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"Scope for Renegotiation and Debt Contract Design"

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Scope for Renegotiation and Debt Contract Design

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Abstract: I examine a sample of over 16,500 private debt contract amendments to study whether and through which mechanisms contracting frictions affect the scope for renegotiation. Unlike prior research, I measure the scope for renegotiation using *time* before renegotiation takes place. I find that the scope for renegotiation declines with firms' operating performance and financial strength. The result holds controlling for environmental uncertainty and growth, which are found to be inversely related to scope for renegotiation. This evidence broadly suggests that agency problems affect the scope for future renegotiation. Further, I find that contract characteristics, such as syndicate size, maturity, and performance pricing, reduce the scope for renegotiation, whereas the opposite is true for other characteristics, such as collateral, and restrictions on actions and certain financial covenants. The findings support the theory suggesting that incomplete contracts can strategically influence the scope for renegotiation.

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Scope for Renegotiation and Debt Contract Design

1. Introduction.

Renegotiation is a central but controversial area of contract theory. Classical theory suggests that leaving scope for renegotiation is inefficient *ex ante* and hence contracts should be written as renegotiation proof (e.g., Dewatripont and Maskin 1990; Maskin and Tirole 1999). In contrast, the theory of incomplete contracts posits that renegotiation is unavoidable and is primarily driven by the realization of exogenous uncertainty (Hart and Moore 1999). Further, a number of studies suggest that renegotiation is a function of contractual mechanisms, which control the underlying agency conflicts (e.g., Huberman and Kahn 1988, Aghion and Bolton 1992, Hermalin and Katz 1991, Bester 1994, Bajari and Tadelis 2001). This theory implies that contracts can control the scope for renegotiation and can take advantage of future renegotiation even if renegotiation proof contracts are available. Specifically, the scope for renegotiation arises if a contract optimal ex ante leads to inefficiency ex post, absent renegotiation. In a sample of syndicated loans, I proxy for the scope for renegotiation by the length of time before renegotiation occurs and study how it varies with the degree of contracting frictions and the associated contract design choices.[1]

The existing literature shows that vast majority of private debt contracts exhibit scope for renegotiation (Roberts and Sufi 2009).[2] Specifically, renegotiation takes place when new information about firms' performance and macroeconomic conditions becomes available. While the arrival of information (realization of uncertainty) is an important determinant of

[1] The scope for renegotiation arises at a point in time when revising a contract results in a Pareto improvement. Thus, I measure the scope for renegotiation by the frequency of renegotiations in time.

[2] Roberts and Sufi (2009) find that over 90% of contracts with maturity longer than one year and 96% of contracts with maturity longer than three years are renegotiated. As a result, they find contract characteristics generally do not explain the existence of the scope for renegotiation.

renegotiation, it does not directly speak to whether the scope for renegotiation varies with agency conflicts and the associated contract design choices. In theory, the arrival of new information is neither necessary nor sufficient for renegotiation to take place. For example, Aghion and Bolton (1992) show that renegotiation requires a misalignment of incentives (conditional on realization of uncertainty), while Huberman and Kahn (1989) argue that strategic renegotiation is a phenomenon distinct from renegotiation due to the realization of uncertainty.[3]

Contract design can influence renegotiation in two ways. First, it can affect the *outcome* of renegotiation by influencing the bargaining power and hence the split of renegotiation surplus (e.g., Aghion, Dewatripont, and Rey 1994). Second, it influences the *scope* for renegotiation, i.e., whether renegotiation will occur in equilibrium in a specific state of the world, by pre-determining the ex post renegotiation surplus (e.g., Aghion and Bolton 1992). Notably, Roberts and Sufi (2009) show that contract design has an effect on whether the *outcome* of renegotiation is favorable or unfavorable for the borrower. Broadly, their results are consistent with renegotiation taking place for exogenous reasons, where the role of the contract is to determine who benefits from renegotiation.[4]

My setting has several unique features, which make it well suited to study the link between contract design and renegotiation. First, I focus on contract renegotiations that generally require *lender majority* consent (typically 51% of votes) rather than *unanimous* consent, which is more difficult to obtain. Thus, my sample includes renegotiations of a wide range of contract provisions (such as negative and financial covenants, performance pricing grids, accounting definitions, etc.), which, in theory, are related to the scope for renegotiation (as

[3] No renegotiation occurs when, following the arrival of new information, the parties agree on efficient action under the initial contract.

[4] For example, renegotiation could occur due to exogenous change in the "outside option," e.g., economy wide interest rates.

explained further). Second, unanimous consent renegotiation may be a result of a refinancing or full re-contracting – a type of renegotiation often initiated by macro-economic changes or significant changes in the firm (e.g., a merger), in which case an ex ante contract is less likely to play a central role.[5] Third, I study time to renegotiation conditional on renegotiation taking place before maturity. This isolates the issue of "forced" renegotiations caused by the maturity of short-term debt. Finally, my sample of renegotiations is substantially larger than in prior studies.

I use information on over 16,500 contract amendments from Dealscan (gathered from SEC disclosures and private sources).[6] Dealscan generally treats contract modifications that require a majority of votes as amendments, whereas renegotiations that require unanimous consent appear as *new deals*.[7,8] I find that contracts exhibit multiple renegotiations under a lender majority vote and are more frequent than prior evidence may suggest. Renegotiated loans exhibit median time to renegotiation under 6 months, which is considerably less than the average of 538 days documented in Roberts and Sufi (2009). Such evidence is likely to be explained by the lower voting requirement and the less radical nature of renegotiations considered here. However, the evidence effectively suggests *close to continuous* re-contracting between borrowers and lenders taking place in practice.

[5] Note, for instance, that Dealscan treats unanimous consent amendments as new loans and includes them in periodic volume analysis.
[6] Although Dealscan contains information on private non-syndicated loans, it generally does not contain amendment data for non-syndicated loans.
[7] This explains why Roberts and Sufi (2009) find that many of the renegotiations that they study (which typically require unanimous consent) generate independent loan observations on Dealscan.
[8] The majority of amendments on Dealscan represent material modifications of contractual terms accompanied by an amendment fee (typically 10-100 bps). In certain instances, Dealscan provides a detailed summary of an amendment. Consider the following examples: "Credit was amended to change pricing grid levels, margins and to modify certain financial covenants and other credit provisions. Amended Key Financial Ratios: Max. debt to EBITDA ratio fluctuating between 3.5:1 and 2.75:1; min. fixed charge coverage ratio of 1.75:1; min. asset coverage ratio of 1:1 thru 6/30/08 and 1.1:1 thereafter" (Liz Claiborne company, December 8, 2008). Another example: "Credit was amended on 11/21/2000 to allow the following changes to co.'s max. funded debt to EBITDA ratio: 3.1 thru 9/30/2000 and prior; 3.5:1 thru 3/31/2001; 3.25:1 thru 6/30/2001 and 3:1 thereafter" (Viad Corp).

The analysis in Aghion and Bolton (1992), Berlin and Mester (1992), Gorton and Kahn (2000), among others, suggests that the scope for renegotiation is a function of the extent to which the interests of the contracting parties are aligned. Consistent with this theory, I find that credit risk, ultimately, a proxy for agency conflicts, is an important determinant of time to renegotiation. It takes half the time before renegotiation for firms with a low credit rating compared to firms with a high credit rating. An immediate concern with such analysis is that credit risk is also a proxy for environmental uncertainty. To alleviate this concern, I use several ways of controlling for future uncertainty in a multivariate duration analysis. The analysis reveals that companies with stronger economic performance and stronger financial position exhibit longer times before renegotiation. There is little reason to expect that, controlling for environmental uncertainty, these firm characteristics should relate to renegotiation via channels other than agency and information problems. Indeed, the agency conflicts are likely to be lower in such companies (e.g., Smith and Warner 1979). As expected, I find that proxies for ex ante uncertainty, such as growth and volatility, are associated with shorter time to renegotiation (in line with higher costs of writing complete contracts in such firms). Interestingly, earnings volatility has an effect on renegotiation beyond stock price volatility, consistent with accounting-based control transfers triggering renegotiation. Overall, the evidence supports the view that agency conflicts influence the scope for renegotiation.

The possibility of ex post renegotiation causes two types of inefficiencies that debt contract design can address: the soft budget constraint and the information hold-up. Soft budget constraint allows borrowers to extract rents via renegotiation when lenders find liquidation suboptimal (e.g., Dewatripont and Maskin 1995). One way to address this problem is by increasing the number of lenders in the syndicate and hence making renegotiation more costly

(Bolton and Scharfstein 1996). Consistent with this theory, I find that *syndicate size* is positively related to time before renegotiation.

In contrast, the holdup problem arises when lenders exploit their information advantage (over other lenders) to extract renegotiation rents from the borrower (Sharpe 1990, Rajan 1992). One can address this problem by controlling the degree of information revelation (e.g., Dewatripont 1994). Indeed, I find that borrowers that *distance* themselves from lenders, and hence limit the degree of soft information available to lenders, renegotiate their contracts more often. Writing contracts of longer *maturity* is another way to avoid holdup during future renegotiations. Consistent with borrowers' preferences to avoid paying rents, I find that contracts of longer maturity are renegotiated less often. Finally, Asquith, Beatty, and Weber (2005) argue that *performance pricing* is a way to minimize costly renegotiation, potentially, helping to reduce information rents. In line with this idea, I find that contracts with pricing grids are also renegotiated less often.

Other contract characteristics are, in theory, strategically chosen *ex ante* because they lead to renegotiation *ex post* (Huberman and Kahn 1989; Berlin and Mester 1992, Garleanu and Zwiebel 2009). I find that *collateral* is associated with shorter time to renegotiation (Huberman and Kahn 1988, Bester 1994). Additionally, *restrictions* on managerial actions and certain *financial covenants* lead to renegotiation taking place more often. This result is in line with the evidence in Dichev and Skinner (2002), who show that covenants are usually tight and frequently violated.[9] The findings are consistent with strategic use of covenants and collateral to create the scope for future renegotiation.

Theory also predicts an asymmetry in future renegotiations where contractual restrictions

[9] Note that relatively few renegotiations are due to covenant violations (perhaps because companies preempt actual violations).

set *ex ante* are commonly relaxed and less commonly tightened *ex post*. Specifically, restrictions are valuable because they can be selectively relaxed in favor of the borrower at the lender's discretion (Huberman and Kahn 1988, Berlin and Mester 1992, Garleanu and Zwiebel 2009). In support of this argument, I find that some restrictive covenants appear to lead to borrower-favorable renegotiation more frequently than to borrower-unfavorable renegotiation.

I contribute to the literature on contract renegotiations. Despite the principal implications of renegotiation for contract efficiency, empirical evidence on the subject remains limited.[10] One notable exception is a study by Roberts and Sufi (2009). Building on their work, I go one step further and argue that the scope for renegotiation can be understood by examining time to renegotiation. The main takeaway from my analysis is that the scope for renegotiation is influenced by contract design choices, and the associated conflicts of interest. I also extend the definition of a renegotiation and focus on a broader set of easier to obtain *lender majority* consent amendments (expected to exhibit links to contract design), whereas Roberts and Sufi examine renegotiations of "money terms" (interest, principal, and maturity), which often require *unanimous* consent by lenders (Wight, Gooke and Gray 2009). Another related study is by Roberts (2010), who examines complete loan "origination and renegotiation paths" for a random sample of about 100 firms.[11] His study focuses on the dynamic aspects of the contracting process, such as the evolution of renegotiated contract terms, the delay of information revelation during the lending relationships, and renegotiation sensitivity to new information. Roberts (2010) does not study how *ex ante* contracting frictions and contract design choices explain the time to renegotiation.

[10] Prior studies mainly focus on renegotiation in financially distressed firms (e.g., Asquith, Gertner and Scharfstein 1994). See Roberts and Sufi (2009a) for a summary and discussion of this literature.
[11] The data are hand collected exclusively from SEC filings (unlike the date in Dealscan) and pool both unanimous consent and lenders' majority amendments.

The study proceeds as follows. Section 2 reviews the related literature; Section 3 describes the data; Section 4 outlines the method and presents the results; Section 5 concludes.

2. Hypotheses development.

In this section, I discuss the implications of the theoretical literature on contract renegotiation, focusing on contract design. An excellent review of the literature is provided in Roberts and Sufi (2009, 2009a).

2.1. Theoretical foundations.

Despite the pervasiveness of renegotiation in practice, a theory underlying renegotiation is still lacking (Maskin and Tirole 1999). Complete contracts can anticipate the future renegotiated outcome and can be written as "renegotiation-proof" (Bolton 1990). Renegotiation arises naturally when contracts are incomplete.[12] At a fundamental level, the scope for the future renegotiation of incomplete contracts is a function of exogenous uncertainty, the underlying contracting frictions, and the associated contract design choices (e.g., Huberman and Kahn 1989, Aghion and Bolton 1992).

Several studies suggest that the scope for renegotiation is a function of the degree of agency problems. In Aghion and Bolton (1992), the scope for renegotiation depends on the number of future states with inefficient outcomes absent renegotiation, which, in turn, depends on the degree of ex ante interest alignment. In Berlin and Mester (1992) and Gorton and Kahn (2000) the scope for renegotiation is increasing with the extent of moral hazard and asset substitution. Debt overhang is also positively related to the scope for renegotiation (Myers 1977,

[12] Contractual incompleteness is typically defined by the inability to write contracts contingent on "the state of the world". The incompleteness arises due to the presence of unforeseen contingencies (bounded rationality), the costs of specifying numerous future contingencies, or a lack of information verifiability (Tirole 1999). A broader definition also includes the inability to contract on an action or type of agent (e.g., in the presence of information asymmetry).

Aivazian and Callen 1980). Finally, the presence of information asymmetry, combined with agency problems, also typically increases the scope for future renegotiation (Bester 1994, Garleanu and Zwiebel 2009, Dewatripont and Maskin 1990). Interestingly, it can be optimal to reveal information via future renegotiations to limit extraction of information rents (Dewatripont 1989, Hart and Tirole 1988). Overall, the theory suggests the following hypothesis:

H1: Agency and information problems are positively related to the scope for contract renegotiation.

2.2. Contract design and renegotiation.

An important insight from the literature is that the scope for ex post renegotiation of incomplete contracts is also a function of ex ante contract design (e.g., Aghion and Bolton 1992, Harris and Raviv 1995, Gorton and Kahn 2000). For example, Aghion and Bolton (1992) show that contracts designed to be renegotiated along the equilibrium path can dominate available renegotiation-proof contracts. Indeed, it is costly to design a contract that fully aligns interests and thus leads to efficient outcome (action) in every non-contractible state (eliminating the scope for renegotiation). A more efficient contract leads to costly renegotiation in some states while capitalizing on the lower costs of inducing an optimal action in other states.

2.2.1. Contract design as a way to deter renegotiation.

It is well understood that renegotiation can adversely affect ex ante incentives to invest (Williamson 1979, Hart and Moore 1988), provide financing (Dewatripont and Maskin 1995) and exert effort (Fudenberg and Tirole 1988). This occurs because the commitment not to renegotiate ex post helps in designing more efficient contracts ex ante (Bolton 1990).[13] Two

[13] To see this in the context of debt contracts, consider a model in Dewatripont and Maskin (1995) in which an asymmetrically informed entrepreneur with an investment project approaches a lender to raise financing. It is assumed that financing entrepreneurs with bad projects is unprofitable ex ante, but their continuation is rational ex post because entrepreneurs are better managers of firms' assets. Because the lenders cannot distinguish between the

specific inefficiencies arise in the market for private loans. First, the lender's inability to pre-commit against renegotiation "softens" their budget constraint and allows borrowers to force concessions (Kornai 1979). This, in turn, destroys incentives. The second source of inefficiency is information holdup problem. Informational advantage acquired by current lender over other lenders allows them to extract rents in future renegotiations, thus also destroying the ex ante incentives (Sharpe 1990; Rajan 1992). Several contractual mechanisms can deal with these frictions, as discussed next.

Bolton and Scharfstein (1996) analyze a way to deal with a soft budget constraint via increasing the *number of lenders* (*syndicate size*). They show that having multiple lenders reduces the scope for opportunistic renegotiation and strengthens ex post incentives to liquidate unprofitable investments. Relatedly, Dewatripont and Maskin (1995) analyze a model in which decentralized lending hardens lenders' budget constraint and reduces the scope for ex post renegotiation. Another way to deal with soft budget constraint is identified by Bester (1994), who shows that *outside collateral* reduces the borrower's incentives for strategic renegotiation.[14]

More generally, one way to minimize the scope for ex post renegotiation and the associated rent extraction is to design a contract that aligns the interests of the contracting parties on firm-value maximization (Aghion and Bolton 1992). Such contract would require firm owners to participate in future payoffs with their own wealth. Christensen and Nikolaev (2011) argue that capital-based financial covenants serve this purpose, and as a result they are expected to reduce the scope for future renegotiation.

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projects, they would like to commit ex ante to liquidate bad projects, thereby discouraging entrepreneurs from undertaking them ex ante. However, the inability to pre-commit against renegotiation "softens" their budget constraint ex post and leads to contracting inefficiency (Kornai 1979).

[14] Although the likelihood that the contract will be renegotiated (and a portion of debt will be forgiven) increases in equilibrium. The loans in my sample typically do not rely on outside collateral and hence I do not test this prediction.

Unlike soft budget constraint, holdup problem makes future renegotiation less likely to occur due to the associated costs. Several mechanisms can, in turn, be used in response to information holdup problem. First, borrowers may control holdup by limiting the amount of "soft" information available to lenders. Indeed, the literature suggests that in some cases informed party finds it optimal to postpone information revelation (Dewatripont 1989, Hart and Tirole 1988). One way to achieve this is to *distance* themselves from the lenders geographically (e.g., Agarwal and Hauswald 2010). Controlling holdup, however, may be difficult and hence contracts may try to circumvent it. *Performance pricing* grids can be used to make a contract "more complete," hence reducing the scope for ex post renegotiations (Asquith et al. 2005) and, therefore, the extraction of information rents. *Maturity* can also be used to minimize the need for costly renegotiations (Sharpe 1990, Rajan 1992, Flannery 1986, Diamond 1991). Repeated borrowing with shorter maturities gives lenders more power to induce renegotiation even before maturity.

Based on the literature discussed above, I expect the following:

H2: *Syndicate size, outside collateral, capital-based covenants, geographical proximity, performance pricing and maturity are associated with lower scope for renegotiation.*

2.2.2. Contract design as a way to promote renegotiation.

Huberman and Kahn (1988, 1989) propose a theory of the strategic design and renegotiation of incomplete contracts. Unlike prior work that relies on realization of uncertainty to explain renegotiation, they argue that contracts can be designed to be renegotiated even in the absence of exogenous information. Contracts with suboptimally restrictive clauses are put in place *ex ante* to protect one party from actions by the other party. These clauses represent a mechanism to induce an efficient action. Once the action is taken, they become suboptimal and

are followed by renegotiation. The use of *collateral*, *restrictions on management's actions*, and *financial covenants* are likely to be among such clauses.[15] Specifically, Huberman and Kahn (1989) note that the use of *security* encourages entrepreneur's effort and leads to more frequent renegotiation ex post because lenders are less efficient asset managers and prefer renegotiation to foreclosure.

Several studies further examine the strategic link of these contractual mechanisms and renegotiation under asymmetric information. Bester (1994) finds that the use of external collateral can increase the probability of renegotiation while decreasing incentives for strategic default. Berlin and Mester (1992) analyze the link between covenants and renegotiation in the presence of asset substitution. The value of covenants, in their model, comes from lenders' ability to renegotiate them at a later stage. Gorton and Kahn (2000) analyze two-sided agency problems and show that covenants expand the region over which renegotiation occurs. Finally, Garleanu and Zwiebel (2009) show that under information asymmetry stricter covenants are set *ex ante* and are renegotiated and relaxed *ex post*. Common to these studies is that covenants serve as tripwires. Christensen and Nikolaev (2011) argue that performance-based covenants (as opposed to capital-based covenants) serve this purpose. The above discussion leads to the following prediction:

H3: *Collateral, restrictions on managerial actions, and performance-based covenants increase the scope for renegotiation.*

3. Data and Descriptive Statistics.

[15] *Financial covenants* play a central role in debt contracting by making lenders' control over management contingent on accounting information (Aghion and Bolton 1992). In contrast, *negative covenants* specify restrictions on managerial actions, potentially leading to debtholder value expropriation (Smith and Warner 1979).

I use data on debt contract amendments provided by Dealscan. Dealscan gathers information on contract amendments from SEC filings (not all amendments are disclosed in SEC filings) and other sources (such as lender submissions and editorial reports by industry specialists). Dealscan generally gathers amendment data for *syndicated* loans only and considers amendments that require *unanimous consent* (100% of votes) to be *new loans.* As a result, such amendments are recorded as independent deals that cannot be distinguished from new issuances. Typical unanimous consent amendments are maturity extensions, decreases in pricing, changes to principal amount, or releases of collateral (with some exceptions). The amendments considered here are generally carried with a 51% vote (or another applicable definition of lenders' majority) and include modifications to a broad set of contractual provisions, such as covenants, performance pricing, and borrowing base, etc.[16] Such amendments are quite common in practice. For example, Standard and Poor's reports over 50 covenant relief amendments in March 2009 with amendment fees in the range of 50-60 bps.

3.1. Frequency of and time to amendments.

Dealscan data on renegotiations starts in 1995 and covers over 16,500 deal amendments for approximately 7,000 deals. Figure 1a shows how amendment frequency varies by quarter. According to Dealscan, amendments were virtually non-existent in 1995, and their frequency peaked around 2004, reaching as high as 600 amendments per quarter. Amendment frequency is also elevated during the period of the credit crisis of 2008-2009. For comparison, Figure 1b shows that the frequency of new syndicated deals on Dealscan increased from around 400 deals

[16] The vast majority of amendments on Dealscan are lender majority vote amendments. Nevertheless, in some instances, Dealscan may include unanimous consent amendments, which do not qualify as "new loans". This typically occurs if an amendment is an upsize in commitment while all other major terms remain unchanged. Note that some contracts do not require unanimous consent for commitment increases (only participating lenders need to agree), while others do. Given this, while such amendments may formally require unanimous consent, in substance, they are similar to lender majority amendments.

in 1995 to over 1,000 deals per quarter in 2004-2007, subsequently reverting to 1995 levels in 2009. Figure 1c suggests that the time between renegotiations (in months) over the same period behaves differently. The time between renegotiations trends up moderately until the end of 2007 and subsequently becomes increasingly longer, presumably, in response to adverse credit conditions. The figure suggests that time to renegotiation is not equivalent to renegotiation frequency.

Table 1, Panel A, presents the distribution of contracts by their amendment frequency. The last column indicates that, out of 6,961 contracts that were amended, 51% experienced one amendment, 20% experienced two amendments, and the remaining 29% experienced three or more amendments. The table further indicates that 70 contracts (1% of the sample) experienced over 10 amendments over their lifetime. Note that these numbers are likely to be understated due to truncation.

Table 1, Panel B, suggests that the mean (median) time to amendment from prior contracting date is under 8 (6) months, although the time to first amendment is somewhat longer. This is substantially shorter than the mean time before renegotiation of money terms in Roberts and Sufi 2009, where the average duration is close to 18 months (538 days). Figure 2 presents a non-parametric "survival" function of renegotiation incidence. The Kaplan-Meier survival estimate indicates that 75% of renegotiations in my sample take place within approximately 10 months of the prior contracting date. The long right tail of the survival function suggests, however, that a portion of contracts exhibit a substantially longer time to rengotiation.

3.2. Sample summary.

To run a multivariate analysis, I merge Dealscan with Compustat using the Dealscan-Compustat link (August 2010 vintage), constructed and maintained by Michael Roberts and

WRDS (see Chava and Roberts 2008). If a credit agreement includes several credit facilities (tranches), I aggregate information at the deal (i.e., loan) level. Table 2 presents summary statistics for a resulting sample of contracts for which at least one deal amendment is recorded (renegotiation sample). Common firm and contract characteristics are reported. Firm characteristics are measured before the contract initiation date. The number of contracts with non-missing data varies between 4,100 and 4,900 (depending on the variable). The last three columns of the table present the same set of statistics for a comparison sample for which no amendment data is available. The comparison sample is restricted to syndicated loans (those with more than one lender) on Dealscan for which covenant data are available.[17] The two samples are very similar in terms of firm and contract characteristics, which implies that the absence of data on contract amendments within the comparison sample is unlikely to systematically bias the results.

4. Determinants of the scope for renegotiation.

To analyze time to renegotiation, I use a proportional hazard model, which allows non-parametric estimation of the baseline hazard function (Cox 1972).[18] Explanatory variables enter the model parametrically by multiplicatively shifting the baseline hazard as follows:

$$h(t) = h_0(t)\exp(\beta_1 x_1 + ... + \beta_k x_k),$$

where $x_1, ..., x_k$ is a set of explanatory variables (in our case, ex ante firm and contract characteristics), $\beta_1, ..., \beta_k$ are the slope parameters to be estimated, $h_0(t)$ is a non-parametric baseline hazard function, and *t* is time to renegotiation. Time to renegotiation is measured by

[17] The sample is restricted for comparison purposes because (1) Dealscan keeps track of renegotiations for syndicated loans and (2) the availability of financial covenant data is likely to indicate that a lending agreement (and hence its potential amendments) is material enough to be disclosed.
[18] It is perhaps the most popular way to analyze duration data (Cleves et al. 2010).

taking the time span between the date of amendment and a previous contracting date (either the contract initiation or a prior amendment date, whichever is more recent).

Two approaches to deal with non-independence of observations within groups in hazard models are in the literature (Cleves et al. 2010). The first approach is to model the correlation across observations within a group parametrically. Specifically, the model introduces a group-specific additive random effect as an additional variable (hence, the expression in the exponent becomes $\alpha_i + \beta_1 x_1 + ... + \beta_k x_k$) and typically assumes that it follows a Gamma distribution (estimation is computationally intensive for large samples). This approach is called "the frailty model" and requires that it be specified whether the random effect is at the contract, firm, or some other level. The alternative approach to correct standard errors for non-independence is to cluster them by groups. I follow this approach because it allows a more general correlation structure within clusters and allows clustering at several levels. The standard errors reported here are clustered by firm and by the quarter in which the renegotiation took place (Petersen 2009).

I begin the analysis by asking how firm characteristics that describe a firm's financial and operating health, as well as environmental uncertainty and investment opportunities affect the time to renegotiation. Subsequently, I study time as a function of the characteristics of the initial debt contract while controlling for a comprehensive set of factors. Finally, I study whether the influence of firm and contract characteristics differs for subsets of borrower-favorable and borrower-unfavorable renegotiations. All firm characteristics are measured as of the end of the quarter preceding the date of initial contracting. *To facilitate the interpretation of estimated parameters, I exponentiate the slope coefficients.*[19]

4.1. Does credit risk explain time before renegotiation?

[19] To facilitate the interpretation of coefficients, note that $(\exp(\beta_i) - 1) \times 100$ equals the percentage change in the hazard rate caused by a unit change in x_i.

The credit risk is perhaps the most comprehensive measure for the severity of agency problems, which, as discussed earlier, are likely to influence the scope for future renegotiations. Table 3, Panels A and B present the average time to amendment across Altman's Z-score deciles (Altman 1968) and S&P's credit rating categories, respectively. The results indicate that the time before renegotiation declines as credit risk increases. The average time to renegotiation for A-rated companies is over 10 months, whereas it falls short of five months for D-rated firms and is slightly above 5 months for C-rated firms.[20] Similar patterns are observed across Z-score deciles. The last column in Panels A and B is worth mentioning because it indicates that time to amendment is *not* equivalent to amendment frequency (the number of amendments observed over the contract life). These differences are likely to arise because renegotiation frequency measures the total number of renegotiations observed for a given contract, whereas duration analysis focuses on the renegotiation frequency per unit of time.

Table 4 reports estimates of the Cox proportional hazard model with a set of dummy variables for each risk category. The highest risk category is taken as a benchmark. The patterns of coefficients indicate that the renegotiation hazard is significantly higher for riskier companies. Overall, the evidence supports the arguments in the literature that riskier firms renegotiate their contracts more frequently (e.g., Berlin and Mester 1992). While credit risk is an important determinant of *stated* contract duration (Barclay and Smith 1995, Stohs and Mauer 1996), my analysis suggests that this also extends to *effective* duration (although, in theory, the stated duration is expected to have a U-shaped relation to credit risk (Diamond 1991)).

4.2. Multivariate duration analysis of time to renegotiation.

[20] Non-rated companies exhibit an average duration slightly under 8 months (note that the absence of credit rating does not indicate poor credit quality). This mimics the pattern in Barclay and Smith (1995) with respect to debt maturity.

The main concern with univariate tests above is that credit risk correlates with exogenous uncertainty, which potentially leads to renegotiation even in the absence of agency conflicts. Additionally, time to renegotiation before maturity may correlate with time to maturity stated in the initial contract to the extent they share common determinants. To alleviate these concerns, I control for a range of proxies for environmental uncertainty and common determinants of stated maturity in multivariate tests (e.g., Barclay and Smith 1995, Stohs and Mauer 1996). Specifically, I control for size, growth opportunities, volatility of stock price, variability of earnings, asset maturity and tangibility, as well as credit risk categories.

Table 5 presents the results of multivariate analysis of time to renegotiation as a function of firm characteristics. Model (1) presents the baseline specification, while models (2) and (3) control for credit risk categories. The estimates across the three models are generally similar, indicating that a number of firm-level variables are significant determinants of time to renegotiation, as discussed next.

4.2.1. Economic performance, financial position and renegotiation.

Companies with stronger economic performance and financial position are likely to exhibit a lower level of agency and information problems (Jensen and Meckling 1976, Smith and Warner 1979). To this end, more profitable firms with lower leverage and a higher level of liquidity are expected to exhibit less scope for renegotiation. As predicted, renegotiations are less frequent in time in companies with stronger operating performance. The estimates indicate that a 0.01 higher *ROA* translates into a 0.5% lower renegotiation hazard. Interestingly, loss companies renegotiate their contracts in a systematically different way. Specifically, the *loss dummy* has a sizable incremental effect over *ROA*, indicating up to a 13% higher renegotiation hazard in loss firms. In addition, companies with a stronger financial position amend their credit agreements

less frequently. Increasing leverage, a direct determinant of debt-related agency problems, by 10% implies a 3.3% increase in renegotiation hazard. Finally, the time before amendment is also longer in companies with higher levels of liquidity (*current ratio*), consistent with them being less financially constrained and hence dependent on renegotiation. Overall, the evidence supports the first hypothesis that the increased agency and information problems present in underperforming and financially weaker companies are positively related to the scope for renegotiation.

4.2.2. Uncertainty, investment opportunities, and renegotiation.

Next, I discuss my findings with respect to uncertainty and investment opportunities. I expect that smaller, more volatile and fast-growing companies are characterized by a larger amount of uncertainty and hence are likely to have a greater scope for ex post renegotiations. For example, rapid changes in financial position are more likely to render the initial contract suboptimal and require modifications. As predicted, I find that that going from the 25th to the 75th percentile of firm *size* distribution implies a 7-8% decline in renegotiation hazard. The estimates in Table 5 suggest that companies with higher asset growth and growth opportunities (inverse of book-to-market) exhibit shorter time to renegotiation. For example, based on model (1), an increase of 0.3 in asset growth, corresponding to the interquartile difference, implies an approximately 25% higher renegotiation hazard. In addition, the volatility of stock price and the volatility of quarterly earnings (both measured over the prior five years) significantly shorten the average time before renegotiation. Interestingly, the "accounting volatility" is incrementally significant and as important in explaining renegotiation as the "market volatility." The interquartile increase in the standard deviation of earnings scaled by assets implies an approximately 8-9% higher renegotiation hazard. This result can be explained by control

allocations being contingent on accounting information rather than market news (e.g., Aghion and Bolton 1992). I do not find that *asset maturity* or *asset tangibility* exhibit a statistically significant relation to renegotiation.

Overall, my results suggest that ex ante contracting environment at loan origination is associated with the scope for future renegotiations. Specifically, both agency conflicts and uncertainty appear to determine the scope for renegotiation.

4.3. Contract design and the scope for future renegotiation.

In this subsection, I examine the association between contract characteristics and time to renegotiation. Table 6 presents the results from the multivariate duration analysis. Model (1) presents a baseline model specification with loan characteristics only, while Models (2) and (3) augment the baseline specification with firm characteristics and a number of additional variables to further alleviate concerns that omitted variables drive the results. Besides control variables used in prior tests, I further control for industry, and macroeconomic conditions that measure ex ante lending conditions and the strength of the banking sector (bond yield, credit spread, bank's leverage, GDP growth, and, time trend; see Appendix A). The results are largely consistent across the three models and do not appear to be sensitive to an omitted variable. Next, I discuss two sets of specific loan characteristics in more detail.

4.3.1. Ways contracts can reduce the scope for renegotiation.

As discussed in section 2, contracts with larger *syndicates*, shorter *distance* from the borrower, *capital-based covenants*, *performance pricing grids*, and longer *maturity* are predicted to have lower scope for renegotiation. Table 6 presents the tests of these predictions. Consistent with arguments that dispersed loan ownership introduces collective action problems and hardens lenders' budget constraints (Smith and Warner 1979, Bolton and Scharfstein 1996), larger

syndicates are associated with a longer time to renegotiation. Adding an extra lender to the syndicate leads to a reduction in the renegotiation hazard of up to 1%.

The table also suggests that loan maturity and the lending frequency are, as expected, among the strong determinants of a renegotiation hazard. For example, moving from the 25th to the 75th percentile of the initially stated maturity decreases the renegotiation hazard by 26%. This finding is consistent with the view that longer maturity is chosen to minimize future renegotiations and hence to limit the extraction of information rents (Sharpe 1990, Rajan 1992), potentially, by slowing down information revelation (Roberts 2010).[21] In contrast, geographical *distance* is associated with shorter time to renegotiation in line with the argument that it limits the soft information acquisition (e.g., Berger et al. 2005) and hence facilitates renegotiation. Indeed, model (1) indicates that increasing the distance to the lead lender by 1,000 miles implies a 4.5% higher renegotiation hazard.

Asquith, Beatty and Weber (2005) suggested that *performance pricing grids* can be used to reduce costly renegotiation. At the same time, Roberts and Sufi (2009) argue that performance pricing serves to allocate the bargaining power between lenders and the borrower and hence affects the split of the renegotiation surplus, but not necessarily its occurrence. Model (1) suggests that the use of a performance pricing grid is associated with roughly 8% lower renegotiation hazard, suggesting that the use of performance pricing reduces the scope for renegotiation. While not inconsistent with Roberts and Sufi's arguments, such results are in line with Asquith et al. (2005).

[21] Interestingly, Roberts (2010) shows the number of renegotiations over the life of a loan to be positively associated with maturity. This is yet another indication that renegotiation frequency is not equivalent to time to renegotiation. Recall that frequency per contract and frequency over a period of time are different concepts.

I find that capital-based covenants do not significantly influence the scope for renegotiation. Overall, the evidence here is consistent with the second hypothesis that a number of contract design choices can be used to reduce the scope for renegotiation.

4.3.2. Ways contracts can increase the scope for renegotiation.

As discussed earlier, collateral (borrowing base), restrictions on management's actions, and tripwire-type performance-based covenants can be used strategically as renegotiation triggers. In line with arguments in Huberman and Khan (1989) that collateral can be taken ex ante only to be renegotiated ex post, I find that the use of a borrowing base leads to significantly shorter to renegotiation. The model(s) without (with) firm level and other control variables indicates that the renegotiation hazard is more than 16% (9%) higher with this type of security.

Restrictions on management's actions can also be strategically binding ex ante. *Cash sweeps* constrain managerial actions (e.g., asset sales) indirectly by requiring the use of cash proceeds from these actions to repay the loan, while, restrictions on dividends and capital expenditures directly control the outflows of cash. Consistent with the arguments that these restrictions are set ex ante to trigger renegotiation ex post, adding a *cash sweep* implies a more than 3% increase in the renegotiation hazard rate, while the existence of a *capex restriction* is associated with a 14-15% higher renegotiation frequency. *Dividend restriction*, however, is insignificant in explaining time to renegotiation.

Performance-based covenants are also valuable as renegotiation triggers (Berlin and Mester 1992, Dichev and Skinner 2002, Garleanu and Zwiebel 2009). However, different types of financial covenants are likely to play different roles. Christensen and Nikolaev (2010) argue that covenants formulated in terms of a firm's performance (*P-Covenants*) are used as tripwires, while covenants formulated in terms of capital ratios (*C-Covenants*) align shareholders' interests

with those of debtholders. Consistent with this prediction, *P-Covenants* exhibit a significantly positive relation to the renegotiation hazard. Adding one *P-Covenant* is associated with up to a 6.4% increase in the hazard rate.

The results also suggest that *loan size* is positively related to time to renegotiation (significant only when additional controls are added), consistent with the idea in Hart and Moore (1998) that loan size influences the scope for ex post renegotiation. Also, in case of a large loan, the benefits of renegotiation are more likely to exceed the costs and thus create a positive renegotiation surplus.

Overall, the findings indicate that ex ante contract characteristics exhibit links to scope for renegotiation, implying that contract design can strategically control future renegotiation in response to contracting frictions.

4.4. Favorable vs. unfavorable renegotiations.

In the last subsection, I examine whether the contract characteristics exhibit differences in explaining borrower-favorable vs. borrower-unfavorable renegotiations. This analysis is motivated by the theoretical arguments of asymmetry in future renegotiations. Specifically, contracts are optimally designed to be overly restrictive ex ante and to be relaxed via ex post renegotiation. For example, Garleanu and Zwiebel (2009) predict that lenders will relax covenants more frequently than they will tighten them following the arrival of information. Given this, I expect favorable renegotiations of contractual terms, particularly contractual restrictions (various covenants, collateral), to take less time on average.

There is no straightforward way to determine whether renegotiation is favorable, even in simple cases (consider the tightening of a covenant coupled with an increase in commitment amount). I gauge the outcome of renegotiation by measuring stock price performance over the

period leading to renegotiation. Stock performance measures whether the economic health of the company improved or deteriorated over a period leading to renegotiation; thus, the outcome of renegotiation should be determined accordingly. When stock return over the period between the prior contracting date (excluding the first two weeks) and the renegotiation date is positive, renegotiation is classified as borrower favorable. Otherwise, it is classified as borrower unfavorable. I allow the coefficients on all contractual characteristics to differ depending on whether renegotiation is borrower favorable or not. Thus, I present two sets of parameters for each model.

Table 7 presents the duration analysis estimates. Model (1) is based on contract characteristics only, whereas model (2) also includes firm characteristics and other control variables (omitted to preserve space). First, note that contract characteristics are strong predictors of both favorable and unfavorable renegotiations. This implies that contracts bring parties to the renegotiation table irrespective of the outcome of renegotiation. The evidence does suggest, however, that contractual restrictions are more frequently followed by a favorable renegotiation. Specifically, cash sweeps that constrain managerial actions are likely to experience a favorable renegotiation in a significantly shorter time. Similarly, dividend restriction and performance-based covenants are marginally significant predictors of favorable renegotiations and are insignificant in unfavorable cases (although the differences are not significant). Overall, the evidence is consistent with the theoretical prediction that favorable renegotiations of contractual restrictions are more common. Interestingly, the evidence indicates that pricing grids minimize the need for favorable renegotiations only.

6. Conclusion.

I examine a large sample of contract amendments to shed light on whether and through what mechanisms the existence of contracting frictions, such as agency problems and the associated contract design choices affect the scope for renegotiation of financial contracts. Specifically, I test theory-based predictions about the ex ante determinants of the time to renegotiation of syndicated credit agreements. My focus is on contract amendments approved via lenders' majority consent, including modifications to various contract provisions such as covenants, collateral, and performance pricing grids. This setting is well suited to studying the link between contract design and renegotiation.

I use a semi-parametric proportional hazard model to analyze scope for renegotiation. The scope is proxied for by the time to renegotiation from prior contracting date. I find that amendments requiring a lender majority vote occur sooner than prior evidence may suggest. I find that ex ante uncertainty and growth are strong determinants of the scope for renegotiation, consistent with predictions from incomplete contracting theory. Moreover, controlling for environmental uncertainty using a large set of factors, I find that firm's financial strength and economic performance are associated with lower scope for renegotiation. This is consistent with incomplete contracts theory (e.g., Huberman and Khan 1988, Aghion and Bolton 1992, Berlin and Mester 1992) and suggests that agency and information problems are associated with increased scope for renegotiation.

This, in turn, raises the question of whether contracts can control the scope for future renegotiation in response to underlying contracting frictions. I find that a number of contract characteristics are systematically related to time to renegotiation. Syndicate size, loan maturity, and performance pricing grids appear to be used to reduce the scope for renegotiation, in line

with arguments in the literature (Bolton and Scharfstein 1996, Rajan 1992, Asquith et al. 2005). In contrast, collateral (borrowing base), restrictions on managerial actions, and performance-based covenants, appear to be used as renegotiation triggers (Huberman and Kahn 1988, Bester 1994, Garleanu and Zwiebel 2009).

My study builds on earlier work by Roberts and Sufi (2009), who show that credit agreements are frequently renegotiated and that their renegotiation is primarily driven by the arrival of new information but it does not appear to be explained by ex ante firm and contract characteristics. While these authors largely focus on the effect of new information on whether at least one renegotiation takes place before maturity, I note that because most longer-term contracts are renegotiated at some point, a useful approach to understanding renegotiation is to focus on the time that it takes before a renegotiation occurs. Overall, my results support the theory suggesting that the scope for renegotiation depends on the severity of agency and information problems and, in response to these problems, can be controlled contractually.

Appendix A: Variable Definitions

Firm characteristics. Firm characteristics are taken from Compustat and are measured as of the end of the quarter before loan origination. To reduce the influence of outliers, I Winsorize all firm characteristics at 1% when applicable.

Firm size = Natural logarithm of market capitalization.

ROA = Return on assets measured as earnings before extraordinary items divided by average total assets.

Loss = Dummy variable that is equal to one if ROA is negative and zero otherwise.

B/M = Book-to-market ratio defined as the book value of equity divided by its market value.

Current ratio = Current assets divided by current liabilities.

Leverage = Total liabilities divided by the sum of total liabilities and the market value of equity.

Asset growth = Current period total assets divided by total assets lagged by one year.

Tangibility = Net property, plant and equipment divided by total assets.

Asset maturity = (gross value of PPE divided by depreciation expense) times (gross value of PPE divided by total assets), where PPE is property, plant, and equipment. The definition follows Guedes and Opler (1996).

Price volatility = Natural logarithm of standard deviation of annual change in prices computed over the five years preceding loan origination.

ROA volatility = Natural logarithm of standard deviation of ROA computed on a quarterly basis over the five years preceding loan origination.

Z-score = Altman's credit risk score computed as 1.2*(Current Assets - Current Liabilities)/Total Assets + 1.4*Retained Earnings/Total Assets + 3.3*Pretax Income/Total Assets + 0.6*Market Capitalization/Total Liabilities + 0.999*Revenue/Total Assets.

S&P's credit rating fixed effects = S&P's credit rating is classified into 7 categories: A-rated (AAA, AA, and A categories), B-rated (BBB category), B-rated (BB category), B-rated (B category), C-rated (CCC and CC categories), D-rated, and not rated (the majority of companies are not rated).

Contract characteristics. Loan characteristics are taken from Dealscan. For multi-tranche loans, the data aggregated at a deal (contract) level.

Deal size = Natural logarithm of the total deal amount.

Maturity = Natural logarithm of stated maturity (in months), averaged across credit facilities.

Syndicate size = Number of banks in the syndicate (capped at 50 to reduce the effect of outliers).

Lending frequency = Number of deals on Dealscan over the 5 years preceding loan origination.

Distance to lender = Geographical distance between the borrower and the lead arranger headquarters, computed based on their zip codes.

Borrowing base = Indicator variable that takes the value of one if a deal has at least one borrowing base and zero otherwise.

Cash sweeps = Number of cash sweeps a credit agreement specifies.

Capex restriction = Indicator variable that takes the value of one if a credit agreement specifies a capital expenditures restriction and zero otherwise.

Dividend restriction = Indicator variable that takes the value of one if a credit agreement specifies a dividend restriction and zero otherwise.

C-Covenants = Number of capital-based covenants specified by a credit agreement. Capital-based covenants include (1) Quick ratio; (2) Current ratio; (3) Debt-to-equity ratio; (4) Loan-to-value ratio; (5) Debt-to-tangible-net-worth ratio; (6) Leverage ratio; (7) Senior leverage ratio.

P-Covenants = Number of performance-based covenants specified by a credit agreement. Performance-based covenants include (1) Cash interest coverage ratio; (2) Debt service coverage ratio; (3) Level of EBITDA; (4) Fixed charge coverage ratio; (5) Interest coverage ratio; (6) Debt to EBITDA; (7) Senior debt to EBITDA.
Performance pricing = Indicator variable that takes the value of one if a credit agreement relies on a performance pricing grid.

Macroeconomic variables. Macroeconomic variables control for macroeconomic condition at the time of loan origination. The data for GDP growth are from the Bureau of Economic Analysis. The remaining data are from the Federal Reserve Economic Database.
GDP growth = Quarterly GDP growth measured in the quarter preceding origination. Data are from the Bureau of Economic Analysis.
AAA yield = Moody's Aaa corporate bond yield.
Credit spread = Moody's Baa corporate bond yield minus Moody's Aaa corporate bond yield.
Banks' equity = Sum of equity held by banks divided by average total assets.

Other controls.
Industry fixed effects = Fixed effects based on Fama and French industry classification. Following Roberts and Sufi (2009), I use a 12-industry classification.
Deal purpose fixed effects = Fixed effects for each type of deal purpose on Dealscan (e.g., corporate purposes, acquisition, working capital, etc.).
Time trend = Linear time trend.

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Figure 1: Amendment Activity by Quarter.

Figure 1a: Frequency of contract amendments by quarter

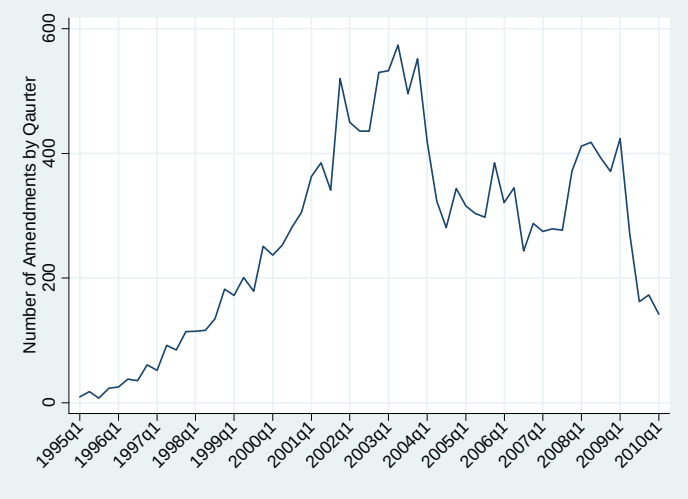

Figure 1b: Frequency of new syndicated (multiple lender) loans

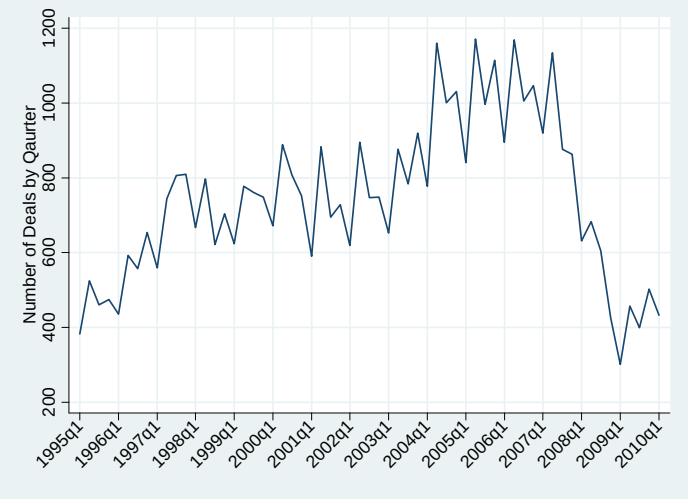

Figure 1c: Average time before amendment by quarter

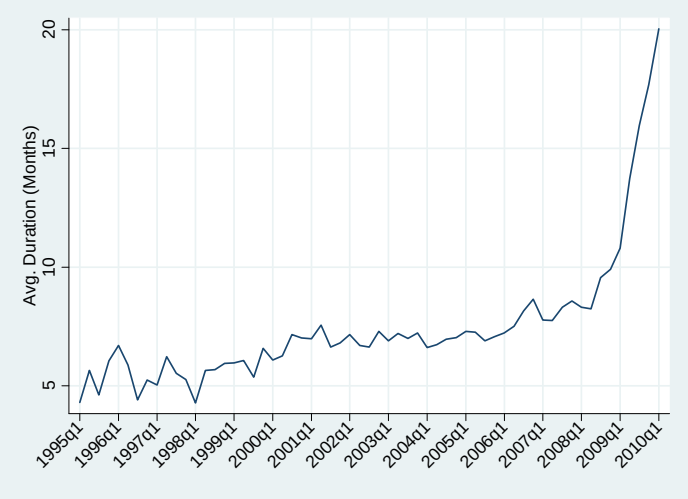

Figure 2: Non-parametric duration plots.

Figure 2a: Non-parametric Survival Analysis of Renegotiation Incidence

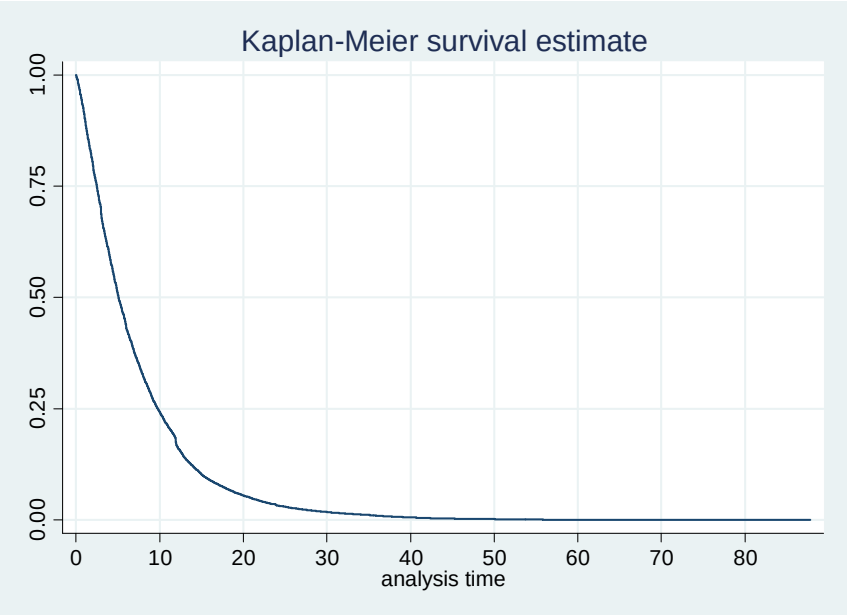

Table 1: Amendment Frequency and Time Between Amendments.

This table provides summary statistics for amendment frequency and time duration. Panel A presents the frequency of contracts by the number of amendments each contract exhibits on Dealscan. Panel B presents the mean and median time to amendment (in months). Data are taken from the Dealscan "deal amendments" table, which consists of amendments carried via lender majority vote (51% or other percentage of required lenders) and generally excludes unanimous consent amendments.

Panel A: Amendment frequency by contract

Amendment Count	**# Contracts**	**%**	**Cumulative**
1	3530	51%	51%
2	1358	20%	70%
3	791	11%	82%
4	472	7%	88%
5	298	4%	93%
6	174	2%	95%
7	108	2%	97%
8	80	1%	98%
9	49	1%	99%
10	31	0%	99%
>10	70	1%	100%
Total Contracts	6,961	100%	

Panel B: Average time to amendment (in months)

Time between renegotiations	**# Obs.**	**Mean Duration**	**Median Duration**
Time to 1st Amendment	6961	10.12	7.38
Average time to an amendment	16,573	7.78	5.41

Table 2: Contract and Firm Characteristics Summary

This table provides summary statistics of contract design features and firm characteristics measured as of contract initiation date. Data come from the intersection of Dealscan and Compustat. The renegotiation sample consists of a sample of credit agreements linking to Compustat for which at least one contract amendment is recorded on Dealscan. If a credit agreement consists of several credit facilities, the information is aggregated and considered at the deal (contract) level. The comparison sample consists of a sample of all syndicated credit agreements (with more than one lender) on Dealscan for which information in a financial covenants table is available and for which Dealscan does not record any amendments (generally, these contracts also experience amendments, but these data are not available on Dealscan). The purpose of the comparison sample is to show whether there are systematic differences in contracts for which amendment data are and are not available. All variables from Compustat are Winsorized at the 1% level at each applicable tail. See Appendix A for variable definitions.

	Renegotiation Sample			Comparison Sample		
Variable	**# Obs.**	**Mean**	**Median**	**# Obs.**	**Mean**	**Median**
Size	4403	6.17	6.32	7257	6.78	6.85
ROA	4665	0.00	0.01	7714	0.01	0.01
Loss	4665	0.27	0.00	7714	0.18	0.00
B/M	4401	0.57	0.51	7255	0.54	0.48
Current ratio	4896	1.79	1.50	8089	1.73	1.50
Leverage	4401	0.46	0.44	7254	0.43	0.41
Asset growth	4668	1.20	1.07	7723	1.23	1.09
Tangibility	4896	0.30	0.23	8089	0.32	0.25
Asset maturity	4896	24.16	5.31	8089	29.11	7.75
Price volatility	4230	-0.80	-0.90	7024	-1.00	-1.09
ROA volatility	4644	-4.41	-4.44	7682	-4.68	-4.73
Deal size	4896	18.95	19.11	8089	19.31	19.30
Maturity	4867	1.55	1.69	8060	1.52	1.67
Syndicate size	4894	8.06	6.00	8084	10.09	8.00
Lending frequency	4896	2.48	2.00	8089	2.73	2.00
Distance to lender	4896	0.80	0.60	8089	0.78	0.60
Borrower base	4896	0.24	0.00	8089	0.12	0.00
Cash sweeps	4329	2.74	1.00	7744	2.91	2.00
Capex restriction	4139	0.35	0.00	8089	0.16	0.00
P-Covenants	4139	1.79	2.00	8089	1.57	2.00
C-Covenants	4139	0.72	1.00	8089	0.87	1.00
Performance pricing	4896	0.67	1.00	8089	0.79	1.00

Table 3: Time to next amendment, and amendment frequency by credit risk.

This table presents the mean time to amendment estimates across credit risk categories. Time to amendment is defined as the time difference between the date of amendment and the prior contracting date, which is either a previous amendment or a contract initiation date (whichever is more recent). Panel A is based on sorting observations on Altman's Z-score into 10 equally sized deciles. Panel B is based on S&P's entity-level credit ratings. Amendment data are taken from the Dealscan "deal amendments" table, which consists of amendments carried via lender majority vote (51% or other percentage of required lenders) and excludes unanimous consent amendments. Z-score and S&P's credit rating categories are defined in Appendix A.

Panel A: Time duration and amendment frequency by credit risk score deciles

Z-score Decile	**Time to Amendment**	**Number of Amendments**
0	6.56	2.81
1	7.86	2.30
2	7.09	2.51
3	7.63	2.60
4	7.70	2.55
5	7.58	2.48
6	7.87	2.58
7	8.71	2.38
8	8.97	2.35
9	9.10	2.34
Total Sample	**7.91**	**2.48**
# Obs.	**12,148**	**4,829**

Panel B: Time duration and amendment frequency by credit rating category

Moody's Rating	**Time to Amendment**	**Number of Amendments**
A-rated	10.31	1.55
B-rated 1 (BBB)	9.34	1.86
B-rated 2 (BB)	7.61	2.56
B-rated 3 (B)	8.31	2.34
C-rated	5.28	3.16
D-Rated	4.89	2.07
Not-rated	7.83	2.59
Total Sample	**7.91**	**2.48**
# Obs.	**12,148**	**4,884**

Table 4: Cox Proportional Hazard Model of duration to amendment as a function of credit risk.

This table presents estimates from a semi-parametric proportional hazard duration model, which explains the time to amendment as a function of credit risk categories. Time to amendment is defined as the time difference between the date of amendment and the prior contracting date, which is either a previous amendment or a contract initiation date (whichever is more recent). Panel A is based on sorting observations on Altman's Z-score into 10 equally sized deciles. Panel B is based on S&P's entity level credit ratings. Amendment data are taken from the Dealscan "deal amendments" table, which consists of amendments carried via lender majority vote (51% or other percentage of required lenders) and excludes unanimous consent amendments. Z-score and S&P's credit rating categories are defined in Appendix A. Robust t-statistics, two-way clustered by company and amendment quarter, are in brackets; *** p<0.01, ** p<0.05, * p<0.10.

	(1)		(2)
Z-score Decile Dummy	**Time**	**Moody's Rating Dummy**	**Time**
Z-score 1	1.4099***	A-rated	0.4597***
	[6.11]		[-6.53]
Z-score 2	1.1689***	B-rated 1 (BBB)	0.5117***
	[2.63]		[-5.41]
Z-score 3	1.2968***	B-rated 2 (BB)	0.6326***
	[5.34]		[-3.71]
Z-score 4	1.2036***	B-rated 3 (B)	0.5793***
	[3.90]		[-4.31]
Z-score 5	1.1896***	C-rated	0.9340
	[4.17]		[-0.44]
Z-score 6	1.2092***	Not-rated	0.6132***
	[4.23]		[-4.64]
Z-score 7	1.1649***		
	[3.53]		
Z-score 8	1.0497		
	[1.05]		
Z-score 9	1.0129		
	[0.27]		
Observations	12,148		12,148

Table 5: Time to Renegotiation and Ex Ante Firm Characteristics.

This table presents estimates from a semi-parametric proportional hazard duration model, which explains the time to amendment as a function of firm characteristics, controlling for credit risk categories. Time to amendment (scaled to be in months) is defined as the time difference between the date of amendment and the prior contracting date, which is either a previous amendment or a contract initiation date (whichever is more recent). Amendment data are taken from the Dealscan "deal amendments" table, which consists of amendments carried via lender majority vote (51% or other percentage of required lenders) and excludes unanimous consent amendments. Compustat variables are truncated at both tails using 1% cutoff values. All variables are defined in Appendix A. Robust t-statistics, two-way clustered by company and amendment quarter, are in brackets; *** p<0.01, ** p<0.05, * p<0.10.

	(1)	(2)	(3)
VARIABLES	Time	Time	Time
Size	0.9714**	0.9692***	0.9766**
	[-2.56]	[-2.73]	[-2.13]
ROA	0.5339*	0.4863*	0.5197*
	[-1.66]	[-1.80]	[-1.65]
Loss	1.1286***	1.1334***	1.1288***
	[3.15]	[3.28]	[3.13]
B/M	1.0306**	1.0241	1.0307**
	[2.26]	[1.55]	[2.26]
Current ratio	0.9562***	0.9550***	0.9576***
	[-3.73]	[-3.64]	[-3.61]
Leverage	1.3310***	1.3267**	1.3348***
	[4.47]	[2.49]	[4.12]
Asset growth	1.0835***	1.0761**	1.0902***
	[2.65]	[2.45]	[2.93]
Tangibility	1.0949	1.0858	1.0806
	[1.34]	[1.22]	[1.14]
Asset maturity	0.9992	0.9993	0.9993
	[-1.57]	[-1.52]	[-1.36]
Price volatility	1.0627***	1.0641***	1.0616***
	[4.09]	[4.19]	[4.05]
ROA volatility	1.0556***	1.0594***	1.0573***
	[4.09]	[4.28]	[4.26]
Z-score dummies	No	Yes	No
Moody's rating fixed effects	No	No	Yes
# of amendments	10,348	10,348	10,346

Table 6: Time to Renegotiation and Ex Ante Contract Characteristics.

This table presents estimates from a semi-parametric proportional hazard duration model, which explains the time to amendment as a function of contract and firm characteristics. Time to amendment (scaled to be in months) is defined as the time difference between the date of amendment and the prior contracting date, which is either a previous amendment or a contract initiation date (whichever is more recent). Amendment data are taken from the Dealscan "deal amendments" table, which consists of amendments carried via lender majority vote (51% or other percentage of required lenders) and excludes unanimous consent amendments. Compustat variables are truncated at both tails using 1% cutoff values. All variables are defined in Appendix A. Robust t-statistics, two-way clustered by company and amendment quarter, are in brackets; *** p<0.01, ** p<0.05, * p<0.10.

	(1)	(2)	(3)
VARIABLES	Time	Time	Time
Deal size	1.0278	1.0740***	1.0685***
	[1.34]	[3.44]	[3.10]
Maturity	0.6538***	0.6592***	0.6764***
	[-9.61]	[-9.59]	[-8.87]
Syndicate size	0.9942**	0.9909***	0.9907***
	[-2.47]	[-3.49]	[-3.53]
Lending frequency	1.0274***	1.0250***	1.0264***
	[4.59]	[3.62]	[3.66]
Distance to lender	1.0515***	1.0386**	1.0388**
	[3.15]	[2.25]	[2.05]
Borrower base	1.1816***	1.1015***	1.0915***
	[5.64]	[3.00]	[2.85]
Cash sweeps	1.0420***	1.0362***	1.0341***
	[5.27]	[5.00]	[4.39]
Capex restriction	1.1495***	1.1327***	1.1379***
	[4.11]	[3.58]	[3.33]
Dividend restriction	1.0875**	1.0612	1.0503
	[2.22]	[1.53]	[1.31]
P-Covenants	1.0597***	1.0474***	1.0379**
	[4.06]	[3.13]	[2.30]
C-Covenants	1.0150	1.0202	1.0155
	[0.59]	[0.74]	[0.57]
Performance pricing	0.9281**	0.9434*	0.9466*
	[-2.33]	[-1.93]	[-1.87]
Size		0.9728**	0.9876
		[-2.11]	[-0.95]
ROA		0.3415***	0.3639**
		[-2.63]	[-2.32]
Loss		1.0686*	1.0866**
		[1.76]	[2.15]
B/M		1.0341***	1.0252**
		[2.66]	[1.96]
Current ratio		0.9554***	0.9568***
		[-3.53]	[-3.20]
Leverage		1.0767	1.1883*
		[0.87]	[1.95]
Asset growth		1.0667**	1.0644**
		[2.33]	[2.29]
Tangibility		1.0610	0.9610

		[0.84]	[-0.56]
Asset maturity		0.9998	1.0000
		[-0.33]	[0.01]
Price volatility		1.0470***	1.0412**
		[2.70]	[2.20]
ROA volatility		1.0395***	1.0413***
		[2.91]	[2.82]
S&P's fixed effects	No	No	Yes
Industry fixed effects	No	No	Yes
Deal purpose fixed effects	No	No	Yes
Macroeconomic indicators	No	No	Yes
Time trend	No	No	Yes
# of amendments	10,611	9,065	9,051

Table 7: Favorable and Unfavorable Renegotiations: Time to Renegotiation as a Function Firm and Contract Characteristics.

This table presents estimates from a semi-parametric proportional hazard duration model, which explains the time to amendment as a function of contract characteristics interacted with favorable vs. unfavorable amendment indicators. An amendment is defined to be favorable if the cumulative stock return from the date of prior contracting is positive and unfavorable otherwise. Time to amendment (scaled to be in months) is defined as the time difference between the date of amendment and the prior contracting date, which is either a previous amendment or a contract initiation date (whichever is more recent). Amendment data are taken from the Dealscan "deal amendments" table, which consists of amendments carried via lender majority vote (51% or other percentage of required lenders) and excludes unanimous consent amendments. Compustat variables are truncated at both tails using 1% cutoff values. All variables are defined in Appendix A. Robust t-statistics, two-way clustered by company and amendment quarter, are in brackets; *** p<0.01, ** p<0.05, * p<0.10.

		(1)			(2)	
VARIABLES	Favorable	Unfavorable	Difference	Favorable	Unfavorable	Difference
Deal size	1.0685***	0.9906	***	1.1167***	1.0245	***
	[3.26]	[-0.36]	[-2.74]	[5.01]	[0.87]	[-2.87]
Maturity	0.7163***	0.6682***		0.7112***	0.6575***	
	[-6.16]	[-7.41]	[-1.09]	[-5.69]	[-7.34]	[-0.97]
Syndicate size	0.9919***	0.9927**		0.9891***	0.9899***	
	[-2.82]	[-2.13]	[0.20]	[-3.67]	[-2.72]	[0.20]
Lending frequency	1.0353***	1.0339***		1.0336***	1.0246**	
	[4.76]	[3.87]	[-0.13]	[3.65]	[2.54]	[-0.79]
Distance to lender	1.0606***	1.0435*		1.0407*	1.0289	
	[2.61]	[1.78]	[-0.53]	[1.67]	[1.12]	[-0.36]
Borrower base	1.2205***	1.1350***		1.1199***	1.0628	
	[5.45]	[3.02]	[-1.53]	[2.61]	[1.53]	[-1.11]
Cash sweeps	1.0628***	1.0284***	***	1.0471***	1.0228***	**
	[6.32]	[2.98]	[-3.39]	[4.57]	[2.61]	[-2.20]
Capex restriction	1.1093**	1.1871***		1.0799*	1.1429***	
	[2.53]	[3.59]	[1.23]	[1.67]	[2.91]	[1.04]
Dividend restriction	1.1406***	1.0348		1.0953*	0.9986	
	[2.65]	[0.67]	[-1.60]	[1.76]	[-0.03]	[-1.44]
P-Covenants	1.0586***	1.0757***		1.0435*	1.0323	
	[2.72]	[3.63]	[0.64]	[1.88]	[1.61]	[-0.43]
C-Covenants	1.0431	0.9971		1.0396	1.0083	
	[1.28]	[-0.09]	[-1.24]	[1.09]	[0.24]	[-0.79]
Performance pricing	0.8945**	0.9974	**	0.9093**	1.0293	**
	[-2.49]	[-0.07]	[2.19]	[-2.19]	[0.75]	[2.39]
Firm characteristics		No			Yes	
S&P's fixed effects		No			Yes	
Industry fixed effects		No			Yes	
Deal purpose fixed effects		No			Yes	
Macroeconomic indicators		No			Yes	
Time trend		No			Yes	
# of amendments		8,936			8,041	