# Creditor Control Rights and Firm Investment Policy*

Greg Nini
Board of Governors of the Federal Reserve System

David C. Smith
University of Virginia, McIntire School of Commerce

Amir Sufi
University of Chicago, Graduate School of Business

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**Abstract**

We provide empirical support for control-based theories of financial contracting by documenting creditors' widespread use of explicit contractual restrictions on firm investment policy. We examine a large sample of private credit agreements between banks and publicly traded corporations, and we find that creditors impose a capital expenditure restriction on 40% of loans. Creditors are more likely to impose a restriction after negative firm performance, and the effect of negative performance on the likelihood of facing a capital expenditure restriction is stronger than the effect of negative performance on other loan terms such as the interest spread or pledging of collateral. We also document a direct link between firm financial and investment policy by providing evidence that contractual restrictions restrain capital expenditures by borrowers. Our results are consistent with optimal financial contracting models in which creditors retain control rights over investment policy as a second-best solution to agency conflicts.

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Traditional thinking in corporate finance maintains that equity claimants, as "owners," hold the ultimate right to control the actions of the corporation. In contrast, creditors are seen as having relatively few control rights until a company has defaulted on its payment obligations. In this paper, we demonstrate empirically that the traditional thinking is incorrect. Creditors draw from a toolkit of contractual covenants that can control or restrict nearly any dimension of corporate financial and investment policy, including the raising of new capital, the payment of dividends, changes in equity control, and the level of funds a company can commit each year to new investments. These restrictions apply to firms across the credit-quality spectrum, and can be imposed long before a company is in danger of bankruptcy.

We document the importance of creditor control by focusing on explicit contractual restrictions on firm investment policy contained in bank loan agreements.[1] We examine nearly 5,000 loan agreements made to publicly traded U.S. corporations, and document that roughly 40% of the loan contracts contain an explicit restriction on the borrower's annual capital expenditures. These restrictions accompany loans to borrowers across all industries and all stages of financial health. While a large body of empirical research has examined the link between firm investment policy and financial policy, this paper is among the first, to our knowledge, to document creditors' widespread use of direct contractual restrictions on the investment policy of public firms.

We investigate these restrictions within the context of control-based theories of financial contracting. Since the seminal papers by Grossman and Hart (1986) and Hart and Moore (1990), a large body of theoretical research argues that the allocation of control rights in an incomplete contract setting can improve on simple cash-flow based financial contracts. We focus on the studies by Aghion and Bolton (1992) and Dewatripont and Tirole (1994), who apply an incomplete contracting framework to examine capital structure decisions in the presence of agency conflicts between stakeholders (Jensen and Meckling (1976)). In their models, the division of control rights over firm investment policy is

[1] Prior research on *public bond covenants* finds that explicit restrictions on firm investment are rare. Our paper considers covenants in *private credit agreements*, where covenants are more likely to affect firm behavior. We discuss the differences between public bonds and private credit agreements in more detail below.

contingent upon the outcome of a noisy performance signal that is correlated with unobservable effort or states of nature. When the performance signal is low, control rights shift to creditors to minimize inefficient investment decisions. In particular, the model by Dewatripont and Tirole (1994) implies that creditors will exercise their control rights by restricting firm investment in response to observed negative performance.

Our results provide strong empirical support for control-based theories of financial contracting. First, the fact that 40% of loan contracts contain an explicit restriction on firm investment constitutes prima facie evidence that control rights improve contracting beyond that which is possible through the specification of cash flow rights alone. In other words, the financial contracting space involves more than price, quantity, and collateral dimensions—creditors make extensive use of control rights when writing debt contracts. We also find that the restrictions apply across the size, industry, and credit quality distribution, including borrowers that are far from bankruptcy.

Second, consistent with the predictions of Aghion and Bolton (1992) and Dewatripont and Tirole (1994), we find that creditor control rights are negatively related to observable measures of firm performance. Using firm fixed-effects regressions within a panel of loan contracts, we find that a capital expenditure restriction is more likely to be imposed following a decline in cash flow, a financial covenant violation, or a downgrade in the firm's credit rating. The effect of negative firm performance on the likelihood of having a capital expenditure restriction is both statistically robust and economically meaningful. For example, a firm that is downgraded from the lowest investment-grade S&P rating (BBB) to the highest speculative-grade rating (BB) experiences a 20 percentage point increase in the likelihood of facing a capital expenditure restriction, which translates to a 52% increase in the likelihood, evaluated at the mean.

Moreover, we demonstrate that capital expenditure restrictions are among the most important performance-contingent contractual features found in loan agreements. In response to negative firm performance, the elasticity of capital expenditure restrictions is larger than the elasticities associated with the interest spread, the pledging of collateral, and the restriction of dividend payments. For example, our

estimates imply that a financial covenant violation leads to a 20 percentage point increase in the likelihood that a capital expenditure restriction is put in place. The same loan also experiences an increase in the contracted interest spread of 29 basis points, an increase in the likelihood of the loan being secured by 8 percentage points, and an increase in the likelihood of having a dividend restriction by 5 percentage points. Evaluated at their respective means, however, the covenant violation leads to a 50% increase in the incidence of a capital expenditure restriction, and only a 15%, 10%, and 5% increase in the interest rate, the incidence of collateral, and the incidence of a dividend restriction, respectively. These results suggest that the allocation of control rights over firm investment policy is more sensitive to firm performance than prices, the use of collateral, or the use of restrictions on wealth transfers.

In our final set of results, we provide evidence that capital expenditure restrictions are relevant to the investment policy of borrowers. It is worth noting the difficulty in identifying a causal effect of a restriction on the capital expenditure policy of a firm. Because our results show that capital expenditure restrictions are imposed on firms that exhibit negative performance, and it is well documented that negative performance is correlated with reductions in capital expenditures, we would likely expect a reduction in capital expenditures even in the absence of the restriction.

Nonetheless, we find two results that suggest that the capital expenditure restrictions constrain firm investment policy. First, using a sub-sample of 757 loans for which we collect the actual value of the capital expenditure restriction, we show that firm capital expenditures cluster tightly at or below a "kink" at the restriction. Expenditures of nearly 25% of firms are within 80 to 100% of their restriction amount, whereas only 9% are within 100% to 120% of the restriction.[2] Relative to an estimated continuous parametric distribution, we can statistically reject the hypothesis that observations do not cluster just below the restriction; likewise, we are able to statistically reject the hypothesis that the number of observations just above the restriction is not too low. The results are even more dramatic when we focus on those loans in which a capital expenditure restriction is imposed after being absent in the

[2] As we explain below, the restriction is renegotiable, but it is likely costly for borrowers to cross the restriction amount.

previous contract. For these borrowers, we show strong evidence that the restriction substantially lowers investment spending. Before the new loan agreement is signed, almost 50% of observations are above the restriction amount. After the restriction is imposed, less than 10% are above the restriction amount and over 30% of firms are within 80 to 100% of the restriction. To buttress these findings, we show, in a broader sample, that firms obtaining a loan with a capital expenditure restriction exhibit a larger decline in their capital expenditures than firms obtaining a loan without such a restriction, even after controlling for changes in performance.

Overall, our results suggest that the allocation of control rights is an important element of financial contracting, even among solvent public firms. Creditors allocate themselves control rights over firm investment policy through the use of explicit capital expenditure restrictions, and creditors are more likely to obtain these control rights in response to negative performance. Our results also suggest that the restrictions contained in debt agreements do alter firm investment policy.

We view our paper as making a novel contribution to the literature along three related dimensions. First, our paper is among the first to document empirically that creditors can, through the use of covenants in the credit agreement, exert direct control over the decision-making of a public company, well outside states of default. Incomplete contract theory rests on the notion that the allocation of control rights leads to more efficient outcomes when contracts are incomplete, and we provide support for this assumption by documenting the large fraction of loan contracts that allocate control rights to creditors over firm investment policy. Along this dimension, the paper most closely related to ours is Baird and Rasmussen (2006), who also emphasize the important influence of creditor control rights on corporate financial decisions. This paper provides large sample statistical support for the mainly anecdotal evidence in Baird and Rasmussen (2006).

Second, our results provide strong support for the idea that shifts in control rights occur in a manner consistent with the theories of Aghion and Bolton (1992) and Dewatripont and Tirole (1994). That is, we observe control rights being transferred to creditors following low realizations of performance signals. Two other papers have documented related findings. Kaplan and Strömberg (2003) study 211

financial contracts between venture capitalists (VCs) and entrepreneurs and document that the division of control rights between VCs and entrepreneurs is often contingent on observable performance signals, with control shifting to the VCs when signals are low (See also Kaplan and Strömberg (2004) and Kaplan, Martel, and Strömberg (2006)). Lerner, Shane, and Tsai (2004) examine 200 contracts between small biotechnology firms and major corporations that act as investors, and show that control rights shift to investors after negative industry-wide shocks, and shift back to the firms after positive industry shocks. Our paper complements these findings by demonstrating that debt-related control shifts are a common feature of credit agreements among a wide set of large, publicly traded firms.

Third, our paper establishes an explicit link between debt contracts and investment policy. The bulk of the existing literature explores the relationship between debt and investment policy by relying on indirect explanations such as debt overhang, collateral constraints, or costly renegotiation (see, e.g., Hennessy and Whited (2006), Hennessy (2004), Chava and Roberts (2006)). These papers overlook the more straightforward explanation that investment levels can be explicitly governed by contract. While we are cautious in interpreting the causal effect of restrictions on actual capital expenditures, we believe that creditors' use of explicit restrictions on firm investment could be an obvious channel through which financing affects firm investment. In addition, our paper departs from the existing literature which emphasizes how financial constraints lead to inefficiently low investment. Instead, we find support for an optimal contracting framework in which constraints on investment are a second-best solution when management is likely to engage in potentially value-destroying behavior.

We believe that the latter contribution is particularly important, given the prevailing wisdom that investment restrictions are too costly to include in a debt contract. For example, Smith and Warner (1976) state that "extensive direct restrictions on production/investment policy would be expensive to employ and are not observed." Consistent with this statement, Reisel (2004) and Billett, King, and Mauer (2006) find that fewer than 5% of public debt agreements contain an explicit restriction on investments. While studies of public bond covenants are instructive, they ignore the fact that private credit agreements contain covenants that bind at an earlier stage than the covenants in a bond indenture (See Dichev and

Skinner (2001), Sweeney (1994), Kahan and Tuckman (1995), Chava and Roberts (2006), and Sufi (2006) for empirical evidence and Park (2000) for a theoretical justification). In addition, relative to the covenants in credit agreements, public debt covenants are relevant only for a small fraction of the population of publicly traded firms. Only 15 to 20% of public firms have access to public debt markets whereas over 80% of public firms utilize private debt in the form of credit lines (Faulkender and Petersen (2006), Sufi (2006)). Even among firms with access to public debt markets, 95% retain a revolving credit facility; these credit facilities contain covenants that are tighter, more likely to violated, and more relevant in terms of restrictions on the firm (Sufi (2006)).

The rest of the paper proceeds as follows. The next section discusses the data and summary statistics. Section II presents the theoretical framework with which we motivate the empirical analysis. Sections III through V present the results, and Section VI concludes.

**I. Data and Summary Statistics**

Our investigation centers around the information we gather from the covenants of private credit agreements between banks and public firms. As mentioned above, we focus on bank credit agreements because, relative to other debt agreements, the covenants contained in bank loans are tighter, more likely to be violated, and more relevant in terms of restrictions on the firm. Historically, information on bank loans has been difficult to gather directly because of the customary secrecy between banks and borrowers.[3] However, public companies are required to file all "material" contracts, including bank loan agreements with the SEC. The contracts typically appear as exhibits at the end of a 10-K or 10-Q report, or as an attachment to an 8-K filing. The SEC's *Edgar* electronic filing system now makes it possible to search, extract, and download these credit agreements. We use these agreements to construct our sample of contracts with and without capital expenditure restrictions.

To build our complete dataset, we begin with loan contracts from Loan Pricing Corporations's *Dealscan* database that have already been linked to firms in Standard & Poor's *Compustat* database. To

[3] As private agreements, the loans are not legal securities and are not subject to SEC regulation.

these loans, we match the credit agreements downloaded from *Edgar*. Our final data set includes 4,978 loans to 1,780 public borrowers from 1996 through 2004. Below, we detail the data-collection process.

*A. Data: Loan agreements from Edgar*

We begin with a sample of loans from *Dealscan* matched to financial characteristics from *Compustat*. The sample includes loans made to non-financial firms, and we require that the loan have information on the amount of the loan and the interest spread. The sample is restricted to loans made from 1996 through 2004. We impose the latter restriction to merge *Dealscan* observations to their electronic contracts contained in *Edgar*. The SEC began requiring firms to file electronically only in 1996; electronic filings are only sparsely available before that date. Once these restrictions are in place, we are left with 13,193 loans.

From *Compustat*, we construct financial statistics as the average of the four quarters prior to the loan agreement being signed. Cash flow is constructed using *item 21*, scaled by the book value of total assets (*item 44*). The book leverage ratio is long term debt (*item 51*) plus short term debt (*item 45*), scaled by book assets. The market to book ratio is total assets less the book value of equity plus the market value of equity, all scaled by total assets. The book value of equity is the book value of assets less the book value of liabilities (*item 54*) and preferred stock (*annual item 10*) plus deferred taxes (*item 52*). The market value of equity is common shares outstanding (*item 14*) multiplied by the share price (*item 61*). We include only loans in which the borrower's lagged cash flow, lagged market to book, and the lagged leverage ratio are non-missing. The final *Dealscan-Compustat* sample includes 12,160 loans.

Covenant data in *Dealscan* is limited to information on financial covenants, sweeps covenants, and covenants restricting dividends. In the core *Dealscan* data set, there is no information on restrictions on capital expenditures. To obtain this information, we use text-search programs to search every 10-Q, 10-K, and 8-K filing in *Edgar* for loan contracts. More specifically, we match every firm in *Compustat* to its respective set of SEC filings, and then scan these filings for key search terms that allow us to extract loan agreements. While the reporting requirements by the SEC regarding loan agreements are quite complicated, the essential requirement is that firms must report all material loan contracts as exhibits

attached to the filing.[4] The loan contracts examined in this paper therefore represent "material" loan contracts, as defined by the SEC.

We extract the actual loan agreements from SEC filings by "tagging" each filing to see if it contains an agreement. Our specific tag is whether a line of the filing contains one of the following 5 terms in capital letters: "CREDIT AGREEMENT," "LOAN AGREEMENT," "CREDIT FACILITY," "LOAN AND SECURITY AGREEMENT," or "LOAN & SECURITY AGREEMENT." If we find one of these 5 terms, we also require the document to contain the search term "TABLE OF CONTENTS" within 60 lines after the above search terms. This search process allows us to extract most original loan contracts and many of the major amendments and restatements of loan contracts that are contained in *Edgar*. We then match the loan agreement to *Dealscan* based on the date of the loan agreement and the company identifier.

Of the 12,160 loans in *Dealscan*, we are able to successfully match over 40% to the actual loan contract from *Edgar* to yield the final sample of 4,978 loans to 1,780 borrowers. In order to understand why the match rate is only 40%, it is instructive to describe how LPC constructs its *Dealscan* data set. *Dealscan* obtains its most detailed observations from SEC filings. LPC follows the filing of SEC documents and continually extracts information from those filings that contain credit agreements. But LPC also creates additional *Dealscan* observations through information collected from financial institutions that report "deal flow" directly to LPC. The company uses this information to construct league tables of bank loan deals. Although LPC requires that the financial institutions provide enough information on the loans to verify the accuracy of the information, they do not typically obtain the level of detail available from a copy of the credit agreement. Thus, the level of detail in a *Dealscan* record will tend to depend on whether LPC could find the original credit agreement in an SEC filing.

To check the effectiveness of our text-search algorithms, we randomly sample 200 observations from *Dealscan* that we could not match electronically to a loan contract on *Edgar*, and conduct a detailed

[4] The reporting requirements for loan contracts fall within item 601(b) of regulation S-K, which is the general provision that requires exhibits to be filed. Item 4 and item 10 under this regulation require disclosure of securities and the disclosure of all material contracts, respectively. Most loan contracts fall within one of these two categories.

search of *Edgar* by hand to understand why the *Dealscan* deals did not match to a contract. For 60% of these unmatched loans, we find no loan contract on *Edgar*, indicating that LPC obtained the information directly from a financial institution. For the remaining 40% of unmatched loans, we find a loan contract in *Edgar*, but it is typically a shorter agreement that does not contain the level of detail of a matched loan. These shorter agreements are missed by our search methodology because they do not typically contain a table of contents.

[TABLE 1]

Table 1 examines the differences in *Dealscan* loans that are matched and unmatched to a loan contract from *Edgar*. Not surprisingly, the table indicates that the data quality of unmatched loans is much poorer than matched loans. In particular, data describing collateral, whether a loan has a dividend restriction, and the percentage held by each lender is more likely to be missing for loans that we are unable to match to a contract. The results for collateral and the dividend restriction are particularly striking; these data are missing for 41% and 49% of the loans that we are unable to match, respectively, whereas these data are unavailable for only 16% and 6% of matched loans. In addition, financial covenant data are missing for almost 40% of unmatched loans, but only 6% of matched loans.[5] Thus, our data set appears to overlap heavily with the set of loans in *Dealscan* for which the LPC is able to obtain the full contract.

Loans that we are unable to match to a contract are also more likely to be sole-lender loans (as opposed to syndicated loans) and revolving credit agreements with maturity of less than 1 year. This latter result may be due to the fact that short term revolving credit facilities are less likely to be considered material contracts, and are less likely to be filed with the SEC.

In terms of any broader sample selection problems, the bottom of Table 1 shows that loans that we are unable to match to a contract are to larger, less levered, and lower cash-flow firms. While these

[5] We code financial covenant data as missing if the field "Covenants: Financial Covenants" is listed as "No." Representatives from *Dealscan* maintain that virtually every loan has at least some form of a financial covenant, and that the financial covenant field being set to "No" more accurately reflects the data being unavailable rather than the loan not having a financial covenant. The evidence in Table 1 that almost 95% of matched contracts contain a financial covenant is consistent with this interpretation.

differences are statistically significant, they are not large in magnitude, and we do not believe we introduce any significant bias by focusing only on loans that we have matched to a contract. Moreover, there is no statistically significant difference between the average loan amount or interest spread for matched and unmatched loans.

We also collect data on whether firms violate a financial covenant in the year prior to the loan agreement. Financial covenants are ratios specified in bank credit agreements (such as interest coverage ratios, debt to cash flow ratios, etc.), and the borrower is in technical default of the agreement if it does not comply with a ratio.[6] The SEC requires "companies that are, or are reasonably likely to be, in breach of [financial] covenants [to] disclose material information about that breach and analyze the impact on the company if material (SEC (2003))." We exploit this requirement by searching all company 10-Ks in years immediately preceding a loan agreement to determine whether a company is in violation of a financial covenant. We use text-search algorithms to identify violations using the procedure described in Sufi (2006).

*B. Control-oriented covenant restrictions*

Using the contracts matched to *Dealscan* loans, we collect information on capital expenditure restrictions contained in the covenants sections of the credit agreement. Before turning to how we collect information on these restrictions, it is worthwhile noting that a variety of control-oriented restrictions are common in these contracts. A typical example is the June 29th, 2001 loan made to Airborne Express, Inc. In addition to a capital expenditure restriction, which we return to below, restrictive covenants in the loan document also prohibit the borrower from:

(a) being acquired or have any unit be acquired.

(b) selling, transferring, or leasing of any company assets in excess of $5 million, excepting the sale of receivables into a securitization program, and the leasing of specific aircraft equipment itemized in the appendix of the document,

[6] For further detail on financial covenant violations and their implications, see Chava and Roberts (2006) and Sufi (2006).

(c) using the proceeds of the loan to acquire, or take an equity interest in another company,

(d) making non capital expenditure-related investments in excess of $20 million (of which only certain types of investments are allowed, as enumerated in the loan document),

(e) pledging any additional collateral beyond that which is identified in the loan contract,

(f) incurring any new debt beyond that which is identified in the loan contract,

(g) selling or transferring shares of the company, except from subsidiaries to the parent, and

(h) paying dividends in an amount greater than $2 million.

In sum, lenders can draw from a toolkit of covenants that explicitly restrict many of the borrower's core investment and financial decisions.

Here, we restrict our analysis to explicit capital expenditure restrictions for three reasons. First, covenants containing capital expenditure restrictions are relatively straightforward to identify using our search methodologies. Second, a limit on capital expenditures corresponds nicely with how control rights are modeled in the control-based theories of financial contracting, particularly in Dewatripont and Tirole (1994), where creditors retain the right to stop an investment from going forward. Third, the main component of a capital expenditure restriction is "cash" capital expenditures, (*Item 128* in Compustat), the measure most often used in papers on corporate investment policy.[7] Thus, the capital expenditure restriction pertains specifically to what is usually termed "investment" in the corporate finance literature. We now describe in more detail how we identify capital expenditure restrictions in downloaded credit agreements.

*C. Capital expenditure restrictions*

Explicit restrictions on capital expenditures are quite common in loan agreements. The restrictions are usually documented in the section on negative covenants near the end of the loan agreement, and are commonly set as a nominal dollar amount for a given fiscal year. The capital

[7] Capital expenditure restrictions typically cover cash capital expenditures as reported in a company's Statement of Cash Flows plus the capitalized value of new capital leases.

expenditure restriction contained in the June 29th, 2001 loan agreement for Airborne Express, Inc is a typical example:

> Limitation on Capital Expenditures. Capital Expenditures for each Fiscal Year shall not exceed the maximum levels as set forth below opposite such Fiscal Year:
>
| Fiscal Year Ended: | Maximum Level |
|---|---|
| December 31, 2001 | $205,000,000 |
| December 31, 2002 | $255,000,000 |
| December 31, 2003 | $305,000,000 |

Alternatively, capital expenditure restrictions are sometimes enforced as percentages of performance variables. For example, the loan agreement between American Precision Industries, Inc. and Marine Midland Bank, dated August 31st, 1998 contains the following restriction:

> CAPITAL EXPENDITURES. For any one fiscal year, [the borrower shall not] make or incur aggregate Capital Expenditures in excess of seven and one-half percent (7-1/2%) of the Company's Consolidated net sales as shown on the Company's audited financial statements for such fiscal year.

For our full sample of loans, we collect information on whether a loan contract contains a capital expenditure restriction by coding as a restriction any limit on the capital expenditure activities of the firm or any of its subsidiaries. To find such restrictions, we use a text searching algorithm that searches all contracts for the term "capital expenditure." The search program tells us if the term is in the agreement, which we then further examine to confirm whether the firm has a capital expenditure restriction in the agreement.

For firms that have a capital expenditure restriction, a fiscal year ending in December, and only a specific nominal restriction on aggregate capital expenditures for the current or next fiscal year, we also collect the actual capital expenditure restriction amount for the first year reported in the loan agreement. We isolate this subset of firms in order to accurately measure the timing and amount of the restriction.[8] This subset includes 757 loans.

*D. Summary statistics*

[TABLE 2]

[8] Actual restrictions often have rollover provisions that permit some portion of unused annual limits to be carried over to the following fiscal year. To avoid the effect of accumulating limits, we focus on the first year.

Table 2 contains the summary statistics for the sample of 4,978 loans to 1,780 borrowers. The first statistic is also one of our main results: 38.2% of the loans contain an explicit restriction on capital expenditures. Across those loans containing a capital expenditure restriction for which we gather a specific nominal restriction, average firm capital expenditures in the year of the agreement, measured relative to lagged assets, is 6.6%. The average level of the restriction, also measured relative to lagged assets, is 8.9%. The average loan amount is $274 million, which represents approximately 40% of lagged book assets. While this may appear large, it is important to understand that over 74% of the loans are revolving credit facilities, 2/3 of which typically remain unused (Sufi (2006)). In terms of the borrower's performance in the year before the loan agreement is signed, cash flow averages 3.4% of total book assets, and 8% of firms have violated a financial covenant within the past year. Over 48% of loans in the sample are made to rated firms, which confirms the fact that most firms with access to public debt markets also utilize bank loans. Conditional on having a credit rating, only 2.5% of firms in our sample have a rating of CCC or below. In other words, very few of the borrowers in our sample are in or very near bankruptcy.

**II. Theoretical Framework**

The results in Table 2 suggest that investment restrictions are a common component in the credit agreements of publicly traded corporations. The restrictions imply that, as part of the agreement with borrowing firms, creditors often assign themselves explicit control rights over firm investment policy. In this section, we motivate our empirical analysis by examining why creditors should care about control rights, and why price and quantity mechanisms might, by themselves, be insufficient in optimal financial contracts.

Jensen and Meckling (1976) provide the basis for control-based theories of financial contracting by considering optimal mechanisms for mitigating agency costs of debt. They argue that explicit covenants against risk-increasing investments can lower financing costs as long as the cost of abiding by the restriction does not exceed the savings from lower interest payments. Aghion and Bolton (1992) and Dewatripont and Tirole (1994) extend this intuition, drawing on the idea that incomplete financial

contracts require some rule for allocating control rights across events that are not covered in the contract. They demonstrate that optimal contracts within this framework may shift control rights from one party to another, conditional on the outcome of some observable signal.

In Aghion and Bolton (1992), a wealth-constrained owner-manager seeks capital to finance company projects that produce both cash profits and private benefits of control. In their model, contracts are written so that control rights optimally shift from the manager to the investor when private benefits are most likely to distort the manager into inefficient decisions.[9] The result relies on a verifiable signal that is correlated with the externality created by the manager's private benefits. Even though control by investors may itself be inefficient, there are states when investor control is more efficient than continued manager control.

Dewatripont and Tirole (1994) offer a theory in which shifts in control rights serve as a deterrent to discourage ex-ante managerial misbehavior. Again assuming a manager with private benefits of control, the threat of losing control serves as a disciplining device, and the optimal contract shifts control away from managers when there is evidence of an inefficient effort choice. In order to encourage investors to implement the optimal change of control, control rights are correlated with cash flow rights. In fact, the optimal capital structure includes debt-like financing, where concave cash-flow rights encourage debt-holders to acquire control rights after signs of poor performance. Thus:

> Proper managerial incentives require outsiders to go against the managers' will only when it is likely that they have engaged in suboptimal courses of action. Poor performance is thus followed by a high probability of external interference [by creditors], while good performance is rewarded by a low probability of external interference (p. 1049, Dewatripont and Tirole (1994))

The model by Dewatripont and Tirole (1994) is directly related to our empirical analysis because "external interference" involves giving the creditor the right to decide whether or not an investment should proceed (See their Table I and description of the action space on page 1,031). In fact, our empirical measure of capital expenditure restrictions is quite analogous to the interference mechanism in their model.

[9] Wealth constraints are the common friction used to prevent the Coase theorem from applying in control-based theories of debt. Such a constraint is natural in a model of external finance.

Both Aghion and Bolton (1992) and Dewatripont and Tirole (1994) demonstrate that the strategic allocation of control rights can lead to Pareto improvements that are infeasible with changes in cash flow rights alone. In Aghion and Bolton (1992), control shifts to avoid inefficient future actions. Within the context of our analysis, this may imply that capital expenditure restrictions prevent equity-holders from gambling on a risky project that is only attractive due to the convex nature of their cash-flow rights. In Dewatripont and Tirole (1994), control shifts to penalize inefficient past actions. In our context, debt-holders may impose a capital expenditure restriction to preserve the value of their debt claim in response to a signal that the manager is consuming excessive perks. Importantly, in either case, the change in control is value-enhancing at the time the contract is signed. Changes in control are generally predicted after indications of poor firm performance, since that is when discipline is most needed and incentives tend to be most misaligned.

Overall, control-based theories of financial contracting suggest that the allocation of control rights is an important element of financial contracting, and that poor performance shifts control away from management toward creditors. Our measure of capital expenditure restrictions is a close empirical analogue to the hypothesized restrictions on managerial behavior in both Jensen and Meckling (1976) and Dewatripont and Tirole (1994). We examine in particular whether capital expenditure restrictions (a) are an important part of the contracting environment, (b) are correlated with negative performance as hypothesized by these models, and (c) affect observed investment policy.

**III. The Widespread Use of Capital Expenditure Restrictions**

One of the most basic predictions in the incomplete financial contracting literature is that the allocation of control rights is an important feature of the optimal contracting environment. In this section, we find support for this prediction by documenting the widespread use of capital expenditure restrictions in loan agreements.

[TABLE 3]

Table 3 documents the use of capital expenditures across the borrower industry, size, and credit quality distribution. Almost 40% of the loans have an explicit restriction on capital expenditures and

these restrictions are common on loans to borrowers across all industries. Over 40% of loans to borrowers operating in trade and services industries have a restriction, and restrictions are also common on loans to borrowers in manufacturing industries. While restrictions are more common for small firms, over 15% of loans to borrowers in the largest quintile based on total assets have a capital expenditure restriction.

Conditional on having an S&P corporate credit rating, almost 10% of loans to investment grade borrowers have a capital expenditure restriction. Among junk borrowers, the fraction of loans with a restriction is almost 50%. The large difference in the incidence of capital expenditure restrictions among loans to junk and investment grade borrowers is evidence that negative borrower performance shifts control of investment policy to creditors, something we explore further in Section IV.

Although capital expenditure restrictions are more common on loans to borrowers of lower credit quality, Table 3 shows that capital expenditure restrictions are not exclusively associated with bankrupt firms. For example, over 10% of loans to borrowers with a BBB rating have a capital expenditure restriction; these borrowers have almost no probability of defaulting within a year based on Moody's historical default probability tables. Likewise, 46% of loans to firms with a BB rating have a capital expenditure restriction, and on average, less than 1 in 100 of these borrowers have defaulted over a one year horizon. Capital expenditure restrictions are correlated with borrower performance, but they are not a restriction used exclusively on loans to borrowers that are in or near bankruptcy. That is, creditors appear to utilize restrictions on investment policy well before a payment default is imminent, and as we explore further in section V, the restrictions appear to significantly restrain actual investment activity.

## IV. Capital Expenditure Restrictions and Borrower Performance

### *A. Unconditional means*

In Section III, we find empirical support for control-based theories of financial contracting by documenting the importance of investment restrictions in bank credit agreements. In addition to stressing the importance of control rights, the theoretical framework outlined in Section II also suggests control rights should shift to creditors in response to poor performance by the borrower. In this section, we use

three proxies for performance in order to empirically evaluate this hypothesis. First, we use average cash flow scaled by assets for the borrower in the four quarters prior to the loan origination. This measure is the most direct empirical analogue to borrower performance in Dewatripont and Tirole (1994): lagged cash flow is an imperfect signal about the behavior of the manager and the direction of future cash flows. Second, we use whether the firm has experienced a financial covenant violation in the previous four quarters. While control-based theories of financial contracting do not discuss financial covenant violations, we believe that they closely parallel the "bad performance" measures conceived in these models. Covenants are set on contractible performance measures chosen by banks, and violations are typically followed by a renegotiation of the loan agreement. Finally, we use the borrower's S&P corporate credit rating as a measure of performance. Debt-holders are particularly focused on the probability of default, and the credit rating is an important measure of this probability. The drawback of the credit rating measure is that it is only available for rated firms, which comprise only 48% of our sample.

[TABLE 4]

Table 4 compares the unconditional means of borrowers that have and do not have a capital expenditure restriction in their loan agreement. Consistent with the theoretical framework outlined in Section II, Table 4 indicates that borrowers with loans containing capital expenditure restrictions exhibit lower performance in the 4 quarters prior to loan origination, compared with firms without a capital expenditure restriction. In the four quarters before the loan origination, borrowers that obtain a loan with a capital expenditure restriction exhibit lower cash flow (0.031 versus 0.037), a higher probability of a financial covenant violation (0.125 versus 0.052), and a lower credit rating (BB versus BBB). The difference in the unconditional means for all 3 measures is significant at the 1% level.

*B. Within-firm performance and capital expenditure restrictions*

The results in Table 4 suggest that capital expenditure restrictions are more likely to be placed on borrowers that exhibit poor performance prior to the loan origination. In the rest of this section, we conduct a series of fixed effects regressions to demonstrate that the unconditional mean differences in

Table 4 are robust to within-firm variation in performance. We also explore the *relative* importance of capital expenditures as a contractual feature that changes in response to negative borrower performance.

In order to isolate the within-firm change in performance, we conduct a series of fixed effects regressions of the following form:

$$\Pr(capexrestriction_{it} = 1) = \alpha_i + \alpha_t + \beta * Perf_{i,t-1} + \Gamma X_{i,t-1} + \varepsilon_{it} \quad (1)$$

Each observation represents a loan to firm *i* made in year *t*. The borrower-specific time-invariant error component is estimated using firm fixed effects. The independent variables are measured as the average values of the 4 quarters prior to the loan origination. The coefficient of interest is $\beta$, which represents the linear estimate of the effect of within-firm changes in performance on the probability of having a capital expenditure restriction in the loan agreement. The matrix *X* contains control variables including the market to book ratio, the leverage ratio, the natural logarithm of total assets, indicator variables for the type of loan {line, term, or mix}, and indicator variables for the purpose of the loan {acquisitions, commercial-paper back up facility, project finance, refinancing, or general corporate purposes}. Reported standard errors are clustered by firm.

There are two additional notes with regard to (1). First, we use a fixed effects linear probability estimation model. While non-linear maximum likelihood estimation such as a logit or probit specification is often preferable to linear probability models in cross-sectional analyses, we prefer the linear probability specification in a panel data setting. As is well known, probit estimation suffers the incidental parameters problem if one attempts to explicitly estimate the firm-specific time invariant error component. While a conditional logit estimator allows for estimates of coefficients using a conditional density for each firm, the assumptions are strong and the coefficients are difficult to interpret across different dependent variables. All of our results are qualitatively similar (with stronger statistical significance) when using a conditional logit model.[10] Second, we also estimate (1) using random effects estimation. The magnitudes of most coefficients are slightly larger, and the statistical accuracy of the estimates is much stronger (with

[10] See Wooldridge (2002, 482-492) for a further discussion of these issues.

standard errors almost 50% smaller). A Hausman test rejects equality of fixed effects and random effects coefficients in the various specifications at the 3 to 10% level. We remain conservative and report only fixed effects estimates throughout.

[TABLE 5]

Table 5 presents the coefficient estimates. The estimates in column 1 show that a drop in cash flow leads to an increase in the probability of having a capital expenditure restriction in the agreement. The magnitude suggests that a drop from the 75$^{th}$ percentile to the 25$^{th}$ percentile of the cash flow distribution leads to a (0.025*1.900 =) 5 percentage point increase in the probability of having a capital expenditure restriction, which is a (0.05/0.38 =) 13% increase, measured at the mean. The coefficient estimate is statistically distinct from zero at the 1% level. The coefficient estimate in column 2 implies that a financial covenant violation in the year preceding the loan origination leads to a 20 percentage point increase in the probability of having a restriction on capital expenditures in the loan agreement, which is a (0.20/0.38 =) 53% increase at the mean. Columns 3 and 4 report estimates from regressions performed on the sample of rated borrowers, and the estimates imply a strong effect of credit downgrades on the probability of having a capital expenditure restriction. The estimate in column 3 suggests that a credit downgrade by one letter (i.e., from A to BBB, or from BBB to BB) increases the probability of having a capital expenditure restriction by 5 percentage points. The estimation reported in column 4 allows the effects of downgrades to vary by each individual rating. The results are striking. For example, a firm that is downgraded from A or above to BB experiences a 29 percentage point increase in the probability of having a capital expenditure restriction, which is a (0.29/0.38 =) 76% increase at the mean.

These results provide solid support for one of the primary implications from Aghion and Bolton (1992) and Dewatripont and Tirole (1994). Namely, in response to poor firm performance, creditors are more likely to place explicit restrictions on firm investment policy. While a large body of empirical research has demonstrated that investment is positively correlated with firm performance, we are unaware of any previous research that documents an explicit link between negative performance and the likelihood of an explicit restriction on capital expenditures. In Section V, we explore whether these restrictions

appear to impact firm investment policy. Regardless, the use of explicit restrictions on capital expenditures in response to negative firm performance is an important channel through which firm performance may affect real activity.

*C. The relative importance of capital expenditure restrictions*

Table 5 suggests that the incidence of a capital expenditure restriction is highly responsive to negative firm performance. In this section, we document that the effect of performance on capital expenditure restrictions is large relative to the effect of firm performance on other loan contract terms. In other words, we are interested in how sensitive restrictions on capital expenditures are to a given shock to performance, relative to other terms of the contract. We focus specifically on capital expenditure restrictions versus interest spreads, whether a loan is secured, and whether a loan contains a dividend restriction.[11]

[TABLE 6]

Table 6 reports the unconditional correlations of the four measures we examine. The four measures are all positively correlated. In particular, a capital expenditure restriction is most highly correlated with the interest spread and whether the loan is collateralized. The interest spread is more highly correlated with whether the loan is secured than whether the loan has a capital expenditure restriction. Interestingly, dividend restrictions are least correlated with capital expenditure restrictions. Dividend restrictions are also relatively ubiquitous, appearing in 80% of the contracts in our sample (not reported in a table). Taken together, these statistics indicate that creditor control rights over dividend policy, while important, likely serve to restrict direct wealth transfers to shareholders, rather than influence firm investment decisions, as in Aghion and Bolton (1992) and Dewatripont and Tirole (1994).

[TABLE 7]

In Table 7, we report estimated coefficients from regression specifications similar to (1), except we separately replace the capital expenditure restriction dependent variable with the natural logarithm of

[11] In unreported results, we also examine how negative performance affects maturity and the dollar loan amounts. We find weak evidence that loan amounts are positively correlated with cash flow, but generally find that performance as no effect on loan maturity or amount.

the interest spread (in basis points), an indicator of whether or not the loan is secured, and an indicator of whether or not the loan contains a dividend restriction. The estimated coefficients in columns 1 through 3 show that negative firm performance results in higher interest spreads, although the effect of a financial covenant violation is not statistically distinct from zero at a reasonable confidence level. Likewise, columns 4 through 6 show that negative performance results in a higher probability of a loan being secured, although again the effect of a financial covenant violation is not statistically distinct from zero at a reasonable confidence level. The effect of negative performance has a weaker effect on the probability of a dividend restriction, both in terms of the magnitude and statistical significance of the estimates. The latter result is consistent with the argument that blatant wealth transfers are always a threat to creditors, regardless of how the firm is performing.

A main goal of this subsection is to estimate the *relative* importance of negative firm performance on various contract terms. In a sense, it is not surprising that interest rates and the probability of a loan being secured both increase when the firm performs poorly. A standard risk-return framework generates this prediction. What is perhaps more informative is the fact that the effect of negative performance on changes in the allocation of control rights is relatively larger than the other terms.

[FIGURE 1]

Figure 1 presents the evidence. It is constructed from the coefficient estimates in Tables 5 and 7, and it shows how within-firm negative performance changes the contract term in question, where the effect is stated as the percent change at the mean of the left hand side variable.[12] The left panel examines how a drop in the cash flow of a firm from the $90^{th}$ to the $10^{th}$ percentile of the distribution affects the contract terms, whereas the right panel of Figure 1 examines how a financial covenant violation affects contract terms. For example, a drop in a borrower's cash flow from the $90^{th}$ to the $10^{th}$ percentile results in a 28% increase in the likelihood of having a capital expenditure restriction at the mean. Figure 1 demonstrates that the effect of a large drop in cash flow has a similar magnitude effect on the probability

[12]There is one exception. Figures 1 and 2 reflect estimated coefficients from regressions using the interest spread in basis points as the left hand side variable, as opposed to the natural logarithm of the interest spread.

of a capital expenditure restriction or the interest spread, but a much weaker effect on the probability that a loan is collateralized or contains a dividend restriction. Figure 1 also shows that the effect of the financial covenant violation has a much larger effect on the probability that a loan contains a capital expenditure restriction than the effect on other contract terms. In particular, a financial covenant violation increases the incidence of having a capital expenditure restriction by over 50% at the mean; the effect on the interest spread is only 15% at the mean.

This latter result suggests that creditor control of firm investment policy is highly related to creditor's use of financial covenants. Chava and Roberts (2006) use a regression discontinuity approach and find evidence that investment falls in response to a financial covenant violation. Figure 1 suggests that one likely channel for this result is creditors' introduction of explicit contractual restrictions on capital expenditures in response to a covenant violation. Indeed, of the 400 loans in our sample obtained by borrowers in the year after they violate a financial covenant, 60% obtain a loan with an explicit restriction on capital expenditures.

[FIGURE 2]

Figure 2 shows similar results using credit ratings. The omitted group is firms rated A or higher, and the graphs show the marginal effect of rating downgrades on various contract terms, where the effects are stated as percent changes at the mean of the left hand side variable. The slope of the downgrade effect is much steeper for capital expenditure restrictions than for interest rates, collateral, or dividend restrictions. A downgrade from A or above to B leads to an 80% increase in the incidence of a capital expenditure restriction at the mean; a similar downgrade leads to a 60% increase in the interest spread. The differences are particularly sharp when firms are rated CCC or worse, which is consistent with the notion that control shifts to creditors when firms approach bankruptcy. However, control also shifts to creditors far before firms are near bankruptcy. A downgrade from a rating of A or above to BB leads to an 76% increase in the incidence of a capital expenditure restriction at the mean. As mentioned above, a borrower with a rating of BB is far from bankruptcy: according to Moody's, such a borrower has less than a 1% chance of defaulting within a year.

Figures 1 and 2 document the importance of the allocation of control rights as a performance-contingent contract provision used in bank credit agreements. Negative performance has a larger effect on the incidence of capital expenditure restrictions than its effect on the interest spread, incidence of collateral, and incidence of a dividend restriction. The evidence supports the framework in Section II: Creditors obtain control rights over firm investment policy in response to poor borrower performance.

**V. The Effect of Restrictions on Firm Investment**

We now turn to the question of whether the capital expenditure restrictions actually matter for firm investment policy. Before discussing the formal techniques we use to answer this question, we emphasize two preliminary facts that suggest that the restrictions matter. First, the results in Section IV suggest that the introduction of capital expenditure restrictions is not random—it is systematically correlated with negative firm performance. While control-based theories of financial contracting provide a strong theoretical framework for explaining why binding investment restrictions are imposed on firms that exhibit negative performance, there is no framework, to our knowledge, that would predict banks putting irrelevant capital expenditure restrictions on firms in response to negative performance.

Second, we can infer the relevance of the restrictions by simply noting the level of detail associated with the restrictions in the contracts. For example, the April 19, 2002 credit agreement for The Chalone Wine Group, Ltd. contains a capital expenditure restriction that specifically limits the amount that can be spent on the purchase of wine barrels. Non wine-barrel capital expenditures are restricted separately. Similarly, the March 27, 1997 revolving loan agreement for casino operator Hollywood Park, Inc. (now Pinnacle Entertainment, Inc.) contains the following detailed set of restrictions:

> Capital Expenditures. [Borrower shall not] Make, or become legally obligated to make, any Capital Expenditure except:
>
> (a) Maintenance Capital Expenditures not in excess of (i) $15,000,000 for the Fiscal Year ending December 31, 1997, (ii) $15,000,000 for the Fiscal Year ending December 31, 1998 and (iii) $20,000,000 for any subsequent Fiscal Year;
>
> (b) Capital Expenditures to the extent financed by Indebtedness permitted under Section 6.9(h);

> (c) Capital Expenditures for the construction of approximately 200 additional hotel rooms, a restaurant, an entertainment lounge, meeting rooms, retail space and parking facilities at the Reno Property not in excess of $25,000,000;
>
> (d) Capital Expenditures for the construction of buffet and restaurant facilities at the New Orleans Property not in excess of $10,000,000;
>
> (e) Capital Expenditures for the purchase of capital assets which, as of the Closing Date, are leased by Borrower or any Restricted Subsidiary from other Persons pursuant to operating leases not in excess of $8,000,000; and
>
> (f) Capital Expenditures not otherwise permitted above which, when added to all other Basket Expenditures theretofore made, do not exceed $40,000,000.

Imposing such a detailed restriction requires time and expense; it is difficult to see why banks would include such a covenant unless it provides a real constraint and adds significant value to the contracting parties. Such examples are common in credit agreements and suggest that creditors can play an important role in the investment choices of their borrowers.

We now take a formal look at whether capital expenditure restrictions influence investment policy. Given the results in Section IV, documenting a causal effect of a capital expenditure restriction on actual investment is a difficult task. As the theoretical framework hypothesizes, firms are more likely to receive a capital expenditure restriction in response to negative performance. Given that negative performance can independently affect investment, it is difficult to assert that firms would have maintained high investment levels in the absence of the restriction. More formally, identifying the causal effect of the restriction involves isolating an exogenous source of variation in the introduction of a capital expenditure restriction. The primary source of variation we identify in Section IV is firm performance, which is clearly not exogenous to investment.

We use two sets of empirical techniques to overcome this identification problem. First, we exploit the actual restriction amount, and show that borrowers tend to cluster just below the restriction amount in the year after the loan origination. As mentioned in Section I, we collect the exact capital expenditure limit in the loan agreement for a sub-sample of 757 loans in our sample. We use these data to compare the borrower's actual capital expenditures (annual *item 128* in Compustat) to the contractual limit. Specifically, we compute the ratio of actual capital expenditures to the contractual limit, so values

below one indicate actual expenditures below the limit, and values above one indicate actual expenditures exceed the limit.[13]

[FIGURE 3]

Figure 3 plots a histogram of the ratio of actual capital expenditures over the restricted amount and compares this histogram to a continuous gamma distribution fit to the data by maximum likelihood (the smooth black line). The noticeable kink in the empirical distribution around one suggests that exceeding the limit is costly. Although 25% of the firms fall within the 20% just below the limit, only 9% are within the 20% just above the kink.

Using the fitted distribution, we can test the hypothesis that the spike in observations just below one is statistically significant. Specifically, under the null hypothesis that the data are drawn from the estimated gamma distribution, the number of observations in the bin (0.9, 1.0] is distributed as a binomial random variable with success probability given by the difference in the estimated cumulative distribution function evaluated at 1.0 and at 0.9. While 13% of the observations are in this bin, the expected number under the null hypothesis is only 8%, and the probability of observing so many observations in that bin is less than 0.1% under the null hypothesis. Similarly, the probability of observing only 9% of the observations in the bin (1.0, 1.2] is 8.4%. Combined, as compared with the estimated parametric distribution, we have statistical evidence that a significant portion of firms seem to move their actual capital expenditures from above the limit to just below the limit. We view this as evidence that exceeding the contractual limit is costly.

[FIGURE 4]

[13] There are several reasons why actual expenditures may be above the limit. First, firms can obtain waivers to most contractual provisions, including the capital expenditure restriction. Second, most contracts contain rollover provisions that permit some portion of 'unused' expenditures to be spent the following year. While we attempt to identify new contracts that apply to a specific fiscal year, we likely include outstanding contracts where the firm has some rollover capacity. Finally, contractually defined capital expenditures may differ from the accounting definition used in financial statements. For example, capitalized leases are often included in the contractual limit but accounted for separately from other capital expenditures. While we try to exclude unique definitions of capital expenditures, our measures undoubtedly contain some noise.

Rather than considering a parametric distribution as the counterfactual measure of the ratio of actual capital expenditures to the contractual limit, Figure 4 provides a comparison with capital expenditures from the prior year. Here we limit the sample to the subset of 135 loans where we can identify that the immediate prior loan did not contain a restriction, so actual capital expenditures from the prior year are likely unrestricted by a contractual limit. Two results are relevant. First, in the year of the agreement in which the restriction applies, the clustering of observations just below the limit is more pronounced for this sample than for the broader sample underlying Figure 3. Here, over 30% of the observations are within the 20% bin just below the threshold, suggesting that the limit is most binding immediately after it is first introduced. Second, actual expenditures from the prior year appear to have no relation with the contractual limit imposed subsequently. Most striking is that 49% of the firms actually exceed the limit in the prior year, and we cannot reject the hypothesis that firms are equally likely to be above or below the limit in the prior year. Conversely, in the year of the agreement, only 9% exceed the limit, and we can strongly reject the hypothesis that current year expenditures exceed the limit with 50% probability.

[TABLE 8]

Finally, in Table 8, we examine the broader sample and compare annual changes in capital expenditures for firms with and without a capital expenditure limit.[14] Panel A in Table 8 shows unconditional means of capital expenditures divided by lagged assets around the year in which the loan contract was signed. We compare loans that do not contain a restriction, loans with a restriction, and loans with a restriction where the previous loan does not contain a restriction. The latter group is analogous to the sample covered in Figure 4 and provides a rough indicator of a new restriction. In all three groups, capital expenditures decrease monotonically over the four-year period, beginning two years prior to the agreement and ending one year after, primarily reflecting the time period of our sample. However, the groups with contractual restrictions experience larger declines. Comparing the year before

[14] We consider a firm-year to have a capital expenditure constraint if any loan to the firm has a restriction in the given year. In practice, very few firms have more than one document in a given year.

with the year after, expenditures fall by an extra 0.6% of lagged assets when the loan contains a restriction and by an extra 1.2% of lagged assets when the loan introduces a new restriction. Both estimates are statistically significantly different from zero at the 10% level, and significantly different from each other. The evidence is similar when comparing two-year averages before and after the contract.

The first two columns of Panel B replicate the above results in a regression framework. The slight differences in the magnitude of the coefficients reflect the inclusion of year indicator variables. Columns 3 and 4 incorporate changes in firm performance, cash-flow and Q, into the first-difference regression. Both performance measures are significantly related to capital expenditures and reduce the magnitude and statistical significance of the capital expenditure variables. This is consistent with the results in Table 5 that the introduction of a capital expenditure restriction is highly correlated with cash flow. While the point estimates decline, the estimate in column 4 implies that capital expenditures drop by 0.4% of lagged assets more when firms have a capital expenditure restriction imposed in a loan agreement, even after controlling for changes in Q and cash flow. The estimate is statistically distinct from zero at the 10% confidence level.

In sum, our results from the last subsection suggest that capital expenditure restrictions are qualitatively and quantitatively important to investment policy decisions. To our knowledge, this is the first study to document a link between explicit contractual restrictions and firm investment policy. Our findings suggest that such these restrictions could explain, in part, the empirical findings that link capital structure to investment.

**V. Conclusion**

This paper explores a large sample of private debt contracts to study empirically the degree to which creditors exercise control rights over firm investment policy. We document that creditors regularly impose explicit restrictions on capital expenditures in loan agreements. Moreover, we show that these restrictions are more likely to be put in place after negative borrower performance, and they change more readily in response to negative performance than other contract terms, such as the interest spread or a collateral requirement. These findings suggest that the allocation of control rights is an important feature

of the financial contracting environment, even among solvent publicly-traded firms. They also suggest that creditors exert control over investment policy when firms perform poorly. Taken together, these results fall closely in line with the contingent control-right predictions of Aghion and Bolton (1992) and Dewatripont and Tirole (1994).

In addition, we provide evidence that restrictions on capital expenditures contained in loan agreements matter for firm investment policy. We depart from the existing research on firm financing and investment policy which relies on indirect measures of financing frictions such as collateral constraints or debt overhang. Instead, we provide empirical support for an optimal contracting framework in which creditors optimally restrict firm investment policy as a response to potentially value-destroying behavior by managers. We do not believe these contractual restrictions are the unique channel through which financing affects investment; however, we believe that they are an important and overlooked part of this debate.

We motivate future research by recognizing two limitations of our analysis. First, we do not attempt to distinguish whether creditors take control in order to prevent being expropriated by equity-holders or whether control shifts to creditors as a managerial disciplining device. In other words, we do not take a stand on whether creditors take control because (a) managers act in the interest of shareholders and would otherwise take ex-post inefficient actions (as in the "asset substitution" of Jensen and Meckling (1976)), or (b) managerial moral hazard leads to a conflict between the interests of all external stakeholders and management (as in the private benefits of Dewatripont and Tirole (1994)). As outlined in Section II, both of these underlying mechanisms lead to creditors taking control in response to negative performance. We hope that future research can shed light on which of these mechanisms is more important when considering creditor control rights.

Second, we do not take an empirical stand on the ex-post efficiency of investment outcomes even in the presence of capital expenditure restrictions. That is, we do not attempt to measure how close the "second-best" investment level in the presence of misaligned incentives comes to the "first-best" investment level in which all incentives are perfectly aligned. In order to answer this question, we need to

know more about the contract renegotiation process. How flexible is renegotiation? Can managers credibly relay information to creditors when they have a positive NPV project? Can managers obtain waivers if a positive NPV project will push them over their limit? Future research on ex-post investment levels in the presence of creditor restrictions on capital expenditures would allow us to quantify the broader implications of our findings on the macro-economy.

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## Table 1
## Comparison of Loans Matched and Not Matched to a Loan Contract

This table compares loans in LPC's *Dealscan* that we are able to match to a loan contract from the SEC's Edgar database of company filings to those that we are unable to match. Tests for the difference in means allow for errors to be correlated for the same borrower.

| | (1) Not matched to a contract | (2) Matched to a contract |
|---|---|---|
| Number of loans | 7,182 | 4,978 |
| *Dealscan data quality* | | |
| Secured data not available {0,1} | 0.406 | 0.155* |
| Financial covenant data not available {0,1} | 0.393 | 0.055* |
| Percentage held by lenders not available {0,1} | 0.724 | 0.607* |
| Dividend restriction data not available {0,1} | 0.485 | 0.064* |
| *Type of loan* | | |
| Sole-lender loan {0,1} | 0.328 | 0.183* |
| Revolver with maturity of < 1 year {0,1} | 0.249 | 0.129* |
| *Borrower characteristics* | | |
| Total assets ($M) | 1,607 | 1,366* |
| Book debt/total assets | 0.309 | 0.326* |
| Cash flow/total assets | 0.029 | 0.034* |
| *Loan characteristics* | | |
| Loan amount ($M) | 269 | 274 |
| Interest rate spread (basis points) | 200 | 191 |

*Statistically distinct from "not matched" category at 1% level

## Table 2
## Summary Statistics

This table presents summary statistics for the sample of 4,978 loans to 1,780 borrowers.

| | Mean | Median | St. Dev. | N |
|---|---|---|---|---|
| *Capital expenditure restrictions* | | | | |
| Capital expenditure restriction$_t$ {0,1} | 0.382 | 0.000 | 0.486 | 4,978 |
| Capital expenditures$_t$ /assets$_{t-1}$ | 0.066 | 0.039 | 0.087 | 757 |
| Restriction, stated as capital expenditures$_t$ /assets$_{t-1}$ | 0.089 | 0.057 | 0.132 | 757 |
| *Other loan characteristics* | Mean | Median | St. Dev. | N |
| Loan amount$_t$ ($M) | 274 | 120 | 637 | 4,978 |
| Loan amount$_t$ / assets$_{t-1}$ | 0.397 | 0.297 | 0.344 | 4,978 |
| Intrerest rate spread$_t$ (basis points above LIBOR) | 191 | 175 | 130 | 4,978 |
| Loan is secured {0,1} | 0.716 | 1.000 | 0.451 | 4,208 |
| Loan has dividend restriction {0,1} | 0.836 | 1.000 | 0.371 | 4,661 |
| Loan is a line of credit/revolver {0,1} | 0.736 | 1.000 | 0.441 | 4,978 |
| *Borrower characteristics* | | | | |
| Cash flow$_{t-1}$ / assets$_{t-1}$ | 0.034 | 0.035 | 0.027 | 4,978 |
| Financial covenant violation within past year$_{t-1}$ | 0.080 | 0.000 | 0.272 | 4,978 |
| Ln(total assets $_{t-1}$ ($M)) | 6.449 | 6.401 | 1.693 | 4,978 |
| Market to book ratio $_{t-1}$ | 1.759 | 1.427 | 1.110 | 4,978 |
| Book leverage ratio$_{t-1}$ | 0.326 | 0.313 | 0.202 | 4,978 |
| Firm has a corporate credit rating $_{t-1}$ {0,1} | 0.483 | 0.000 | 0.500 | 4,978 |
| *Conditional on borrower having credit rating* | | | | |
| Credit rating (1 = AAA or AA, 2 = A, 3 = BBB …) | 3.629 | 4.000 | 1.072 | 2,402 |
| Junk rated {0,1} | 0.550 | 1.000 | 0.498 | 2,402 |
| AAA, AA rated {0,1} | 0.015 | 0.000 | 0.120 | 2,402 |
| A rated {0,1} | 0.140 | 0.000 | 0.347 | 2,402 |
| BBB rated {0,1} | 0.295 | 0.000 | 0.456 | 2,402 |
| BB rated {0,1} | 0.326 | 0.000 | 0.469 | 2,402 |
| B rated {0,1} | 0.200 | 0.000 | 0.400 | 2,402 |
| CCC rated or worse {0,1} | 0.025 | 0.000 | 0.155 | 2,402 |

## Table 3
## Capital Expenditure Restrictions, Across Types of Firms

This table presents the fraction of loans that have a capital expenditure restriction by industry, size, and credit rating.

| | Fraction with capital expenditure restriction |
|---|---|
| *Total* | 0.382 |
| *By industry* | |
| Agriculture, minerals, construction | 0.178 |
| Manufacturing | 0.382 |
| Transportation, communication, and utilities | 0.319 |
| Trade—wholesale | 0.423 |
| Trade—retail | 0.480 |
| Services | 0.458 |
| *By size quintile* | |
| 1 | 0.511 |
| 2 | 0.490 |
| 3 | 0.443 |
| 4 | 0.310 |
| 5 | 0.152 |
| *Borrower does not have credit rating* | 0.444 |
| *Borrower has credit rating* | 0.314 |
| *Conditional on firm having rating* | |
| Investment grade | 0.093 |
| Junk rated {0,1} | 0.494 |
| AAA, AA rated {0,1} | 0.000 |
| A rated {0,1} | 0.047 |
| BBB rated {0,1} | 0.112 |
| BB rated {0,1} | 0.464 |
| B rated {0,1} | 0.527 |
| CCC rated or worse {0,1} | 0.627 |

## Table 4
## Borrower Performance, by Whether Loan Has Capital Expenditure Restriction

This table presents the unconditional mean characteristics for borrowers that obtain a loan without a capital expenditure restriction (column 1) to the unconditional mean characteristics for borrowers that obtain a loan with a capital expenditure restriction (column 2). Tests for the difference in means allow for errors to be correlated for the same borrower.

| | (1) No capital expenditure restriction | (2) Capital expenditure restriction |
|---|---|---|
| Cash flow$_{t-1}$ / assets$_{t-1}$ | 0.037 | 0.031* |
| Financial covenant violation within past year$_{t-1}$ | 0.052 | 0.125* |
| Market to book ratio $_{t-1}$ | 1.833 | 1.640* |
| Book leverage ratio$_{t-1}$ | 0.303 | 0.363* |
| *Conditional on borrower having credit rating* | | |
| Credit rating (1 = AAA or AA, 2 = A, 3 = BBB …) | 3.333 | 4.279* |
| Junk rated {0,1} | 0.405 | 0.866* |

*Statistically distinct from "no capital expenditure restriction" category at 1% level

## Table 5
## Negative Firm Performance and Capital Expenditure Restrictions

This table presents estimated coefficients from borrower fixed effects linear probability regressions that relate the probability of having a capital expenditure restriction in a loan agreement to borrower performance in the 4 quarters preceding the loan origination. In column 4, the omitted rating group is the set of borrowers that are rated A or better. All regressions include year indicator variables, loan purpose indicator variables, and loan type indicator variables. Standard errors are clustered for each borrower.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Sample | Full | Full | Rated firms | Rated firms |
| Dependent variable | Capital expenditure restriction$_t$ {0,1} | Capital expenditure restriction$_t$ {0,1} | Capital expenditure restriction$_t$ {0,1} | Capital expenditure restriction$_t$ {0,1} |
| Credit rating$_{t-1}$ (1 = AAA or AA, 2 = A …) | | | 0.048** | |
| | | | (0.014) | |
| BBB rated$_{t-1}$ {0,1} | | | | 0.084 |
| | | | | (0.048) |
| BB rated$_{t-1}$ {0,1} | | | | 0.288** |
| | | | | (0.094) |
| B rated$_{t-1}$ {0,1} | | | | 0.327** |
| | | | | (0.126) |
| CCC rated or worse$_{t-1}$ {0,1} | | | | 0.628** |
| | | | | (0.204) |
| Cash flow$_{t-1}$ / assets$_{t-1}$ | -1.900** | -1.536* | -1.692 | -1.690 |
| | (0.702) | (0.712) | (1.368) | (1.345) |
| Financial covenant violation within past year$_{t-1}$ | | 0.195* | 0.227 | 0.227 |
| | | (0.078) | (0.125) | (0.121) |
| Ln(total assets$_{t-1}$ ($M)) | -0.055 | -0.051 | 0.002 | 0.001 |
| | (0.053) | (0.053) | (0.090) | (0.087) |
| Market to book ratio$_{t-1}$ | -0.025 | -0.020 | -0.016 | -0.019 |
| | (0.018) | (0.018) | (0.034) | (0.035) |
| Book leverage ratio$_{t-1}$ | 0.060 | 0.017 | -0.128 | -0.125 |
| | (0.130) | (0.127) | (0.183) | (0.184) |
| Number of loans | 4,978 | 4,978 | 2,402 | 2,402 |
| Number of firms | 1,780 | 1,780 | 743 | 743 |
| $R^2$ | 0.10 | 0.10 | 0.18 | 0.18 |

*,** statistically distinct from 0 at the 5 and 1 percent, respectively

## Table 6
## Correlations between Capital Expenditure Restrictions and Other Loan Contract Terms

This table presents unconditional correlations between the probability of a loan containing a capital expenditure restriction and other loan contract terms. All correlations are statistically distinct from 0 at the 1 percent level.

| | Capital expenditure restriction {0,1} | Dividend restriction{0,1} | Secured {0,1} |
|---|---|---|---|
| Dividend restriction {0,1} | 0.28 | | |
| Secured {0,1} | 0.42 | 0.46 | |
| Interest rate spread | 0.41 | 0.35 | 0.57 |

## Table 7, Panel A
## Negative Firm Performance and Other Loan Contract Terms

This table presents estimated coefficients from borrower fixed effects linear probability regressions that relate loan contract terms to borrower performance in the 4 quarters preceding the loan origination. In columns 3, 6, and 9, the omitted rating group is the set of borrowers that are rated A or better. All regressions include year indicator variables, loan purpose indicator variables, and loan type indicator variables. Standard errors are clustered for each borrower.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Sample | Full | Full | Rated firms | Full | Full | Rated firms |
| Dependent variable | Ln(Interest rate spread) | Ln(Interest rate spread) | Ln(Interest rate spread) | Secured {0,1} | Secured {0,1} | Secured {0,1} |
| BBB rated $_{t-1}$ {0,1} | | | 0.304** | | | 0.086 |
| | | | (0.102) | | | (0.073) |
| BB rated $_{t-1}$ {0,1} | | | 0.580** | | | 0.375** |
| | | | (0.141) | | | (0.107) |
| B rated $_{t-1}$ {0,1} | | | 0.786** | | | 0.371** |
| | | | (0.176) | | | (0.115) |
| CCC rated or worse $_{t-1}$ {0,1} | | | 0.819** | | | 0.342** |
| | | | (0.192) | | | (0.128) |
| Cash flow$_{t-1}$ / assets$_{t-1}$ | -5.654** | -5.482** | -5.622** | -1.233** | -1.074* | -1.384 |
| | (0.828) | (0.823) | (1.612) | (0.553) | (0.541) | (1.137) |
| Financial covenant violation$_{t-1}$ | | 0.092 | 0.036 | | 0.079 | -0.014 |
| | | (0.075) | (0.122) | | (0.051) | (0.073) |
| Ln(total assets $_{t-1}$ ($M)) | -0.159** | -0.157** | -0.116 | -0.104** | -0.102** | -0.086 |
| | (0.037) | (0.037) | (0.062) | (0.029) | (0.029) | (0.044) |
| Market to book ratio $_{t-1}$ | -0.082** | -0.080** | -0.118** | -0.037 | -0.036 | -0.048 |
| | (0.023) | (0.023) | (0.039) | (0.024) | (0.024) | (0.040) |
| Book leverage ratio$_{t-1}$ | 0.720** | 0.700** | 0.591** | 0.262** | 0.245** | 0.203** |
| | (0.121) | (0.123) | (0.169) | (0.089) | (0.089) | (0.106) |
| Number of loans | 4,978 | 4,978 | 2,402 | 4,208 | 4,208 | 1,994 |
| Number of firms | 1,780 | 1,780 | 743 | 1,635 | 1,635 | 687 |
| $R^2$ | 0.49 | 0.50 | 0.71 | 0.29 | 0.28 | 0.56 |

*,** statistically distinct from 0 at the 5 and 1 percent, respectively

**Table 7, Panel B**
**Negative Firm Performance and Other Loan Contract Terms**

| | (7) | (8) | (9) |
|---|---|---|---|
| Sample | Full | Full | Rated firms |
| Dependent variable | Dividend restriction {0,1} | Dividend restriction {0,1} | Dividend restriction {0,1} |
| BBB rated $_{t-1}$ {0,1} | | | 0.047 |
| | | | (0.100) |
| BB rated $_{t-1}$ {0,1} | | | 0.233* |
| | | | (0.115) |
| B rated $_{t-1}$ {0,1} | | | 0.179 |
| | | | (0.120) |
| CCC rated or worse $_{t-1}$ {0,1} | | | 0.215 |
| | | | (0.151) |
| Cash flow$_{t-1}$ / assets$_{t-1}$ | -1.140* | -1.023 | -1.056 |
| | (0.541) | (0.535) | (1.034) |
| Financial covenant violation$_{t-1}$ | | 0.053 | 0.103 |
| | | (0.047) | (0.074) |
| Ln(total assets $_{t-1}$ ($M)) | -0.063* | -0.062* | -0.111** |
| | (0.026) | (0.026) | (0.039) |
| Market to book ratio $_{t-1}$ | -0.032 | -0.031 | -0.054 |
| | (0.021) | (0.022) | (0.038) |
| Book leverage ratio$_{t-1}$ | 0.043 | 0.034 | 0.064 |
| | (0.093) | (0.094) | (0.125) |
| Number of loans | 4,661 | 4,661 | 2,312 |
| Number of firms | 1,690 | 1,690 | 725 |
| $R^2$ | 0.17 | 0.17 | 0.30 |

*,** statistically distinct from 0 at the 5 and 1 percent, respectively

## Table 8
## Capital Expenditures Before and After a Capital Expenditure Restriction

This table examines the capital expenditure patterns of firms before and after signing a loan contract, conditional on whether the loan contract contains a capital expenditure restriction. Panel A presents the unconditional means, and it presents tests for differences in the differences in capital expenditures for firms that have or do not have a capital expenditures restriction in their loan agreement. Panel B reports regressions relating the difference in capital expenditures to an indicator variable of whether the loan contract contains a restriction and changes in control variables. The regressions in Panel B contain year indicator variables.

**PANEL A**

| | 2 years before contract | 1 year before contract | Year of contract | Year after contract |
|---|---|---|---|---|
| Loan: | | | | |
| does not contain restriction | 0.097 | 0.089 | 0.084 | 0.075 |
| contains restriction | 0.090 | 0.077 | 0.068 | 0.058 |
| contains restriction & previous loan does not contain restriction | 0.089 | 0.079 | 0.062 | 0.051 |
| Difference in difference | Year after – year before | | Average 2 years after – Average 2 years before | |
| contains restriction - does not contain restriction | -0.006+ | | -0.007+ | |
| contains restriction & previous loan does not contain restriction - does not contain restriction | -0.012+ | | -0.014+ | |

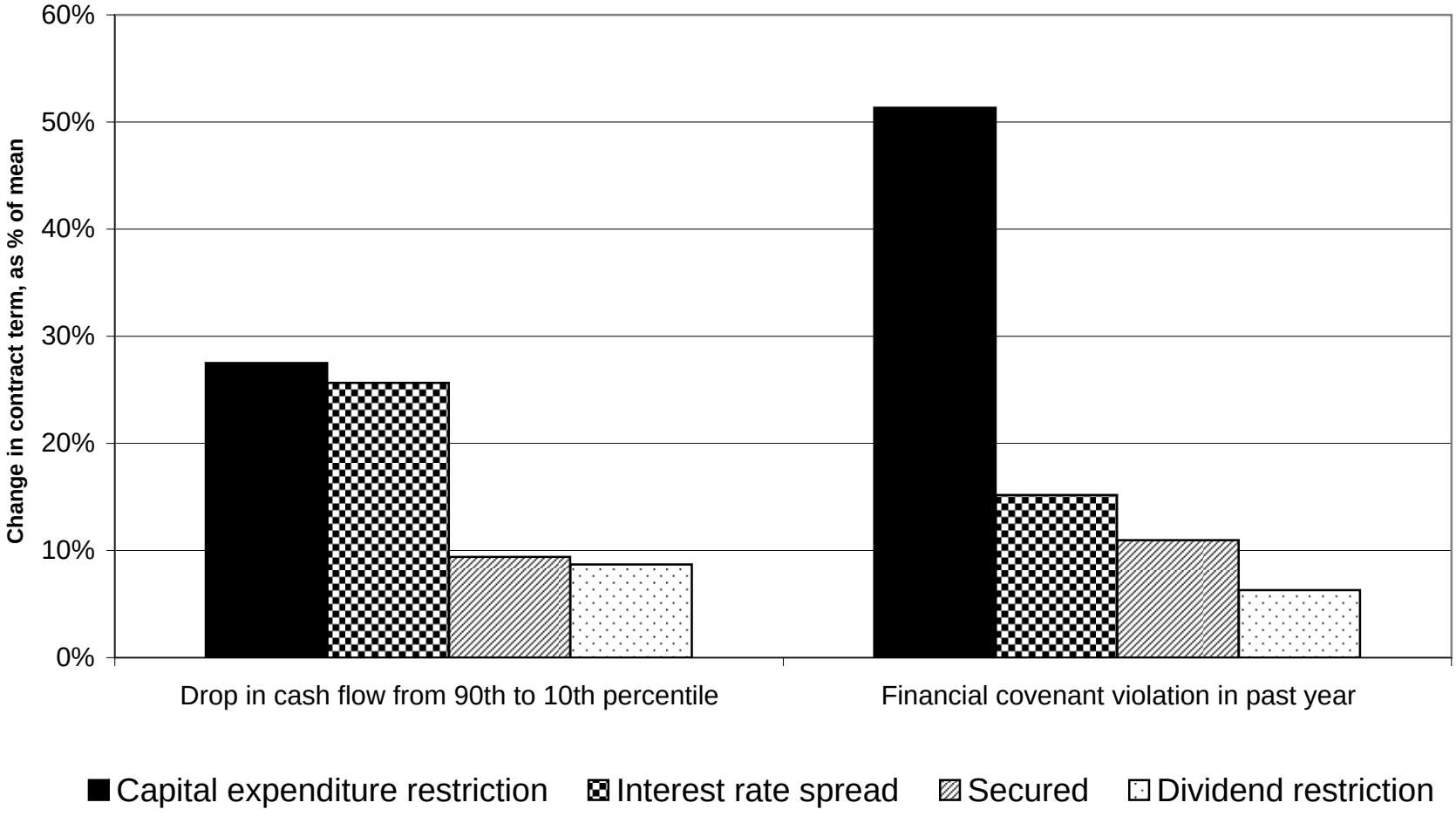
**PANEL B**

| Dependent variable: | (1) Year after – year before | (2) Average 2 years after – average 2 years before | (3) Year after – year before | (4) Average 2 years after – average 2 years before |
|---|---|---|---|---|
| Capital expenditure restriction {0,1} | -0.005+ | -0.008+ | -0.003 | -0.004+ |
| | (0.002) | (0.003) | (0.002) | (0.002) |
| Capital expenditure restriction {0,1}* | -0.004+ | -0.006+ | -0.002 | -0.002 |
| Previous loan does not have restriction{0,1} | (0.003) | (0.003) | (0.003) | (0.002) |
| Difference in cash flow$_t$ / assets$_{t-1}$ | | | 0.075+ | 0.107+ |
| | | | (0.026) | (0.024) |
| Difference $Q_{t-1}$ | | | 0.023+ | 0.026+ |
| | | | (0.002) | (0.003) |
| N | 2,206 | 2,206 | 2,206 | 2,206 |
| $R^2$ | 0.01 | 0.02 | 0.12 | 0.19 |

+statistically distinct from 0 at the 10 percent level

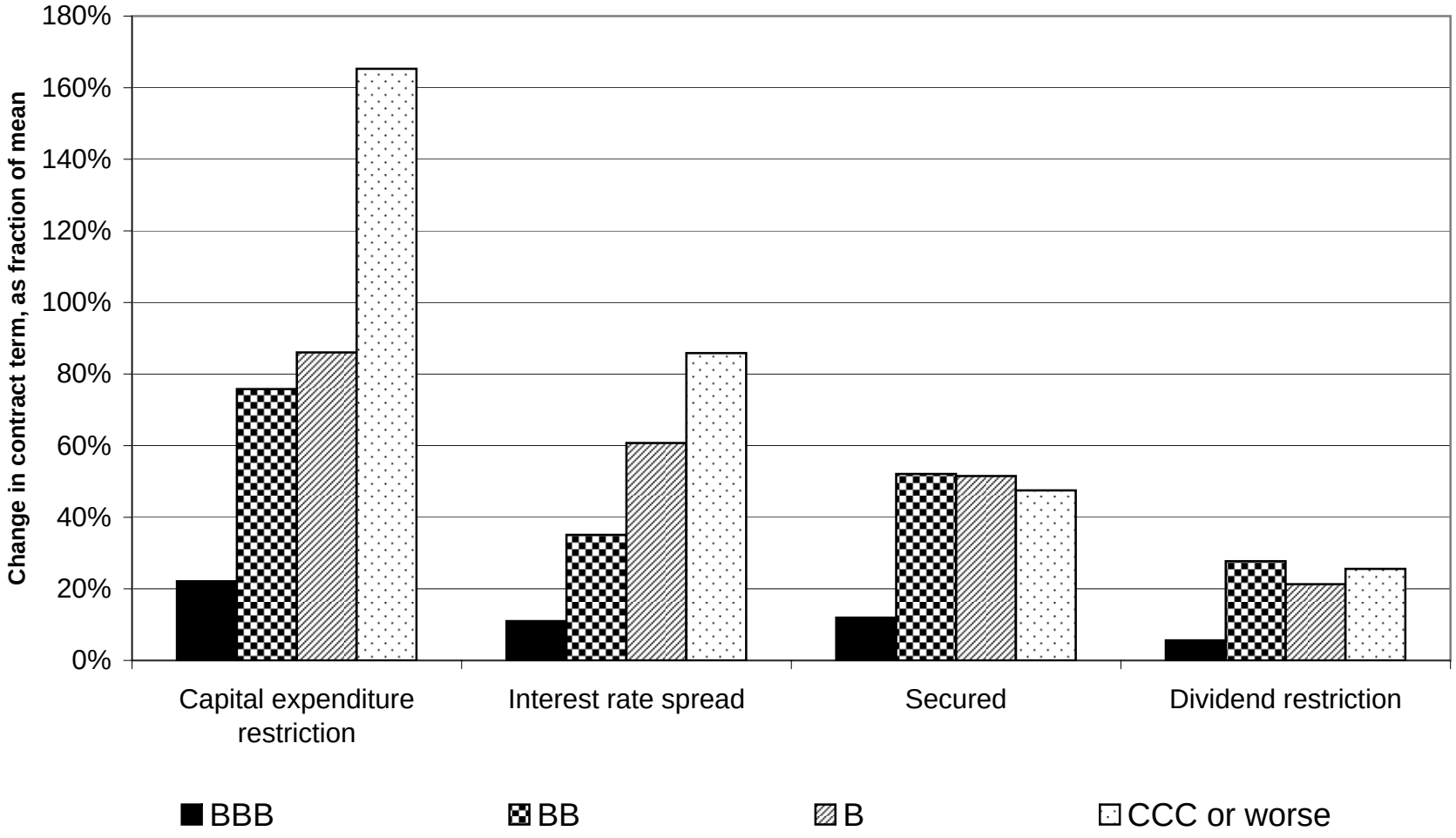
## Figure 1: How Does a Negative Performance Shock Affect Loan Contract Terms?

This figure presents the marginal effect of negative performance on loan contract terms for a given borrower. It presents the marginal effect on contract terms for a drop in cash flow from the 90th percentile of the distribution to 10th percentile of the distribution (left) and the marginal effect of a financial covenant violation (right). The marginal effect is stated as the percent change relative to the mean. For example, a financial covenant violation in the past year results in a 51% increase in the incidence of a capital expenditure restriction at the mean, and a 15% increase in the interest rate spread at the mean. The estimated marginal effects come from fixed effects regressions reported in Tables 5 and 7.



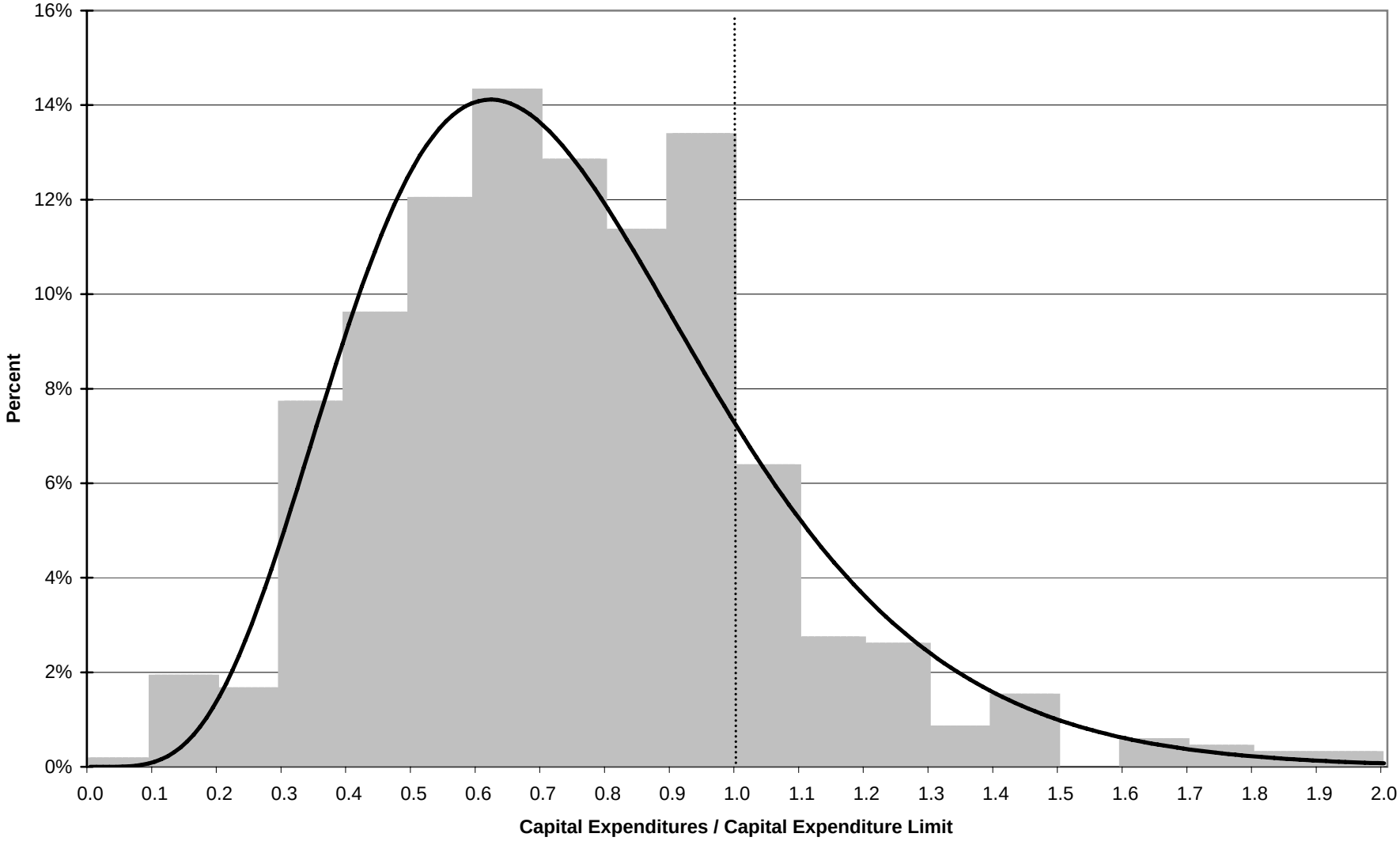
## Figure 2: Changes in Loan Contract Terms in Response to Credit Downgrades

This figure presents the marginal effect of credit downgrades from A or above on loan contract terms for a given borrower. The marginal effect is stated as the percent change relative to the mean. For example, a firm that is downgraded from A to BB exprerienced a 78% increase in the likelihood of having a capital expenditure restriction at the mean. The estimated marginal effects come from fixed effects regressions reported in Tables 5 and 7.



## Figure 3: Capital Expenditures/Capital Expenditure Limit

This figure presents a histogram of the ratio of actual capital expenditures to the capital expenditure limit. Actual capital expenditures are for the first fiscal year after the loan contract is signed. Values above 2 are excluded, and the sample includes the remaining 742 loans for which we have the actual capital expenditure restriction. The solid black line is a fitted gamma distribution computed with the maximum likelihood parameter estimates.



## Figure 4: Capital Expenditures/Capital Expenditure Limit, Year Before and Year of Loan

This figure presents a histogram of the ratio of actual capital expenditures to the capital expenditure limit, where actual capital expenditures are for the first fiscal year completed after the loan contract is signed (solid black) and for the fiscal year immediately preceeding the year in which the contract is signed (striped). The sample includes only the 135 loans where the prior sample loan agreement did not include a capital expenditure restriction.