Bank Skin in the Game and Loan Contract Design: Evidence from Covenant-Lite Loans

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Abstract

In a model of dual agency problems where borrower-lenders and bank-nonbank incentives may conflict, we predict a hockey stick relation between bank skin in the game and covenant tightness. As bank participation declines covenant tightness increases until reaching a low threshold, at which point the relation sharply reverses and covenant protection is removed with a commensurate increase in spread. We find support for the hockey stick relation with banks stake in covenant-lite loans averaging 8% (0% median). We also find that covenant-lite loans are more likely when borrower moral hazard is less severe and when bank relationship rents are high.

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1 Introduction

The changing mix of capital from the shadow and traditional banking sectors has altered the landscape of the syndicated loan market. What was originally a bank dominated market now includes a plethora of nonbank institutions (see Figure 1). A bank's economic stake in loans it originates (i.e., bank's "skin in the game") can vary from 100% to little or no stake at all when the bank simply acts as an originator. Concerns regarding the drivers and consequences of this fundamental shift have been sounded by academics, regulators, and practitioners who worry about the ultimate influence this change in the bank's "skin in the game" has had on lending standards and contract design.[1]

Such concerns have been particularly acute for "covenant-lite" loans (described in detail in Section 3) which have recently exploded in popularity. Unlike typical loans, covenant-lite loans lack financial maintenance covenants, granting the issuer greater flexibility, but leaving the lender with little recourse in the event the issuer's condition deteriorates. This lack of lender protection would perhaps be innocuous if confined to low risk borrowers; however, covenant-lite loans are found virtually exclusively in leveraged loans, the riskiest segment of the syndicated loan market primarily involving non-investment grade ("junk") borrowers. First introduced in 2005, covenant-lite loans rose in popularity with issuance of $140 billion in 2007. Covenant-lite loan activity virtually disappeared during the crisis, only to return at a record pace and at record levels with covenant-lite loans accounting for 20% of the $465 billion leveraged loan market in 2012 (see Figures 2 and 3) and reaching 48% in January 2013 (Treasury-today, 2013).[2]

[1]Stein (2013) articulates how institutional involvement may change loan contract features as well as affect prices (yield spreads): "…in an institutions-driven world, where agents are trying to exploit various incentive schemes, it is less obvious that increased risk appetite is as well summarized by reduced credit spreads. Rather, agents may prefer to accept their lowered returns via various subtler nonprice terms and subordination features that allow them to maintain a higher stated yield."

[2]LeveragedLoan.com, a subsidiary of Standard and Poor's, describe recent covenant-lite loan activity as follows: "It may be too early to conclude that traditional financial covenants are going the way of vinyl records and VHS tapes (or even DVDs). Still, the loan market's buoyant conditions of the past few months have propelled covenant-lite volume ahead of its covenant-heavy counterpart for the first time. During the opening days of 2013, for example, 57% of new institutional volume had only incurrence tests, as opposed to more restrictive maintenance tests. That builds on December's record monthly reading of 52%."

One important issue is exactly how to regulate, if at all, covenant-lite loans.[3] While bank regulation may intend to limit or enhance certain bank activities, there may be unintended consequences. Some forms of regulation may simply "squeeze the balloon" which, rather than popping, simply expands away from the tightening hands of the regulator and towards the unregulated "shadow banking" sector. When regulation influences the mix of regulated and shadow bank participation, the activity may not simply change hands. It may alter the nature and structure of transactions, leading to fundamental changes in contract design. If the contract features influence future economic outcomes for borrowers, investors, and the overall economy, then there will be important welfare implications resulting from how this mix of capital ultimately influences contract design.

So what role does the changing nature of bank and nonbank involvement play, if any, in loan contract design and the rise of covenant-lite loans? This is precisely what we explore in this paper. We develop a new model where the optimal loan contract depends on the funding mix, defined as the proportion of the loan funded by the bank (i.e. bank skin in the game). Nonbank institutional investors (henceforth "institutions") fund the remainder of the loan.[4] We model a dual-agency problem with conflicts of interest between the borrower and lender and between the bank and institutions. In our setup, borrowers may engage in moral hazard, destroying value. In an effort to counter the moral hazard incentives, lenders write covenants based on observable financial metrics (i.e., "maintenance covenants"). When triggered, the covenant provides the lenders the opportunity to enforce the covenant (i.e., renegotiate the loan in their favor), acting as an ex ante deterrent to the borrower's moral hazard.

The second part of the dual agency conflict arises over differences in bank and institution

[3]"Federal regulators issued new guidance on leveraged lending to combat weakening standards as issuance of the debt grows at the fastest pace since the financial crisis. Prudent underwriting practices have deteriorated with the inclusion of covenant-light transactions and less-than-satisfactory risk management practices." ("Regulators Caution Banks to Boost Standards on Leveraged Loans," *Bloomberg Businessweek*, 3/21/2013).

[4]The composition of investors contributing capital to the leveraged loan market has systematically shifted from predominantly banks, who have 'special' monitoring and screening expertise (See Fama, 1985, and James, 1987) to nonbank institutional investors who view loans as a passive asset class (Gande and Saunders, 2012; Ivashina and Sun, 2011).

interests regarding when to enforce and when to waive a triggered covenant violation. On the one hand, banks have a cost advantage of enforcing the covenant, which benefits the institution if the bank controls covenant enforcement. On the other hand, banks earn relationship rents from the borrower, which materialize if and only if the borrower is allowed to continue.[5] This contingent nature of relationship rents gives rise to a conflict of interest over enforcement. Covenant tightness determines the states in which enforcement may occur. As a result relaxing or tightening the covenant affects the conflict of interest between bank and institutions. In equilibrium, the covenant will be set based on its simultaneous influence on both borrower moral hazard incentives and on bank-institution conflicts, which in turn depend on the mix of capital used to finance the loan.

Our model has numerous implications, which we test using a comprehensive sample of syndicated leveraged loans over the years 2005-2011. First, we find optimal covenant tightness increases as the bank's share of the loan declines. Yet unlike prior work, our model uniquely predicts a reversal of this relation when the bank share falls below a threshold. The intuition is that as bank participation declines, the conflict of interest between the bank and institutions becomes so severe that the optimal contract grants institutions enforcement control, who under certain conditions optimally choose to remove the covenant entirely.[6] This results in a non-monotonic, hockey stick like, relation where covenant tightness gradually increases as bank share declines until reaching a threshold value, at which point the covenant becomes infinitely loose.

Our non-monotonic relation complements existing theory and evidence. Motivated by Pennacchi (1988) and Gorton and Pennacchi (1995), Drucker and Puri (2008) show that both a loan's liquidity and its appeal to institutional investors increase with covenant protection, likely resulting from the pivotal role covenants play in solving a dual agency problem. They argue that as the bank's stake in the loan declines, institutions prefer tighter covenants which increase the bank's

[5]The borrower continues when the covenant is either not triggered or if it is waived (i.e., not enforced).

[6]As discussed in detail in the model section, low bank participation makes a loan more likely to be covenant-lite, but it is not a sufficient condition. When we endogenize the bank share, we show that covenant-lite characteristics of a loan are always accompanied by very low bank participation (i.e. a necessary, but not sufficient condition.) We discuss the circumstances where covenant-lite arise, which depend on the severity of borrower moral hazard, the degree of bank enforcement cost advantage, and the bank's relationship value.

incentive to monitor (Rajan and Winton, 1995) and reduce monitoring costs (Berlin and Loeys, 1988). However, none of the theories motivating Drucker and Puri (2008) predict a reversal of this relation (hockey-stick), which is a truly unique prediction of our model.[7]

We find remarkable evidence in support of this prediction relation in the data. Figure 4 plots institutional loan share (one minus bank share) against covenant tightness, measured as the number of covenants. We not only see the dramatic "hockey stick" relation our model predicts, but also that the bank's stake in covenant-lite loans averages 8% (and institutions 92%).[8]

Moreover, our model predicts that this discontinuity in covenant tightness comes in tandem with a change in loan pricing (i.e., loan spread). Not only are covenant-lite loans financed primarily by institutions, they also carry a higher spread given lenders require greater compensation for borrower moral hazard. This higher spread also represents a reversal in the relation between loan spreads and institutional participation. As institutional participation increases, optimal covenant tightness increases, and the contract carries a lower loan spread. This negative relation between loan spreads and institutional participation is empirically documented by Ivashina and Sun (2012). However, our model predicts that this relation sharply reverses as institutional share in the loan crosses a threshold to a covenant-lite equilibrium. We empirically test our covenant-lite loan spread prediction using both regression and propensity-score matching techniques and find that covenant-lite loans carry a 7% to 16% higher loan spread than covenant-heavy loans, which translates to between 25 and 50 basis points, after controlling for risk. These findings also support a popular view that covenant-lite loans are satisfying investor demand for higher yielding instruments.[9]

Our model has important implications about the types of borrowers and lenders who will likely

[7]In addition to generating a non-monotonic relation between bank share and covenant tightness, our model generates both variation in covenant tightness and the propensity to waive covenants, similar to Gârleanu and Zwiebel (2009) and consistent with the findings of Chava and Roberts (2004).

[8]We find the bank median stake in covenant-lite loans is 0%. In addition to the bank having a direct economic interest through its stake in the loan, banks will likely also have reputational capital tied to the loan. We explore and discuss this in greater detail later in the paper.

[9]For example: "Do credit investors have goldfish-like memories?. . . covenant-lite high-yield bonds and loans are back in vogue. The latest frantic search for yield triggered by the liquidity unleashed by quantitative easing could lead to capital being misallocated." *Barley, R. "The Return of Credit-Market Craziness?" The Wall Street Journal, Heard on the Street. 6, November, 2010.*

be involved in covenant-lite loans. What kind of loan each firm gets will be determined by its net benefit from covenants (i.e, the value that would have otherwise been destroyed by risk-shifting less expected renegotiation costs). The efficient outcome will be for firms with low benefit from covenants to get covenant-lite loans. These are the firms that destroy little value by risk-shifting or are hard to incentivize not to risk-shift. Empirically, we test this implication by focusing on loans sponsored by private equity groups (PEGs), which comprise a significant fraction of all leveraged loans as well as covenant-lite loans (see Demiroglu and James, 2010). If the PEGs have reputation concerns across deals and for future deals, then they may be less likely to engage in moral hazard by exploiting the flexibility of covenant-lite loans. Moreover, more active PEGs may also make renegotiation particularly costly to banks, given they frequently engage lenders and likely have superior negotiating skill. Empirical tests indeed reveal PEG sponsored loans are more likely to be covenant-lite, and within PEG sponsored loans the probability of receiving a covenant-lite loan increases in the PEG's overall activity (reputation) in the loan market.

Last, a key component to our model is the bank's relationship value with the borrower, a primary source of the friction between banks and institutions. Our model suggests that higher bank relationship value increases the enforcement conflict between the institution and the bank, and thus increases the likelihood of a covenant-lite loan. To empirically test this implication, we use a bank's syndicated loan market share to proxy for future relationship rents, consistent with Ross (2010). In multivariate logit regressions we document that covenant-lite loans are more likely to be originated by dominant banks.

Our paper has important implications for regulators and financial market design. The model suggests that any regulatory burden that raises banks' cost of capital relative to shadow banks may lead to more covenant-lite loans and a greater potential for risk-taking.[10] We show covenant-lite

[10]For example, bank regulation in the form of risk-based capital requirements may significantly raise banks' cost of capital relative to unregulated non-bank institutions, especially for non-investment grade loans. (Basel II capital requirements for a BB rated loan are about twice that for A rated loans.) This significant increase in banks' cost of capital gives unregulated institutional investors a cost advantage in funding riskier loans (Kashyap, Stein, and Hanson, 2010) and supports our finding that covenant-lite loans will arise when bank capital is limited (relative to non-bank capital and relative to loan demand).

loans arise when bank capital is insufficient to meet aggregate loan demand; thereby alleviating the negative effects of bank capital constraints. However, covenant-lite loans do not simply transfer risk from banks to institutions. Rather, risk increases due to the changes in incentives that arise when the optimal contract becomes one free of covenant restrictions, allowing risky borrowers far greater flexibility in choosing their own destiny, and that of its creditors. If covenants serve as an early warning device that allows renegotiation and a redeployment of assets, then the benefits of covenant protection – at the firm, borrower-lender, and economy-wide level – are lost.

2 Theoretical model

We develop a theory of covenants, based on dual agency problems. We have three participants in our model: a firm (borrower) with a project in need of funding, and two lenders - a bank and a nonbank investor, which we call institution. First, we model a standard moral hazard problem between the borrower and lenders, resulting from the borrower's ability to unobservably add risk to the project (risk-shifting). The second agency conflict arises between the two lenders over the decision of when to enforce or waive the covenant. In our model the bank has a cost advantage of enforcing the covenant (in the event the covenant triggers). Given the bank's cost advantage, the institution will always prefer to give the bank control over the enforcement decision as long as the bank's incentives to enforce align with the institution's. In contrast to the institution, the bank receives a relationship benefit if the borrower survives to make a second period investment. This benefit accrues to the bank when the covenant is either not violated or waived if violated (not enforced). We interpret this relationship benefit as a future round of borrowing where the bank receives a portion of the NPV of the subsequent investment. The conflict arises in states where the bank's relationship benefit exceeds its benefit from enforcing (i.e., from renegotiating the loan terms).[11]

[11]The institution has no relationship benefit so the additional payoff of enforcement leads the institution to always choose enforcement (never waive).

The loan contract defines both the covenant set (the states of the world where the lender has the right to enforce the covenant), and covenant control (whether the bank or institution makes the enforcement decision in the event the covenant is breached). The tension in the model stems from the dual effect that increasing covenant tightness has on both agency problems considered in the model. As covenant tightness increases, the borrower's incentive to engage in moral hazard diminishes; however, increasing covenant tightness now spans a greater number of states where the institution and the bank's enforcement incentives conflict.

The tension created by these two effects of covenant tightness, and hence the optimal contract, will depend on the relative participation of the bank and the institution. The payoff of enforcement is split between the lenders according to their relative stakes in the loan, while the bank's relationship rent is fixed (independent of the bank's stake in the loan). As the bank's stake decreases, its benefit from enforcing carries less weight compared to its relationship benefit, and the conflict between the bank and the institution worsens.

The model predicts three possible outcomes: a covenant-lite loan, a covenant-heavy loan with institution control of enforcement, and a covenant-heavy loan with bank control. We show that the crucial parameters that determine which loan contract prevails are the bank's participation (stake) in the loan and the magnitude of the bank's cost advantage of enforcing the covenant.

Our model relates to prior work by Pennacchi (1988) and Gorton and Pennacchi (1995). They model the agency problem between the bank and institutions as one of moral hazard where banks may choose a suboptimal level of loan screening (or, equivalently, post-origination monitoring) if they sell a fraction of the loan to institutions. They show that the conflict between the bank and the loan buyer can be alleviated when the bank maintains a sizeable stake in the loan or provides a (partial) guarantee of the loan. Our model employs a similar friction. We explicitly model the bank's post-origination control activities where covenants influence bank monitoring and enforcement incentives.

Rajan and Winton (1995) also model the agency conflict between banks and other claimants with borrower moral hazard, as in our model. They show covenants enhance the bank's incentive to monitor, and thus alleviate the dual agency conflicts. Our framework differs along many dimensions. First, Rajan and Winton model covenants based on private information where in our model the covenants are based on publicly observable information (as maintenance covenants). Second, we model covenant tightness, which is not a focus in their framework. Finally, our model explicitly allows us to analyze the influence of the bank's (and institution's) share in a loan on optimal contract features.

Our model relates to Garleanu and Zwiebel (2009) who explain the waiving of covenant requirements after a violation, as empirically documented by Chava and Roberts (2005). In their model, the bank has the right to forbid a certain action, which may be productive, so the bank waives the restriction under some conditions. In this paper, we model optimal loan contracts in an environment with dual agency problems and characterize covenant-lite equilibria. Furthermore, we also find that for loans with covenants, banks may have incentives to waive them due to relationship rents.

Another strand of the literature models the influence of loan securitization on the bank-institution agency problem. Rajan, Seru and Vig (2010) explore the influence of securitization on the agency problem between the bank (as loan originator) and the institution (as purchaser of securities tied to loan pools). They argue that banks use both hard and soft information when originating loans they plan to hold. In the case of securitization, the bank has little incentive to invest in soft information collection and simply uses hard information. While their paper concentrates on information and origination standards, we investigate the effect of the dual agency problem on covenant *and* enforcement behavior.

Similar to our focus, Ayotte and Bolton (2009) look at the influence of loan securitization on covenant-lite loans. They construct a model in which lenders may want to sell pools of loans to manage a liquidity shock. The friction is driven by the outside institution's cost of reading detailed contract terms for a large pool of loans. They show that two equilibria are possible: one with a robust secondary market for covenant-lite loans (which impose no such reading costs given the lack of covenants), and an equilibrium where covenant-heavy loans are issued, but not resold.

Their model is similar in spirit to ours, but with key distinctions. Ayotte and Bolton assume that the loan is either sold or retained. In our modeling framework, the share of the loan that is kept by the bank is critical for contract design. This prediction is validated in our empirical tests. Secondly, heterogeneity in the pool of borrowers is key in our model to determine which firms get covenant-lite loans, which get covenant-heavy, and what share of each loan is kept by the bank. We see our model as a complement to theirs by showing that even absent securitization, covenant-lite loans may arise.

We also stress that earlier studies present models suitable for the analysis of negative covenants. Negative covenants prohibit particular actions by the firm, whereas the theoretical model in this paper generates endogenously a maintenance covenant, which is tested at specific time intervals regardless of the firm's actions.

2.1 Environment

There are three parties: a firm, a bank, and outside investors which we call institutions.

Investment The firm has a productive project that requires an investment of I and yields a return of $\bar{R}$. After the investment takes place, the firm chooses whether to conduct its business in a safe (s) or risky (r) manner. Action $a = r$ can be interpreted as risk-shifting and (due to limited liability) it brings a private benefit x to the borrower and a cost y to the lenders. We assume that the action r destroys value ($y > x$), so it would be desirable that the loan contract prevents it.

Second period investment The firm has a subsequent investment opportunity with an uncertain (but positive) payoff. Information about the opportunity is revealed over time. Let c be the conditional expectation of the payoff at the time when covenant can be enforced. At date zero, c is a random variable with a density $h(c)$. If a covenant (to be defined later) is enforced, the financially constrained firm cannot undertake second period investment. For this reason, we interpret c as the opportunity cost of enforcing a covenant. The cost c has a compact support $\mathbf{C} \equiv [c_a, c_b]$. Let $\bar{c} = E[c]$. We model the bank as having a continuing business relationship with the firm, where the bank makes a future profit of βc if the firm succeeds in undertaking the second period investment.[12] The parameter $\beta \in (0, 1)$ and is related to the strength of the relationship between the firm and the bank.

Information and Signals The action a is observable only by the firm. However, there exists a random variable z which provides a noisy signal of the action a, with a conditional CDF $F(z|a)$ and a pdf $f(z|a)$. The signal z can be interpreted as accounting or financial metrics, such as a leverage ratio, a debt to earnings ratio, etc., commonly employed in loan covenants. We assume that z can be costlessly and perfectly observed by all parties and that it satisfies the Monotone Likelihood Ratio Property (MLRP) in that $f(z|s)/f(z|r)$ is strictly increasing in z. This implies that a lower value of z is more informative of action r. For analytical convenience, we assume that z has a compact support $\mathbf{Z} \equiv [z_a, z_b]$. Let $g(z) \equiv f(z|r)/f(z|s) - 1$ summarize the information in the signal z.

The terms of the contract include provisions based on all the publicly available and verifiable information. This implies that the nonconctractible term c is by definition orthogonal to z. Upon realization, all the parties (firm, bank, and institution) observe c perfectly. We follow the pioneering work of Aghion and Bolton (1992) and cast the model in the incomplete contracts paradigm and we assume that c is noncontractible information.

Contract and renegotiation The loan contract specifies a base repayment D, a set $A \subseteq \mathbf{Z}$ of signal realizations at which the lender can ask for early repayment (covenant) and a party (institution or bank) that has the right to ask for early repayment.[13] Since the firm cannot repay the loan, the

[12] The two period assumption need not be taken literally. We can think of c as the net present value of future (short or long-run) projects that are disrupted when a covenant is enforced.

[13] One may expect that the decision should be taken by the party with larger share in the loan. However, many loan agreements have supermajority or unanimity requirements for any major decisions. A supermajority requirement is

lenders renegotiate the contract and extract the whole free cash flow. The extractible cash flow is $R \leq \bar{R}$. Since the firm is liquidity constrained, if the lender asks for early repayment, the firm must forgo the second period investment opportunity.[14] The bank cannot implement the investment on its own, nor can it extract its value from the firm. This is justified by the investment being specific to the manager and the need to provide incentives for management.

Since the opportunity cost c is not contractible, covenant enforcement is also not contractible. The cash flow from the loan repayment is divided proportionally between the institution and the bank with the bank share denoted as k.[15]

There is a resource cost to enforcing the covenant, γ for the institution and γ' for the bank. The institution has a cost disadvantage to enforcing the covenant: $\gamma > \gamma'$. This is due to the fact that institutions lack the expertise in managing loans and monitoring firms. However, since z is public, $\gamma < \infty$. Without loss of generality, we can normalize the bank's cost $\gamma' = 0$. The enforcement cost is borne proportionally by all lenders (institution and bank).

Commitment None of the parties can commit to an action. In particular, the firm cannot commit to a and the lender with control (enforcement) right cannot commit to enforcement and renegotiation behavior.

We have the usual assumption that the source of the friction is the firm's private information. However, we also have another friction. As we shall see, the lender may fail to enforce the covenant when it is (ex ante) optimal to do so. Thus we can think of the covenant set A as a constraint against opportunistic behavior on the part of the lender with control right and also a device to provide incentives for enforcement.

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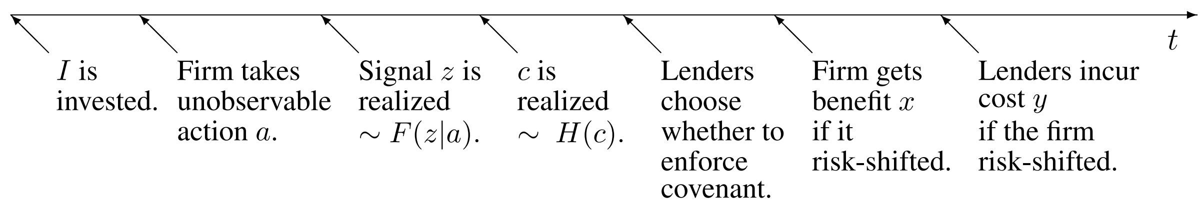
equivalent to granting the party a control right.

[14]For evidence that firms experience a contraction in capital expenditures after a covenant violation, see Nini, Smith, and Sufi (2012).

[15]This is justified by regulatory restrictions. For a discussion of this issue, see Gorton and Pennacchi (1995), p. 397.

Timeline



Symbols

I	Investment (size of the loan).
$\bar{R}$	Cash flow from the funded project.
R	Cash flow available for repayment.
a	Firm's unobservable action. $a \in \{r, s\}$.
x	Private benefit of the risky action ($a = r$).
y	Cost to the lenders from the risky action ($a = r$).
z	Publicly observable signal z, correlated with a.
$F(z\|a)$	Conditional CDF of the signal z.
$\mathbf{Z} = [z_a, z_b]$	Support of the signal z.
c	Conditional expectation of net present value of second period investment projects
$H(c)$	PDF of c with a support $\mathbf{C} = [c_a, c_b]$.
$\bar{c}$	Expected value of c (and of NPV of the second period project).
k	Bank share in the loan.
$1 - k$	Institution share in the loan.
β	Share of the value of the second period project captured by the bank.
γ	Additional cost if institution enforces the contract
D	Base payment
$A \subseteq \mathbf{Z}$	Set of z-s for which the lenders can demand early repayment.
$E(z, c)$	Enforcement strategy of the party with control rights.
$\pi(a)$	Payoff of the firm as a function of action a.

2.2 Strategies and incentives

Except for the base payment, covenant set, and granting of control right, the behavior of all parties cannot be predetermined. The behavior of all the parties maximizes their payoff, subject to anticipated behavior by the other parties, or in other words, given an enforceable contract, the strategies of all the parties constitute a Nash equilibrium.

The lenders decide, whether to enforce the covenant and how to negotiate after the covenant is enforced. In principle, these decisions can be made by either the institution or the bank. Depending on the party making the decision, the equilibrium of the subgame following a breach of the covenant will be different, so the allocation of control rights is part of the optimal contract. For the purposes of comparison, we also characterize the optimal contract when the institution and the bank can commit to some strategies in advance.

2.2.1 Strategies

When considering the incentives of the firm, the bank, and the institution, it will be useful to consider the strategies of the three parties in the greatest possible degree of generality. The strategies and the contract (which specifies the base payment, covenant, and the allocation of control rights) are the predictions of the model. In what follows we concentrate on pure strategies.

The firm chooses an action $a \in \{r, s\}$. So the firm's strategy consists of action a.

The lender strategy must specify covenant enforcement and repayment. First, after observing the signal z and the opportunity cost c the covenant may be enforced. Let $E : \mathbf{Z} \times \mathbf{C} \to \{0, 1\}$ be the lender's enforcement strategy. Enforcement is conditioned on the verifiable (and hence contractible) signal z and the opportunity cost c (which is known to the parties of the contract, but not contractible). Since the lenders cannot enforce if z is not in the covenant set, we have that $E(z, c) = 0$ if $z \notin A$. Then the covenant set A is, in effect, a constraint on the lender.

Secondly, a strategy specifies a renegotiation behavior in the event of breaking the covenant. Since c is noncontractible, the enforcement and renegotiation strategies cannot be specified in the contract. We assume that the party with control rights makes a take-it-or-leave-it offer to the firm. There is a mass of competitive lenders that are able to refinance the loan. Thus the take-it-or-leave-it offer is constrained by the best outside option the firm can obtain. The lender has some freedom of action since there are switching costs. Thus we can think of R as the largest amount the lender can extract subject to the threat of outside financing. So the renegotiation strategy is summarized by the function $D' : \mathbf{Z} \times \mathbf{C} \to \mathbb{R}$.

2.2.2 Firm payoffs and incentives

The firm has an informational advantage: it chooses the action a, which is hidden from the bank and the institution. The equilibrium strategy must be consistent with the incentives for action. It is possible to provide incentives for the firm since by choosing the action a, the firm affects the likelihood that the covenant will be triggered and subsequently enforced.

The firm's payoff as a function of its action is given by:

$$\pi(a) = \bar{R} + \bar{c} - \int_{\mathbf{C}} \int_{\mathbf{Z}} [D + E(z,c)(D'(z,c) - D + c)] f(z|a)h(c)dzdc + \mathbf{1}_r(a)x, \tag{1}$$

where $\mathbf{1}_r(.)$ is the indicator function. The firm's payoff is given by its cash flow $\bar{R}$, expected second period profits, risk-shifting value x (if it occurs) minus expected payment and disruption of second period projects. The firm will take action $a = s$ if and only if $\pi(s) \geq \pi(r)$, or:

$$\int_{\mathbf{C}} \int_{\mathbf{Z}} E(z,c)(D'(z,c) + c - D)[f(z|r) - f(z|s)]h(c)dzdc \geq x. \tag{2}$$

Taking the risky action $a = r$ increases the probability that the covenant is triggered, which is captured by the term $f(z|r) - f(z|s)$. The firm suffers a loss of $D'(z,c) + c - D$ whenever the covenant is enforced which allows for incentives for $a = s$ to be provided.

2.2.3 Payoffs and incentives for the institution

We solve for the behavior of the institution working backwards. If the covenant is enforced, it is optimal for the institution to demand the entire extractible cash flow R, so $D'(z,c) = R$. The institution gets an additional payoff $(1-k)(R-D)$ of enforcing the covenant at a cost of $(1-k)\gamma$. Therefore, the institution will either always enforce the covenant: $E(z,c) = 1, \forall (z,c) \in A \times \mathbf{C}$, or never enforce it: $E(z,c) = 0, \forall (z,c) \in A \times \mathbf{C}$. Clearly a condition for enforcing the covenant is $R - D \geq \gamma$.

2.2.4 Bank payoffs and incentives

Similar to the case of the institution, we solve for the bank's strategies working backward. If the bank chooses to enforce the covenant, it will forego the profit βc for any demanded repayment, so the bank will demand the entire extractible cash flow. Therefore $D'(z, c) = R$.

The bank chooses to enforce only if

$$k(R - D) \geq \beta c. \tag{3}$$

Then the bank's enforcement strategy is given by:

$$E(z, c) = \begin{cases} 1 & c < k(R - D)/\beta \text{ and } z \in A \\ 0 \text{ or } 1 & c = k(R - D)/\beta \text{ and } z \in A \\ 0 & \text{otherwise.} \end{cases}$$

2.3 Optimal enforcement behavior with perfect bank commitment

Our model relies on the interaction of two frictions – the firm cannot commit to choose action $a = s$ and the lenders cannot commit to the optimal enforcement behavior. In order to disentangle the role of the two frictions, we briefly consider the case when the lender can commit to enforcement and renegotiation behavior. We call this problem the one-sided commitment problem. First, we solve for the optimal enforcement behavior and contract under those circumstances. Second, we check if under some circumstances, the equilibrium outcome can attain the optimal solution.

In particular, we assume that the enforcement strategy E and the repayment function $D'(z, c)$ can be arbitrary (as long as the functions are Borel-measurable). This also implies that the bank share k and the fraction of the value of the second period project captured by the bank β are irrelevant for the bank's enforcement decision.

Consistent with our assumptions about the competitive equilibrium, the optimal contract maximizes the payoff of the firm subject to incentive and break-even constraints. For regulatory and accounting reasons, the bank must break even in expectation and they cannot book future profits when accounting.

$$\max_{(a,D,D',E)} \bar{R} + \bar{c} - \int\int [D + E(z,s)(D'(z,c) - D + c)]h(c)f(z|a^*)dcdz + \mathbf{1}_r(a^*)x \qquad (4)$$

$$\text{s. to } (2) \text{ if } a = s$$

$$\int\int [D + E(z,c)(D'(z,c) - D)]h(c)f(z|a^*)dcdz \geq I + \mathbf{1}_r(a^*)y$$

We call this problem P1. Characterizing the mechanism is tractable since the objective function and the constraints are integrals of fixed functions, so the problem is convex.

Theorem 1 *At the optimal solution, $D'(z,c) = R$. There exist positive constants μ and λ such that the covenant is enforced at (z,c) if and only if $z \in [z_a, z^*]$, and $c \in [c_a, c(z)]$, where*

$$c(z) = \frac{(R - D)(\lambda - 1 + \mu g(z))}{1 - \mu g(z)}$$

and z^* is implicitly given by $c(z^*) = c_a$ and $z^* < c_b$ and $g(z) = f(z|r)/f(z|s) - 1$. The base payment D is such that the break-even constraint holds with equality.

Proof. In Appendix B. ■

Theorem 1 shows that for large enough z ($z > z^*$), there will never be an enforcement action. Therefore, the optimal mechanism for problem P1 has a covenant-like structure. Moreover, enforcement depends on the realizations of both the signal z and the relationship rent c.

We combine enforcement policies under different scenarios in figure 5. Panel A illustrates the optimal enforcement under commitment, implied by theorem 1. At the optimum, the covenant is waived if $c > c(z)$ and $c(z)$ is strictly decreasing on some interval $(z_a, z^*]$. Panel B describes enforcement decision consistent with the incentives for the institution, derived in section 2.2.3. Panel C does the same for the bank. Both for the bank and the institution (panels B and C), the value of z does not matter for the waiving of the covenant. *Conditional* on having the right to enforce, the decision of the lender whether to enforce or not depends only on c.

We conclude that the equilibrium contract without commitment cannot replicate the one under an environment where commitment is granted. Therefore, the lenders' lack of commitment is a binding constraint for the competitive equilibrium. Thus it is necessary to analyze the general case of no-commitment.

2.4 The competitive equilibrium contract

We have shown that the optimal contract for the (realistic) case, when the the lenders cannot commit to ex post enforcement behavior, must incorporate incentives for the enforcement party. This is the focus of this section which presents the predictions of the full model. What is the contract and implied enforcement behavior when the lenders cannot commit? Do we observe covenants and what is their tightness?

To reiterate, the loan contract consists of base payment D (spread), covenant set A (set of values of the signal z in which early repayment can be demanded) and the party (bank or institution) that has the control right to enforce the covenant. The contract terms are binding and enforceable. The actions of the firm, the institution and bank are not contractible. Therefore, we impose the constraint that the actions of every party be optimal at each point.

Definition 1 *An equilibrium given A, D and allocation of control rights consists of firm strategy $a \in \{r, s\}$ and strategy of the party with control rights E,D' such that:*

1. *Given E and D', the firm strategy is optimal, that is $a = s$ if and only if (2) holds.*

2. *The strategy of the party with control right is optimal at each pair $(z, c) \subseteq \mathbf{Z} \times \mathbf{C}$.*

We assume that financial markets are competitive. There exists a mass of competitive banks. If a bank lends to the firm in the first period, it builds a relationship with the firm, so in the second period their interests are aligned to some degree. For regulatory and accounting reasons, the bank must break even in expectation and they cannot book future profits when accounting. We also assume that the bank share in the loan k is exogenously determined. In section 2.5 we present an extension of the model that endogenizes k.

Given these assumptions, the equilibrium contract maximizes the firm's payoff (equation 1), subject to the firm incentive constraint (equation 2), a relevant break-even constraint and an additional constraint: the behavior of the lender with control rights is individually rational at every point.[16]

There are two parties providing financing and each one must break even. In appendix A, we show that a consolidated break-even constraint is sufficient. There are three cases. First, if there are no covenants, the break-even constraint is simply

$$D \geq I + y. \tag{5}$$

If there is a covenant with bank control, the break-even constraint is given by:

$$D + \int_{\mathbf{C}} \int_{\mathbf{Z}} E(z,c)(D'(z,c) - D) f(z|a) h(c) dz dc \geq I + 1_r(a) y. \tag{6}$$

The third contract, with covenants and institutional control, is similar to the one above, but the cost of enforcement must be included:

$$D + \int_{\mathbf{C}} \int_{\mathbf{Z}} E(z,c)(D'(z,c) - D - \gamma) f(z|a) h(c) dz dc \geq I + 1_r(a) y. \tag{7}$$

Therefore, the competitive equilibrium contract solves the following problem

$$\max_{(D,z,A,a)} \bar{R} + \bar{c} - D - \int \int E(z,c)(R - D + c) h(c) f(z|a) dc dz \mathbf{1}_r(a) x \tag{8}$$

[16] Alternatively, we can assume that for the current bank $\beta > 0$, while potential competitors have $\beta = 0$ (since they don't have a relationship with the firm). The current bank has some degree of monopoly power, so the equilibrium contract maximizes its payoff subject to the constraint that the firm is not better off contracting with the outsider banks. The main results of the paper go through, so we omit presenting this model here.

subject to the appropriate constraints.

The bank share k does not appear explicitly in the incentive or the consolidated break-even constraints. However, it is crucial in determining bank enforcement behavior, or E. We show that as the bank share k gets higher, the bank's agency problem becomes less severe.

Detailed derivation of the Competitive Equilibrium Contract is performed in Appendix A. There are three possibilities: no covenants, covenants with bank control and covenants with institutional control. We find the optimal contract, subject to all the relevant constraints, for each option. The Competitive Equilibrium Contract is the best within the three.

The first outcome, contract without covenants, is optimal out of the three when providing incentives is too expensive or, conversely, when the net cost of risk-shifting is small. Covenants with bank control are optimal when the agency costs of bank lack of commitment are low (bank share k is high, or relationship rents β are low). Lastly, covenants with institutional control are optimal when the institutional cost disadvantage of enforcement (γ) is low.

The contract specifies a *set* A of signal realizations that give the lender the right to enforce. The following lemma shows that the set A has a simple cutoff structure, $A = [z_a, z^*]$, where z^* is the covenant trigger (interpreted as tightness).

Lemma 1 *Suppose that the contract is with a covenant. Then* $A = [z_a, z^*]$ *for some* $z^* \in (z_a, z_b)$. *The incentive and break-even constraints are binding.*

Proof. In Appendix B. ■

The intuition is simple - lower values of the signal z are more informative of risk-shifting. Providing incentives is cheaper (in terms of resource and opportunity cost) for low z.

2.4.1 Covenant existence and tightness

We begin our analysis on covenant existence and tightness with the following theorem.

Theorem 2 *There exist cutoffs $0 < \underline{k} \leq \bar{k} \leq 1$ such that if $k < \underline{k}$, the contract is either without covenants or with covenants and institutional control; if $k \geq \underline{k}$, the contract is with covenants and bank control. Covenant tightness (z^*) is strictly decreasing on $(\underline{k}, \bar{k})$ and constant on $(\bar{k}, 1]$.*

We summarize a few distinct cases that show the relationship of bank share and covenant tightness in Figure 6. We concentrate on the case when γ is sufficiently high, so that the alternative to bank control is covenant-lite. The upper-left quadrant corresponds to the case $0 < \underline{k} < \bar{k} < 1$. The upper right quadrant to the case when $\bar{k} = 1$. The difference between those two cases is that for some parameter combinations, all the costs of the bank's lack of commitment are eliminated when k is large enough. The third panel corresponds to the case when the no-covenant contract is preferable for all k. Finally, for completeness we lay out the case when $\underline{k} = \bar{k}$ in the lower right quadrant. We can think of this possibility as a special case when covenants are attractive only if the bank is able to commit fully.

Implication 1 *Covenant-lite loan is an equilibrium contract. They are more likely when k, the bank share in the loan, is low. In other words, for a fixed population of firms, if we lower k, the fraction of firms that get covenant-lite loans increases.*

Implication 2 *For $k \geq \underline{k}$, covenant tightness is decreasing in bank's holding in the loan k. As k increases, agency problems between the bank and the institution are relaxed, and the covenant is loosened.*

Results similar to implication 2 have been shown in an environment with moral hazard on the part of the bank (Pennacchi 1988, Gorton and Pennacchi 1995) or negative covenants (Rajan and Winton 1995) and documented empirically (Drucker and Puri 2009). Our model contributes to the existing literature by simultaneously deriving implications 1 and 2. Taken together, implications 1 and 2 show that in a dual agency friction environment, the "hockey stick" relationship between covenant tightness and institution's share $(1 - k)$ arises.

Implication 3 *The higher the institution's cost disadvantage (γ), the more likely that the loan will be covenant-lite.*

2.4.2 Spread

Next, we consider the implications of the model about the base payment D (spread) in the contract. Let D_i be the payment in the best contract for the three possible cases ($i = N$ when there are no covenants, $i = B$ if there are covenants and bank control and $i = F$ if there are covenants and institutional control).

In the analysis of the competitive equilibrium contract we show that all the constraints are binding. Then, clearly in the contract with covenant and bank control $D_B < I$ (since there are additional revenues from enforcing the contract). A contract without a covenant must include the cost of risk-shifting y in D, so $D_N = I + y$, therefore $D_B < D_N$. In a slightly more involved argument (in the appendix) we can show that the base payment when the institution is in control D_F satisfies $D_F < D_N$.

Implication 4 *Controlling for riskiness, spread is higher in covenant-lite contracts.*

For completeness, we investigate the behavior of spreads for contracts with covenants, as a function of bank share k.

Proposition 1 *Let $D(k)$ be the spread in the optimal contract. If $k \geq \underline{k}$, the spread $D(k)$ is increasing in k.*

The earlier implication and the proposition imply another "hockey stick" relationship, this time between spread and institutional share $1 - k$.

2.4.3 Effects of bank relationship intensity

We next turn to the effect of bank characteristics on the loan contract. A bank that has a long-run relationship with a lender and is more active on that market will have a higher parameter β in our model. A bank with active participation in the syndicated loan market is more likely to have repeat business (long-run relationship) with the borrower and hence higher β.

Proposition 2 *For any k, there exists some cutoff $\bar{\beta} \leq 1$ such that if $\beta \geq \bar{\beta}$, the competitive equilibrium contract is without covenants or with covenants and institutional control.*

Proof. In Appendix B ■

Implication 5 *Banks with longer relationships or more extensive participation in the syndicated market (higher β) will issue more covenant-lite loans.*

It is known that relationship banking has many benefits and costs to the firm. This is an instance of a disadvantage to relationship banking – it weakens the bank's commitment to provide incentives to the firm. On the other hand, there may be a smaller need for enforcement in a long-run relationship.

This influence of bank relationships, like much of the model, depends on k, the bank's share of the loan. To this point we have treated k as exogenous. Variation in k may depend on many factors including aggregate capital supply, regulatory restrictions and costs, which ultimately leads to a differential cost of capital for banks and institutions. Next we formally endogenize k.

2.5 Extended model

We have seen that the crucial parameter in the model is the bank share in the loan k. In this section we extend the model to allow it to be optimally chosen.

Bank and institutional capital are not perfect substitutes – bank capital lowers the cost of enforcing covenants and in addition provides financing of loans. This implies that in equilibrium, even in the presence of perfect arbitrage, the two kinds of capital can have different prices.

Let the opportunity cost of funds on *this particular loan* be i_b for banks and i_f for institutions. These are the rates of return that banks or institutions can earn on investments of similar risk characteristics and regulatory requirements to the loan.[17] We adopt a partial equilibrium approach in that we take i_b and i_f to be given. Since bank capital can always substitute for institutional capital, but not vice versa, and banks are subject to heavier regulation we impose the restriction that $i_b \geq i_f$.

In addition to the terms of the debt contract (which remain the same), now we need to determine how the loan is financed and how the cash flow from the firm's repayment of the loan are distributed.

We keep the assumption that the lender's payment cannot be conditioned on its renegotiation activity. The institution and the bank split the proceeds from the firm proportionally, so the payment from the firm to the bank and the institution is pinned down by the bank's share of loan revenues k. This implies that the bank's renegotiating strategy is determined in the same way and hence the incentive constraint for the firm is the same as before.

Secondly, the amount to be raised – I – must be divided up between the bank and the institution. Let M be the amount provided by the bank and $I - M$ provided by the institution.[18]

Let ED denote expected revenues from a contract.

$$ED = D + \int_{\mathbf{C}} \int_{\mathbf{Z}} E(z,c)(D'(z,c) - D) f(z|a) h(c) dz dc$$

The enforcement and renegotiation functions E and D' depend on the contract, the bank share k and the party in control.

Then if the bank is in control, we have the following break-even constraints:

$$kED \geq M(1 + i_b) \tag{9}$$

$$(1 - k)ED \geq (I - M)(1 + i_f). \tag{10}$$

[17]Banks are subject to heavy capital requirement regulations for leveraged loans. This renders their cost of capital for this subset of the loan market relatively high. In the empirical section we show that covenant-lite loans are prevalent in the leveraged loan market, but nonexistent in the investment grade.

[18]Neither the bank nor the institution can create derivatives on the loan, or $0 \leq M \leq I$.

If the institution is in control, the break-even constraints look similar, but now they must include the cost γ.

$$k[ED - \text{Prob}(A|a)\gamma] \geq M(1 + i_b) \tag{11}$$

$$(1 - k)[ED - \text{Prob}(A|a)\gamma)] \geq (I - M)(1 + i_f). \tag{12}$$

The financial markets are competitive, so they maximize the payoff of the firm

$$\max_{(k,D,z,A,a)} \bar{R} + \bar{c} - D - \int\int E(z, c)(R - D + c)h(c)f(z|a)dcdz\mathbf{1}_r(a)x \tag{13}$$

subject to the relevant break-even constraints and, if $a = s$, the firm's incentive constraint.

The problem above is similar to problem (8) with two modifications. First, bank share k is chosen optimally and second the bank share k has an effect on the break-even constraints.

Lemma 2 *An optimum exists. If the contract is with bank control, at the optimum constraints (9) and (10) bind. If the contract is with institutional control, at the optimum constraints (11) and (12) bind.*

Proof. In Appendix B. ■

The lemma above implies there is one-to-one mapping between bank's share in revenue k and bank's share in financing M/I.[19] This allows us to substitute M as a function of k and derive a consolidated budget constraint for the case with bank control:

$$ED = \frac{I(1 + i_b)(1 + i_f)}{1 + i_b - k(i_b - i_f)}. \tag{14}$$

The left-hand side of the equality is the repayment by the firm and the right-hand side is the cost of capital and the renegotiation costs, adjusted by the capital structure. So we see that lowering k

[19] Since the bank and the institution earn different rates of return on their investment in the loan, there is a distinction between M/I (bank's share or financing) and k (bank's share of cash flows from the loan). There is 1-to-1 mapping between the two. If, for example, $i_b - i_f = 0.02$, the maximum difference between k and M/I is less than half a percentage point.

reduces the required rate of return for the loan (since a larger proportion of the loan is financed by outside institution who have lower required rate of return), but increases the agency problems for the bank and increases the renegotiation cost (since renegotiation will take place in more inefficient ways).

Similarly, when the institution is in control the consolidated budget constraint becomes:

$$ED - \text{Prob}(A|a)\gamma = \frac{I(1+i_b)(1+i_f)}{1+i_b-k(i_b-i_f)}. \tag{15}$$

2.5.1 Competitive equilibrium contract

As in the model with exogenous bank share k, the competitive equilibrium maximizes the payoff of the firm subject to constraints. The main difference is that we are also solving for the bank participation k. We have shown that higher k alleviates the bank's agency problem. Hence the only reason to include institutional capital in loans with bank control is to lower the required rate of return for the loan.

Theorem 3 *For all firms, either the optimal loan contract has no bank control for all $i_b \geq i_f$, or there exists a cutoff $\bar{i}_b$ such that the loan contract is with covenant and bank control for $i_b \in (i_f, \bar{i}_b]$. In all cases when the contract is without bank control, $k = 0$.*

Proof. In Appendix B. ■

Implication 6 *Any mechanism that increases the cost of capital of banks for a particular loan relative to other institutions leads to more covenant-lite loans. In other words, for a fixed population of firms, if i_b increases, the fraction of firms that get covenant-lite loans increases.*

Implication 7 *If a loan is covenant-lite, then it will be held exclusively by institutions.*

Effects of firm type on the contract A question that is best answered with endogenous bank share k is about the effect of firm type on the contract design. We present a numerical example to explore this issue. We are considering a large number of firms that are identical, except for their willingness to perform risk-shifting (x) and the cost that risk-shifting imposes on lenders (y). We set $I = 1$, $R = 1.15$, the investment opportunity c has uniform distribution with support $[0.02, 0.25]$ and the signal z has distribution $F(z|a) = (1 - \alpha_a/2)z + \alpha_a z^2$, with $\alpha_r = -1.5$, $\alpha_s = 1.5$.[20] The parameter $\beta = 0.2$ and $i_f = 0.01$, $i_b = 0.03$.

In Figure 7, we plot the total agency costs (firm payoff when the firm can commit to $a = s$ minus expected firm payoff when the firm cannot commit) as a function of x. We also display the endogenous optimal bank share k for each x. A larger x implies more severe incentive problems for the firm, and hence, requires tighter covenants which leads to lower payoff for the firm. However, the benefit of having a covenant is in the value destruction it prevents: $y - x$. Moreover, it is plausible that y, varies with firm characteristics likely increasing with x. The numerical example shows that the agency costs are relatively flat. If $y - x$ is a convex function of x, then the numerical example suggests that firms with low x may get covenant-lite loans, while firms with higher x will get covenant-heavy (or no loan at all).

Discussion of the extended model The main trade-off in the determination of k is between economizing on the cost of capital ($i_b > i_f$) and the bank's agency problem. When the spread between i_b and i_f widens, it is optimal to accept marginally more distortions on covenant renegotiation in return for lowering capital costs. For sufficiently high i_b, the costs of monitoring exceeds the benefit, so it is optimal to switch to either a covenant-lite contract, or a contract with covenant based on public information, enforced by the institution.

Thus in periods when institutional activity in that market is high (driven for example by lower returns on alternative investments), the model implies that covenant-lite loans are more common, outside participation in loans is higher and (conditional on having covenants) covenant tightness increases.

[20]This is a simple example in which the pdf is linear and the support of the signal has been normalized to $[0, 1]$. The only parameter is α_a – the slope of the respective pdf – and $\alpha_s - \alpha_r$ is a measure of the informativeness of the signal.

Finally, what determines i_b and i_f? The rates of return are determined by the operation of the credit market. Suppose that bank capital and outside funds are supplied to the market exogenously. If there are no outside institutions supplying funds, i_b must clear the demand and supply of loans.[21] As the supply of outside funds increases, banks can lower the k on their existing loan portfolio slightly without creating agency problems and use the freed up capital to make more loans. This will lower the equilibrium interest rate, but $i_b = i_f$ because at the margin the two sources of capital are perfect substitutes. Finally, as the supply of institution supplied funds increases even more, total available bank capital becomes insufficient to ensure that all loans get high bank participation. Since bank capital is more valuable in this instance, i_f falls below i_b.

Policy implications All the risks in our model are internalized, so on its face, we cannot discuss policy. However, as is well known, a variety of sources of inefficiencies may exist and be accommodated in our model, such as 'too big to fail' concerns (moral hazard by the bank vis-a-vis a regulator), agency problems on lender management, pecuniary externalities, etc.

In particular, the effect of firm risk-taking ($a = r$) may not be confined to the lenders and the firm alone. Therefore, it may be optimal from a social point of view to encourage more enforcement and covenants. Our model has two policy implications. First, any regulatory burden on the bank that raises its cost of capital for some loan asymmetrically, will lead to more covenant-lite loans and more risk-taking. Second, 'skin in the game' requirements are effective in reducing covenant-lite loans and encouraging control of firms by lenders.

In our model covenant-lite loans lack ongoing maintenance protections. Given this interpretation, it is important to understand how covenant-lite loans mesh with our theory in practice. In the section below, we explore the features of covenant-lite loans and the extent to which covenant-lite loans lack direct covenant protection and indirect covenant protection from other parts of the capital structure.

[21] There are no forces that would generate credit rationing in our model. So the interest rate clears the market.

3 The Covenant-lite loan

Covenant-lite loans lack traditional financial maintenance covenants. Maintenance covenants contractually oblige the firm to comply with defined financial metrics, such as a maximum debt to EBITDA ratio or a leverage ratio. These covenants are "tested" at specific points in time, most commonly at each quarter end. Violation of the maintenance covenant results in technical default, and is a breach of the loan contract (Miller, 2012b).

Eliminating maintenance tests benefits the issuing firm by reducing the probability of technical default and the consequent loss of shareholder control.[22] Recent research finds that financial covenant violations are neither rare (10-20% of public firms are in technical default in any given year) nor inconsequential. Moreover, in the aftermath of the violation firms face not only increased borrowing costs, but also increased creditor involvement as evidenced by the documented post-violation reductions in acquisitions, capital expenditures, leverage, shareholder payouts, and by increases in CEO turnover (Beneish and Press, 1993; Nini, Smith, and Sufi, 2012).

In addition to the lack of maintenance covenants, covenant-lite loans tend to have fewer and looser negative covenants and fewer and looser incurrence covenants. Negative covenants prevent the borrower from taking certain actions, like incurring additional debt, paying dividends, making acquisitions, and/or repaying junior debt (Maxwell and Shenkman, 2010). Incurrence covenants are financial ratio tests that are triggered by these same activities.[23] In standard covenant-heavy loan contracts, actions prohibited by negative and incurrence covenants require creditor approval in addition to a waiver fee, and leave open the possibility of repricing the loan to bring it in line with the increased risk of the firm. These restrictions do not exist or are substantially weaker in covenant-lite loans.

[22]The likelihood of a covenant violation, or a technical default, is substantially lower in the case of covenant-lite loans as they have no financial maintenance covenants to violate.

[23]The key distinction between maintenance and incurrence covenants is when they are tested. Incurrence covenants test only in the event the firm engages in certain activities, whereas maintenance covenants have automatic and recurring testing at regular intervals.

3.1 How lite is a covenant-lite loan?

While the specific covenant-lite loan may lack covenant restrictions, the firm may be bound by covenants elsewhere in its capital structure. First, covenant-lite term loans are typically part of a "loan package" that can include a bank revolver that may contain separate financial covenants.[24] Second, firms' may have other covenant-heavy debt, and loan cross-default provisions could provide de facto protection to the covenant-lite debt.

We carefully explore both of these issues. First, to explore the covenant protection of the entire loan package, we hired two senior law students with expertise in contract law to analyze the credit agreements for a random sample of 100 loan packages that contain a covenant-lite loan. The credit agreements are found by searching SEC filings.[25] Our major findings are as follows. We find that 47% of the covenant-lite agreements do not include revolving credit facilities. For the 53% that do have a revolver, we document that 49% of the revolving facilities are "naked revolvers", which is an industry term indicating that the revolver lacks any financial maintenance covenants. An additional 40% have "springing" maintenance covenants which are tested ("spring in") only if the revolver is drawn down beyond a particular threshold (Maugue, 2012). The remaining 11% of the revolvers have standard maintenance covenants, in the form of a leverage ratio.

The credit agreements also indicate that both springing and regular covenants in revolvers provide little protection for the other facilities in the loan package. First, covenants are tested at the end of the quarter and borrowers always have the option to pay down the revolving credit before the end of the quarter so that financial covenants go untested (Norris, Barclay, Fanning, 2012). Second, even if a springing covenant in the revolver is violated, the agreements explicitly state that the violation is not an event of default for the covenant-lite facility. Springing covenants in covenant-lite loans are written solely for the benefit of revolving lenders, who retain complete

[24] We describe the typical loan package below in the data section.

[25] We randomize the list of covenant-lite contracts in the S&P LCD database using Excel's random number generator. We then go through the list of contracts and search the SEC Edgar database for the credit agreement using Morningstar Document Research's 10kwizard service. We go down the list if a credit agreement is not found until we reach 100 observations.

discretion over the terms of the renegotiation. Third, while covenant-lite loans typically include cross-acceleration provisions, such provisions are only triggered if the revolver lender chooses to accelerate payment, and then only after a 30-day grace period. This contrasts with the standard and much stricter cross-default provisions where any event of default in other agreements triggers an immediate event of default in the agreement with the cross-default. In sum, even if the loan package includes regular or springing covenants in the revolver, covenant-lite loan lenders receive minimal spillover protection (Myles, 2011; Maugue, 2012).

While other loan and revolver facilities in the loan package do not appear to provide the covenant-lite loan de facto protection, such protection could stem from other firm debt agreements outside the loan package. To see if this is the case, we study the debt instruments and their associated credit agreements for a random sample of 50 firms receiving covenant-lite loans before and after the quarter of covenant-lite loan issuance. We find that covenant-lite loans are large and are designed to replace or refinance existing covenant-heavy loans for the borrower. In cases where other debt exists, we find it is typically in the form of public bonds, which do not include financial maintenance covenants during our sample period, and are thus covenant-lite by construction. Thus, the lack of other covenant-heavy debt makes the issue of cross-acceleration or cross-default moot, and leads us to believe that covenant-lite debt are not de facto protected by covenant-heavy loans, and suggesting that covenant-lite loans indeed grant firms much greater flexibility.[26]

3.2 Do loan credit default swaps replace covenants in a covenant-lite loan?

Another important facet of the loan market to consider is the prevalence of loan credit default swaps (LCDS), and how such instruments may alter a banks incentive to monitor and to include covenants in the loan. Banks can hedge loan credit risk in two major ways: by buying credit protection or through loan sales (Parlour and Winton, 2012). If the bank hedges its stake in the

[26]Later in the paper, we show that covenant-lite loans are issued at a premium over similarly rated covenant-heavy debt. If covenant-lite loans bind the firm to the same obligations as covenant-heavy loans, with the same triggers and risk profiles, firms would not pay a premium for covenant-lite loans. In a competitive loan market, the difference in spread signifies the market's assessment of a differential risk profile.

loan using LCDS then perhaps the usefulness of covenants as an incentive for the bank to monitor diminishes, leading to covenant-lite loans. However, this does not appear to be the case. Bank stakes in covenant-lite loans are often minuscule. We see 92% of covenant-lite loans are bought by institutions, on average, suggesting LCDS use by the bank is unlikely a factor in this market. In fact, bank use of LCDS would be more likely to play a role in covenant heavy loans, where bank participation is very significant. While bank loan sales and LCDS may act as substitutes, covenants serve a role unlikely to be replaced by LCDS.[27] Loan covenants serve as early-warning tripwires and their mere presence may alter the path to default. Creditor control after a covenant violation or the threat of creditor control prior to bankruptcy may improve outcomes and certainly alters borrower behaviors (see Chava and Roberts, 2008; Nini et al, 2009; Nini et al, 2012; and Roberts and Sufi, 2009). This point is not missed by the rating agencies: "The pre-eminent risk is that a covenant-lite structure will postpone default, eroding value and recoveries available to creditors when the issuer finally becomes distressed or files for bankruptcy," Moody's said. That risk, however, falls most heavily on subordinated bondholders in companies that have covenant-lite loans. The bondholders' claim is lower in the pecking order of payments in a default than the claim of the loan creditors. *Bullock, N., (2011, March 10). Moody's warns on covenant-lite loans. FT.com.*

Last, if the banks reputation depends on the performance of the loan then LCDS cannot substitute for the effect of influential monitoring on bank reputation.

4 Empirical results

4.1 Data sources

We construct a dataset of leveraged loans to examine how covenant-lite loans relate to institutional demand, borrower demand (supply of loans), and other market-wide and loan-specific factors. We

[27]It is quite possible that these institutions buy credit protection to hedge the loans risk, which begs the question of who is selling the LCDS, and how they consider the covenant protection, or lack thereof, in the pricing of LCDS.

collect information on leveraged loans from a proprietary database called S&P Leveraged Commentary & Data (LCD) with data supplemented from the Thomson Reuters Dealscan database[28]. Our analysis covers loans made in U.S. dollars to U.S. borrowers issued after January 1st, 2005 – the first year covenant-lite loans emerged in our sample.

We start with the S&P LCD database for several reasons. First, S&P LCD is the industry standard for leveraged loans and has more complete coverage of covenant-lite loans. Second, as noted in Drucker and Puri (2009) and reported in Coffey (2005), Dealscan covenant information is sporadic. While Coffey points out that 95% of BBB- syndicated loans have financial covenants, Drucker and Puri find that Dealscan reports covenant information for only 56% of such loans. This is particularly problematic for studying covenant-lite loans as loans indicated as having no financial covenants on Dealscan could either be covenant-lite or have missing covenant data. Third, and perhaps most importantly, S&P LCD provides information not available from Dealscan, such as loan and firm level ratings and explicit dollar amounts for institutional (non-bank) and pro rata (bank) participation for each loan. Finally, LCD tracks new loans (known as "new money" or "newly syndicated dollars"), while separate loan observations in Dealscan may be either new loans or renegotiations of existing loans (Roberts and Sufi, 2009).

Each observation in the database consists of an entire loan package, where a package can contain multiple facilities such as amortizing term loans known as Term Loan A's, institutional term loans known as Term Loan B's (TL-B), and bank revolving credits known as revolvers. TL-A facilities are typically syndicated to bank investors who prefer the accelerated amortizing nature of these loans. TL-B's are designed for institutional investors and have cash flows similar to that of bonds with a series of interest payments and a final bullet payment of the principal at maturity. Revolving credit lines allow the borrower to draw down, repay, and reborrow at will

[28]Our analysis is restricted to leveraged loans with a rating of BBB+ and below. This restriction is in place for several reasons. First, covenant-lite loans are overwhelmingly seen in the leveraged loan market. Second, this group of high risk borrowers is characterized by significantly greater agency costs. Thus, the presence of covenant-lite loans to these firms is of greater interest than covenant-lite lending to investment grade firms. Third, leveraged loans account for a distinct market with traders, dealers, firms, and investment banks that specialize in junk rated loans. We thank S&P LCD for generously providing their database for academic use.

(Miller, 2012b).

We obtain firm characteristics from Compustat, stock return and volatility from CRSP data, and macroeconomic variables from the St. Louis FRED database. Appendix 2 contains all of our variable definitions. Our key variable is institutional share obtained directly from S&P LCD. Institutional share (one minus bank share) is the proportion of the total loan held by institutions. Our data also provides loan level information on the bank leading the syndication and the identity of the private equity group (PEG) if the loan is sponsored. Following Demiroglu and James (2010), we connect PEG identities with their time series of LBO activity from SDC to construct measures of PEG reputation.

We supplement S&P LCD data with loan information from Dealscan in order to compute time-on-market (TOM), a proxy for loan demand used as robustness in some regressions in Tables 2 and 3. Dealscan provides the date the loan is launched (i.e., the date investors can begin to subscribe to the loan) and the date the loan is completed (i.e., the date the loan is fully funded). Following Ivashina and Sun (2011), we use the difference between these dates to measure loan demand as TOM. This proxy for loan demand presumes a shorter time span on the market is indicative of high institutional demand. We merge the two databases by manually looking up firm names and confirming both loan dates and loan amounts. Within Dealscan, launch dates are only available for approximately 16% of all loans, which limits the number of observations in tests that require the TOM proxy.

4.2 Descriptive statistics

Our overall sample includes both covenant-lite and covenant-heavy leveraged loans. We present descriptive statistics comparing these two categories of loans in Table 1. Panel A presents descriptive statistics for and differences between covenant-lite and covenant-heavy leveraged loans. Panel B presents a greater variety of descriptive statistics for the covenant-lite loans. Variable definitions are contained in Appendix C.

These preliminary restrictions result in a sample of 5,307 leveraged loans from 2005-Q1 through 2011-Q3, consisting of 381 covenant-lite loans and 4,926 covenant-heavy loans[29] In Panel A we see covenant-lite loans are large with an average loan size of $670 million, which is statistically larger than that for covenant-heavy loans.

We also compare the risk characteristics of covenant-lite and covenant heavy loans. Traditional theory posits that covenants offer greater protection for riskier borrowers (Jensen and Meckling, 1976; Aghion and Bolton, 1992; Rajan and Winton, 1995; Garleanu and Zwiebel, 2009), suggesting less restrictive covenants would involve safer borrowers. In contrast, we find that covenant-lite loans are made to high risk and highly leveraged borrowers. The median loan rating for covenant-lite loans is 7, corresponding to a B-, and well below the highest junk rating of BB+. The pre-loan leverage of covenant-lite borrowers averages 0.41, similar to leveraged loan borrowers in general, and well above the 0.29 for non-leveraged loans. We also see covenant-lite loans have a lower average loan spread; however, we will see below that this is due to the timing of covenant-lite loans, which tend to cluster when market-wide loan spreads are low. Adjusting for time and other risk factors, below, reveals that covenant-lite loans have higher spreads.

Table 1 illustrates that the proportion of the covenant-lite loan funded by institutional investors averages 92%. This high-level provides strong support for our model predictions (Implication 1) relating covenant-lite existence and institutional participation. As discussed in the theory section, this empirical finding is in stark contrast to existing theory and evidence. Table 1 also shows that covenant-lite loans take 25 days, on average, to be fully subscribed (completed), much quicker than the 33 days for covenant-heavy loans and the 36 day average for syndicated loans in general. This suggests that covenant-lite loans appear to coincide with greater institutional demand.

Examining the time series properties of the leveraged loan market provides further insight into

[29]Our sample represents all leveraged loans from S&P LCD for which we have data available. Sample sizes vary across tests if particular variables required for the test such as data from Compustat or corresponding data from Dealscan to compute the time-on-market proxy are not available. Also, it is important to note that the incidence of covenant-lite loans varies through time, peaking in 2007 and 2011. As noted in footnote 1, S&P Capital IQ reports that covenant-lite loans represented 40% of total institutional loan volume and about 24% of S&P/LSTA's leveraged loan index as of April 2012 (Miller, 2012a).

the relation between covenant-lite loans and institutional participation. First we plot the times series pattern of institutional and bank participation in the leveraged loan market (Figure 1). The figure illustrates a fundamental shift from bank to non-bank institutional funding in this market. In 1998, non-bank institutions contributed only 10% of the aggregate leveraged loan volume. By 2013, this percentage had increased to 80%. Next, we plot the dollar volume of covenant-lite issuance and the percentage of leveraged loan issuance that is covenant-lite (Figure 3). Figure 3 shows that the issuance of covenant-lite loans peaks in 2007, prior to the financial crisis, virtually disappears during the crisis, and then makes a strong recovery in the post-crisis period. We see a similar pattern in the time series of institutional funding in the leverage loan market in Figures 1 and 2. Figure 2 shows that the absolute level of institutional capital also peaks in 2007, drops off in the financial crisis, and sharply returns in 2010-2012. Viewing institutional funding in comparison to bank funding, also in Figure 2, we can see the times series pattern is more dramatic - with greater rising, falling, and rising again - for institutions than banks. This suggests that the use of covenant-lite loans and the institutional demand for leverage loans coincide. Indeed, we find that the correlation between the average institutional share in a loan, measured on a quarterly frequency, 0.62 with the average time-on-market and -0.84 with the pro-cyclical VIX index.

We explore whether these inferences from univariate statistics remain in more refined multivariate tests below.

4.3 Bank and institutional share and covenant-lite loans

The key prediction of the model is that covenant-lite loans are more likely when bank share of the loan is low. While the univariate results point in this direction, we conduct more precise multivariate tests below. We estimate a logit regression of whether or not a loan is covenant-lite as a function of *Institutional share*, which is the proportion of the loan financed by nonbank institutions (i.e., one minus bank share). We present the results in Table 2. The dependent variable equals 1 for covenant-lite loans and 0 otherwise. Regression (2.1) omits firm specific controls, which are unavailable for private firms in our sample. We include control variables for the size of the loan, log loan size, and a dummy variable indicating whether the loan is sponsored by a private equity group, *PE sponsored loan*, given that Demiroglu and James (2010) find that many private equity LBOs involve covenant-lite loans. We also include dummy variables for each credit rating category. Consistent with the model's prediction, we find a positive and significant at the 1% level coefficient on institutional share. Results also indicate that covenant-lite loans tend to be larger in size and are more likely to be sponsored by a PE group.

In regressions (2.2) through (2.5), we add firm characteristics, which necessitates restricting the sample to public firms given our data source, Compustat, does not include private firms. We include the following: *Log of total assets*, *Leverage*, *Cash* to assets ratio, *Asset tangibility*, and *Profitability*. This requirement reduces the sample size from 4,861 to 1,535 in regression (2.2). After controlling for borrower characteristics, many of which are significant, we continue to see the coefficient on *Institutional share* is positive and significant at the 1% level. Thus, our model's predictions on the relationship of covenant-lite loans and institutional share remain strongly supported in multivariate tests.

We next explore the role of nonbank institutional demand for loans, in addition to Institutional share. Given the model's prediction that covenant-lite loans are more likely when bank share is low (institutional share is high), we would expect the prevalence of covenant-lite loans to be increasing in aggregate institutional capital flows into the loan market. Figure 2 shows that institutional investment in leveraged loans is highly pro-cyclical, far more than for banks. Given the dependence of covenant-lite on Institutional share, we expect aggregate changes in the make-up of banks and institutions to influence the existence of covenant-lite loans.

To test this relationship, we compute *Institutional share-market* as the average institutional share of all loans in our sample in a given calendar quarter. Aggregate measures also have an additional benefit. While loan specific proxies for institutional demand may reflect an unobservable quality of the individual loan; cross sectional heterogeneity in loan characteristics cannot explain market level shifts in institutional behavior. Regression (2.3) shows that the coefficient on *Institutional share-Market* is positive and significant at the 5% level while the coefficient on *Institutional share* remains positive and highly significant.

Ivashina and Sun (2011) show that institutional demand impacts loan spreads. We further explore institutional demand by controlling for *TOM*, which is the number of days between the loan's launch and completion dates (i.e., Time-On-Market) and TOM – Market, the average of *TOM* for all leveraged loans in a given calendar quarter. Given that greater loan demand should result in a quicker completion, we expect a negative coefficient on *TOM*. Results from the specification including *TOM* is reported in column (2.4), where we see a negative and significant coefficient on *TOM*. We add *TOM - Market* in column (2.5) where we find both of these TOM variables carry a negative coefficients, statistically significant at the 10% level or better. Taken together, these results suggest covenant-lite loans occur more frequently when institutional demand is high, consistent with the notion that institutional demand not only influences loan yield spreads, but also influences contract design. Moreover, in all specifications we find a positive and significant coefficient on *Institutional share*, consistent with the model's prediction.

4.4 Covenant-lite loan spreads

Our model predicts that covenant-lite loans will carry higher spreads, all else equal, than if they were to have covenants. There is a tradeoff between covenants and the loan spread, where the borrower receives flexibility and the lender receives compensation for the lack of covenant protection. If covenants have value, investors should expect to be compensated by an increase in spread for bearing increased risk resulting from the loosening of covenants in the loan contract. Univariate statistics presented in Table 1 appear counter to this prediction; however, those figures lack any controls for differences in issuer traits or the timing/cyclicality of covenant-lite loans. We explore yield spreads for covenant-lite loans beginning with multivariate regressions, reported in Table 3. We include loan and borrower characteristics as well as market-wide factors. We include an indicator variable *Covenant-lite dummy* that equals one if the loan is a covenant-lite loan in a standard log spread regression. Control variables include proxies for loan size, PE group sponsored, firm size, leverage, stock return volatility, asset tangibility, profitability, market volatility (VIX).

In specification (3.1) of Table 3 we see that the coefficient on the *Covenant-lite dummy* is 0.16, statistically significant at the 1% level. Specification (3.2) includes dummy variables for the S&P loan rating categories and (3.3) additionally includes time fixed effects. The resulting coefficient on *Covenant-lite dummy* drops to 0.09 and 0.07, significant at the 5% level, respectively. The last specification adds *TOM - Market*, which Ivashina and Sun (2011) find to be a significant determinant of loan spreads, as do we. In this final specification, the resulting coefficient on the *Covenant-lite dummy* is 0.07, significant at the 5% level. Given the log transform of the yield spread and the coefficient range on the *Covenant-lite dummy*, these results suggest as 7% to 16% higher loan spread for covenant-lite loans. This translates to 21 to 48 basis points when compared to the 300 bps median loan spread we see for covenant heavy loans. This is remarkably close to an estimate made in a Forbes article: "Share of covenant-lite loans jumps to post-crisis high in April" May 29, 2012. They point to a $235 million loan by Schrader International that was first priced with covenants, then withdrawn and repriced as a covenant-lite loan. The difference in pricing was 50 basis points going from Libor+450 to Libor+500.

There are important caveats one must make when interpreting the difference in yield spreads between covenant-lite and covenant-heavy loans. The difference reflects both the economic trade-off of not having covenants, as well as effects of selection. If covenant-lite borrowers differ in unobservable ways, then they could have higher or lower yields depending on the nature of the unobservable characteristic. While we control for observable characteristics in our regressions, we turn to propensity score matching techniques that help control for selection in Table 4.

We begin with simple matching techniques based on the credit rating and the timing of the loan issuance. While our multivariate tests include time effects and some macro variables, the influence of market factors may be occurring at a higher frequency given loan spreads can change dramatically over months, weeks, and even days. In panel A of Table 4, we match each covenant-lite loan to a covenant-heavy loan issued within 5 days of one another and with the same S&P loan rating. Tighter restrictions on the time window reduce probable matches but allow for a better control of macroeconomic and time specific factors that affect spreads in general. If multiple matches are found, the loan with the closest loan amount is kept. We compute mean loan spreads for covenant-lite and matched covenant-heavy loans as well as their difference. We see in Panel A.1 that covenant-lite loans have an average spread that is 34.7bp greater and highly significant. In Panel A.2. we repeat the matching approach with the addition of leverage and size as a matching variable and the difference in loan spread climbs to 56bp.

While our matching procedure above imposes an ex-ante assumption of the relative importance of traits used to match, propensity scores relax this assumption. For our propensity score matching approach we use a logit model and a caliper of 0.25 with loan characteristics (log loan size, PEG sponsored loan dummy), firm characteristics (log total assets, leverage, asset tangibility, profitability, cash, stock volatility), ratings, and time controls (TOM – Market, VIX, calendar quarter dummies). We conduct a likelihood ratio test for balance/bias and find that the treatment and control samples are insignificantly different from each other based on the selection parameters.

In panel B.1 we generate propensity score matched firms based on loan, loan ratings, and time controls. This allows us to include loans to both public and private firms, but ignores many firm specific traits. We again see that covenant-lite loans have an average spread that is significantly higher than that for the covenant-heavy matched loans, with a statistically significant difference of 27.2bp. Panel B.2 limits the sample to public firms but includes the aforementioned firm characteristics in the propensity score. We find covenant-lite loan spreads exceed covenant heavy by an average of 48.7bp in this case. In sum, the multivariate regressions as well as the matching analysis confirm the model's prediction that covenant-lite loans substitute higher spreads in place of covenant protection. This higher spread for covenant-lite loans represents a reversal in the relation between loan spreads and institutional participation. Our findings also support a popular view that covenant-lite loans are satisfying investor demand for higher yielding instruments.

4.5 Relationship banking, borrower incentives, and covenant-lite loans

We next visit the models implications about borrower moral hazard incentives. PEG sponsored loans comprise a significant portion of leveraged loans. Many specific PEGs return to the market frequently to refinance existing as well as new deals. If engaging in moral hazard by the PE group negatively influences its interactions with lenders in future deals, then we would expect the most active PE groups to have lower moral hazard than PEGs that do not depend as heavily on the leveraged loan market. In the context of the model, more active PEGs will have lower x.

We measure individual PEGs activity following Demiroglu and James (2010). They use deal-level data on 180 LBOs from 1997-2007 and document the frequent existence of covenant-lite loans in LBO contracts, which also explains our positive coefficient on PEG sponsored in Table 2. We follow them and construct a measure of PE group activity computed as the natural log of 1 plus the number of deals completed by the PE group since 1980 (or alternatively over the prior three years) and label this PEG reputation proxy 1 (PEG reputation proxy 2). We explore this notion by revisiting the determinants of covenant-lite loans to see whether PE group reputation matters. Specifically, we interpret the frequency with which a PE group engages in LBOs as a proxy for the cost of engaging in moral hazard (equivalent to assuming more active PE groups have lower x in our model).

Our model also predicts that banks with greater relationship rents will be more likely to waive covenant violations if given the opportunity, and will be more likely to originate covenant-lite loans. We argue that bank's with greater syndicated loan market share derive greater relationship benefits (Ross, 2010). We implement this by creating a variable, *Bank activity*, which equals the log or one plus the number of leveraged loans originated by the bank. We hypothesize that higher *Bank activity* associates with higher banking relationship rents $\beta * c$ in our model, and thus a higher probability of being involved in a covenant-lite loan.

Table 5 reports logit regressions of covenant-lite loan status on two PEG reputation proxies and the bank activity measure. Column (5.1) reports the results for loans to both public and private firms, while (5.2) adds firm characteristics thereby restricting the sample to public firms. In both cases, there are two main differences in the results as compared to Table 2. First, the coefficient on *PEG sponsored loan dummy* is no longer significant, and second, the reputation variables are all significant at the 5% level. We also see the coefficient on *Bank activity* is positive and marginally significant.

One concern is that PEG reputation is simply capturing the PEG effect, perhaps due to multicollinearity. In specifications (5.3) – (5.6) we restrict the sample of loans to only those that involve PEG sponsorship. Within these PEG sponsored loans we continue to find the PEG reputation matters. For both reputation proxies and for both the full and public firm samples, we find a positive and statistically significant coefficient on PEG reputation. We also see in these specifications that the coefficient on the bank relationship proxy is always positive and significant at the 5% level. This supports the model's prediction that covenant-lite loans are more likely when moral hazard incentives are not extreme and when relationship banking influences are high.

5 Conclusions

How the confluence of shadow banks and traditional banks affects lending activity is of great importance. The influence of bank "skin in the game" on lending practices is currently being debated by academics, regulators, and practitioners alike. Allowing banks to hold less of the loan may facilitate greater lending activity and increase economic growth. However, low bank participation may alter loan underwriting standards given the bank economic interest in the loan becomes small. We speak to this debate by developing and empirically testing a model that relates covenant structure, institutional participation, and the loan spread in a cohesive framework, where covenants are based on public information that provide ex-ante borrower incentives. Our key finding is that the relative participation of bank and nonbank institutions not only influences pricing and quantity, but also fundamentally changes contract design.

Our model and empirical results show covenant-lite loans arise precisely when nonbank institutional capital is necessary to meet relatively high loan demand, supporting the view that covenant-lite loans alleviate credit constraints. However, covenant-lite loans are no panacea. As bank capital restrictions increase, covenant-lite loans are extended to borrowers who would otherwise have restrictive covenants, altering risk taking incentives and economic outcomes. While we find covenant-lite loans do not arise for borrowers with severe moral hazard incentives, we show that it may be optimal to remove all covenants, even in the face of significant moral hazard. Some borrowers that would optimally receive covenant-heavy loans in the absence of limited bank capital, will receive covenant-lite loans, and a greater agency cost of moral hazard is born by all. The question of how covenant-lite loans will influence firms in financial distress and in economic downturns remains to be seen, and may provide guidance for future research that may better calibrate the costs and benefits of the influence of bank skin in the game on lending activity and commensurate contract distortions.

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A Derivation of the Competitive Equilibrium Contract

A.1 Exogenous bank share k

In the next three sections, we will characterize the optimal contract, conditional on no covenants, institutions control or bank control. Finally, we will characterize the contract fully, that is we will determine which one of the three options will be chosen for different parameter values. We take the bank share as exogenous for now.

Both for banks and institution, the value of z does not matter for the waiving of the covenant. *Conditional* on having the right to enforce, the decision of the lender whether to enforce or not depends only on c. We call enforcement functions of the sort ”rectangular”. Since we know that any enforcement function that can occur when the lenders cannot commit is rectangular, we will look for the best rectangular enforcement function.

Lemma A.1 *For the optimal rectangular enforcement function there exists some z^* such that $E(z,c)=1$ if and only if $z \leq z^*$.*

Proof. In Appendix B. ■

The result is striking: if we cannot condition the severity of the punishment on the signal z, then it is optimal to base the enforcement decision only on z. It is optimal to make the punishment as severe and as rare as possible.

A.1.1 Contract without covenants

The first case to consider is without covenants. In this case, there is no distinction between bank and institutions control. It is easy to see that the firm will always choose the risky action r. The consolidated break-even constraint is simply $D \geq I + y$. Then the optimal contract has $A = \emptyset$, $D = I + y$ and the payoff to the firm is $\bar{R} + x - I - y$.

In any equilibrium in which the firm acts r, expected payment to the lenders must be greater than or equal to $I + y$. Then, $\bar{R} + x - I - y$ is an upper bound on the payoff of the firm if acts r. If the covenant is enforced with positive probability, the payoff of the firm is strictly less. So in the following sections, we will assume that the firm must nor risk-shift.

A.1.2 Contract with institutions control

Next, we consider the equilibrium outcome when the institutions has the control rights.

Given D, we know that the covenant will be enforced if the institutions has the right ($z \in A$) and $R - D \geq \gamma$.

Assumption 1 $\gamma < R - I$.

Then the optimal contract with institutions control will solve the following problem, call it P2:

$$\max_{D,A} \bar{R} + \bar{c} - D - Prob(A|s)(R - D) - Prob(A|s)\bar{c} \tag{A.1}$$

$$\text{s.to } (Prob(A|r) - Prob(A|s))(R - D + \bar{c}) \geq x \tag{A.2}$$

$$D + Prob(A|s)(R - D - \gamma) \geq I \tag{A.3}$$

$$R - D \geq \gamma \tag{A.4}$$

Lemma A.2 *If the constraint set is nonempty, then an optimal contract with institutions control exists.* $A = [z_a, z^*]$. $D = R + \bar{c} - \frac{x}{F(z^*|r) - F(z^*|s)}$, *where* z^* *is the smallest* z *such that* $R - \frac{1-F(z|s)}{F(z|r)-F(z|s)}x - I - F(z|s)\gamma \geq 0$. *The constraint* $R - D \geq \gamma$ *never binds. The payoff to the firm is constant in* k.

Proof. In Appendix B. ■

It is worth noting that for some parameter values, no contract that satisfies those constraints may exist. Invoking the covenant is expensive – it has an opportunity cost $\bar{c}$ and an enforcement cost γ, so the optimal contract minimizes it. Since lower values of z are more informative of risk-shifting the optimal covenant has a cutoff form – it binds when the signal z falls below a certain threshold.

A.1.3 Contract with Bank control

Next we consider the contract when the bank has control to force the firm into technical default (enforce the covenant). The bank chooses optimally whether to enforce a covenant. We know that the bank will enforce the covenant if it has the right to do so so and $c \leq k(R-D)/\beta$.

Let $\Delta(D,k)$ be the expected change in repayment, conditional on breaking the covenant. It is easy to see that

$$\Delta(D,k) = H(k(R-D)/\beta)(R-D)$$

Then the contract with bank control will solve the following problem, called P3:

$$\max \bar{R} + \bar{c} - D - Prob(A|s)\left(\Delta(D,k) + \int_{c_a}^{k(R-D)/\beta} ch(c)dc\right) \tag{A.5}$$

$$\text{s.to } D + Prob(A|s)\Delta(D,k) \geq I \tag{A.6}$$

$$(Prob(A|r) - Prob(A|s))\left(\Delta(D,k) + \int_{c_a}^{k(R-D)/\beta} ch(c)dc\right) \geq x \tag{A.7}$$

It is elementary to verify that $\frac{\partial}{\partial D}\Delta(D,k) = -H(k(R-D)/\beta) - h(k(R-D)/\beta)(R-D)/\beta < 0$; $\frac{\partial}{\partial k}\Delta(D,k) = h(k(R-D)/\beta)(R-D)^2/\beta > 0$.

Assumption 2 $\frac{\partial}{\partial D}\Delta(D,k) > -1$ *for all* $0 < D \leq R$ *and* $k \in [0,1]$. *Define* $\hat{z}$ *by* $F(\hat{z}|s)\Delta(0,1) = I$. *If* $\Delta(0,1) < I$ *set* $\hat{z} = z_b$. *Then for all* $z \geq \hat{z}$, $(F(z|r) - F(z|s))\Delta(0,1) < x$.

This assumption ensures that $D \geq 0$, so that we can interpret D as a payment.[30] By this assumption we gain ease in exposition for some of the proofs, without affecting the results.

Define $\Delta^{-1}(w,k)$ to be the inverse function of Δ with respect to D, so

$$\Delta(\Delta^{-1}(w,k),k) = w.$$

The properties of Δ ensure that $\Delta^{-1}(w,k)$ is well-defined for all $k > 0$, $w \in (0, \Delta(0,k)]$. Since

[30]In principle, for some parameter values, it could be that all of the revenue needed to cover the break-even constrained is gathered in the events when the covenant is enforced and the bank pays the firm when the covenant is not enforced. We consider this possibility uninteresting and unrealistic.

$\Delta(D,k) = 0$ for all $D \geq R - \beta c_a/k$, we define $\Delta^{-1}(0,k) = R - \beta c_a/k$ to preserve continuity. Then we have the following lemma

Lemma A.3 *For the optimal contract with bank control, the incentive and break-even constraints are binding, $A = [z_a, \tilde{z}]$. Let $D(z,k)$ be an implicit function, satisfying $(F(z|r) - F(z|s))(\Delta(D(z,k) + ce(D(z,k),k)) = x$. Then $D = D(\tilde{z},k)$ and $\tilde{z}$ is the smallest z such that*

$$D(z,k) + F(z|s)\Delta(D(z,k),k) \geq I$$

where $ce(D,k) = \int_{c_a}^{k(R-D)/\beta} ch(c)dc$. At the optimum, $D \geq 0$.

Proof. In Appendix B. ■

The choice between bank and institutions control. The set on which the covenant is enforced is rectangular for both institutions and bank ($[0, z^*] \times [c_a, c_b]$ for institution and $[0, \tilde{z}] \times [c_a, k(R-D)/\beta$ for banks). We have shown that within the class of rectangular enforcement functions, it is optimal never to waive the covenant. Thus the trade-off between bank and institutions control is between lower costs (for the bank) and commitment.

A.2 Endogenous bank share k

Contract without covenants The optimal loan package without covenants is the solution to the following problem:

$$\max_{k,D,z,a} \bar{R} + \bar{c} - D + x$$

$$\text{subject to } D \leq R, z \in [z_a, z_b], a \in \{r, s\}, k \in [0,1]$$

$$D \geq \frac{(I+y)(1+i_b)(1+i_f)}{1 + i_b - k(i_b - i_f)}$$

Contract with covenants and bank control The optimal loan package with bank control is the solution to the following problem:

$$\max_{k,D,z,a} \bar{R} + \bar{c} - D - F(z|a)\Delta(D,k) - F(z|a)\int_{c_a}^{k(R-D)/\beta} ch(c)dc + \mathbf{1}_r(a)x$$

$$\text{subject to } D \leq R, z \in [z_a, z_b], a \in \{r,s\}, k \in [0,1]$$

$$\text{constraint } (14) \text{ and if } a = s \text{ constraint } (2).$$

Contract with covenants and institutional control Similarly, the optimal loan package with institutional control is the solution to the following problem:

$$\max_{k,D,z,a} \bar{R} + \bar{c} - D - F(z|s)(R - D + \bar{c}) + \mathbf{1}_r(a)x$$

$$\text{subject to } D \leq R, z \in [z_a, z_b], a \in \{r,s\}, k \in [0,1]$$

$$\text{constraint } (15) \text{ and if } a = s \text{ constraint } (2).$$

B Proofs

Proof of Theorem 1. First, we show that without loss of generality, $D'(z,c) = R$. Suppose not. Then increase $D'(z,c)$ to R and decrease D to keep the break-even constraint. The incentive constraint is strengthened and the objective function is unchanged.

Relax the constraint that $E(z,c) \in \{0,1\}$ to $E(z,c) \in [0,1]$. Then P1 is convex maximization problem with a nonempty interior. Then by theorem 1 in Luenberger (1969), page 217 there exist constants $\lambda \geq 0$, $\mu \geq 0$ such that the optimal solution to P1 maximizes

$$\begin{aligned} L(D, E(c,z); \lambda, \mu) &= \bar{R} + \bar{c} - \int \int [D + E(z,s)(R - D + c)] h(c) f(z|s) dc dz \\ &+ \lambda \left(\int \int [D + E(z,s)(R - D)] h(c) f(z|a^*) dc dz - I \right) \\ &+ \mu \left(\int \int E(z,s)(R - D + c) h(c)(f(z|r) - f(z|s)) dc dz - x \right) \end{aligned}$$

Taking Gateaux derivatives, the following conditions are necessary:

$$D_{E(z,c)} L(D, E(z,c); \lambda, \mu) = \begin{cases} \geq 0 & \text{if } E(z,c) = 1 \\ = 0 & \text{if } E(z,c) \in (0,1) \\ \leq 0 & \text{if } E(z,c) = 0 \end{cases}$$

Then if we define $c(z) = \frac{(R-D)(\lambda - 1 + \mu g(z))}{1 - \mu g(z)}$, $D_{E(z,c)} L > 0$ if and only if $c < c(z)$; $D_{E(z,c)} L < 0$ if and only if $c > c(z)$. Therefore $E(z,c) = \in \{0,1\}$ almost surely. This concludes the proof.

■

Lemma B.1 $v(z) = F(z|s)/[F(z|r) - F(z|s)]$ *is strictly increasing in* z.

Proof. $v'(z) = \frac{f(z|s)F(z|r) - F(z|s)f(z|r)}{(F(z|r) - F(z|s)^2}$. Then it is sufficient to show that $f(z|s)F(z|r) - F(z|s)f(z|r) > 0$.

$$f(z|s)F(z|r) - F(z|s)f(z|r) = f(z|s) \int_{z_a}^{z} \left[\frac{f(w|r)}{f(w|s)} - \frac{f(z|r)}{f(z|s)} \right] f(w|s) dw > 0.$$

■

Proof of Lemma 1. Let z^* be defined by $F(z^*|s) = Prob(A_z|s)$. By lemma A.1. in Elkamhi et al (2012), $F(z^*|r) - F(z^*|s) \geq Prob(A_z|r) - Prob(A_z|s)$ with strict inequality if $Prob(A_z \Delta [z_a, z^*]|s) > 0$. Then setting the covenant set to $A = [z_a, z^*]$ does not affect the firm's payoff or the break-even constraint and strengthens the incentive constraint. ■

Proof of lemma A.1. Suppose $Prob(A_c) < 1$. Since the incentive constraint is binding (lemma

1), $Prob(A_c)(R-D)+\int_{A_c} ch(c)dc = \frac{x}{F(z|r)-F(z|s)}$, therefore the objective function is given by $\bar{R}+\bar{c}-D-F(z|s)x/[F(z|r)-F(z|s)]$.

Replace A_c with $A'_c = [c_a, c_b]$. Then both constraints will be slack. There exist $D' < D$ and $z' < z$ such that both constraints are binding. By lemma B.1 this variation strictly increases the objective function. ■

Lemma B.2 *For any contract satisfying constraints (A.2) and (A.3) and at least one of the constraints is slack, there exists a contract with $A = [z_a, z^*]$, both constraints are binding and the firm's payoff is strictly larger.*

Proof. By lemma 1, we can set $A = [z_a, z^*]$ which tightens the incentive constraint without affecting the payoff of the firm. Let $M(D, z; k) = D + F(z|s)(R - D - \gamma) - I$. The break-even constraint is $M(D, z; k) \geq 0$. Similarly, let $N(D, z; k) = (F(z|r) - F(z|s))(R - D - \bar{c}) - x$. The incentive constraint is $N(D, z; k) \geq 0$. The objective function is $f(D, z; k) = \bar{R} + \bar{c} - D - F(z|s)(R - D + \bar{c})$.

Suppose that both constraints are slack. Then there exists $z' \in (z_a, z^*)$ such that one of the constraints is binding. The new contract $(D, [z_a, z'])$ increases the firm's payoff strictly.

Suppose that the break-even constraint is slack and the incentive constraint holds. Let $\hat{D}(z) = (I - F(z|s)R)/(1 - F(z|s))$. Set $D' = \hat{D}(z^*) < D$. Clearly, $M(D', z^*; k) = 0$, $N(D', z^*; k) > 0$ and $f(D', z^*; k) > f(D, z^*; k)$.

Suppose that the incentive constraint is slack, but the break-even constraint is binding. It can be shown that for z small enough, $N(\hat{D}(z), z; k)$ is strictly decreasing in z and for some $z' < z^*$, $N(\hat{D}(z'), z'; k) = 0$. Since $D^* = \hat{D}(z^*)$,

$$f(\hat{D}(z'), z'; k) = \bar{R} + \bar{c} - I - F(z'|s)\bar{c} > \bar{R} + \bar{c} - I - F(z'|s)\bar{c} = f(D^*, z^*; k).$$

■

Proof of Lemma A.2. We will ignore the constraint $R - D \geq \gamma$ in the first step of the proof. First, we show that a maximum exists. Clearly, the payoff from any contract that satisfies (A.2) and (A.3) is bounded by above from $\bar{R} + \bar{c} - I$. Suppose that the constraint set is nonempty. Let the sup of the payoffs be B. Let (z_n, D_n) be a sequence of contracts that satisfies the constraints (A.2) and (A.3) and the payoff of contract n is larger than $B - 1/n$. By lemma B.2, there exist contracts $(\hat{D}(z'_n), z'_n)$ that also satisfy (A.2) and (A.3), the break-even constraint is binding, and their payoff is larger than $B - 1/n$. Since the sequence z'_n lies in a compact set, there exists a subsequence z'_{n_k} that converges to some z^*. Then by continuity $\hat{D}(z'_{n_k})$ converge to $\hat{D}(z^*)$, and the contract $(\hat{D}(z^*), z^*)$ satisfies (A.2) and (A.3) and has payoff B. Thus a maximum exists.

The rest of the lemma is implied by the fact that a maximum exists and by lemma B.2. Finally, we need to check that at the optimum $R - D \geq \gamma$. But since the break-even constraint is binding, $D = \frac{I - F(z|s)(R-\gamma)}{1 - F(z|s)} \leq I$. Then $\gamma \leq R - I \leq R - D$. ■

Lemma B.3 *For any contract satisfying constraints (A.6) and (A.7) and at least one of the constraints is slack, there exists a contract with $A = [z_a, z^*]$, both constraints are binding and the firm's payoff is strictly larger.*

Proof. By lemma 1, we can set $A = [z_a, z]$ which tightens the incentive constraint without affecting the payoff of the firm.

If $z = z_a$, or $z = z_b$, $Prob([z_a, z]|r) - Prob([z_a, z]|s) = F(z|r) - F(z|s) = 0$, or the incentive constraint will not be satisfied. Therefore $z \in (z_a, z_b)$.

Let $M(D, z; k) = D + F(z|s)\Delta(D, k) - I$ and $N(D, z; k) = (F(z|r) - F(z|s))(\Delta(D, k) + \int_{c_a}^{k(R-D)/\beta} ch(c)dc) - x$. These evaluate the break-even and the incentive constraints. Also let $f(D, z; k) = \bar{R} + \bar{c} - D - F(z|s)(\Delta(D, k) + \int_{c_a}^{k(R-D)/\beta} ch(c)dc$ be the firm's payoff.

Suppose that both constraints are slack. Then there exists $z' \in (z_a, z^*)$ such that one of the constraints is binding. The new contract $D, [z_a, z']$ increases the firm's payoff strictly.

Suppose that the incentive constraint is slack, but the break-even constraint is binding, i.e. $M(D^*, z^*) = 0$. Let $\hat{D}(z)$ be an implicit function, given by $M(\hat{D}(z), z; k) = 0$. By assumption 2

$\hat{D}(z)$ is well-defined and decreasing in z. It can be shown that for z small enough, $N(\hat{D}(z), z; k)$ is strictly decreasing in z and for some $z' < z^*$, $N(\hat{D}(z'), z'; k) = 0$. Since $D^* = \hat{D}(z^*)$, we see that

$$\begin{aligned}\bar{R} + \bar{c} - \hat{D}(z') - F(z'|s)\Delta(\hat{D}(z'), k) - F(z'|s) \int_{z_a}^{k(R-\hat{D}(z'))/\beta} ch(c)dc > \\ \bar{R} + \bar{c} - I - F(z^*|s) \int_{z_a}^{k(R-\hat{D}(z^*))/\beta} ch(c)dc = \\ \bar{R} + \bar{c} - \hat{D}(z^*) - F(z^*|s)\Delta(\hat{D}(z^*), k) - F(z^*|s) \int_{z_a}^{k(R-\hat{D}(z^*))/\beta} ch(c)dc,\end{aligned}$$

so the payoff of $(\hat{D}(z'), z')$ is strictly higher.

Now suppose that the break-even constraint is slack. By the same reasoning as above, there exists a strictly decreasing continuous function $\tilde{D}(z)$ such that $N(\tilde{D}(z), z; k) = 0$ and $D^* = \tilde{D}(z^*)$. Then there exists $z' < z^*$ such that $M(\tilde{D}(z'), z'; k) = 0$. Since $N(\tilde{D}(z), z; k) = 0$, we know that $\int_{c_a}^{k(R-\tilde{D}(z)/\beta} ch(c)dc = x/[F(z|r) - F(z|s)] - \Delta(\tilde{D}(z), z)$. Then we have that

$$\begin{aligned}\bar{R} + \bar{c} - \tilde{D}(z') - F(z'|s)\Delta(\tilde{D}(z'), k) - F(z'|s) \int_{z_a}^{k(R-\tilde{D}(z'))/\beta} ch(c)dc = \\ \bar{R} + \bar{c} - \tilde{D}(z') - F(z'|s)\frac{x}{F(z'|r) - F(z'|s)} > \\ \bar{R} + \bar{c} - \tilde{D}(z^*) - F(z^*|s)\frac{x}{F(z^*|r) - F(z^*|s)} = \\ \bar{R} + \bar{c} - \tilde{D}(z^*) - F(z^*|s)\Delta(\tilde{D}(z^*), k) - F(z^*|s) \int_{z_a}^{k(R-\tilde{D}(z^*))/\beta} ch(c)dc,\end{aligned}$$

where we used the fact that $\tilde{D}(z)$ and $F(z|s)/[F(z|r) - F(z|s)]$ are strictly decreasing functions (lemma B.1). Therefore the payoff of $(\hat{D}(z'), z')$ is strictly higher. ■

Proof of Lemma A.3. By the same proof as for lemma A.2, we establish the fact that a maximum exists. The rest of the lemma is implied by the fact that a maximum exists and by lemma B.3. The last claim follows from the fact that the break-even constraint is binding and assumption 2. ■

Proof of Theorem 2. Let $B_2 = \{(D, z, k) :$ constraints $(A.6)$ and $(A.7)$ are satisfied.$\}$. By feasibility $z \in [z_a, z_b]$, $k \in [0,1]$, and by lemma B.3, $D \in [0, R]$.

Suppose that B_2 is nonempty. B_2 is bounded. Moreover, since the constraints are continuous, B_2 is closed and hence compact. Then by Weierstrass extreme value theorem there exists (D_*, z_*, k_*) such that $k_* \leq k$ for all k such that $(D, z, k) \in B_2$. Since for all $(D, z, k) \in B_2$ $k > 0$, therefore $k_* > 0$. If $B_2 = \emptyset$, then set $k_* = 1$. Then for all $k \in [0, k_*)$, no contract with covenant is feasible.

Since, $\frac{\partial}{\partial k} M(D, z, k) \geq 0$ and $\frac{\partial}{\partial k} N(D, z, k) \geq 0$, increasing k relaxes the constraints, so if bank control is feasible for some k, it is feasible for all $k' \geq k$.

Let $(\hat{D}, \hat{z})$ be the optimal rectangular contract. Define $\bar{k} = \beta c_b / (R - \hat{D})$. Clearly, for all $k \geq \bar{k}$, $(D^*(k), z^*(k)) = (\hat{D}, \hat{z})$ and for all $k_* \leq k < \bar{k}$, $k(R - D^*) < \beta c_b$.

Let $k_* \leq k_1 < k_2 \leq k^*$ and let (D_i^*, z_i^*) be the corresponding optimal contract. From lemma A.3, $D_i^* = D(z_i^*, k_i)$ and z_i^* is the smallest z such that $M(D(z, k_i), z; k_i) \geq 0$. By the implicit function theorem, $\frac{\partial}{\partial k} D(z, k) > 0$. Since M is increasing in D (assumption 2), z and k, it follows that $z_1^* > z_2^*$.

Finally, by the proof of lemma A.1, the firm's payoff is increasing in k if the bank is in control and is constant in k if the institution is in control. Therefore there exists some $\underline{k} \geq k_*$ such that the firm's payoff is higher with bank control if and only if $k \geq \underline{k}$. ■

Proof of Proposition 1. As we have shown in the proof of theorem 2, if $k \geq \bar{k}$, the optimal contract $(D^*(k), z^*(k)) = (\hat{D}, \hat{z})$, where $(\hat{D}, \hat{z})$ is the optimal rectangular contract.

Suppose that $\underline{k} \leq k_1 < k_2 \leq \bar{k}$. We want to show that $D(k_1) < D(k_2)$. Suppose not: $D(k_1) \geq D(k_2)$. Therefore:

$$
\begin{aligned}
D(k_1) + F(z(k_1)|s)\Delta(D(k_1), k_1) &> D(k_1) + F(z(k_2)|s)\Delta(D(k_1), k_1) \\
&\geq D(k_2) + F(z(k_2)|s)\Delta(D(k_2), k_1) \\
&\geq D(k_2) + F(z(k_2)|s)\Delta(D(k_2), k_2) = I,
\end{aligned}
$$

where we used the fact that $z(k)$ is strictly decreasing on $[\underline{k}, \bar{k}]$, assumption 2 and the fact that all the constraints bind at the optimal contract (lemma A.3). Then the break-even constraint is slack for $(D(k_1), z(k_1))$, which is a contradiction. ■

Proof of Proposition 2. Suppose that for some k and $\beta_1 > 0$, the optimal contract $(D(k), z(k))$ is with covenants and bank control. Then for all $\beta_2 < \beta_1$, the contract $(D(k), z(k))$ is feasible and all the constraints are slack. Then by lemma B.3 and A.1 there exists a feasible contract that gives the firm strictly higher payoff than under $(D(k), z(k))$ and $\beta = \beta_1$. This implies that for a fixed k, the set of β such that investor control or no covenants is preferred has the form $(\bar{\beta}, 1]$.

Let $\beta = 1$. By theorem 2, there exists some $\underline{k} > 0$ such that the contract is without bank control if $k < \underline{k}$. Then for all $k < \underline{k}$, $\bar{\beta} < 1$. ■

Proof of Lemma 2. Any feasible contract for $a = r$ is weakly dominated by the contract $k = 0$, $z = z_a$, $D = I(1 + i_f) + y$. Then this is an optimal contract, conditional on $a = r$.

Let $B = \{(D, z, k) :$ constraints $9, 10$ and 2 are satisfied.$\}$ As in the proof of proposition 2, we can show that B is compact. Therefore there exists a contract that maximizes the firm's value if $a = s$ and banks are in control.

Similarly, let $B_1 = \{(D, z, k) :$ constraints $11, 12$ and 2 are satisfied.$\}$ As in the proof of proposition 2, we can show that B_1 is compact. Therefore there exists a contract that maximizes the firm's value conditional on $a = s$ and institutions are in control.

Comparing the three contracts, we can find the optimum contract.

Suppose that the optimal contract is with bank control. If $M = 0$ or $M = I$, then the constraints must be binding by the argument in lemma B.3.

Suppose that both (9) and (10) are slack. Then by the same variation as described in the proof of lemma B.3, we can increase the firm's objective function, which is a contradiction.

Suppose that (9) is slack and (10) is binding. Then it is feasible to increase M marginally, without affecting the firm's value. This will make both constraints slack, which is a contradiction. The case when (10) is slack, but (9) is binding is analogous.

The case when institutions are in control is analogous. ∎

Proof of Theorem 3. Let $\underline{k}(i_b)$ be the smallest k such that a contract with bank control exists and $\bar{k}(i_b)$ be the largest k such that a contract with bank control exists. It is immediate that $\underline{k}(i_b)$ ($\bar{k}(i_b)$) exist and are weakly increasing (decreasing) in i_b and for any $k \in [\underline{k}(i_b), \bar{k}(i_b)]$, a feasible contract with bank control exists.

Let $v_b(k, i_b)$ be the firm's payoff if the bank is in control, has share k and its interest rate is i_b. Let $v_b(i_b) = \max_{k \in [\underline{k}(i_b), \bar{k}(i_b)]}\{v_b(k, i_b)\}$.

Suppose that $i_b < i'_b$, $k' \in [\underline{k}(i'_b), \bar{k}(i'_b)]$. Let (D, z) be optimal contract for k' and i'_b. Then (D, z) is feasible for k' and i_b and the break-even constraint is slack. Then by lemma B.3, there exists (D^*, z^*) that is feasible and has strictly higher payoff. Therefore $v_b(i_b) \geq v_b(k', i_b) > v_b(k', i'_b) = v_b(i'_b)$. So v_b is strictly decreasing in i_b.

Let $v_n(k, i_b)$ be the firm's payoff in the covenant-lite case and $v_f(k, i_b)$ be the firm's payoff if institutions are in control. $v_n(i_b)$ and $v_f(i_b)$ are defined similarly to $v_b(i_b)$. Clearly, $v_n(i_b) = v_n(0, i_b)$ is independent of i_b and similarly for $v_f(i_b)$.

Bank control is chosen if $v_b(i_b) > \max\{v_n(i_b), v_f(i_b)\}$. Since $v_b(i_b)$ is strictly decreasing in i_b the conclusion of the theorem follows. ∎

Appendix C
Variable definitions

Variable	Definition
Asset tangibility	Total Property, Plant, and Equipment / Total assets
	PPENTQ/ATQ
Cash	Cash/Total assets
	CHEQ/ATQ
Loan size	Total value of all facilities in the loan package (in $ millions)
Default spread	Difference between yield of BAA rated corporate bonds and AAA rated corporate bonds as of the earnings announcement date
TOM	TOM stands for Time On the Market, computed following Ivashina and Sun (2011), as the number of days between the loan launch date and the loan start date.
TOM - Market	Average TOM (time on market) across all leveraged loans in the sample, for which data is available, in the given calendar quarter
Institutional share	New institutional capital as a proportion of total new money in the loan, defined as New Institutional Money/(New Institutional Money + New Pro Rata Money)
Institutional share - Market	Average institutional share of all leveraged loans in the sample, for which data is available, in the given calendar quarter
Leverage	(Total long term debt + Total debt in current liabilities) / Total assets
	(DLTTQ+DLCQ)/ATQ
Loan spread	Average spread of all facilities in the loan package
Market volatility	CBOE VIX level as of the earnings announcement date
Net percentage of banks increasing spreads	Net percentage of banks increasing spreads for large and medium size corporations from the Federal Reserve bank survey (DRISCFLM)
Not rated	Equals 1 if firm does not have a rating, 0 otherwise
Profitability	Net Income/ Total assets (x4)
	IBQ/ATQ
Rating	S&P rating, lower numbers represent lower default risk (BBB+=1, BBB=2,…,BB=5,…B=8, CCC=11).
PEG Reputation	Reputation of the private equity group sponsor is computed following Demiroglu and James (2011) as the natural log of 1 plus the number of deals completed since 1980 (or in the past three years).
Bank activity	Bank activity is computed as the natural log of 1 plus the number of leveraged loan deals originated by the bank in the past three years.
PEG sponsored loan	Equals 1 if the loan has a private equity group sponsor, 0 otherwise.
Stock volatility	Volatility of daily returns is computed using 254 day period ending one day before the loan launch date, expressed in percent, and annualized
Term spread	Slope of the yield curve as of the loan launch date.
	10 year - 2 year constant maturity treasury yield.

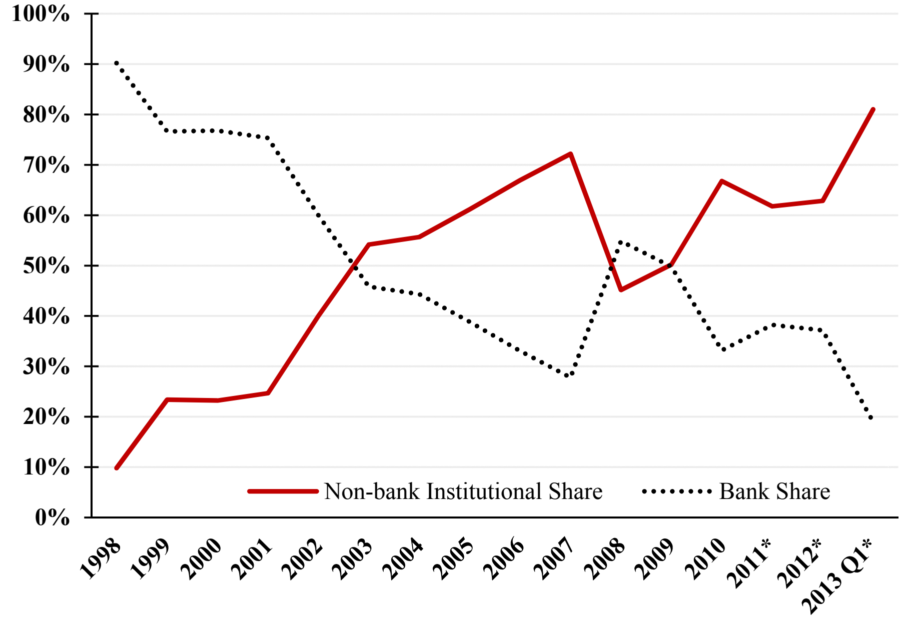

Figure 1: Bank and nonbank share of aggregate loan volume in the leveraged loan segment of the syndicated loan market. This figure highlights the increase in the share of non-bank institutional capital in the leveraged loan market from 1998 to the first quarter of 2013. We use loan level data from S&P LCD to compute the aggregate volume of loans financed by non-bank institutions and banks for each year. Non-bank institutional share plus bank share equals 100%. As loan level data used in computing the volume is only available until July 2011 due to data licensing restrictions, we supplement the series using aggregate volume statistics reported by leveragedloan.com, an S&P LCD service (denoted by an asterisk).

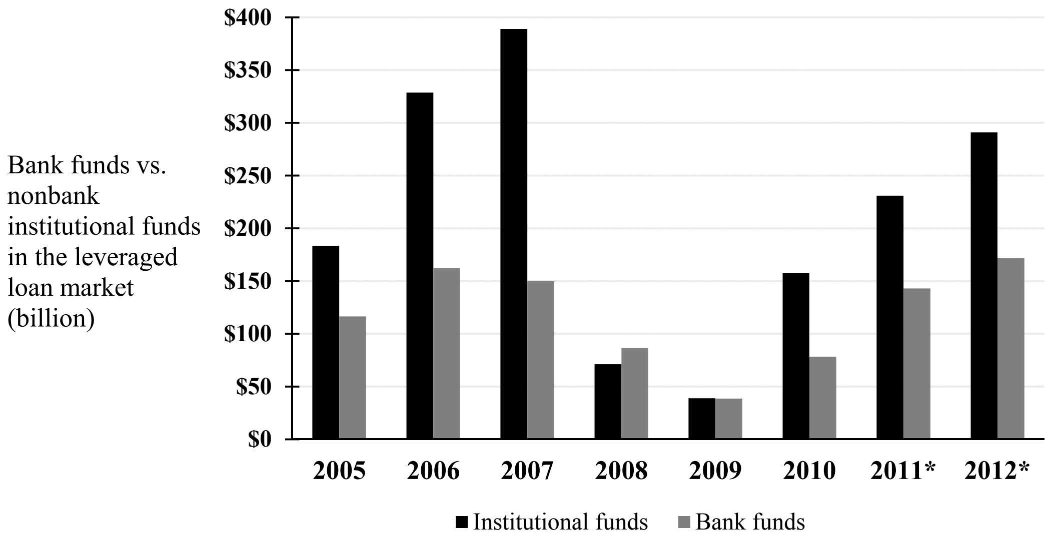

Figure 2: Bank and nonbank institutional volume in the leveraged loan segment of the syndicated loan market. Figure 2 depicts the volume of new leveraged loans financed by banks and non-bank institutional investors from 2005-2012. We use loan level data from S&P LCD to compute the aggregate volume of loans financed by non-bank institutions and banks for each year. As loan level data used in computing the volume is only available until July 2011 due to data licensing restrictions, we supplement the series using aggregate volume statistics reported by leveragedloan.com, an S&P LCD service (denoted by an asterisk).

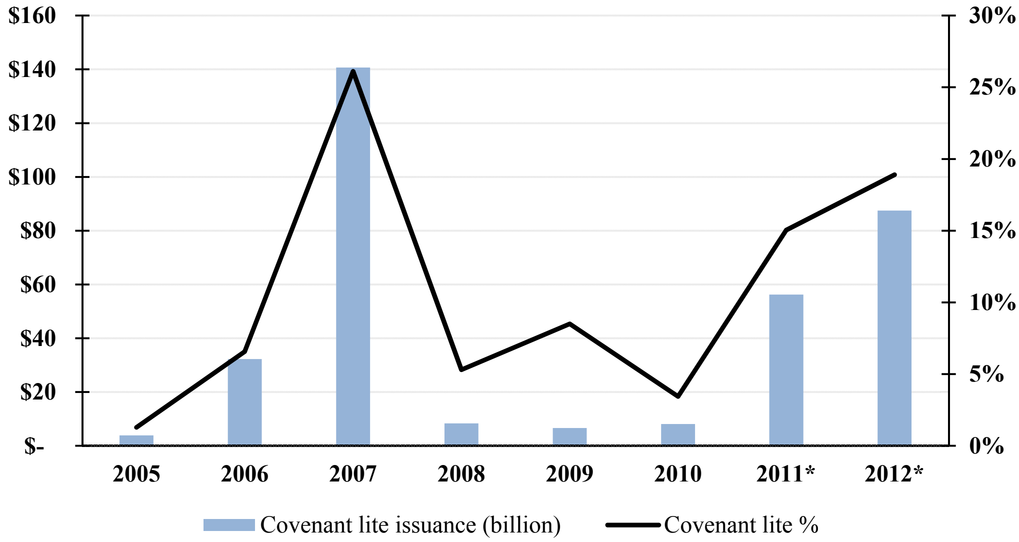

Figure 3: Covenant-lite loan volume and share in the leveraged loan market. Figure 3 depicts covenant lite loan issuance (in billions) by year on the primary Y-axis, along with the percentage of leveraged loan volume that is covenant-lite by year on the secondary Y-axis. We use loan level data from S&P LCD to compute the aggregate volume of covenant lite loans for each year. As loan level data used in computing the volume is only available until July 2011 due to data licensing restrictions, we supplement the series using aggregate covenant lite volume statistics reported by leveragedloan.com, an S&P LCD service (denoted by an asterisk).

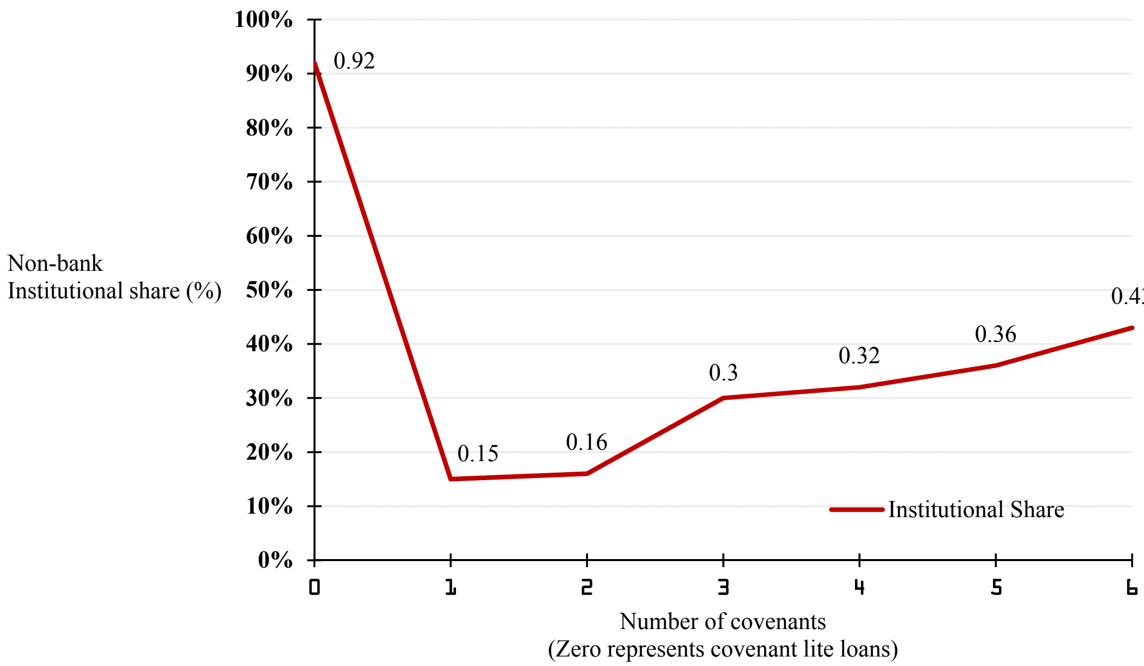

Figure 4: Bank loan share ("skin in the game") and covenant protection. Figure 3 plots the relation between the fraction of the loan funded by non-bank institutions, *institutional share*, and the number of financial maintenance covenants in the loan. The number 0 on the X-axis represents covenant lite loans. Institutional share is computed following Ivashina and Sun (2011) as the ratio of the dollar value of the institutional tranche (Term Loan B) to the total loan. The number of loan covenants is taken from the Dealscan database (loans with missing data on covenants are omitted).

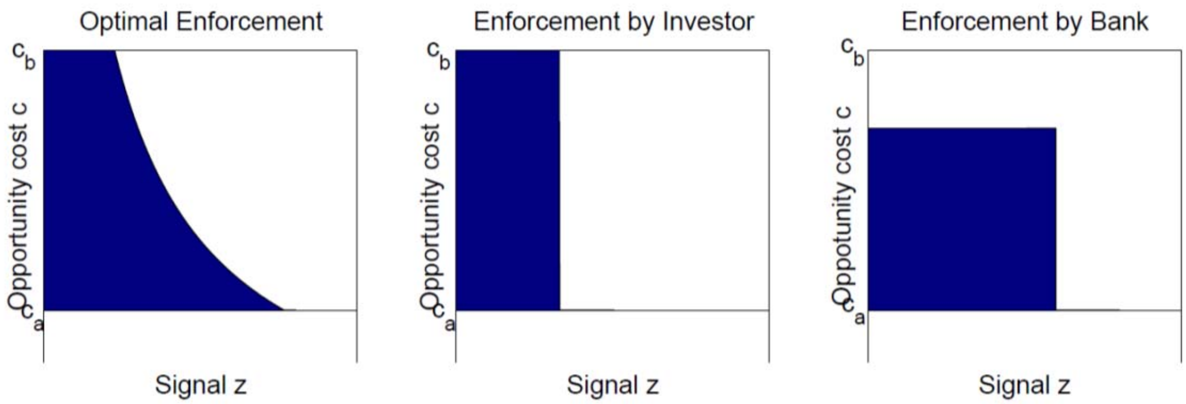

Figure 5: Enforcement under different scenarios. Shaded area is the collection of points *(z,c)* at which enforcement takes place.

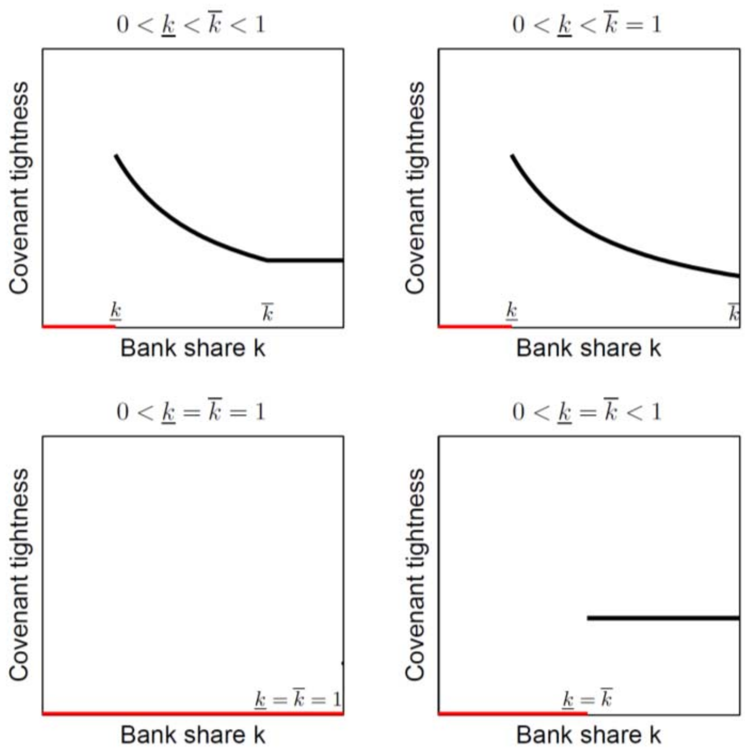

Figure 6: Optimal covenant enforcement without commitment. Cases when institutions enforce not shown.

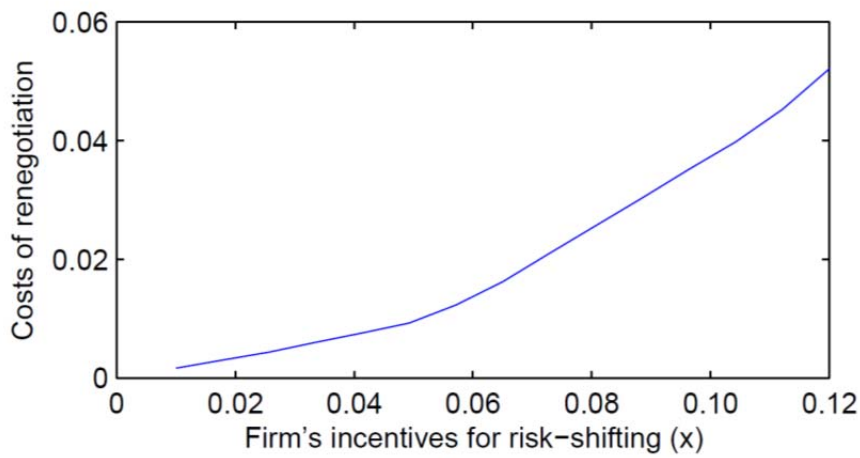

Figure 7: Total cost of renegotiation for different *x*.

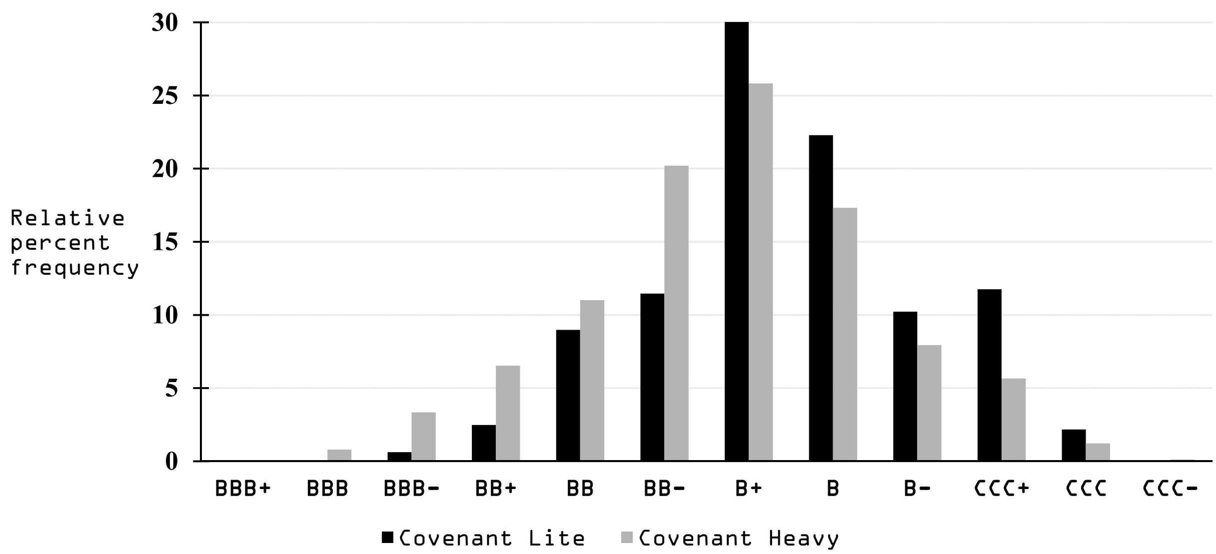

Figure 8: Loan credit ratings for covenant-lite and covenant-heavy leveraged loans. T shows relative percent frequencies for S&P credit ratings for both covenant lite and covenant heavy loans. The figure excludes unrated loans. All data on loans for this figure is sourced from S&P LCD.

Table 1

Descriptive statistics

This table provides summary statistics of key variables for the sample of 4,926 covenant heavy leveraged loans and 381 covenant-lite loans from January 2005 to July 2011. Leveraged loan data is sourced from S&P's proprietary leveraged commentary & data (LCD) service. Firm characteristics (total assets, leverage, asset tangibility, profitability) from Compustat are available for a subset of 162 covenant lite loans and 1,735 covenant heavy firms. Stars represent significance differences between covenant-lite and covenant-heavy loan samples at the 1,5, and 10 percent levels. Variable definitions are contained in Appendix C.

Panel A: Comparing covenant-lite and covenant-heavy loans

	Covenant-lite loans			Covenant-heavy loans		
	Mean	Standard deviation	Median	Mean	Standard deviation	Median
Loan size (million)	670	936	365	473***	1061	220***
Loan spread (bps)	353	180	300	370*	200	300
Institutional share	0.92	0.25	1.00	0.65***	0.41	0.85***
TOM (days)	24.59	14.01	22.00	32.96***	44.86	25.00**
Sponsored dummy	0.75	0.43	1.00	0.55***	0.50	1.00***
Not rated dummy	0.15	0.36	0.00	0.48***	0.50	0.00***
Rating score (if rated)	7.47	1.62	7.00	6.76***	1.78	7.00***
Total assets (billion)	3.37	4.11	1.55	4.38*	18.75	1.29**
Cash	0.12	0.12	0.08	0.09***	0.11	0.05***
Leverage	0.41	0.28	0.37	0.42	0.30	0.38
Asset tangibility	0.30	0.23	0.24	0.30	0.24	0.25
Profitability	0.09	0.14	0.07	0.05***	0.21	0.06**

Table 2

Determinants of covenant-lite loans

This table presents a logistic regression examining the relationship between supply factors such as institutional share and institutional demand (TOM) and covenant lite loans. The dependent variable is a dummy that takes the value of 1 if the loan is covenant-lite, and 0 otherwise. The sample period starts on 1st January 2005 and ends on 31st July 2011 and includes data on leveraged loans obtained from S&P LCD. The key explanatory variables are *institutional share*, or the fraction of the loan syndicated to non-bank investors, and *TOM*, which is the time on market between loan launch date and loan start date following Ivashina and Sun (2011). Regression (2.1) presents a logistic regression with institutional share, loan specific variables, and credit rating dummies. Regression (2.2) – (2.5) augments regression (2.1) with firm specific variables such as size, leverage, cash, asset tangibility, and profitability from the Compustat quarterly database. Thus, regressions (2.2) - (2.5) are restricted to public firms, while regression (2.1) includes both public and private firms. Regressions (2.3) includes Institutional share-Market, or the average institutional share for all leveraged loans in the calendar quarter of the loan issue, while (2.4) and (2.5) include TOM-Market, the average time on market for all leveraged loans in the calendar quarter of the loan issue. Two way clustered *t*-statistics that adjust for clustering at the calendar quarter and firm level are presented in parentheses. Stars represent significance at the usual levels. Variable definitions are contained in Appendix C.

	Dependent variable: Covenant lite = 1				
	(2.1)	(2.2)	(2.3)	(2.4)	(2.5)
Institutional share	2.64 (2.59)***	3.70 (3.34)***	3.70 (3.21)***	4.81 (2.47)**	4.66 (2.52)**
Institutional share – Market			7.46 (2.00)**		
TOM				-0.01 (-2.40)**	-0.01 (-1.78)*
TOM – Market					-0.07 (-2.25)**
PEG sponsored loan	0.46 (2.49)**	0.58 (2.60)***	0.60 (2.51)**	0.38 (1.81)*	0.29 (1.32)
Log loan size	0.52 (5.61)***	0.16 (1.21)	0.10 (0.76)	0.09 (0.56)	0.08 (0.48)
Log total assets		0.33 (2.93)***	0.41 (3.29)***	0.30 (2.00)**	0.30 (1.83)*
Leverage		-0.48 (-1.58)	-0.31 (-0.92)	-0.74 (-1.87)*	-0.76 (-1.90)*
Cash		2.04 (2.58)***	2.19 (2.92)***	1.73 (1.32)	1.70 (1.32)
Asset tangibility		0.62 (1.29)	0.44 (0.89)	1.01 (1.69)*	0.89 (1.47)
Profitability		2.31 (3.13)***	2.32 (2.84)***	2.33 (2.05)**	2.04 (1.80)*
Constant	-8.59 (-6.21)***	-9.82 (-6.56)***	-15.09 (-5.73)***	-10.20 (-4.15)***	-7.78 (-2.78)***
Rating dummies	Yes	Yes	Yes	Yes	Yes
Pseudo R-square	0.16	0.24	0.27	0.29	0.32
Observations	4,861	1,535	1,535	982	982

Table 3

Covenant-lite loans and yield spreads

This table documents the tradeoff in yield spreads and covenant protection in a multiple regression setting. The key independent variable is the covenant-lite dummy that takes the value of 1 if the loan is covenant-lite, and 0 otherwise. As the dependent variable is log spreads, the coefficient on the covenant-lite dummy indicates the percentage differential between covenant-lite loans compared to covenant-heavy ones. Regressions (3.1) – (3.4) differ in their use of rating and time fixed effects. Rating dummies are based on S&P credit ratings while time dummies are based on calendar quarter periods. TOM - Market is computed as the average time on market for all loans in the calendar quarter following Ivashina and Sun (2011). The loan sample is sourced from S&P LCD and starts on 1st January 2005 and ends on 31st July 2011. Clustered *t*-statistics at the firm level are included in all specifications. Stars represent significance at the usual levels. Variable definitions are contained in Appendix C.

	Dependent variable: Log spread			
	(3.1)	(3.2)	(3.3)	(3.4)
Covenant-lite dummy	0.16 (3.83)***	0.09 (2.43)**	0.07 (2.22)**	0.07 (2.22)**
TOM - Market				0.43 (3.74)***
PEG sponsored loan	0.17 (5.20)***	0.12 (3.69)***	0.10 (3.35)***	0.10 (3.35)***
Log loan size	-0.06 (-3.67)***	-0.04 (-2.48)**	-0.04 (-2.93)***	-0.04 (-2.93)***
Log total assets	-0.04 (-2.82)***	-0.03 (-2.13)**	-0.03 (-2.65)***	-0.03 (-2.65)***
Leverage	0.22 (3.11)***	0.13 (1.78)*	0.08 (1.14)	0.08 (1.14)
Stock volatility	0.46 (6.92)***	0.49 (7.34)***	0.38 (5.44)***	0.38 (5.44)***
Asset tangibility	0.01 (0.20)	0.01 (0.13)	0.06 (1.05)	0.06 (1.05)
Profitability	-0.05 (-0.50)	-0.05 (-0.50)	-0.06 (-0.60)	-0.06 (-0.60)
Market volatility (VIX)	0.01 (6.17)***	0.01 (6.37)***	0.01 (2.90)***	0.01 (2.90)***
Constant	5.62 (51.50)***	5.42 (45.18)***	5.52 (42.86)***	-8.03 (-2.22)**
Rating dummies	No	Yes	Yes	Yes
Time dummies	No	No	Yes	Yes
Adjusted R-square	0.32	0.36	0.51	0.51
Observations	1,203	1,203	1,203	1,203

Table 4

Covenant-lite loans and yield spreads II: Propensity score matching

In this table, we measure the effect of covenant-lite features on loan spreads after controlling for default risk using credit rating, leverage, and size. We match each covenant-lite loan to a covenant-heavy loan issued in a (-5 day,+5 day) time window around the covenant lite issue date. Matching in a short time window reduces potential matches, but allows us to control for macroeconomic and time specific factors that affect loan spreads. The loan sample is sourced from S&P LCD and starts on 1st January 2005 and ends on 31st July 2011. Panel A.1 restricts matches to have the same S&P rating and be issued in a (-5, +5) day window. If multiple matches are found, the loan with the closest loan size is kept. Panel A.2 is similar to the matching procedure in Panel A.1 but adds leverage and firm size from Compustat. Panel B employs a *propensity score matching* approach using a logit model and a caliper of 0.25 with loan characteristics (log loan size, PEG sponsored loan dummy), firm characteristics (log total assets, leverage, asset tangibility, profitability, cash, stock volatility), ratings, and time controls (TOM-market, VIX, calendar quarter dummies). We conduct a likelihood ratio test for balance/bias and find that the treatment and control samples are insignificantly different from each other based on the selection parameters. The significance levels of differences in means and medians are based on a *t*-test and the Wilcoxon signed-rank test. The notation *, **, *** denotes statistical significance at the 10%, 5%, and 1% levels respectively. Variable definitions are contained in Appendix C.

	Covenant-lite loan	Covenant-heavy loan	Spread difference
Panel A.1: Matched by rating and a (-5,5) day window, closest loan size (N=346) [Public and private firms]			
Loan spread	349	313	34.7***
Panel A.2: Matched by rating, leverage, firm size, and a (-5,5) day window (N=46) [Public only]			
Loan spread	295	239	56.0**
Panel B.1: Propensity score matched using loan features, ratings, and time controls (N=378) [Public and private firms]			
Loan spread	353.2	325.9	27.2**
Panel B.2: Propensity score matched using loan features, borrower features, ratings, and time controls (N=104) [Public only]			
Loan spread	315.8	267.1	48.7**

Table 5

The role of originator and borrower reputation in covenant-lite loans

This table examines whether covenant-lite deals are backed by more reputable private equity group (PEG) sponsors and banks. We measure PEG reputation in two ways following Demiroglu and James (2012). We use data from SDC to construct both measures. The first measure takes a longer time horizon and is equal to the log of 1 plus the number of LBO deals that a sponsor has been involved in since 1980. The second measure is defined similarly but restricts deals to three years before the covenant-lite issue date. We measure the activity of the originating bank as log of 1 plus the number of leveraged loans originated by the bank in the last three years. All specifications include fixed effects for credit ratings (S&P). Specifications (5.3) to (5.6) are restricted to loans sponsored by PEG groups, and thus drop the PEG sponsored loan dummy. The base loan sample is sourced from S&P LCD and starts on 1st January 2005 and ends on 31st July 2011. Two-way clustered *t*-statistics at the firm and calendar quarter level are presented in parentheses. Stars represent significance at the usual levels. Variable definitions are contained in Appendix C.

	(5.1)	(5.2)	(5.3)	(5.4)	(5.5)	(5.6)
	All loans	Loans by public firms	PEG sponsored loans	PEG sponsored loans (public)	PEG sponsored loans	PEG sponsored loans (public)
Institutional share	2.71 (2.77)***	3.80 (3.40)***	2.03 (2.35)**	3.44 (2.20)**	2.01 (2.40)**	3.32 (2.26)**
PEG reputation proxy 1 (Since 1980)	0.28 (2.41)**	0.41 (3.55)***	0.28 (2.43)**	0.46 (3.76)***		
PEG reputation proxy 2 (Last three years)					0.34 (2.45)**	0.39 (2.95)***
PEG sponsored loan dummy	-0.00 (-0.01)	-0.19 (-0.57)				
Bank activity proxy	0.24 (2.66)***	0.14 (1.69)*	0.29 (2.11)**	0.35 (2.54)**	0.29 (2.11)**	0.35 (2.67)***
Log loan size	0.46 (4.93)***	0.13 (0.93)	0.46 (4.10)***	0.12 (0.57)	0.46 (4.16)***	0.11 (0.59)
Log total assets		0.29 (2.65)**		0.08 (0.48)		0.10 (0.63)
Leverage		-0.45 (-1.43)		-1.19 (-2.76)***		-1.17 (-2.79)***
Cash		1.93 (2.39)**		0.35 (0.23)		0.31 (0.22)
Asset tangibility		0.54 (1.20)		-0.17 (-0.27)		-0.02 (-0.03)
Profitability		2.14 (2.96)***		3.09 (2.79)***		3.44 (3.21)***
Constant	-9.52 (-7.24)***	-10.03 (-6.95)***	-9.20 (-5.78)***	-9.04 (-4.50)***	-9.12 (-5.92)***	-8.75 (-4.62)***
Rating dummies	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-square	0.17	0.25	0.14	0.22	0.14	0.22
Observations	4,861	1,535	2,809	527	2,809	527