experience a borrower unfavorable renegotiation.

To summarize, the findings in Tables V and VI provide two insights into existing research. First, ex ante contingencies such as borrowing bases and pricing grids do not appear to be designed to reduce the probability of renegotiation. We find no evidence that contingencies make any type of renegotiation less likely. To the contrary, we find that covenants on cash flow make renegotiation more likely. Second, we find no evidence that the number of creditors in the original syndicate is associated with renegotiation. Instead, we find that the number of creditors is weakly positively correlated with the likelihood of renegotiation. Thus, the number of creditors is either jointly determined with the probability of renegotiation in a manner outside of our empirical model, or renegotiation costs simply are not significantly higher in larger lending syndicates.

B.2 Ex Post Determinants of Renegotiation

We now consider how the evolution of firm characteristics after the origination of the loan affects the likelihood of renegotiation. Theory (e.g., Hart and Moore (1998)) suggests that changes in factors determining debt repayment should affect the likelihood and outcome of renegotiation. As such, we begin with two figures to illustrate the dynamic relation between firm characteristics and renegotiation outcomes. Figures 1A and 1B present a “backward”-looking analysis of firm characteristics, where we condition on renegotiation outcomes and examine the evolution of firm characteristics in the 5 quarters leading up to that outcome. On the vertical axis,

firm characteristics at time t are measured as deviations from the same firm characteristic at the time of origination. The three outcomes are mature, favorable renegotiation, and unfavorable renegotiation. These outcomes occur at $t = 0$ in the figures. As Figure 1A demonstrates, firms with contracts that mature without being renegotiated at $t = 0$ experience almost no change in their cash flow in the 5 quarters before the contract matures. In contrast, borrowers with contracts that are unfavorably renegotiated at $t = 0$ have a sharp deterioration in cash flow leading up to the renegotiation. In addition, borrowers with contracts that are favorably renegotiated experience a sharp increase in cash flow prior to renegotiation.

Figure 1B examines asset growth. Borrowers with contracts that are renegotiated at $t = 0$ experience more asset growth prior to renegotiation than contracts that mature at $t = 0$, which is reflected in the higher asset deviation for unfavorable and favorable renegotiations at $t = -5$. However, only borrowers that experience favorable renegotiations experience strong asset growth between $t = -5$ and renegotiation at $t = 0$. In conjunction with Figure 1A, these results hint at the importance of cash flow and asset growth in influencing not only the likelihood of renegotiation but also the outcome.

In Figures 2 and 3, we examine the cyclicity of renegotiations. These figures are motivated by two sources. First, several recent studies suggest that fluctuations in the supply of capital impact corporate financial policy (e.g., Faulkender and Petersen (2006), Sufi (2007), Leary (2007), and Lemmon and Roberts (2007)). One potential channel through which this affect may occur is via renegotiation of existing debt contracts. Second, the financial press is littered with anecdotal evidence of lenders pointing to the importance of access to capital for credit terms. Thus, there is reason to believe that changes in the business, or credit, cycle may influence the outcome of renegotiations by altering the relative bargaining power of the contracting parties.

Figure 2 graphs the fraction of active contracts that are renegotiated in each year of our sample. Throughout the sample period, between 20% and 35% of active contracts are renegotiated every year, with a clear upward trend since 2002. Focusing on the different renegotiation outcomes, we see that there is a spike in the fraction of unfavorable and amount decreasing renegotiations during the recession of 2001. In contrast, the fraction of favorable and amount increasing renegotiations drops during the recession, but increases sharply during the expansion in 2004 and 2005, mimicking the general patten in renegotiations as a whole.

Figures 3A and 3B split these two categories into sub-categories. Figure 3A demonstrates that borrower favorable renegotiations experience a sharp increase in 2004 and 2005. Before 2003, the fraction of active contracts that experience a borrower-favorable renegotiation is never above 6%. By 2004, over 14% of contracts experience a borrower-favorable renegotiation. Figure 3B shows a similarly sharp increase in borrower-unfavorable renegotiations during the recession of 2001. More than 10% of contracts experience a borrower-unfavorable renegotiation during the recession – a near doubling in unfavorable outcomes relative to most other years.

Figures 1 through 3 suggest that cash flow, asset growth, and the business cycle potentially play an important role in driving renegotiation and its outcomes. We say potentially at this point because it is unclear to what extent these patterns are an artifact of one another, or of other confounding influences. For example, one could imagine that the cyclicity of renegotiation outcomes is, at least in part, an artifact of the cyclicity in earnings. To tease out the marginal effects, we now turn back to our empirical model, which we extend by incorporating a time dimension.

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

$$\Pr(Y_{it} = j) = \frac{\exp(\beta_{j0}X_{it} + \beta_{j1}X_{it-1})}{\sum_{k=1}^{k=8} \exp(\beta_{k0}X_{it} + \beta_{k1}X_{it-1})}, \quad j = 1, \dots, 8. \quad (6)$$

There are several changes relative to the model in equation (5) worth noting. First, the inclusion of the t subscript indicates that each observation is now a contract-quarter, as opposed to a contract. As such, we will be using the full contract-quarter panel dataset for estimation. In each quarter, contract l can experience one of the 8 outcomes, as discussed earlier in the context of equation (5). We also continue to restrict the parameters corresponding to outcome (0), loan matures, to be equal to zero for identification purposes.

We also divide the determinants into static, X_{it} , and dynamic, X_{it-1} , covariates. The former determinants are identical to those examined in the previous subsection. The latter determinants contain three sets of time-varying variables. The first set includes changes in firm characteristics as of the beginning of each quarter in the life of the loan. More precisely, each firm characteristic is measured as the deviation from the same firm characteristic at the time of origination. For example, if 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 $t = 0$, then the leverage ratio deviation x_{i5} would be measured as 0.10. These variables are proxies for the revelation of new information during the course of the contract. The second set of variables includes year indicator variables to examine cyclical trends in renegotiations. The final set includes linear and quadratic control variables for the number of quarters until stated maturity. These last set of control variables attempts to account for the fact that the maximum number of quarters before one of the outcomes is realized is fixed in the original contract.

In Table VIII, we present coefficient estimates from a baseline specification. To ease the presentation, we suppress the results corresponding to the static determinants, which are similar to those found earlier in Table VII. Again, while suggestive, we caution against a literal interpretation of the magnitude or even sign of these estimates. We investigate both the direction and magnitude of the marginal effects below. However, the results are useful for identifying the statistical significance of each factor. In particular, we see that several factors appear to play a statistically important role in shaping the outcome of renegotiation. Changes in cash flow, assets growth, market-to-book and macroeconomic factors are all highly statistically significant in the specification, albeit in different combinations of renegotiation outcomes. We also observe that, even after controlling for changes in the credit quality, a number of the year indicator variables are highly statistically significant.

Table IX presents estimates from a similar specification, which includes a covenant violation indicator variable. We see that 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 (2007b)). These findings also suggests that covenant violations are critical to providing creditors the ability to change contract terms (Chava and Roberts (2007) and Roberts and Sufi (2007)).

In Table X, we assess the economic magnitudes and confirm the direction of each affect on the different outcomes of renegotiation. More specifically, Table X reports predicted probabilities across the distribution of each significant covariate found in Table IX, holding all other covariates at their mean values. For comparison, the first row of the table presents the mean predicted probabilities of each type of renegotiation. Even though 75% of loans are renegotiated

at some point during their tenure, the probability of renegotiating in a given *quarter* is small. Borrowers have a 2.3% likelihood of a favorable renegotiation, and a 1.6% likelihood of an unfavorable renegotiation in any particular quarter.

Cash flow changes are strongly positively correlated with favorable renegotiation outcomes. Moving from the middle of the cash flow deviation distribution (25th to 75th percentile) to the 90th percentile almost doubles the likelihood of a favorable renegotiation. On the other hand, cash flow changes are also strongly *negatively* correlated with unfavorable renegotiation outcomes. Moving from the middle of the distribution to the 10th percentile increases the probability of an unfavorable renegotiation by almost 300%. These results imply that the probabilities of favorable and unfavorable outcomes are especially sensitive to changes in the borrower's cash flow, even after controlling for ex ante characteristics and ex post changes in other variables.

The second and third panels examine the effect of changes in investment opportunities, as measured by the market-to-book ratio and asset growth, on renegotiation. We see that the market-to-book ratio exhibits a strong negative correlation with unfavorable outcomes, while asset growth is strongly positively correlated with favorable and amount increasing outcomes. The effect of asset growth on amount increasing renegotiations is particularly strong: moving from the middle of the distribution to the 90th percentile increases the probability of an amount increasing renegotiation by more than 3 times. These results highlight the different roles that contemporaneous and future growth opportunities have on renegotiation. We see that current asset growth often leads to additional funds and better lending terms. However, growth in future investment possibilities does not lead to favorable renegotiations. These results suggest that lenders value pledge-able assets more than the expectation of future growth opportunities.

The fourth panel examines the predicted probability of different renegotiations across years. Borrower favorable renegotiations show a very strong cyclical pattern, even after controlling for changes in firm characteristics such as cash flow, asset growth, leverage, and market to book ratios. Relative to the recession of 2001, a borrower favorable renegotiation is more than seven times more likely to occur in 2004. Borrower unfavorable renegotiations also show a strong cyclical pattern. Relative to the recession of 2001, a borrower unfavorable renegotiation is much less likely in both 1998 and 2005. These findings suggest that liquidity in the syndicated loan market has a strong influence on renegotiation outcomes, even after

controlling for firm characteristics. In the final panel, we examine the effect of covenant violations on the probability of renegotiation. Firms that violate financial covenants are much more likely to experience an amount decreasing or unfavorable renegotiation.

In total, the results in Table X 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, Table X demonstrates that deviations in cash flow are a strong predictor of renegotiation. This finding suggests that 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 likely 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 may not be able to precisely 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? We turn to this question in the next section.

C. How Do Ex Ante Contingencies Affect Ex Post Renegotiation?

Recall that the results presented in Section II.A show that almost none of the *ex ante* contract characteristics predict renegotiation outcomes. This result appears to contradict 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 cash flow, 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 equation (6) of the previous section but for one change: the inclusion of interaction terms between contract characteristics and the deviation in cash flow. We focus on the deviation in cash flow for two reasons. First, as Table II demonstrates, cash flow is one of the most contracted upon outcomes in initial contracts. Second, as Table X demonstrates, the deviation in cash flow is one of the strongest predictors of renegotiations.

Table XI presents the coefficient estimates of four specifications differing only in the interaction term. We focus on the statistical significance and direction of the estimates, which is confirmed in unreported predicted probability analysis similar to that found Table X. Each specification includes an interaction term of the deviation in cash flow with a different ex ante contract characteristic. For space considerations, we report only coefficients on the favorable and unfavorable outcomes. Consistent with the evidence in Table VII that larger syndicates do not make renegotiation more costly, loans with larger syndicates do not show less sensitivity of renegotiations to changes in cash flow. Similarly, contracts with longer maturity are not more or less likely to be renegotiated for a given change in cash flow.

The last two specifications in Table XI examine whether loans with an explicit pricing grid or financial covenant on cash flow are more sensitive to changes in cash flow. These specifications are motivated by the idea that ex ante contingencies may be designed to reduce the probability of renegotiation. The evidence directly contradicts this argument. Negative deviations in cash flow for contracts without a pricing grid do not affect the probability of an unfavorable renegotiation. In contrast, contracts with a pricing grid are much more likely to be unfavorably renegotiated for a negative deviation in cash flow. We find a similar result for positive deviations in cash flow when examining whether the ex ante contract has a covenant on cash flow. The estimates in row (4) show that positive deviations in cash flow only lead to favorable renegotiation for contracts which contain a covenant on cash flow.

To assess the economic magnitude of this last set of results, Figure 4 shows the predicted probabilities of an unfavorable renegotiation across the cash flow deviation distribution, stratified by whether the initial contract contains a pricing grid. The solid black line shows that contracts with a pricing grid are much more likely to be unfavorably renegotiated for negative deviations in cash flow. For example, borrowers that move from the median to the 10th percentile in the cash flow deviation distribution are 7 percentage points more likely to experience an

unfavorable renegotiation. The increase in the likelihood for borrower without a pricing grid is less than 1 percentage point.

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 cash flow if the contract contains a contingency on cash flow. These findings suggest that 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) and Rajan and Winton (1995)). The intuition of this result is perhaps best explained by way of a simple example.

Suppose that the future project quality of a borrower is observable but non-contractible, and banks cannot commit to not holding up borrowers who have good projects in the future. This discourages the manager from putting in effort (Rajan (1992)). A pricing grid on cash flow can help mitigate this problem if having good projects in the future is correlated with cash flow. The pricing grid reduces the interest rate in the original contract when the borrower has a good project, which improves the borrower's bargaining power in renegotiation. The contingency accomplishes this by altering the default option should renegotiation break down. Specifically, the borrower is left with a lower interest rate on the loan as a result of the pricing grid. As a result, the borrower puts in more effort up front knowing that the ex post hold up problem is mitigated by the presence of the contingency.

IV. Conclusion

This study shows empirically that contingency and renegotiation are integral elements of financial contracts. Almost every private credit agreement employs a variety of contingencies that dynamically alter the nature of the lending relationship. Major terms of the loan—interest rates, principal, and decision rights—are explicitly tied to verifiable accounting benchmarks and credit ratings via pricing grids, borrowing bases, and financial covenants. Our results document that borrowers and lenders take significant strides towards accounting for future contingencies in the ex ante contract.

However, even with the presence of these contingencies, we find that the large majority of these contracts are ultimately renegotiated before their stated maturities. The revelation of new information during the course of the contracting relationship leads borrower and lenders to make material changes to several features of the original contract. In particular, changes in credit quality, asset growth, and investment opportunities play a key role in determining the likelihood of renegotiation, as well as the outcome. Further, the macroeconomic environment plays an instrumental role in shaping renegotiation, as well. These findings have important implications for research on debt maturity, the effect of supply on corporate capital structure, and the optimal number of lenders.

In addition, our results have important implications for research on incomplete contracts and renegotiation. 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 through their effect on renegotiation default outcomes 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, how do parties determine which contract features to alter during renegotiation? What are the ex ante and ex post efficiency implications of renegotiation? We look forward to future research that addresses these questions.

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Table I
Summary Statistics

This table presents borrower and deal summary statistics for a random sample of 1,000 private credit agreements between financial institutions and U.S. publicly traded companies during the period 1996 to 2005. Borrower characteristics are averages across the four quarters prior to the deal origination date.

	Mean	St. Dev.
<i>Borrower characteristics</i>		
Assets (\$Million)	2927	6567
Debt/assets	0.303	0.193
EBITDA/assets, quarterly	0.036	0.026
Market to book ratio	1.771	1.085
EBITDA variance	0.019	0.020
<i>Deal characteristics</i>		
Amount (\$Million)	450	1122
Amount/assets	0.334	0.302
Spread over LIBOR	162	114
Number of lenders	8.603	8.187
Term loan in deal	0.262	0.440
Stated maturity, days	1217	643

Table II
Contract Contingencies

This table presents contract contingencies for the our sample of 1,000 private credit agreements.

	Mean	St. Dev.
<i>Contingencies</i>		
Price grid	0.726	0.446
Any cash flow	0.367	0.482
Debt to cash flow	0.340	0.474
Coverage ratio	0.026	0.159
Cash flow only	0.001	0.032
Credit rating	0.232	0.422
Balance sheet measure	0.049	0.216
Leverage ratio	0.037	0.189
Debt to net worth	0.011	0.104
Other	0.078	0.268
Borrowing base	0.194	0.396
Accounts receivable	0.166	0.372
Inventories	0.134	0.341
Other	0.036	0.186
Financial covenant	0.953	0.212
Any cash flow	0.826	0.379
Debt to cash flow	0.556	0.497
Coverage ratio	0.733	0.443
Cash flow only	0.118	0.323
Any net worth	0.449	0.498
Net worth	0.247	0.431
Tangible net worth	0.195	0.396
Stockholders equity	0.008	0.089
Any balance sheet	0.318	0.466
Debt/capitalization	0.223	0.416
Debt/net worth	0.079	0.270
Other balance sheet	0.024	0.153
Liquidity measure	0.141	0.348
Current ratio	0.084	0.278
Quick ratio	0.020	0.140
Working capital	0.008	0.089
Other liquidity	0.038	0.191

Table III
Contract Renegotiations

This table presents summary statistics for 852 of the 1,000 contracts that either mature or are renegotiated during the period 1996 through the first quarter of 2007. Contracts to borrowers that either disappear from the Edgar data base (96) or that are still active at the end of the first quarter of 2007 (52) are excluded. Effective maturity is the number of days from the loan origination date to the earliest of either the date of renegotiation or the stated maturity date. A borrower favorable renegotiation is an outcome that increases the amount of the loan and does not increase the interest spread, or decreases interest spread and does not decrease the amount. A borrower unfavorable renegotiation is a renegotiation that decreases the amount and does not decrease the interest spread, or increases the interest spread and does not increase the amount.

	Mean	St. Dev.
Contract renegotiated before maturity	0.757	0.429
<i>Stated and effective maturity</i>		
Stated maturity (days)	1158	639
Effective maturity (days)	530	374
Relative Duration (Effective Maturity / Stated Maturity)	0.573	0.338
<i>Conditional on being renegotiated</i>		
Relative duration 0 to 10%	0.076	0.265
Relative duration 10 to 25%	0.253	0.435
Relative duration 25 to 50%	0.287	0.453
Relative duration 50 to 75%	0.205	0.404
Relative duration 75 to 90%	0.122	0.328
Relative duration 90 to 100%	0.057	0.233
<i>Renegotiations</i>		
Amount increased	0.424	0.494
Amount decreased	0.221	0.415
Interest spread increased	0.222	0.416
Interest spread decreased	0.196	0.397
Maturity lengthened	0.431	0.495
Maturity shortened	0.090	0.287
Switch lead arranger	0.086	0.280
<i>Mutually exclusive renegotiation categories</i>		
Borrower favorable	0.215	0.411
Amount increased, not favorable	0.255	0.436
Amount increased, spread increased	0.122	0.328
Amount increased, spread change ambiguous	0.133	0.339
Amount decreased, not unfavorable	0.137	0.344
Amount decreased, spread decreased	0.036	0.187
Amount decreased, spread change ambiguous	0.060	0.237
Fraction of deal amount prepaid	0.009	0.097
Deal terminated	0.032	0.175
Borrower unfavorable	0.115	0.319
Maturity lengthened only	0.034	0.181
Maturity shortened only	0.001	0.034

Table IV
Stated Maturity, Contingency, and Renegotiation

This table presents empirical probabilities of contingencies and renegotiations across the distribution of the stated maturity of contracts. The sample includes the 852 contracts that either mature or are renegotiated by the first quarter of 2007.

Stated maturity:	Less than 1 year	1 year to 3 years	More than 3 years to 5 years	More than 5 years
	(1)	(2)	(3)	(4)
Price grid	0.634	0.616	0.779*	0.803*
Any cash flow measure	0.084	0.363*	0.465*	0.460*
Credit rating	0.485	0.095*	0.140*	0.239*
Balance sheet measure	0.045	0.063	0.050	0.042
Other	0.020	0.095*	0.124*	0.061*
 Borrowing base	 0.069	 0.353*	 0.278*	 0.097
 Financial covenant				
Any cash flow measure	0.683	0.832*	0.896*	0.848*
Any net worth measure	0.381	0.526*	0.525*	0.372
Any balance sheet ratio	0.475	0.358*	0.278*	0.230*
Liquidity measure	0.084	0.263*	0.181*	0.065
 Contract renegotiated before maturity	 0.268	 0.731*	 0.941*	 0.983*
Effective maturity, days	294	494*	627*	649*
Stated maturity, days	327	812*	1321*	1928*
Effective Maturity/Stated Maturity	0.901	0.639*	0.490*	0.341*
 Borrower favorable	 0.052*	 0.216*	 0.278*	 0.280*
Amount increased, not favorable	0.077	0.234*	0.306*	0.362*
Amount decreased, not unfavorable	0.093	0.123	0.149	0.172
Borrower unfavorable	0.021	0.111*	0.176*	0.129*
Maturity lengthened only	0.026	0.047	0.031	0.034
Maturity shortened only	0.000	0.000	0.000	0.004
 N	 202	 190	 299	 309

*Statistically distinct from the less than 1 year category at the 5 percent level.

Table V
Credit Quality, Contingency, and Effective Maturity

This table presents means of maturities, contingencies and renegotiations across the distribution of the credit quality of the borrower in the quarter before the contract origination. We isolate the sample to the 343 contracts to borrowers with a Moody's credit rating that either mature or are renegotiated by the first quarter of 2007.

Credit rating:	A or better	Baa	Ba	B	Caa or worse
Stated maturity, days	737	975*	1326*	1510*	1011*
364-day facility	0.463	0.388*	0.096*	0.015*	0.000*
Price grid	0.821	0.871	0.759	0.662*	0.222*
Any cash flow measure	0.015	0.043	0.349*	0.456*	0.000*
Credit rating	0.791	0.793	0.241*	0.029*	0.000*
Balance sheet measure	0.015	0.017	0.024	0.015	0.111
Other	0.000	0.017	0.145*	0.162*	0.111
Borrowing base	0.000	0.009	0.157*	0.265*	0.444*
Financial covenant					
Any cash flow measure	0.388	0.759*	0.952*	0.912*	0.444
Any net worth measure	0.284	0.267	0.494*	0.279	0.000
Any balance sheet ratio	0.597	0.474	0.373*	0.118*	0.000*
Liquidity measure	0.015	0.009	0.169*	0.191*	0.222
Effective maturity, days	443	532	502	565*	552
Contract renegotiated	0.507	0.647	0.831*	0.897*	0.556
Effective Maturity/Stated Maturity	0.763	0.683	0.482*	0.444*	0.650
Borrower favorable	0.134	0.233	0.301*	0.265	0.333
Amount increased, not favorable	0.209	0.164	0.241	0.309	0.000*
Amount decreased, not unfavorable	0.075	0.103	0.181*	0.162	0.222
Borrower unfavorable	0.000	0.078*	0.096*	0.147*	0.000
N	74	130	101	83	15

*Statistically distinct from the A or better at the 5 percent level.

Table VI
Ex Ante Characteristics and Ex Post Renegotiation

This table presents coefficient estimates relating ex post renegotiation to ex ante characteristics. Column 1 reports maximum likelihood estimated marginal effects from a probit model of renegotiation events. The dependent variable equals one if a contract is renegotiated before maturity and zero otherwise. All borrower characteristics are measured one quarter before prior to the loan origination. Column 2 reports estimates from an OLS specification relating the fraction of stated maturity remaining to ex ante characteristics. Specifications include year and 1-digit SIC indicator variables, and standard errors are clustered by borrower.

	(1) Renegotiated {0,1}	(2) Fraction remaining
Ln(assets)	-0.004 (0.014)	-0.014 (0.011)
Leverage ratio	0.040 (0.084)	-0.091 (0.047)
Market to book ratio	0.002 (0.014)	0.006 (0.009)
EBITDA/assets	-0.420 (0.581)	0.131 (0.424)
EBITDA variance	1.268 (0.668)	-0.773 (0.548)
Ln(stated maturity)	0.299** (0.026)	-0.257** (0.014)
Deal amount/assets	0.029 (0.064)	-0.114* (0.045)
Term loan in deal	0.032 (0.033)	-0.058* (0.024)
Ln(number of syndicate members)	0.041 (0.022)	0.014 (0.014)
Price grid	0.034 (0.032)	-0.000 (0.021)
Borrowing base	0.047 (0.031)	-0.010 (0.026)
Financial covenant on any cash flow	0.191** (0.048)	-0.077** (0.026)
Financial covenant on any net worth	0.020 (0.027)	-0.031 (0.019)
Financial covenant on balance sheet ratio	-0.019 (0.031)	0.016 (0.021)
Financial covenant on liquidity	-0.014 (0.043)	-0.012 (0.031)
N	852	852
Pseudo R ²	0.456	0.478

*,** statistically distinct from 0 at 5 and 1% level, respectively

Table VII
Ex Ante Characteristics and Ex Post Renegotiation Type
Panel A: Estimated Coefficients

This table presents coefficient estimates from a single multinomial logit specification relating ex post renegotiation types to ex ante characteristics. The baseline outcome is mature, and the alternative outcomes are disappear, censored, maturity altered only renegotiation, favorable renegotiation, amount increasing not favorable renegotiation, amount decreasing not unfavorable renegotiation, and unfavorable renegotiation. Panels A and B report coefficients for the last four outcomes only. The specification includes year and 1-digit SIC indicator variables. The standard errors are clustered by borrower.

Outcome:	(1) Favorable	(2) Amount increasing	(3) Amount decreasing	(4) Unfavorable
Ln(assets)	-0.084 (0.151)	-0.232 (0.160)	0.289* (0.148)	-0.139 (0.167)
Leverage ratio	0.632 (0.854)	1.537 (0.814)	-0.045 (0.927)	-0.907 (0.963)
Market to book ratio	-0.080 (0.170)	0.041 (0.143)	0.240 (0.160)	-0.471 (0.241)
EBITDA/assets	4.808 (6.522)	4.552 (5.605)	-16.674* (6.694)	-4.445 (6.291)
EBITDA variance	12.016 (6.804)	9.821 (6.944)	13.290* (6.530)	9.624 (8.288)
Ln(stated maturity)	2.804** (0.247)	2.523** (0.247)	2.254** (0.289)	2.723** (0.317)
Deal amount/assets	-1.263 (0.763)	-0.137 (0.632)	1.465* (0.618)	0.052 (0.629)
Term loan in deal	0.309 (0.389)	0.303 (0.387)	0.629 (0.388)	0.373 (0.415)
Ln(number of syndicate members)	0.305 (0.232)	0.330 (0.225)	0.229 (0.223)	0.483 (0.253)
Price grid	0.116 (0.312)	0.352 (0.315)	0.244 (0.335)	0.124 (0.355)
Borrowing base	0.403 (0.386)	0.088 (0.381)	0.702 (0.411)	-0.022 (0.442)
Financial covenant on any cash flow	1.100** (0.326)	1.265** (0.324)	1.585** (0.398)	1.410** (0.430)
Financial covenant on any net worth	0.037 (0.278)	-0.138 (0.277)	0.399 (0.315)	-0.051 (0.303)
Financial covenant on balance sheet	-0.347 (0.308)	-0.012 (0.297)	-0.029 (0.336)	-0.370 (0.338)
Financial covenant on liquidity	-0.309 (0.420)	-0.548 (0.436)	0.243 (0.498)	0.371 (0.445)
N	1000	Pseudo R ²		0.242

*,** statistically distinct from 0 at 5 and 1% level, respectively

Table VII
Ex Ante Characteristics and Ex Post Renegotiation Type

Panel B: Assessing Magnitudes

This table presents predicted probabilities across the distribution of variables that are statistically significant in explaining renegotiation outcomes. The predicted probabilities are estimated using coefficient estimates reported in Panel A.

	(1)	(2)	(3)	(4)
Outcome:	Favorable	Amount increasing	Amount decreasing	Unfavorable
Maturity category				
Less than 1 year	0.064**	0.084**	0.078**	0.029**
1 year to 3 years	0.160**	0.212**	0.144**	0.106**
More than 3 years to 5 years	0.259**	0.254**	0.130**	0.136**
More than 5 years	0.208**	0.288**	0.138**	0.123**
Financial covenant on any cash flow	0.191**	0.235**	0.133**	0.111**
No financial covenant on cash flow	0.132**	0.125**	0.077**	0.057**

*,** Underlying coefficients in Panel A statistically distinct from 0 at the 5 and 1%, respectively

Table VIII
Ex Post Determinants of Renegotiation, Without Covenant Violations

This table presents coefficient estimates from a single multinomial logit specification relating ex post renegotiation types to ex post characteristics. For each quarter, the baseline outcome is no renegotiation, and the alternative outcomes are disappear from Edgar, maturity only renegotiation, favorable renegotiation, amount increasing not favorable renegotiation, amount decreasing not unfavorable renegotiation, and unfavorable renegotiation. This table presents coefficient estimates for the last four outcomes only. Firm characteristics at the beginning of a given quarter are measured as deviations from the firm characteristic at the beginning of the quarter of origination of the deal. The specification includes all $t=0$ control variables listed in Table a linear and quadratic control variable for the number of quarters before stated maturity. Standard errors are clustered by borrower.

Outcome:	(1) Favorable	(2) Amount increasing	(3) Amount decreasing	(4) Unfavorable
EBITDA/assets deviation	21.796* (9.943)	-3.635 (5.175)	-10.901 (8.347)	-23.727** (8.442)
Leverage ratio deviation	1.007 (0.835)	1.224 (0.768)	-0.117 (0.889)	2.445 (1.266)
Ln(assets) deviation	1.787** (0.396)	1.439** (0.260)	0.460 (0.387)	-0.463 (0.401)
Market to book ratio deviation	-0.100 (0.179)	0.056 (0.106)	-0.225 (0.164)	-1.136** (0.338)
1996-1997 year indicator	1.798** (0.670)	0.951* (0.380)	0.421 (0.536)	-0.489 (0.587)
1998 year indicator	1.265 (0.658)	0.907** (0.325)	-0.266 (0.582)	-1.103* (0.558)
1999 year indicator	1.369* (0.602)	0.487 (0.331)	-0.325 (0.535)	-0.853 (0.466)
2000 year indicator	0.767 (0.629)	0.151 (0.349)	0.404 (0.405)	-0.640 (0.382)
2001 year indicator (omitted)				
2002 year indicator	0.151 (0.727)	-0.464 (0.419)	0.693 (0.413)	-0.716 (0.389)
2003 year indicator	1.393* (0.609)	-0.071 (0.381)	0.770 (0.446)	-0.626 (0.380)
2004 year indicator	2.267** (0.568)	0.113 (0.358)	0.387 (0.446)	-0.913 (0.470)
2005 year indicator	2.304** (0.582)	0.737* (0.341)	0.550 (0.480)	-1.397* (0.593)
# observations	5,812			
# contracts	944			
Pseudo R ²	0.121			

*,** statistically distinct from 0 at 5 and 1% level, respectively

Table IX
Ex Post Determinants of Renegotiation, With Covenant Violations

This table presents coefficient estimates from a single multinomial logit specification relating ex post renegotiation types to ex post characteristics. The specification is identical to the specification reported in Table VII, with the inclusion of a covenant violation indicator variable. For each quarter, the baseline outcome is no renegotiation, and the alternative outcomes are disappear from Edgar, maturity only renegotiation, favorable renegotiation, amount increasing not favorable renegotiation, amount decreasing not unfavorable renegotiation, and unfavorable renegotiation. This table only presents coefficient estimates for the last four of these outcomes. Firm characteristics in a given quarter are measured as deviations from the firm characteristic in the quarter prior to the origination of the deal. The specification includes a linear and quadratic control variable for the number of quarters before stated maturity. Standard errors are clustered by borrower.

Outcome:	(1) Favorable	(2) Amount increasing	(3) Amount decreasing	(4) Unfavorable
EBITDA/assets deviation	20.355* (10.117)	-2.621 (5.067)	-6.821 (8.154)	-14.298 (8.432)
Leverage ratio deviation	1.061 (0.833)	1.220 (0.766)	-0.124 (0.865)	2.594 (1.249)
Ln(assets) deviation	1.785** (0.397)	1.451** (0.260)	0.469 (0.392)	-0.590 (0.412)
Market to book ratio deviation	-0.103 (0.179)	0.055 (0.107)	-0.198 (0.160)	-1.073** (0.334)
Covenant violation in last year	-0.417 (0.383)	0.186 (0.235)	0.879** (0.296)	1.678** (0.273)
1996-1997 year indicator	1.785** (0.666)	0.950* (0.380)	0.425 (0.532)	-0.467 (0.589)
1998 year indicator	1.258 (0.656)	0.905** (0.325)	-0.318 (0.575)	-1.030 (0.546)
1999 year indicator	1.364* (0.602)	0.480 (0.330)	-0.368 (0.530)	-0.842 (0.452)
2000 year indicator	0.765 (0.628)	0.139 (0.350)	0.333 (0.396)	-0.808 (0.398)
2001 year indicator (omitted)				
2002 year indicator	0.161 (0.728)	-0.470 (0.420)	0.651 (0.415)	-0.894* (0.427)
2003 year indicator	1.400* (0.609)	-0.083 (0.381)	0.708 (0.454)	-0.762* (0.387)
2004 year indicator	2.264** (0.568)	0.106 (0.358)	0.363 (0.451)	-0.942* (0.461)
2005 year indicator	2.321** (0.585)	0.723* (0.340)	0.454 (0.484)	-1.668** (0.600)
# observations	5,812			
# contracts	944			
Pseudo R ²	0.129			

*,** statistically distinct from 0 at 5 and 1% level, respectively

Table X
Assessing Magnitudes

This table presents quarterly predicted probabilities across the distribution of variables that are statistically significant in explaining renegotiation outcomes. The quarterly predicted probabilities are estimated using coefficient estimates reported in Table VIII, with the exception of the covenant violation predicted probabilities, which are estimated using coefficient estimates from Table IX.

Outcome:	(1) Favorable	(2) Amount increasing	(3) Amount decreasing	(4) Unfavorable
Mean predicted probabilities	0.023	0.030	0.018	0.016
EBITDA/assets deviation:				
0-5 th percentile	0.011**	0.049	0.032	0.062**
5 th to 10 th percentile	0.017**	0.045	0.026	0.034**
10 th to 25 th percentile	0.023**	0.041	0.023	0.027**
25 th to 75 th percentile	0.023**	0.030	0.017	0.013**
75 th to 90 th percentile	0.029**	0.031	0.018	0.014**
90 th to 95 th percentile	0.041**	0.031	0.018	0.009**
95 th to 100 th percentile	0.050**	0.031	0.022	0.008**
Market to book ratio deviation:				
0-5 th percentile	0.018	0.033	0.034	0.023**
5 th to 10 th percentile	0.022	0.048	0.026	0.025**
10 th to 25 th percentile	0.024	0.041	0.021	0.023**
25 th to 75 th percentile	0.024	0.029	0.019	0.019**
75 th to 90 th percentile	0.031	0.031	0.017	0.013**
90 th to 95 th percentile	0.033	0.033	0.014	0.011**
95 th to 100 th percentile	0.037	0.040	0.014	0.006**
Ln(assets) deviation:				
0-5 th percentile	0.012**	0.011**	0.027	0.046
5 th to 10 th percentile	0.017**	0.016**	0.018	0.021
10 th to 25 th percentile	0.019**	0.021**	0.016	0.015
25 th to 75 th percentile	0.024**	0.026**	0.016	0.014
75 th to 90 th percentile	0.034**	0.046**	0.021	0.018
90 th to 95 th percentile	0.031**	0.063**	0.028	0.028
95 th to 100 th percentile	0.041**	0.091**	0.040	0.026
Year indicator variables				
1996-1997	0.016**	0.037*	0.016	0.008
1998	0.013	0.048**	0.010	0.008*
1999	0.019*	0.039	0.011	0.016
2000	0.014	0.031	0.025	0.020
2001 (Baseline year)	0.007	0.028	0.018	0.040
2002	0.006	0.014	0.029	0.021
2003	0.023*	0.020	0.023	0.017
2004	0.051**	0.023	0.014	0.010
2005	0.045**	0.038	0.016	0.006*
Covenant violation in last 4 quarters	0.014	0.032	0.039**	0.056**
No covenant violation in last 4 quarters	0.024	0.030	0.015**	0.011**

*,** Underlying coefficients in Table VIII statistically distinct from 0 at the 5 and 1%, respectively

Table XI
The Effect of Cash Flow Deviations on Renegotiation,
By Ex Ante Contract Characteristics

This table presents coefficient estimates from four separate multinomial logit specifications relating ex post renegotiation types to ex post deviations from cash flow interacted with ex ante contract characteristics. Each specification replicates the specification reported in Table IX, with the addition of the level (not reported) and the interaction term for the given ex ante contract characteristic. Standard errors are clustered by borrower.

Outcome:	(1) Favorable	(4) Unfavorable
<i>(1) Size of syndicate</i>		
EBITDA/assets deviation	21.345 (11.517)	-10.709 (8.903)
EBITDA/assets deviation*Syndicate size above median	-2.761 (15.850)	-12.426 (16.790)
<i>(2) Stated maturity</i>		
EBITDA/assets deviation	34.076* (14.409)	-32.376** (12.148)
EBITDA/assets deviation*Stated maturity>3 years	-19.051 (14.419)	15.363 (15.426)
<i>(3) Price grid on cash flow</i>		
EBITDA/assets deviation	16.947 (11.689)	-3.611 (9.811)
EBITDA/assets deviation*Price grid on any cash flow	14.094 (14.452)	-52.267** (16.956)
<i>(4) Financial covenant on cash flow</i>		
EBITDA/assets deviation	-18.967 (17.709)	7.300 (16.117)
EBITDA/assets deviation*Covenant on any cash flow	44.609** (17.382)	-25.097 (18.034)

*,** statistically distinct from 0 at 5 and 1% level, respectively

Figure 1A
EBITDA to assets ratio relative to pre-origination EBITDA to assets ratio

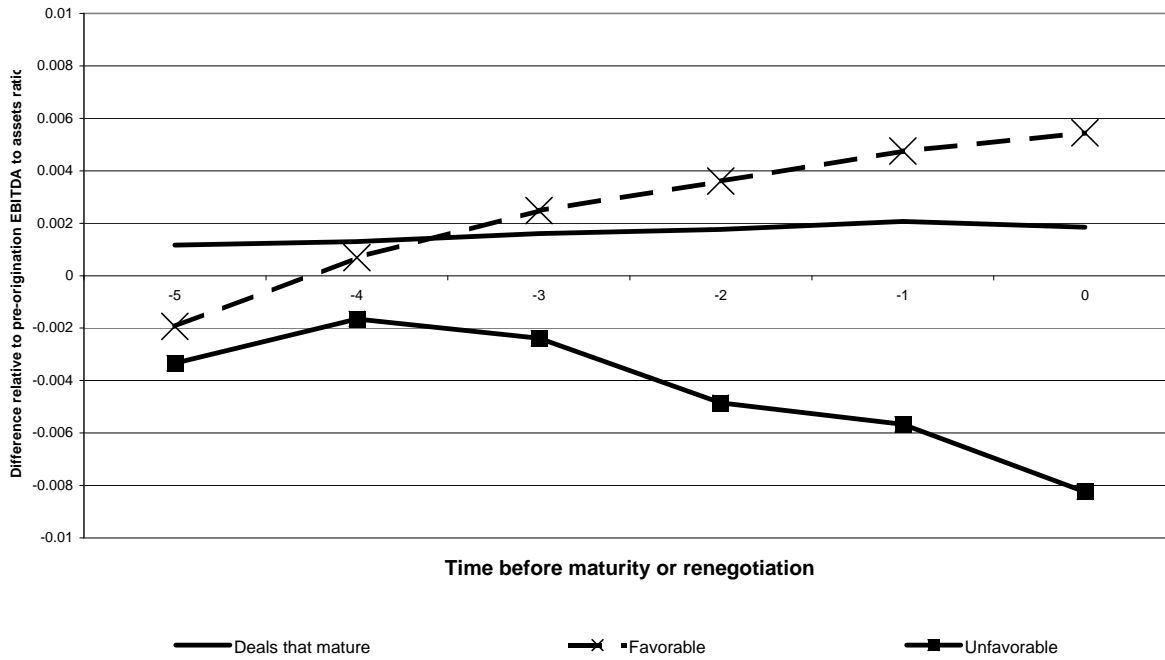


Figure 1B
Ln(assets) relative to pre-origination Ln(assets) ratio

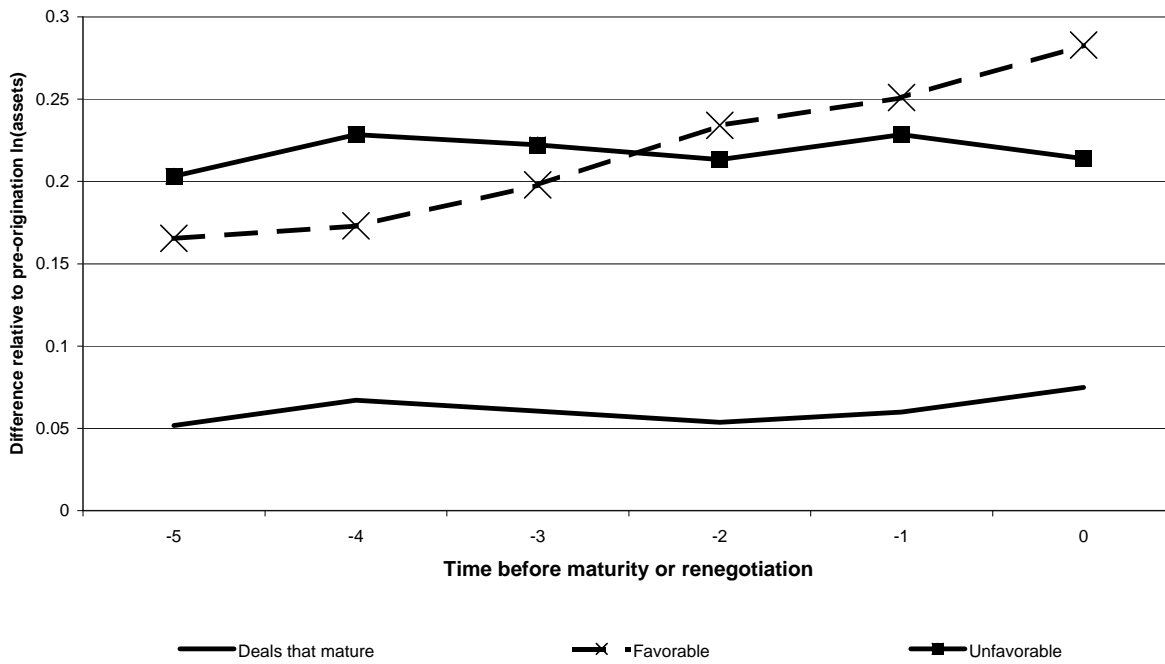


Figure 2
Fraction of Deals Renegotiated across Years

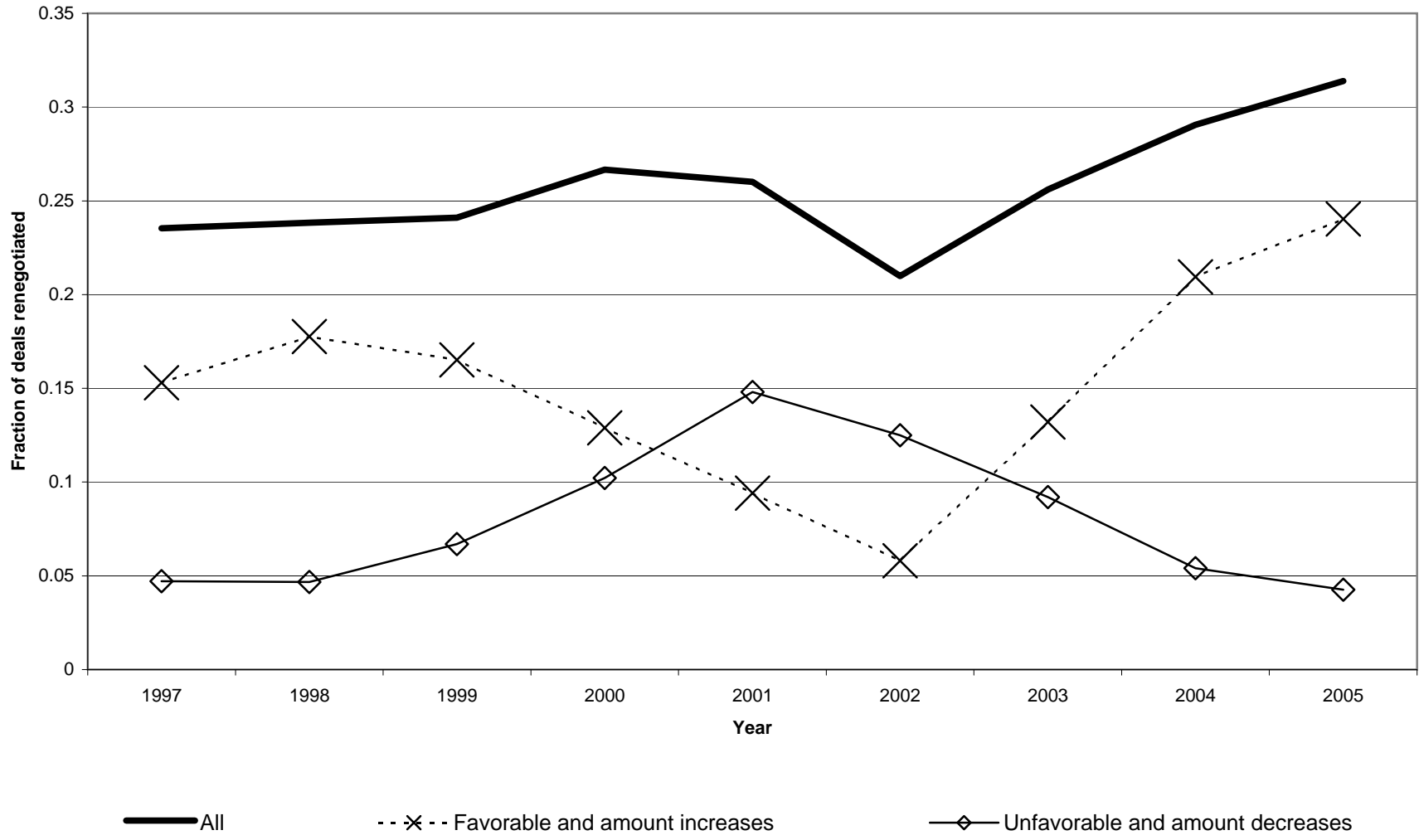


Figure 3A
Fraction of Deals Renegotiated across Years
Favorable and Amount Increases

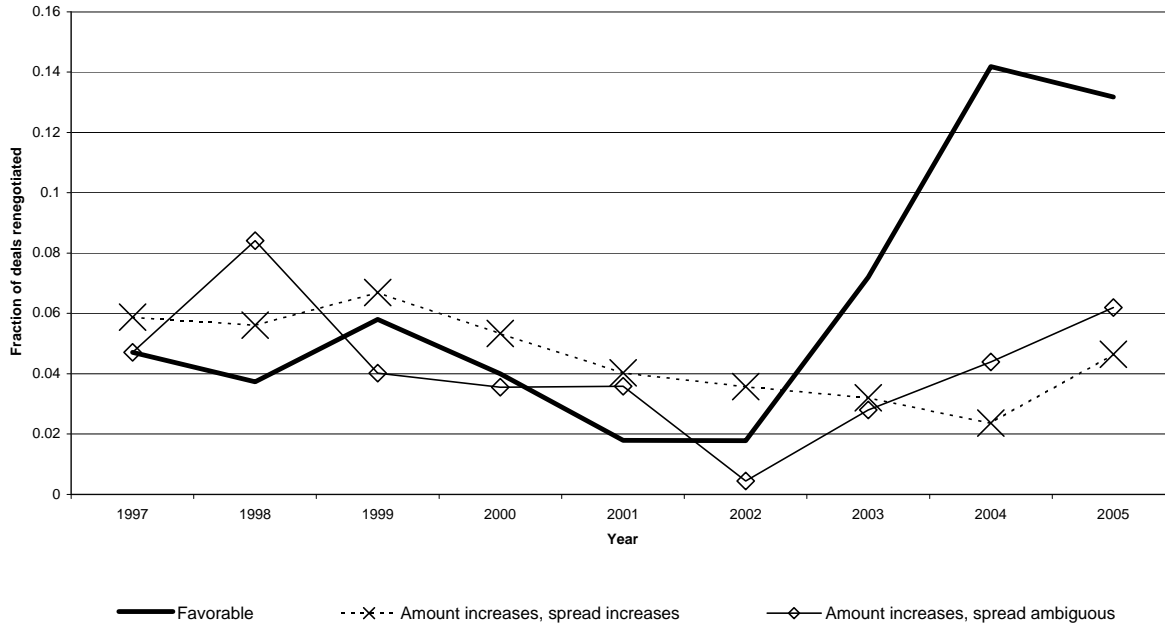


Figure 3B
Fraction of Deals Renegotiated across Years
Unfavorable and Amount Decreases

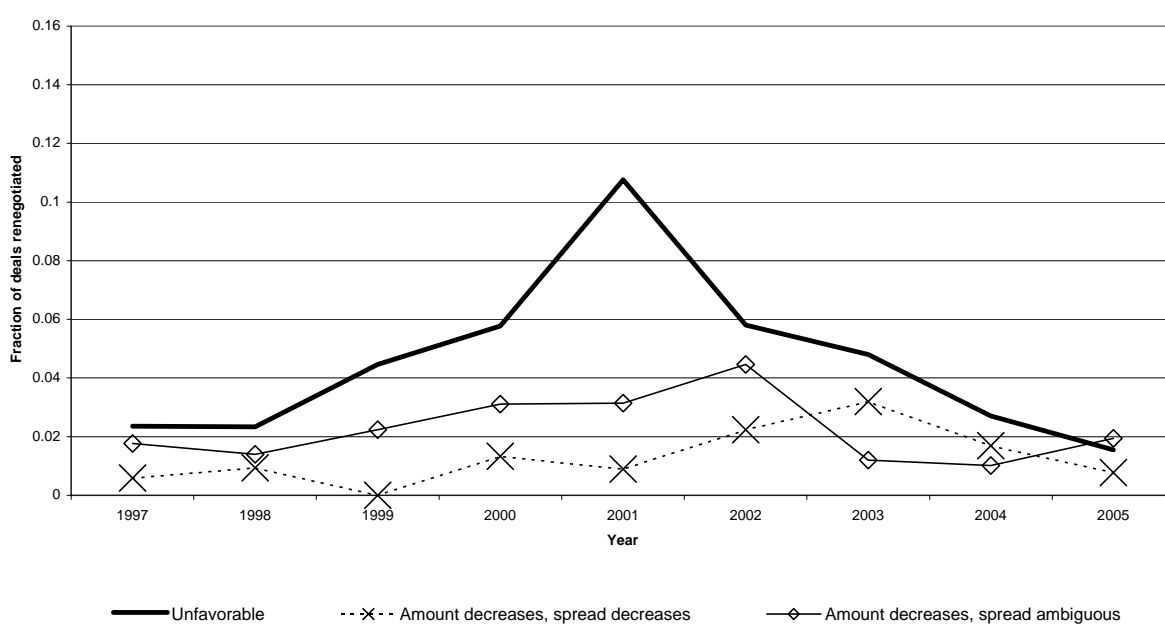


Figure 4
Probability of Borrower-Unfavorable Renegotiation Across Cash Flow Deviation Distribution,
By Whether Contract has Pricing Grid on Cash Flow

