Credit Default Swaps and Moral Hazard in Bank Lending*

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Abstract

We analyze whether introducing Credit Default Swaps (CDSs) on a borrower's debt leads to lender moral hazard around covenant violations, wherein lending banks can terminate or accelerate the loan. Using a regression discontinuity design, we show that CDS firms, including those with agency problems, do not decrease their investment after covenant violations, pay a higher loan spread, and perform poorly, but do not go bankrupt at a higher rate when compared with non-CDS firms that violate covenants. These results are magnified when lenders have weaker incentives to monitor and suggest that introducing CDSs misaligns incentives between lenders and borrowers.

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1 Introduction

Credit Default Swaps (CDSs) are a relatively new financial instrument that allow lenders to reduce exposure to the credit risk of their borrowers. Credit risk transfer, through a CDS, can be used to hedge on-balance sheet asset credit risk. Commercial banks and other lenders are natural buyers of CDS protection to mitigate credit risk which helps free up regulatory capital,[1] diversify risk, and potentially increase credit supply to firms (Gorton and Haubrich, 1987; Pennacchi, 1988; Bolton and Oehmke, 2011; Saretto and Tookes, 2013). On the flip side, credit risk transfer through a CDS can reduce the incentives of banks to screen and monitor their borrowers, even though they still retain control rights[2] (Demarzo and Duffie, 1999; Parlour and Plantin, 2008). This separation of cash flow exposure and control rights could potentially give rise to an even stronger form of incentive misalignment, the *empty creditor problem* (Hu and Black, 2008; Bolton and Oehmke, 2011; Subrahmanyam, Tang, and Wang, 2014).

In this paper, we focus on the private debt market to study whether the initiation of CDS trading on borrowers' debt misaligns incentives between lenders and borrowers. Covenant violations and the consequent renegotiation between banks and borrowers provide an ideal setting to understand whether lender moral hazard exists when lenders can easily engage in credit risk transfer. Covenant violations give creditors contractual rights similar to those in the case of payment defaults – rights include requesting immediate repayment of the principal and termination of further lending commitments – enhancing the bargaining power of lenders vis-á-vis the borrowers (Chava and Roberts, 2008; Nini, Smith, and Sufi, 2009). If

[1]For instance, the Basel II regulation permits using a CDS as a hedge against loan credit risk if the CDS reference obligation (typically a bond) is junior to the loan being hedged

[2]Banks may now originate a loan, hold the loan on their balance sheet, and continue to service the loan without being exposed to the borrowing firm's prospects. Servicing includes monitoring the borrower and enforcing the covenants, even though economic exposure to credit risk is passed on to the credit default swap insurance provider.

the lenders are indeed empty creditors and intend to impose harsher renegotiated loan terms to extract rents or if they intend to push borrowers into bankruptcy, borrowers' covenant violations give lenders an ideal opportunity to do so. Covenant violations also allow us to employ a regression discontinuity design to help with identification.

There are potential countervailing forces against moral hazard in the private debt market that may not be as relevant for public bond holders. First, banks, in contrast to public bond holders, may face reputation costs if they push borrowers into inefficient bankruptcy or liquidation. These reputation costs are two-fold and are not directly modeled in the one period setup of Bolton and Oehmke (2011). One cost that lead-lenders face is the damage to their reputation in the loan syndication market in the event that the borrower files for bankruptcy (Gopalan, Nanda, and Yerramilli, 2011). In addition, in a competitive lending market, a lender with a reputation of being an empty creditor, who imposes harsh renegotiated loan terms or pushes borrowers into bankruptcy, would be at a disadvantage. Moreover, lenders risk losing all the relationship-specific information and future profits in the case of borrower bankruptcy. These reputation costs may be large enough to discourage banks from engaging in the aforementioned exploitative behavior in a multi-period setting. Thus, whether or not lender moral hazard exists in the private debt market, is ultimately an empirical question that we address in this paper.

In order to answer this question, we first analyze changes in corporate policies of borrowers conditional on covenant violations in a regression discontinuity framework. Chava and Roberts (2008) and Nini, Smith, and Sufi (2009) document that lenders in the private debt market use their bargaining power to influence borrowers' corporate policies after a covenant violation, and this type of creditor governance improves firm value (Nini, Smith, and Sufi, 2012). On the other hand, banks that hedge borrower exposure with CDSs, may be prone to moral hazard and not expend costly effort in negotiating and influencing firm policies. We

find that borrowers with CDS trading on their debt do not reduce their investment after their covenant violations. This is in contrast to firms without CDSs which experience a significant reduction in firm investment. These results are broadly supportive of lender moral hazard and suggest that lenders do not expend much effort on influencing investment policies of borrowers after covenant violations when borrowers have CDS trading on their debt.

In the absence of availability of data on the exact net credit risk exposure of the lender to the borrower, we use other measures of lenders' propensity to engage in credit risk transfer and consequent lender moral hazard. We consider three proxies: banks' purchase of credit derivatives, their securitization activity, and their reliance on non-interest income. Consistent with our hypotheses, when lenders are more likely to lay off credit risk and exhibit moral hazard (i.e., banks that engage in credit risk transfer through credit derivatives or securitization, or rely more on non-interest income), we find that covenant violations do not have a material impact on a firm's investment policies.

A potential alternative explanation for our results could be that investment projects of firms with CDSs are more valuable and, hence, investment is not cut even after covenant violations. Chava and Roberts (2008) show that there is a significantly larger decrease in firm investment post covenant violation when borrowers have information asymmetry or agency conflicts (as proxied by cash holdings and the length of the relationship with the lender), highlighting that inefficient investment is reduced. In contrast, we find that when lenders can purchase CDSs on borrowers, there is no significant drop in investment even when borrowers are more exposed to information asymmetry and agency problems. These results provide further support to credit risk transfer through CDS causing lender moral hazard.

We next consider the result of debt renegotiations after a borrower violates a covenant and when the borrower has a CDS trading on its debt. As discussed before, after the covenant violations, creditors can request immediate repayment of the principal and terminate further

lending commitments. Alternatively, creditors can use their additional bargaining power and extract higher spreads on loans extended consequent to the covenant violation. Consistent with the argument that the availability of credit derivatives on the borrower's debt increases the lender's outside options (Bolton and Oehmke, 2011) and, hence, their bargaining power vis-á-vis the borrower, we find that lenders extract rents after covenant violations by imposing higher spreads on renegotiated loans of borrowers with a traded CDS. These results suggest that the availability of CDS on borrowers induces lender moral hazard, where lenders do not expend costly effort to influence firm policies that increase firm value, but extract rents using their stronger bargaining power.

We next examine the effect of lender intervention on the stock returns of the borrowing firm after covenant violation in the presence of a traded CDS on the firm's debt. For non-CDS firms, we find that after a covenant violation, the actions taken by creditors to influence borrowers' policies increase the value of the firm (Nini, Smith, and Sufi, 2012). However, for firms with traded CDSs, the post covenant violation cumulative abnormal returns are not significantly different from zero and are negative in the long-run, indicating deteriorating firm performance. Consistent with this evidence, we find that firms with traded CDSs on their debt are more likely to experience a credit rating downgrade consequent to a covenant violation. Overall, these results again support the existence of lender moral hazard wherein the lender doesn't expend costly effort to influence firm policies to improve firm value. Instead, lenders renegotiate higher loan spreads post-covenent violation using their enhanced bargaining power. Consequently, firm performance deteriorates as evidenced by credit rating downgrades and lower stock returns.

One implication of severe moral hazard problems is that CDS trading may lead to higher borrower bankruptcies (see Bolton and Oehmke, 2011; Subrahmanyam, Tang, and Wang, 2014). Our results from a Cox proportional hazards model of the survival time of the firm

after covenant violation suggests that CDS firms are neither more nor less likely to make a distressed exit or go bankrupt after a covenant violation than firms without CDS.[3] These results indicate that banks may not be actively causing firm bankruptcies due to overinsurance (empty creditor problem). Rules regarding risk-weighting of bank assets, such as those prescribed by Basel Accords, suggest why banks may not overinsure against borrowing firms. The risk weights, determined based on the credit rating of a borrower, can be substituted by those of the CDS protection seller when the CDS is used to hedge credit exposure from the borrower. Typically, as the CDS protection/insurance seller is better rated than the borrower, it leads to lower risk weights on the credit exposure. However, if CDS purchases lead to overinsurance, they are deemed speculative assets and receive higher risk weights. Thus, overinsurance can be quite costly for banks. Banks that do not overinsure are less likely to be empty creditors. Another potential reason could be the inability of banks, which are arguably more informed, to overinsure (as opposed to partially insure) against the borrower due to increased adverse selection problems making any marginal credit protection expensive, especially after a covenant violation.

Finally, we explore whether these ex-post lender moral hazard problems in the presence of CDS trading on borrowers are consistent with ex-ante loan announcement returns. Theoretically, Diamond (1984) suggests that bank monitoring improves firm value. Empirical evidence that bank credit line announcements indeed generate positive abnormal borrower returns is presented in Mikkelson and Partch (1986), James (1987), Lummer and McConnell (1989), and Billett, Flannery, and Garfinkel (1995) among others. If capital markets anticipate lender moral hazard in the presence of CDS trading and, consequently, lower lender monitoring (see Demarzo and Duffie, 1999; Parlour and Plantin, 2008), then loan announcement returns for a firm with CDSs, should be relatively lower than returns for firms without

[3]Following Gilson (1989) and Gilson, John, and Lang (1990), firms are identified as distressed if they are in the bottom 5% of the universe of firms in the Center for Research in Security Prices (CRSP) on the basis of the past three-year cumulative return.

CDSs. In the absence of any agency problems between banks and firms, the loan announcement returns of firms with CDSs should be statistically indistinguishable from firms without CDSs. We find that loan announcement returns for CDS firms are muted and not statistically different from zero. However, the loan announcement returns for non-CDS firms are positive and significant, which is in line with the previous studies.

Overall, our results complement and enrich our understanding of the impact of CDSs on the credit risk of the borrowers. Subrahmanyam, Tang, and Wang (2014) show that CDS introduction leads to a higher incidence of bankruptcy and credit rating downgrades for firms. However, they do not distinguish between public and private debt. In a related paper, Danis (2012) analyzes out-of-court restructurings of public debt and shows that firms with CDSs face difficulties with reducing debt out-of-court, thus increasing the likelihood of future bankruptcy. The dramatically different results that we document in the context of bankruptcy incidents after covenant violations on bank loans suggest that lenders in the private market behave very differently from public bond holders. In contrast to public debt holders, reputational concerns, future lending and non-lending business from established relationships, and lower debt renegotiation frictions due to concentrated ownerships are a few of the factors that can mitigate such severe moral hazard concerns in the private debt market.

Our work is also related to the contemporaneous paper by Shan, Tang, and Winton (2014) who find that debt covenants are less strict if CDS contracts exist on the borrowing firm's debt at the time of loan initiation. Interestingly, we find that, even ex-post, lenders do not influence CDS firms to reduce their investment after covenant violations.

Our paper is related to work that examines the impact of credit transfer mechanisms on lenders.[4] However, CDSs are not the only mechanism that lenders have to reduce their

[4]The CDS market has grown quickly to an outstanding notional value as high as 5 Trillion U.S. dollars, or approximately 15% of the total over the counter derivative markets in the 2007–2008 period.

exposure to the borrowers. Some other possibilities are loan syndication, loan sales, and loan securitization. In the context of loan sales, Dahiya, Puri, and Saunders (2003) empirically show that firms whose loans are sold by their banks suffer negative stock returns, and suggest that a loan sale conveys the selling bank's private negative information on the borrower to the market. As Parlour and Winton (2013) discuss, the broad difference between loan sales and a CDS purchase on a loan is that in the former cash flows are bundled with control rights, while in the latter they are not.

Wang and Xia (2014) show that banks impose less restrictive covenants in anticipation of securitization. However, Drucker and Puri (2009) show that sold loans have significantly more covenants than loans that are not sold, reducing the financial flexibility of the borrowers. Securitization and hedging borrower exposure with a CDS have very different economic implications for lenders.[5] Our results contribute to this literature and highlight lender moral hazard when banks maintain control rights (but not economic exposure).

Our work also relates to the literature on the special nature of banks as information producers and monitors.[6] We show that the market reaction to a loan announcement is insignificant when there is a potential for lender moral hazard in the presence of CDS trading on the borrower's debt. However, the loan announcement returns for non-CDS firms are positive and significant, consistent with the previous studies.

The remaining sections are organized as follows. Section 2 discusses sources of data and summary statistics. Section 3 discusses our empirical specifications and results. Section 4

[5]Also, as Wang and Xia (2014), among others, point out, generally loans of borrowing firms with high leverage, non-investment grade rating, and severe information problems are securitized. On the other hand, as Saretto and Tookes (2013) and our paper among others find, firms with CDSs traded against them are in similar, if not in better, financial health than other firms.

[6]Lummer and McConnell (1989) focus on the status of the lending relationship and find that new bank loans generate zero average abnormal returns, while loan renewals have a positive effect. The type of lender also matters. James (1987) finds that loans placed with banks have a higher announcement effect compared to loans placed through private placements. In contrast, Preece and Mullineaux (1994) find a smaller return for bank loans. The findings of Billett, Flannery, and Garfinkel (1995) suggest that the quality of the lender affects the market's perception of firm value.

concludes.

2 Data

2.1 Data sources and sample selection

We utilize five main datasets for our analysis: (i) Loan Pricing Corporation (LPC) Dealscan database; (ii) Credit Market Analysis (CMA) Datavision dataset; (iii) Bloomberg; (iv) Markit; (v) Consolidated Financial Statements for Bank Holding Companies (FR Y-9C) and Bank Call Report data. We obtain firm-quarter level financial data from COMPUSTAT and equity return-related information from the CRSP.

Loan information is extracted from the Dealscan database. The basic unit of loans reported in Dealscan is a loan facility. Loan facilities are grouped into packages. Packages may contain various types of loan facilities for the borrower. Loan information such as loan amount, maturity, type of loan, and other information, is reported at the facility level. The database consists of private loans made by bank and non-bank lenders to U.S. corporations. The Dealscan database contains the majority of all commercial loans issued in the U.S. We construct our covenant violation sample following Chava and Roberts (2008) for the period between 1994 and 2012[7]. We focus on loans of non-financial firms with covenants written on current ratio, net worth, or tangible net worth, as these covenants are more frequent and the accounting measures used for these covenants are unambiguous, standardized and less susceptible to manipulation.

The data on the timing of CDS introduction is obtained from three separate sources: Markit, CMA Datavision, and Bloomberg. The CMA Datavision database collects data

[7]The covenant sample begins in 1994 as the information on covenants is limited before that period in the Dealscan database

from 30 buy-side firms which consist of major investment banks, hedge funds, and asset managers. Mayordomo, Pea, and Schwartz (2014) compare multiple CDS databases, namely GFI, Fenics, Reuters, EOD, CMA, Markit, and JP Morgan, and find that the CDS quotes in the CMA database lead the price discovery process. The CMA database is widely used among financial market participants. We use the CMA database to identify all firms for which we observe CDS quotes on their debt. To further ensure the accuracy of CDS initiation dates on a firm, we augment the CMA database with the CDS data from Bloomberg and Markit. We take the earliest quote date from those three databases as the first sign of active CDS trading on a firm's debt.

As discussed later, our primary variables of interest in the combined dataset are (i) an indicator that shows if the firm violates a financial covenant, and (ii) an indicator that shows if the firm has outstanding CDS trades in the corresponding quarter. We do not have access to data regarding the exact firms against which lending banks protect themselves using CDSs. However, since CDS protection can only be obtained for firms with traded CDS, we divide firms based on traded CDS. We use the lead bank's Y9C and call report data to identify which lenders are active in the credit derivatives market. Arguably, most stock market participants and investors also may not have access to information on which specific bank loans are protected with a CDS. Hence, we believe that our analysis based on the credit derivative exposure of the bank and CDS trading for a firm is justified from a market investor's point of view. This is especially true when we try to assess the stock market reaction to loan announcements and covenant violations.

2.2 Descriptive statistics

Table I summarizes the statistics for the loan announcement sample. Loan agreements are significant external financing events: the median loan or commitment size is 31% of the firm's

total assets, which also implies that the median loan announcer is not a very large firm. The median maturity of a loan is approximately four years. Panel B of Table I summarizes the number of loan announcements along with the mean size of the loan each year. There are about 1,200 loan announcements per year, which is consistent with previous studies. We observe that the number of loans issued increased from 1990 to 1997, before declining and plateauing thereafter. Since the recent financial crisis, the number of loans issued per year has almost halved. The increasing trend in the earlier part of the sample may be due to Dealscan's increasing coverage of issued loans over time. Panel B of Table I also shows that the average size of loan announcements has also increased over the years. There are 3,074 loan announcements for 507 unique firms where the borrowing firms have traded CDS contracts. On the other hand, there are 24,375 loan announcements for 5,962 unique firms when the borrowing firms have not traded CDS contracts. Table I also shows that the median loan size for firms that have CDS contracts traded is larger than the average loan size for firms that do not have CDS contracts traded. This difference in loan size leads us to specifically control for loan size in the latter part of the analysis.

Table II, Panel A summarizes the statistics for the current ratio and net worth covenant samples from 1994 to 2012. The current ratio and net worth samples consist of all firm-quarter observations of non-financial firms in the COMPUSTAT database. These two samples are further divided based on whether a firm-quarter observation is determined to be in covenant violation (denoted by "Bind") or not in covenant violation (denoted by "Slack") for the corresponding covenant. Panel B displays the same set of firm-quarter observations split by firms with CDSs and without CDSs issued against them. The outcome variables and control variables used in the analysis for changes in firm characteristics when a covenant violation occurs are defined in the Appendix section. The distributions of the covenant violations and the control variables are in line with data used in previous studies (see Chava

and Roberts, 2008 and Nini, Smith, and Sufi, 2012).

3 Empirical results

This section provides evidence regarding the existence of lender moral hazard in the presence of CDS trading on a borrowing firm's debt. It also tests if an empty creditor problem exists, and whether markets anticipate lender moral hazard. Sections 3.1, 3.2, and 3.3 test for moral hazard based on (i) lender intervention in the firm's operations, (ii) loan renegotiations after covenant violation, and (iii) the realized stock market returns in the post covenant violation period respectively. Section 3.4 tests for the presence of an empty creditor problem where banks can overinsure and cause a higher rate of firm bankruptcies by studying firm exit hazard rates post covenant violation. Finally, Section 3.5 tests whether capital markets anticipate and discount for the potential agency problems by comparing the stock market returns to the loan announcement conditional on whether or not CDS trades against a firm's debt.

3.1 CDS and Capital Expenditure After Covenant Violations

Financial covenant violations provide an ideal setting for studying agency problems that banks face in the presence of CDSs. Covenant violations give creditors contractual rights similar to those in the event of payment defaults, such as the right to request immediate repayment of the principal and terminating further lending commitments. Such rights provide creditors with a sudden increase in bargaining position post-violation. Hence, if agency problems between lenders and borrowers exist, they should manifest after covenant violation.

Granting waivers for a violation to a borrowing firm requires banks to investigate the firm's current condition, and its future prospects, and then handle each waiver on a case-

by-case basis. This requires the lending bank to exert effort at a significant cost. Hence, if a bank hedges or reduces its exposure to a firm through CDS trading, and the firm violates a covenant, the bank may not have economic incentives to take corrective actions. To test for such lender moral hazard in the presence of CDS trading, we follow the regression discontinuity approach in Chava and Roberts (2008).

The identification is based on comparing firms just around the contractually written covenant violation threshold. We compare the average treatment effects (ATE) of firms that violate a covenant and have a traded CDS, with firms that violate a covenant and do not have a traded CDS. Chava and Roberts (2008) have shown that after covenant violation, creditors intervene and firm investment is reduced significantly. Nini, Smith, and Sufi (2009) show that such intervention helps the firm regain financial strength over time, helping equity holders as well. If banks with CDS protection intervene less in firm policy, then we should see smaller corrective changes, resulting in smaller drops in investment, for firms with CDSs traded against their debt than for firms without.

The empirical specification is as follows, where i is the subscript to denote a specific firm, and subscript t represents time quarter:

$$\begin{aligned} Investment_{it} = \alpha + \beta_1 d\_Bind_{it-1} \times d\_CDS_{it-1} + \beta_2 d\_Bind_{it-1} \\ + \beta_3 d\_CDS_{it-1} + \beta_4 X_{it-1} + \eta_i + \delta_t + \varepsilon_{it}, \end{aligned} \tag{1}$$

where $Investment_{it}$ is the ratio of the capital expenditures to the capital in the beginning of the period. Our main variables of interest is the interaction term $d\_Bind_{it-1} \times d\_CDS_{it-1}$. d_Bind_{it-1} is an indicator variable equal to one if a firm i in quarter $t-1$ is in covenant violation and zero otherwise. Similarly, d_CDS_{it-1} is an indicator variable equal to one if there is a traded CDS contract for a firm i in quarter $t-1$. The coefficient β_1 captures the average difference in investment between a firm with a traded CDS and a firm without a traded CDS,

after covenant violation. Coefficient β_2 captures the ATE of covenant violation for the firms that do not have a traded CDS. X_{it-1} is a vector of control variables to control for potential differences in dynamic firm characteristics that affect firm investment. η_i denotes firm fixed effects and δ_t estimates year-quarter fixed effects to control for unobserved heterogeniety across firms and time. Detailed variable definitions of the dependent variable and all the firm controls included in the regression specifications are provided in the Appendix.

Table III, Panel A reports the results. The first three columns utilize the full dataset and the last three columns conduct the analysis using the regression discontinuity sample. The regression discontinuity sample limits the sample of observations to 30% of the relative distance around the covenant violation boundary. Columns (2), (3), (5), and (6) include firm level characteristics, and Columns (3) and (6) also include the distance from covenant violation threshold as additional controls.

The negative and statistically significant coefficients that we find on the *d_Bind* indicator variable confirm the findings of Chava and Roberts (2008), who show that firms face a significant reduction in investment after a covenant violation due to creditor intervention. The positive coefficient on the interaction term *d_Bind*×*d_CDS* shows that firms which violate a covenant and have a CDS traded do not have as large a decrease in investment. In fact, adding the coefficients on *d_Bind* and *d_Bind*×*d_CDS*, we note that the net effect of violating a covenant on firm investment is statistically indistinguishable from zero for firms with traded CDSs. The results hold through all six specifications. This supports the hypothesis that in the presence of CDS trading, which allows lending banks to reduce credit exposure to borrowing firms, banks do not intervene in changing firm investment policy after gaining control post covenant violation.

For a visual representation, Figure 1 plots firm investment with respect to the distance

of the firm from the covenant violation threshold [8]. We consider two types of covenants, net worth and current ratio, and use the tighter of the two covenants when both are present to calculate the distance to covenant violation. The top panel reports the relationship between firm investment and the distance to covenant violation for firms which do not have CDSs traded against them. The bottom panel is for firms with traded CDSs. In the case of firms without CDSs, we note a significant decline in investments once a covenant is violated. However, in the bottom panel we do not see any marked change in firm investment for firms with a traded CDS.

3.1.1 CDS and Borrower CapEx After Violations: Lender Heterogeneity

In this section, we delve deeper into the hypothesis that bank moral hazard is causing the muted reduction in firm investment after covenant violation. We investigate if lender characteristics that affect bank moral hazard have predictable effects on firm investment post covenant violation.

We match lenders from Dealscan to their parent bank holding companies (BHCs). Using the parent BHC's FR Y-9C reports, we gather data on their activities in the credit derivatives market, loan sales, and securitization market and the total amount of non-core banking activities. We are able to find matches for lenders for about 70% of the packages in our sample. Data for credit derivatives and securitization & loan sales are available from 1997 Q1 and 2001 Q2 onwards, respectively, while data on non-interest income is available for the entire sample period from 1994-2012. Detailed definitions for these lender variables are in the Appendix.

High (*Low*) lender activity for a specific lender variable is defined as the variable being above (below) its computed median value using the entire sample period over which data for

[8] We also plot the polynomial fit for firm investment versus firm distance to covenant violation in the appendix section in Figure B.1

it is available. Similar to specifications in Table III, the dependent variable is *Investment* and the main independent variables of interest are *d_Bind*×*d_CDS* and *d_Bind*. As before, along with firm level controls such as *Macro q*, *Cash Flow*, and *Assets (log)*, we also include the initial distance to the covenant violation threshold. The distance to threshold helps control for the probability of covenant violation (and ensuing conflicts of interest with the borrower) that the lender expects while setting the initial covenant tightness.

We find that banks that actively reduce their credit exposure – by either buying protection in the credit derivatives market or removing loans from their balance sheets by securitizing them and/or selling them in the secondary loan market – intervene less in borrowing firms' investment policies after covenant violation. Table IV, Panels A and B report these results for the full sample and the regression discontinuity sample, respectively. By noting the positive and significant coefficient of the interaction variable *d_Bind*×*d_CDS* in Column (2) compared to the statistically and economically insignificant coefficient in Column (1), we note that banks that have higher amounts of CDS protection bought, intervene less. This holds true for Columns (3) and (4) where banks with higher amounts of loans securitized, intervene less post covenant violation. Finally, Columns (5) and (6) show that banks that have higher amounts of non-interest income, i.e. banks with more non-core banking activities such as proprietary trading and investment banking activities, intervene less as well. Overall, banks that are more likely to hedge credit risk exposure intervene less in firms' investment policies post-violation. These results are consistent with a bank moral hazard argument.

3.1.2 CDS and Borrower CapEx After Violations: Borrower Heterogeneity

Table V, Panels A and B conduct a test similar to the one above, where we investigate whether borrowing firm characteristics that increase intervention costs for the lender affect moral hazard. We examine two sets of problems that can increase the costs of monitoring for

the lender: (i) agency problems, such as free cash flow problems, are exacerbated for firms that have a higher fraction of assets held as cash (see Jensen, 1986); and (ii) information asymmetry and related monitoring costs should be higher when firms have a shorter relationship history with the lending bank. Banks that are exposed to such agency and information problems have even higher incentives to intervene in firm policies after a credit event than in the case of firms in general. However, a creditor hedged with a CDS has less incentive to intervene after a credit event, even for firms with higher agency and information problems.

To conduct the test, we first divide our sample based on cash holdings and lending relationship length. These borrower characteristics, as we argued above, should affect the level of intervention post covenant violation, based on our hypothesis. Borrowing firms' cash holdings data is from COMPUSTAT and lending relationship length is obtained from Dealscan. *High* (*Low*) *Cash* is defined as cash being above (below) its computed median value using the entire sample period over which data is available. Lending relationship is computed at the firm level when a loan is made by summing up the lending relationships of all lenders in the syndicate. A *High* lending relationship sample corresponds to loans in which 30% or greater of the borrower's past loans have been made by the lending syndicate. A *Low* lending relationship sample corresponds to loans in which a borrower has no historical relationship with the lenders in the syndicate. As before, detailed definitions of these variables are in the Appendix.

Our dependent variable remains *Investment* and the main independent variables of interest remain the interaction term $d\_Bind \times d\_CDS$ and also d_Bind. Along with firm-level controls, we again include the initial distance to the covenant threshold to take into account potential future problems, such as covenant violation, that the lenders might anticipate.

Comparing Columns (2) and (1) for both panels, we first note that the coefficient of d_Bind is twice as large and negative for firms with higher cash holdings when compared to

firms with low cash holdings. This result suggests that lenders recognize possible free cash flow problems and reduce investment in firms with more cash. Next, we note the positive and significant coefficient for the interaction term $d\_Bind \times d\_CDS$ for firms with a greater fraction of cash holdings. Thus, even though possible free cash flow problems are large, the net effect of the presence of a CDS is that there is effectively no reduction in firm investment after covenant violation. The same phenomenon holds true when we compare the coefficient of interaction terms in Columns (3) and (4) in either panel. Firms with shorter relationship history, which implies higher information asymmetry and higher costs of due diligence by banks, face less intervention in the presence of CDS trading.

A potential concern is that CDS traded firms tend to be large and if covenant violations are less constraining for larger firms then our results may possibly be driven by size [9]. In order to examine this we analyze the subsample of non-CDS firms by dividing it into small and large firms. Large firms are defined as firms with an asset value greater than \$1 billion (which is close to the median asset value of CDS firms). We follow the regression discontinuity setup as in column (4) of Table III and substitute *d_CDS* with the large-firm dummy *d_Large* instead. We find that the $d\_Bind \times d\_Large$ coefficient is indeed positive but statistically insignificant from zero with a t-statistic of 1.23 and a coefficient value of 0.006 which is half the magnitude of the comparable $d\_Bind \times d\_CDS$ coefficient in column (4) of Table III.

Overall, these results further bolster the hypothesis that banks suffer from moral hazard in the presence of CDS trading, which results in muted or no corrective action after a credit event.

[9] We control for firm-size and include firm fixed-effects in our covenant violation regression which should arguably address this issue to some extent. In unreported specifications, we also control for non-linear terms of firm-size and find that our results are qualitatively unaltered.

3.2 Debt renegotiation after covenant violation

As discussed before, intervention, renegotiation, and monitoring are costly to banks. If a lending bank has hedged or reduced its credit exposure to a borrowing firm by purchasing a CDS, then the lender may not have incentives to intervene and help improve the firm's future prospects. At the same time, the lending bank still has control rights over the firm, which allows it to renegotiate loans and grant waivers after covenant violation. Thus, in the presence of a CDS against the firm, a hedged lending bank may minimize the costly monitoring efforts post covenant violation.

If lending banks can overinsure themselves, through CDS, then arguably they will have a higher incentive to accelerate the loan payment by not granting a waiver and push the borrowing firm into bankruptcy (empty creditor problem). However, there are many reasons why banks cannot get overinsured against their borrowers: (a) regulatory reasons,[10] (b) adverse selection,[11] and (c) reputation concerns.[12] In such cases however, banks could grant waivers to borrowing firms and extract rents via the renegotiated loan terms due to their increased bargaining power vis-á-vis the borrower. This can be achieved, for instance, by imposing higher spreads or fees on renegotiated loans of borrowing firms that have violated a covenant.

[10]The rules regarding risk-weighting of bank assets, such as those prescribed by Basel Accords, may also suggest why banks do not overinsure against borrowing firms. A CDS purchased to hedge credit exposure receives a lower weight in terms of the risk based on the credit rating of the CDS seller according to the Basel credit risk methodology. However, purchases that lead to overinsurance are deemed speculative assets and receive higher risk weights as they are evaluated under the Basel market risk methodology. Thus, overinsurance can be costly for banks.

[11]One can purchase CDS protection only if there is a counterparty willing to sell it. Given that a lending bank is in an informationally advantageous position regarding a borrowing firm's health, it may be harder to find protection sellers to lay off credit risk at an attractive price, especially during or after a credit event like a covenant violation.

[12]The concern of losing future loan origination business or syndicate ties might deter lending banks from getting overinsured and pushing firms into bankruptcy after a credit event like a covenant violation. However, given that large banks with diversified businesses are more active in the credit derivatives market, reputation may be a weak disciplining mechanism for such lending banks (See Gopalan, Nanda, and Yerramilli (2011)).

Table VI investigates changes in the major loan contract terms post covenant violation. We focus on loans initiated and amended by the same borrower-lead lender pair before and after covenant violation [13] . The loan issuance date post covenant violation is restricted to before the maturity of the loan facility which was affected by the violation, or within one year of the covenant violation, whichever is the shorter period. In addition to new issuances, we also gather data from the Dealscan facility amendment datafile on the covenant violating loan facilities. Again, we require that the amendment date be within one year of the covenant violation date.

Loan spread is the main dependent variable in our regression analysis. The main independent variable of interest is the interaction term *d_AfterCovViol*×*d_CDS*. *d_AfterCovViol* is an indicator variable set equal to one for loan facilities initiated or amended after the covenant violation date and is set to zero otherwise. *d_CDS* is an indicator variable equal to one if the loan facility announcement occurs when CDS is traded on the underlying firm's debt, and zero otherwise. *d_TradedCDS* is an indicator variable equal to one if the firm in our sample has CDS traded on the debt at any point during our sample period, and zero otherwise.

By noting the coefficient of *d_AfterCovViol* in Column (1) of Table VI, we find that after covenant violation, the spread of the renegotiated loan increases, which is in line with the results in Nini, Smith, and Sufi (2012).[14] The coefficient in Column (1) of our variable of interest $d\_AfterCovViol \times d\_CDS$ suggests that firms that have CDS traded against them, experience an increase in spread of approximately 51%, or about 90 bps on average compared to firms that do not have a traded CDS. The summation of coefficients in Column (1) shows

[13]When there is a unanimous decision among the lenders to restructure or refinance a given loan then the loan is entered as a new loan as opposed to an amended loan in Dealscan. Some of these loans are marked as refinanced loans but many are not. Whereas the facility amendment dataset in Dealscan mainly consists of amendments which requires a majority (51%) of lenders to agree to the amendment (See Roberts (2015))

[14]We also find that the maturity decreases and the syndicate size is also significantly reduced.

that post covenant violation, firms with a CDS experience a 65% increase in loan spread (by approximately 120 bps). The main observed change in loan terms post-violation is in the loan spread, through which the lending banks can extract additional rents.[15] Thus, renegotiation in the presence of CDS seems to only benefit the lending bank and not the borrowing firm.

The remaining columns investigate if extraction of rents is higher in cases where banks have a higher probability of hedging their economic exposure to borrowing firms. Columns (2)–(9) in Table VI report the results for changes in loan spreads by dividing the sample by credit derivative market activity, securitization activity, proportion of non-interest income, and syndicate size, respectively. A larger syndicate size can imply a greater coordination failure among lenders upon a credit event incentivizing lenders to hedge themselves in the CDS market (Bolton and Oehmke (2011)). Therefore using these subsamples we test the hypothesis that lenders who actively reduce their credit exposure extract more surplus from borrowing firms as a result of the higher bargaining power vis-á-vis the borrower.

The coefficients of interaction variable $d\_AfterCovViol \times d\_CDS$ in Columns (3), (5), (7), and (9) are all positive and statistically significant. This suggest that banks that have high credit derivative market activity, high securitization activity, a high proportion of non-interest income, and banks that have large syndicates, and are thus more likely to hedge credit risk of their borrowers, extract surplus by charging a statistically significant higher loan spread in the case that CDS trades on borrower debt. Overall, this evidence supports the hypothesis that banks attempt to extract additional surplus from firms where they have higher bargaining resulting from a lower credit exposure.

[15] In unreported tests, we also check non-price loan terms such as whether the loan is secured, or has performance pricing terms, sweep provisions. Although we note that CDS firms are significantly less likely to have secured loans and sweep provisions, we do not see a significant change in the non-price terms for CDS firms compared with non-CDS firms post covenant violation.

3.3 Equity return after violation

In this section, we examine the effect of lender intervention on the stock returns of the borrowing firm after covenant violation where there is a traded CDS on the firm's debt. Nini, Smith, and Sufi (2012) find that after a covenant violation, the actions taken by creditors to change the firm policy increase the value of the firm. On average, if creditor intervention improves firm quality, then the equity markets should respond with higher cumulative abnormal returns in the long run.

However, as discussed above, as a result of moral hazard stemming from the ability to buy CDS protection, creditors may not take corrective action post covenant violation. Creditors may not expend costly effort to reign in inefficient firm investment, and instead may extract higher surplus from firms. In such a case, firms should experience lower cumulative abnormal returns after a covenant violation. Therefore, in the long run, firms with a traded CDS should have lower cumulative abnormal returns after a covenant violation compared with firms that do not have a traded CDS.

We compare the stock return post-violation for firms with an outstanding CDS with firms without an outstanding CDS for the full sample as well as the regression discontinuity sample. As before, the regression discontinuity sample limits the observations in the sample to 30% of the relative distance around the covenant violation boundary. Following the regression framework developed in Thompson (1985) and Sefcik and Thompson (1986) and implemented in Nini, Smith, and Sufi (2012), we compute monthly abnormal returns using a four-factor model (three Fama-French factors and the momentum factor). We also account for delisting returns which are calculated from the CRSP delisting file. We then use the estimated model to calculate cumulative abnormal returns of each firm over various horizons after covenant violation. For our analysis, as in Nini, Smith, and Sufi (2012), we define a "new covenant violation" for a firm as a violation where the firm has not violated another

covenant in the previous four quarters.

Figure 2 plots event-time abnormal returns after a new covenant violation, and compares the returns of firms with CDSs with those of firms without CDSs. The figure shows that in the post-violation period, firms without a traded CDS show substantially higher positive abnormal returns than firms with a traded CDS. The equity price of violating firms with a traded CDS also increases in the early part of the post-violation period, but then remains flat after about a year.

Table VII, Panel A reports the results of the monthly CAR regressions post covenant violation for the full sample of firms. Panel B reports the results for the regression discontinuity sample. The dependent variable is the monthly cumulative abnormal return CAR computed at various horizons. For instance, for every firm i and quarter q, *CAR(1,m)* is computed by summing up the monthly abnormal returns of firm i from the first month following quarter q until the m^{th} month. The main independent variables of interest remain *d_Bind* and *d_Bind*$\times$*d_CDS*. The control variables included in the regressions are *assets (log)*, *tangible assets*, *operating cash flow*, *book leverage*, *interest expense*, and *market-to-book*. All control variables are lagged by one quarter and their definitions are provided in the Appendix. All columns include firm level accounting variables as controls along with firm fixed effects and year quarter fixed effects.

Consistent with Figure 2 and the findings of Nini, Smith, and Sufi (2012), we note that the coefficient estimates of the *d_Bind* indicator variable suggest that on average violating firms experience positive stock returns after covenant violation. This can be attributed to a reduction in inefficient investment and an improvement of management discipline in general by lending banks that gain control rights. The coefficient estimates of the *d_CDS* indicator variable are not significant, suggesting that just the presence of CDS trading does not lead to a different stock market performance. The variable of interest is, as before, the estimated

coefficient of the interaction between the *d_Bind* and *d_CDS* indicator variables. We note that over time, the coefficient of the interaction variable is statistically and economically significant and negative. The net effect on firms with a CDS traded against them post covenant violation is statistically indistinguishable from zero, as observed by the sum of the *d_Bind* and *d_Bind*$\times$*d_CDS* coefficients.

We next carry out similar CAR regressions for our regression discontinuity sample. In support of our results from the full sample, we again find that violating firms with a CDS have much lower abnormal stock returns than firms without a CDS. The coefficient of the interaction variable, over 24 months, i.e., two years post covenant violation is -17% and is statistically and economically significant. The same remains true 30 months and three years out.

Overall, these results suggest the absence of lender intervention in the borrowing firm's interest when the firm has a traded CDS, which potentially allows creditors to hedge their credit risk.

3.4 Firm survival after covenant violation

If banks face an empty creditor problem, then firms should default more often in the presence of CDS trading. This is because in this extreme case of moral hazard, overinsured banks benefit from firm bankruptcy. As banks gain control rights after covenant violation, they should use these control rights to push firms into bankruptcy. To test this hypothesis, we conduct a survival analysis for firms after a covenant violation.

We first examine the frequency of firm exit from our sample. We identify firm exits from the CRSP delisting codes[16] and Moody's Ultimate Recovery Database (Moody's URD) which

[16]Financial failure is defined as liquidation (400 – 490), bankruptcy (574). Other forms of firm exit include mergers (200 – 290), or going private (573). Active firms have codes ranging from (100 – 170).

contains information on all bonds rated by Moody's.[17] Firms which do not have delisting codes in the CRSP dataset are classified as dropped due to financial distress, in case we also fail to find firm data on total assets, total sales, common shares outstanding, and the closing share price in COMPUSTAT.

Overall, we find that the frequency of firm exit within four quarters after covenant violation is 7.82% in our sample compared to a firm exit rate of 3.30% when there is no covenant violation. Distress related exits within the four quarters after covenant violations are 4.5% while non-distress related exits (mergers, going private) over the same period after covenant violation is 3.32%. We also note that only 5% of all the exits over fours quarters after covenant violations are CDS firms, whereas this number is 2% for our entire sample period.

We run a Cox proportional hazards model on loan-quarter observations, where the hazard rate is the likelihood of a firm exit after a covenant violation. The survival time is measured in quarters from the firm's covenant violation until its exit. Specifically, we estimate the hazard rate $h(t)$ which is the conditional probability that a firm will exit between t and $t+\delta t$ conditional on surviving until time t. Formally, let T be the time when the firm exits. Then $h(t)$ is defined as:

$$h(t) = \lim_{\delta t \to 0} \frac{\mathbb{P}(t \leq T < t + \delta t | T \geq t)}{y}.$$

In our hazard regression model, the hazard function is then represented by:

$$h(t, \mathbf{x}, \mathbf{z}(t)) = h(t) \exp\left(\sum_{i=1}^{k_1} \beta_i x_i + \sum_{j=1}^{k_2} \gamma_j z_{j,t-1} \right) \tag{2}$$

[17] Moody's defines default as an event when one or more of the following occurs: (a) there is a missed or delayed disbursement of interest and/or principal, including delayed payments made within a grace period; (b) the company files for bankruptcy, administration, legal receivership, or other legal blocks to the timely payment of interest or principal; and (c) a distressed exchange takes place.

In the above equation, $\mathbf{x} = (x_1, x_{2,} \ldots, x_{k_1})'$ is a time-independent vector of variables which consists of the initial covenant tightness, industry fixed effects and year fixed effects. $\mathbf{z}_{t-1} = (z_{1,t-1}, z_{2,t-1}, \ldots, z_{k_2,t-1})'$ is a time-dependent vector of lagged firm characteristics affecting the hazard rate of firm exit.

Table VIII reports the results. Specification (1) examines all firm exits, while specifications (2) and (3) examine distress related exits and non-distress related exits, respectively. An insignificant coefficient for the d_CDS indicator variable, which is our main variable of interest, suggests that CDS firms are neither more nor less likely to exit the sample after covenant violation. This result is evidence against the presence of a severe empty creditor problem where an over-hedged creditor has an incentive to push the firm into bankruptcy.

Next, we measure firm distress in an alternative manner. We define distress and outperformance based on Gilson (1989) and Gilson, John, and Lang (1990), among others, to be the firms in the bottom and top 5% of the entire universe of firms in the CRSP dataset based on the past three-year cumulative return. The reason we focus on distress is because distressed firms are generally more likely to be bankrupt. The insignificant coefficient estimates on the d_CDS indicator variable for the distress regression in specification (4) based on cumulative equity return confirms our previous result that CDS firms are not more likely to be distressed when compared with non-CDS firms. As a comparison, we also investigate the probability of firms outperforming the universe of CRSP firms in Column (5). Interestingly, the negative and significant result on the d_CDS indicator variable suggests that firms with a CDS traded against them have a significantly lower likelihood of outperforming the universe of firms. These results suggest that creditors do not cause the CDS firm to be distressed or push them into bankruptcy after covenant violation as suggested by the severe empty creditor problem where lenders are over-hedged. However, if the creditors are at least partially hedged, they do not exert effort to improve firm performance either.

A concern may be that firms with a CDS traded against them are inherently different or distressed to begin with. To address such potential selection concerns regarding the presence of CDS trading, we employ an instrumental variables approach. Following Saretto and Tookes (2013), we instrument the presence of CDS trading by the average amount of forex derivatives used for hedging purposes relative to total assets of the lead syndicate banks and bond underwriters with which the borrowing firm has conducted business in the past five years. Data on bond underwriters is obtained from Mergent Fixed Income Securities Database (FISD). Following the methodology in Wooldridge (2001), we use the fitted value from a probit model for *d_CDS* as shown in the appendix Table B.2 as an instrumental variable for *d_CDS*. We estimate the model for the determinants of CDS trading on firm-quarter observations for the full sample including additional controls that might affect the propensity of CDS trading on a firm. We then run a 2SLS regression using a linear probability model with the fitted CDS probability as an instrument. Table B.1 in the Appendix reports the results. As in Table VIII, the negative coefficient in Column (1) for all exits, and the insignificant coefficients for the d_CDS indicator variable in Columns (2)-(4) suggests that CDS firms are not more likely to exit the sample after covenant violation. As before, Column (5) suggests that firms that have CDS traded against them have a lower likelihood of outperformance.

While exits and stock performance provide corroboration of our hypothesis of bank moral hazard in the presence of CDSs (but not the extreme case of an empty creditor problem), another firm event that can shed light on bank behavior before firm exit is a debt rating change. Hence, we examine the frequency of a rating downgrade or upgrade conditional on covenant violation. We gather rating change events from FISD and construct loan-quarter level observations post covenant violation. If a firm in a given quarter post covenant violation is downgraded (upgraded) by any of the three rating agencies – namely S&P, Moody's or

Fitch – then an indicator varible *d_DNG* (*d_UPG*) is set to one; otherwise it is set to zero. We then run a hazard model similar to the firm exit regressions. However, in this case, the sample is limited to loan-quarter observations of rated firms.

Table IX reports the results for the ratings change using a Cox proportional hazards model. Specifications (1) and (2) show that traded CDS firms are more likely to get downgraded, and not upgraded after a covenant violation compared with non-traded CDS firms. Columns (3) and (4) show that these results are robust to using the instrument variables approach for CDS trading as well.

Overall, the evidence above suggests that the lender moral hazard in the presence of CDS trading leads to under-performance of firms, but does not increase the likelihood of distress or default.

3.5 Loan announcement results

Do capital markets anticipate lender moral hazard in presence of CDS trading, and the resulting under-performance of firms due to lax monitoring? To answer this question, we focus on loan announcement results. The literature has shown that bank loan announcements lead to positive abnormal returns for stocks (see Mikkelson and Partch, 1986; James, 1987; Lummer and McConnell, 1989; Billett, Flannery, and Garfinkel, 1995, among others). The theoretical argument hinges on the special role of banks: bank monitoring increases firm value and loan issuance signals positive private information regarding the firm (see Diamond, 1984). However, if the purchase of CDS protection by banks creates moral hazard, then equity holders who anticipate such agency problems should discount the significance of bank loan announcements. This, in turn, should lead to lower loan announcement abnormal returns for CDS firms when compared with non-CDS firms.

To test this, we conduct an event study on the abnormal return of firms' stocks around

the loan announcement date (using the deal active date of a loan in Dealscan). We compare the loan announcement effect in a five-day window (-2,+2) for firms with CDS against their debt with those firms without. The null hypothesis is that there is no difference in the loan announcement return between firms with CDS and those without, and hence, the estimate of interest is the average effect of the presence of CDS trading on loan announcement returns.

We first compare the loan announcement effect for the full sample. The full sample includes both firms that never had CDS traded against their debt and firms that have had CDS traded at some point in the sample period. Table X reports the results. Consistent with previous studies, we find a significantly positive stock price reaction at the time of the loan announcement for the full sample. The average five-day abnormal return is 0.39%, significant at 1% level. These results are similar in magnitude to findings in the literature that suggests that bank loans are special in terms of providing monitoring benefits to the firm. However, we find that for loan announcements of firms with CDS, the stock abnormal return is close to zero (mean five-day CAR of 0.10%, which is statistically insignificant).

A potential concern is that the firms with CDS are inherently different from firms that have never had CDS traded. The right-hand side of the table reports the results only for firms that had CDS traded against their debt at some point in time, compared to the same firms when they did not have CDS traded against their debt. Even within this set of firms that have traded CDSs, the average five-day loan announcement abnormal return is 0.31%, significant at the 1% level, before the introduction of CDS trading, and in the period after the introduction of CDS trading, the five-day abnormal return drops to 0.08%, which is not statistically significant.

The univariate comparison of loan announcement returns described above suggests a possible decline in the traditional value that the market places on a bank's role after the introduction of CDS trading. We next conduct a multivariate regression analysis to examine

whether this conclusion changes when we control for other determinants of borrower loan announcement abnormal returns identified in the literature.

The dependent variable for the multivariate analysis is the five-day (-2,+2) stock cumulative abnormal return (CAR) of the borrowing firm, where day 0 refers to the loan announcement day. The main variable of interest is, as before, the CDS indicator variable d_CDS, that takes a value of 1 if a firm has CDS trading on its debt at the time of the loan announcement and 0 otherwise.[18] If CDS trading leads to bank moral hazard that the market anticipates ex-ante, then we should expect the coefficient on the CDS indicator variable to be negative and statistically significant.

We employ four sets of controls to capture additional determinants of loan announcement returns: (i) loan-level characteristics; (ii) pre-announcement stock performance controls; (iii) firm level accounting variables as controls; and (iv) controls that may determine the presence of CDS trading. Loan-level characteristics include variables such as the interest rate spread at which the loan was obtained, the size of the loan, the horizon of the loan, and the number of lenders in the syndicate. All these characteristics contain potential information about the firm's future plans and how banks perceive them. Korajczyk, Lucas, and McDonald (1991) show that firms tend to sell new equity claims following a run-up. If the issuance of bank loans are related to similar trends, then pre-announcement stock performance such as *Runup* and *Beta* of the firm's stock may be related to the abnormal return around loan announcement. We also include idiosyncratic volatility as an independent variable since shareholders in a risky firm might react more positively to the initiation of a loan and accompanied monitoring, than shareholders of a less risky firm (see Billett, Flannery, and

[18] As discussed before, we do not have access to data regarding which bank obtains protection using a CDS against which firm. We divide firms based on traded CDSs. We think this approach is reasonable since stock market participants also may not have access to bank data regarding which bank loans are protected with a CDS. Hence, stock market participants also respond to loan announcements based on a similar information set, i.e., expected CDS exposure of the bank with respect to a firm.

Garfinkel, 1995). Bharath, Dahiya, Saunders, and Srinivasan (2011) show that large firms are able to obtain large loans at lower interest rates. Hence, firm level accounting variables such as size of the firm and leverage may be relevant to firm performance around loan announcement. A loan announcement event for a profitable company or a firm with a high current ratio could convey a different signal to the market than an unprofitable firm or a firm with a low current ratio, which may require more monitoring. Consequently, we expect a relationship between variables such as profitability and current ratio and the abnormal stock return on the day of loan announcement. Firms with high market-to-book ratios tend to have more growth options, and hence, we expect alleviation of financial constraints to be especially important for such firms (see Gande and Saunders, 2012). Since we are interested in the impact of CDS trading on bank behavior, we also included controls that may determine which firms have CDS traded against their debt.

Table XI reports the loan announcement regression results for the full sample of firms. To address any industry level announcement effects, the specifications include industry fixed effects. The columns also include an indicator variable *d_TradedCDS* to control for firms that have ever had a CDS traded against them. This control helps address concerns about selection bias due to the inherent heterogeneity of firms that ever had a CDS traded against their debt. We also control for the purpose of the deal and time fixed effects.

All specifications (1)-(4) show that the coefficient of the CDS indicator variable (*d_CDS*) is indeed negative and statistically significant in each case. As shown in specification (4), which is the most exhaustive, firms with traded CDS conservatively have approximately a 0.5% lower abnormal loan announcement return.

These results are consistent with the hypothesis that suggests that capital markets anticipate bank moral hazard ex-ante when firms with CDSs obtain loans.

3.6 Evidence against adverse selection

In this section, we further investigate whether selection in terms of the quality of firms that have traded CDS can explain the muted loan announcement response. The muted loan announcement returns could be because the quality of firms that have CDS traded against them is worse at the time of loan announcement. In other words, the presence of a CDS market allows lower quality firms to obtain loans, and hence, markets discount the loan announcements since the markets believe banks are not screening firms with CDSs carefully.

Table B.3 in the Appendix investigates this concern by considering various measures of firm health such as Altman Z-score, proportion of intangible assets, interest coverage, and cash flow volatility. Controls include firm level characteristics such as whether the firm has a rating, which may indicate different access to credit markets, firm size, leverage, market-to-book, profitability, and current ratio, and other characteristics that may affect the probability of CDS trading.

In Column (1), we note that the indicator variable CDS loads positively on the Altman Z-score, suggesting that firms with traded CDS are, in fact, in relatively better health statistically, and not worse health. A higher proportion of intangible assets at the firm may suggest higher information asymmetry and riskier loans. The insignificant coefficient of *d_CDS* in Column (2) shows this not to be the case. Firms with low interest coverage may be risky as they are closer to potential technical default. Column (3) shows that firms with traded CDSs do not have statistically different interest coverage than firms without. Cash flow volatility can also indicate firm level risk. Column (4) again shows that firms with traded CDSs are similar in this dimension as well to firms without traded CDSs. These results suggest that firms with traded CDSs are not in relatively worse financial health at the time of loan announcement. This evidence suggests that the quality of firms at the time of loan announcement cannot explain the muted response of the markets.

Another possible explanation for the muted loan announcement returns could be that the lenders lending to CDS and non-CDS firms are different. In that case, the loan announcement result between CDS and non-CDS firms may be driven by some unobserved heterogeneity among different lender-types. Table B.4 investigates this concern by including Lender fixed-effects in the loan announcement CAR regressions in specifications (1) & (2). Specifications (3) & (4) are more exhaustive and include both Lender and Firm fixed-effects. In all of the columns (1) – (4), the negative and statistically significant coefficients on *d_CDS* show that the even after controlling for lender heterogeneity, loan announcement returns for CDS traded firms are muted.

4 Conclusion

The growth of CDSs have allowed banks to now originate a loan and continue to service the loan without being exposed to the borrowing firm's prospects. This paper empirically investigates agency problems that banks may suffer in the presence of CDS trading. By analyzing changes in firm policy in case of covenant violations, we provide evidence consistent with the presence of bank moral hazard in the presence of CDS contracts. CDS firms do not decrease their investment after a covenant violation, even those that are more prone to agency issues. Moreover, consistent with the increased bargaining power of the lenders, CDS firms pay a significantly higher spread on loans issued after covenant violations than non-CDS firms that violate covenants. These results are magnified when lenders have weaker incentives to monitor (higher purchase of credit derivatives, higher amount of securitization, and higher non-interest income).

However, we do not find evidence in support of a more severe empty creditor problem, where banks overinsure themselves and cause firms to go bankrupt more often. Our loan

announcement return results are also more consistent with lender moral hazard but not the empty creditor problem. The capital markets seem to anticipate this lender moral hazard, leading to insignificant loan announcement return, for firms with CDSs, as compared to positive returns for non-CDS firms. It seems, in contrast to public debt investors, the reputation of the lenders or regulatory capital requirements constrain private lenders to not overinsure themselves with CDSs, and push firms into inefficient bankruptcy or liquidation.

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Figure 1: Investment vs distance to violation: CDS vs non-CDS firms

This figure plots investment vs distance to covenant violation. Distance to covenant violation is defined as the negative of the relative covenant distance for every firm-quarter observation ($-\frac{Ratio-CovenantThresholdRatio}{CovenantThresholdRatio}$). In case both, net worth and current ratio covenants are present, the tighter of the two is chosen to compute the distance to covenant violation. The plot displays the mean investment for 60 bins defined along the distance to covenant violation on each side with 95% confidence bands.

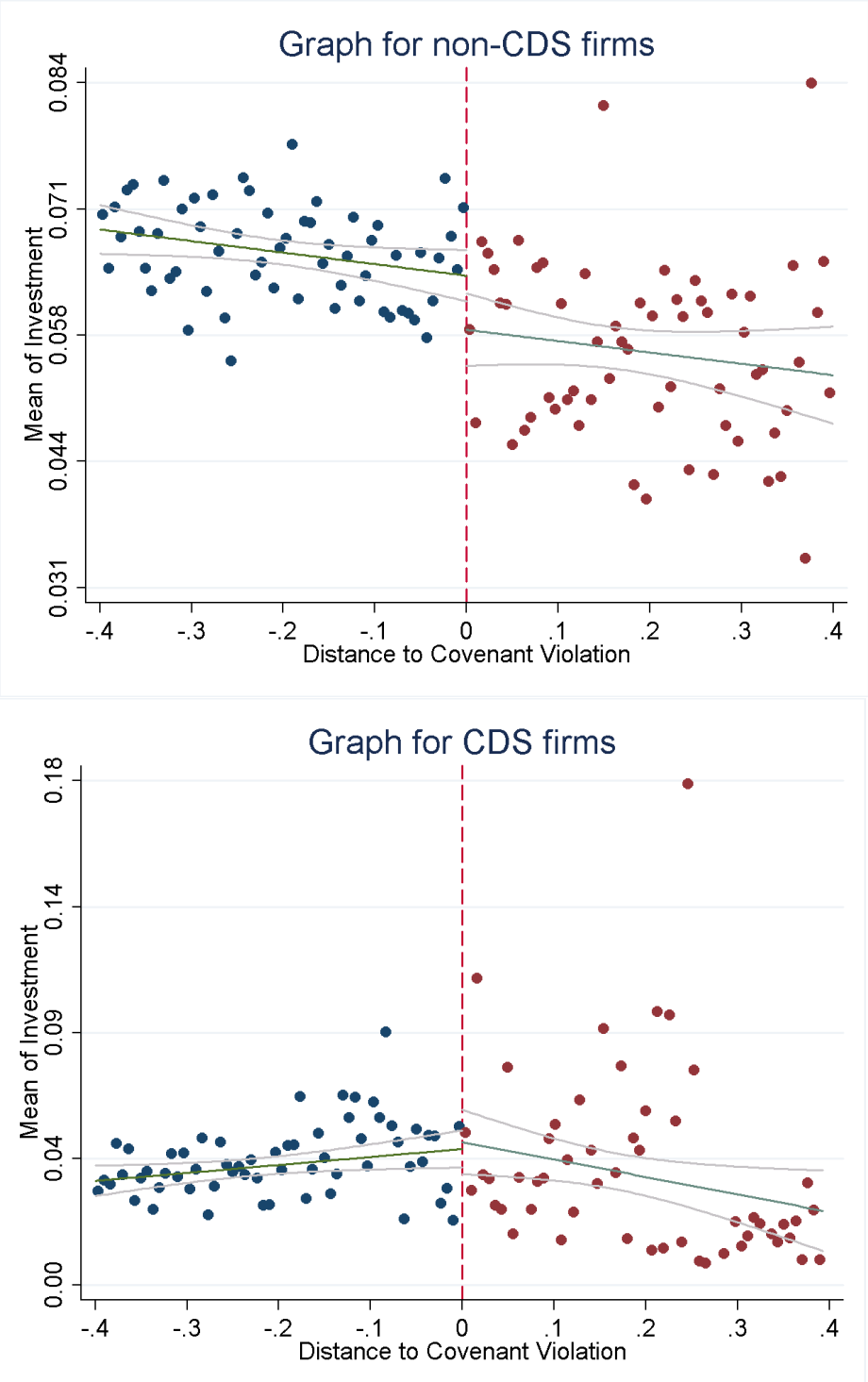


Figure 2: Financial covenant violations and stock price performance

This figure plots event-time abnormal returns post covenant violation for firms in the presence and absence of CDS on its underlying debt. Following the regression framework developed in Thompson (1985) and Sefcik and Thompson (1986) and implemented in Nini, Smith, and Sufi (2012), monthly abnormal returns are computed using a four-factor model (three Fama-French factors and the momentum factor) over the entire sample period by including dummy variables for the covenant violation event month and for months prior and post the event month for which we need to compute the monthly abnormal returns. We also account for delisting returns computed from the CRSP delisting file. The estimated model is then used to compute the monthly abnormal return for each firm and the cumulative abnormal returns. Data for the three monthly Fama-French factors and the momentum factor are gathered from Kenneth French's web data library.

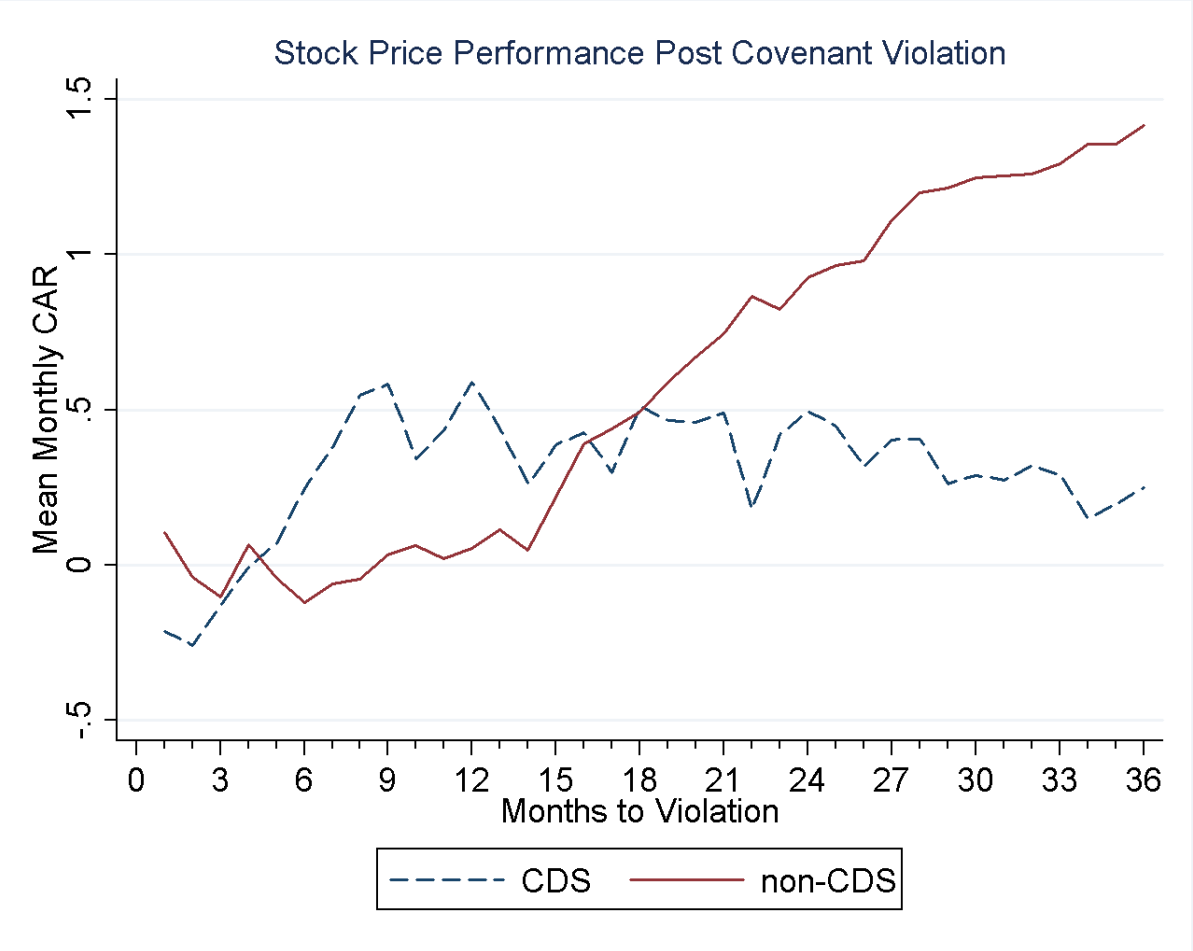


Table I: Loan sample summary statistics

This table presents summary statistics (mean, median, standard deviation, and the 10^{th} and 90^{th} percentile) for the loan characteristics for all loans made to non-financial firms found in the Dealscan database during the period of 1990–2012. The sample consists of 5,951 firms and 27,450 packages and the following loan characteristics are at the package level. A package is a collection of loans made under a common agreement or a deal. Variable definitions for the loan and firm cahracteristics are provided in the Appendix section.

Panel A : Summary statistics of loan sample

	Mean	**Median**	10^{th}	90^{th}	**Std. Dev**	**N**
Loan Size (Mil)	352.030	127.000	10.500	1000.000	580.861	27449
Relative Loan Size	0.308	0.192	0.036	0.658	0.620	27449
Maturity (Months)	48.582	48.700	12.133	85.233	28.264	25946
Assets (log)	6.529	6.449	4.021	9.274	1.922	27450
Book Leverage	0.297	0.286	0.026	0.564	0.199	27120
Market-To-Book	1.658	1.352	0.898	2.815	0.933	26400

Panel B : Summary statistics by year

Year	**CDS=0**		**CDS=1**	
	Count (#)	**Loan Size (Median)**	**Count (#)**	**Loan Size (Median)**
1990	588	30.00		
1991	802	35.00		
1992	1019	40.00		
1993	1141	55.00		
1994	1436	75.00		
1995	1442	100.00		
1996	1806	77.00		
1997	2324	100.00		
1998	1840	100.00		
1999	1619	135.00		
2000	1502	150.00		
2001	1261	100.00	197	650.00
2002	1103	85.40	263	600.00
2003	971	100.00	308	500.00
2004	948	133.50	383	680.00
2005	847	165.00	399	750.00
2006	796	175.00	334	950.00
2007	711	225.00	338	1000.00
2008	485	150.00	136	750.00
2009	345	100.00	130	600.00
2010	484	200.00	178	917.50
2011	666	300.00	303	1000.00
2012	239	300.00	105	1250.00
Total	24375	100.00	3074	750.00

Table II: Summary statistics of the covenant violation sample

This table provides the summary statistics for the covenant violation sample which was constructed based on Chava and Roberts (2008). The covenant sample begins in 1994 as the information on covenants is limited before that period. There are two main covenant samples included in the analysis - the current ratio covenant sample and the net worth covenant sample. The median and standard error are provided in square brackets and round brackets respectively.

Panel A provides summary statistics for the current ratio and net worth covenant samples from 1994 to 2012. The current ratio and net worth sample consists of all firm-quarter observations of non-financial firms in the COMPUSTAT database. The current ratio (net worth) sample consists of firms whose private loans have a current ratio (net worth and/or tangible net worth) covenant as per the Dealscan database between 1994 to 2012. These two samples are further divided based on whether a firm-quarter observation is determined to be in covenant violation (denoted by "*Bind*") or not in covenant violation (denoted by "*Slack*") for the corresponding covenant.

Panel B displays the same firm-quarter observations for CDS and non-CDS firms. The data on the timing of CDS introduction is obtained from three separate sources: Markit, CMA Datavision (CMA), and Bloomberg. Firm-quarter observations are classified as "CDS" observations if there are CDS contracts trading on the firm's debt in that quarter. The sample is further divided on whether the observation is determined to be in covenant violation for either the current ratio, net worth covenant, or both. Variable definitions of all the firm characteristics in the table are provided in the Appendix section.

Panel A: Current ratio vs net worth. Mean, Median, and Standard error

	Current Ratio				**Net Worth**			
	Bind		**Slack**		**Bind**		**Slack**	
Assets(log)	5.335	(0.034)	5.191	(0.013)	5.277	(0.034)	5.882	(0.011)
	[5.243]		[5.190]		[4.945]		[5.803]	
Market-to-Book	1.453	(0.022)	1.745	(0.014)	1.439	(0.022)	1.753	(0.014)
	[1.215]		[1.339]		[1.138]		[1.292]	
Macro q	4.991	(0.221)	9.733	(0.161)	6.847	(0.237)	10.370	(0.121)
	[1.974]		[3.713]		[2.375]		[3.739]	
ROA	0.016	(0.002)	0.034	(0.000)	0.005	(0.001)	0.035	(0.003)
	[0.026]		[0.034]		[0.018]		[0.033]	
Tangible Capital	0.506	(0.007)	0.334	(0.002)	0.298	(0.004)	0.316	(0.002)
	[0.477]		[0.259]		[0.231]		[0.241]	
Investment	0.066	(0.005)	0.099	(0.007)	0.050	(0.004)	0.086	(0.002)
	[0.043]		[0.055]		[0.025]		[0.048]	
Cash Flow	-0.051	(0.008)	0.100	(0.003)	-0.099	(0.008)	0.099	(0.002)
	[0.028]		[0.076]		[0.020]		[0.076]	
Book Leverage	0.433	(0.006)	0.258	(0.002)	0.401	(0.006)	0.244	(0.001)
	[0.384]		[0.232]		[0.358]		[0.235]	
Firm-Qtr Obs.	2353		11104		3388		23797	
Firms	395		901		541		1817	

Panel B: CDS vs non-CDS firms. Mean, Median, and Standard error

	CDS				**Non-CDS**			
	Bind		**Slack**		**Bind**		**Slack**	
Assets(log)	9.291	(0.040)	8.769	(0.022)	5.106	(0.023)	5.600	(0.010)
	[9.887]		[8.738]		[5.010]		[5.585]	
Market-to-Book	1.187	(0.016)	1.443	(0.018)	1.460	(0.017)	1.773	(0.012)
	[1.159]		[1.276]		[1.161]		[1.313]	
Macro q	6.468	(0.748)	7.568	(0.344)	6.055	(0.178)	10.419	(0.109)
	[2.478]		[3.512]		[2.119]		[3.801]	
ROA	0.027	(0.001)	0.032	(0.001)	0.009	(0.001)	0.035	(0.002)
	[0.025]		[0.032]		[0.020]		[0.033]	
Tangible Capital	0.368	(0.015)	0.340	(0.006)	0.389	(0.004)	0.320	(0.001)
	[0.347]		[0.270]		[0.300]		[0.244]	
Investment	0.041	(0.003)	0.047	(0.002)	0.059	(0.003)	0.093	(0.003)
	[0.024]		[0.038]		[0.032]		[0.051]	
Cash Flow	0.066	(0.016)	0.122	(0.009)	-0.085	(0.006)	0.100	(0.002)
	[0.051]		[0.075]		[0.022]		[0.077]	
Book Leverage	0.316	(0.008)	0.291	(0.003)	0.412	(0.004)	0.248	(0.001)
	[0.298]		[0.285]		[0.372]		[0.232]	
Firm-Qtr Obs.	330		1601		5172		28360	
Firms	42		110		814		2228	

Table III: Investment response to covenant violations: Regression discontinuity

This table follows the regression discontinuity (RD) approach for investment in Chava and Roberts (2008). The sample consists of firm-quarter observations for non-financial firms merged with COMPUSTAT. Panels A and B present results for the full sample and the RD sample, respectively. The RD sample in Panel B is defined as those firm-quarter observations that have a relative distance (absolute value) of less than 0.3 around the covenant violation boundary. The dependent variable is *Investment* and the main independent variables of interest are *d_Bind* and *d_Bind*×*d_CDS*, where *d_Bind* is an indicator variable equal to one if a firm-quarter observation is determined to be in covenant violation and zero otherwise; and *d_CDS* is an indicator variable equal to one if there is a traded CDS contract for that firm-quarter observation. All control variables are lagged by one quarter. Variable definitions of all the firm characteristics in the table are provided in the Appendix section. All t-statistics displayed in parantheses are robust to within-firm correlation and heteroscedasticity. *, **, and *** indicate significance greater than 10%, 5%, and 1% , respectively.

	Panel A: Full sample			**Panel B: RD sample**		
	(1)	(2)	(3)	(4)	(5)	(6)
d_Bind	-0.015***	-0.014***	-0.011***	-0.009***	-0.008***	-0.005*
	(-8.13)	(-8.29)	(-5.68)	(-4.91)	(-4.06)	(-1.87)
d_Bind×d_CDS	0.010***	0.010**	0.008*	0.014***	0.013**	0.012**
	(2.77)	(2.56)	(1.88)	(3.08)	(2.32)	(2.06)
d_CDS	0.007**	0.011***	0.011***	0.000	0.008	0.008
	(2.09)	(3.35)	(3.43)	(0.03)	(1.39)	(1.46)
Macro q		0.002***	0.002***		0.002***	0.002***
		(16.81)	(16.76)		(6.90)	(6.91)
Cash Flow		0.011***	0.011***		0.015***	0.015***
		(4.71)	(4.65)		(3.73)	(3.63)
Assets(log)		-0.011***	-0.011***		-0.013***	-0.012***
		(-5.51)	(-5.37)		(-3.21)	(-3.14)
NW Distance			0.000***			0.015
			(15.14)			(1.60)
CR Distance			0.028***			0.037**
			(3.54)			(2.44)
ΣCoeff	-0.005	-0.004	-0.003	0.004	0.005	0.007
T-stat	(-1.38)	(-0.92)	(-0.72)	(1.02)	(0.94)	(1.31)
N	33439	28584	28584	11054	9532	9532
Adj. R^2	0.385	0.434	0.434	0.418	0.455	0.456
Firm FE	✓	✓	✓	✓	✓	✓
Year-Quarter FE	✓	✓	✓	✓	✓	✓

Table IV: Investment response to covenant violations : Lender characteristics

Panels A and B divide our main sample based on lender characteristics that may affect the level of intervention post covenant violation. The observations in the sample are at lender-firm-quarter level. *High* (*Low*) lender activity in a given lender variable is defined as the variable being above (below) its computed median value using the entire sample period over which data for it is available.

Panels A and B present results for the full sample and the RD sample respectively. The RD sample in Panels B1 and B2 is defined as those firm-quarter observations that have a relative distance (absolute value) of less than 0.3 around the covenant violation boundary. The dependent variable is *Investment* and the main independent variables of interest are *d_Bind* and *d_Bind*$\times$*d_CDS*, where *d_Bind* is an indicator variable equal to one if a firm-quarter observation is determined to be in covenant violation and zero otherwise; and *d_CDS* is an indicator variable equal to one if there is a traded CDS contract for that firm-quarter observation. All control variables are lagged by one quarter. Firm-level controls included in the regressions are *Macro q*, *Cash Flow*, *Assets (log)*, and the initial distance to the covenant threshold. Variable definitions of all the firm and lender characteristics in the table are provided in the Appendix section. All t-statistics displayed in parentheses are robust to within-firm correlation and heteroscedasticity. *, **, and *** indicate significance greater than 10%, 5%, and 1%, respectively.

Panel A: Lender characteristics – Full sample

	CD bought		**Loans securitized**		**Non-interest income**	
	Low	*High*	*Low*	*High*	*Low*	*High*
	(1)	(2)	(3)	(4)	(5)	(6)
d_Bind	-0.015***	-0.010***	-0.013***	-0.011***	-0.017***	-0.010***
	(-6.19)	(-4.12)	(-4.18)	(-3.59)	(-6.96)	(-4.53)
d_Bind×d_CDS	0.004	0.010**	0.009	0.010*	0.006	0.010*
	(0.51)	(2.01)	(0.99)	(1.82)	(1.09)	(1.89)
d_CDS	0.015**	0.007**	0.012*	0.002	0.017***	0.007**
	(2.51)	(2.37)	(1.82)	(0.49)	(3.12)	(2.26)
ΣCoeff	-0.011	0.000	-0.004	-0.001	-0.011**	-0.001
	(-1.57)	(-0.11)	(-0.45)	(-0.31)	(-2.22)	(-0.14)
N	15185	14674	8834	8889	15770	16379
Adj. R^2	0.447	0.462	0.450	0.458	0.449	0.448
Firm Controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Year-Quarter FE	✓	✓	✓	✓	✓	✓

Panel B: Lender characteristics – RD sample

	CD Bought		**Loans Securitized**		**Non-Interest Income**	
	Low	*High*	*Low*	*High*	*Low*	*High*
	(1)	(2)	(3)	(4)	(5)	(6)
d_Bind	-0.011***	-0.006*	-0.011***	-0.011***	-0.011***	-0.006**
	(-3.70)	(-1.90)	(-3.06)	(-2.65)	(-3.71)	(-2.14)
d_Bind×d_CDS	0.002	0.014**	0.010	0.020**	0.008	0.014**
	(0.27)	(2.12)	(1.52)	(2.49)	(1.33)	(2.06)
d_CDS	0.005	0.009	0.009	0.007	0.005	0.011
	(0.84)	(1.31)	(1.49)	(0.56)	(0.93)	(1.48)
ΣCoeff	-0.008	0.008	-0.001	0.009	-0.003	0.008
	(-1.11)	(1.33)	(-0.16)	(1.37)	(-0.56)	(1.27)
N	5201	4945	2839	2826	5460	5619
Adj. R^2	0.480	0.480	0.499	0.484	0.481	0.484
Firm Controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Year-Quarter FE	✓	✓	✓	✓	✓	✓

Table V: Investment response to covenant violations: Borrower characteristics

Panels A and B divide our main sample based on borrower characteristics that may affect the level of intervention post covenant violation. The observations in the sample are at the firm-quarter level. We compute the cash from COMPUSTAT and lending relationship using Dealscan. *High* (*Low*) cash is defined as cash being above (below) its computed median value using the entire sample period over which data for it is available. Lending relationship is computed at the firm level when a loan is made by summing up the lending relationships of all lenders in the syndicate. A *High* lending relationship sample corresponds to loans in which 30% or greater of the borrower's past loans have been made by the lending syndicate. A *Low* lending relationship sample corresponds to loans in which the borrower has no historical relationship with the lenders in the syndicate.

Panel A and B present results for the full sample and the RD sample, respectively. The RD sample in Panel B1 and B2 is defined as those firm-quarter observations that have a relative distance (absolute value) of less than 0.3 around the covenant violation boundary. The dependent variable is *Investment* and the main independent variables of interest are *d_Bind* and *d_Bind*×*d_CDS*, where *d_Bind* is an indicator variable equal to one if a firm-quarter observation is determined to be in covenant violation and zero otherwise; and *d_CDS* is an indicator variable equal to one if there is a traded CDS contract for that firm-quarter observation. All control variables are lagged by one quarter. Firm-level controls included in the regressions are *Macro q*, *Cash Flow*, *Assets (log)*, and the initial distance to the covenant threshold. Variable definitions of all the firm characteristics in the table are provided in the Appendix section. All t-statistics displayed in parentheses are robust to within-firm correlation and heteroscedasticity. *, **, and *** indicate significance greater than 10%, 5%, and 1%, respectively.

Panel A: Firm Characteristics – Full Sample

	Cash		**Lending Relationship**	
	Low	*High*	*Low*	*High*
	(1)	(2)	(3)	(4)
d_Bind	-0.009***	-0.019***	-0.016***	-0.011***
	(-4.09)	(-6.15)	(-7.01)	(-3.56)
d_Bind×d_CDS	0.004	0.017***	0.013	0.011
	(0.58)	(3.12)	(1.53)	(1.57)
d_CDS	0.006*	0.014**	0.013**	0.008**
	(1.72)	(2.45)	(2.37)	(2.04)
ΣCoeff	-0.005	-0.002	-0.003	0.000
	(-0.64)	(-0.34)	(-0.33)	(-0.03)
N	13335	14275	17995	8705
Adj. R^2	0.400	0.437	0.428	0.448
Firm Controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Year-Quarter FE	✓	✓	✓	✓

Panel B: Firm Characteristics – RD Sample

	Cash		**Lending Relationship**	
	Low	*High*	*Low*	*High*
	(1)	(2)	(3)	(4)
d_Bind	-0.008***	-0.007*	-0.008***	-0.010***
	(-2.95)	(-1.68)	(-3.13)	(-2.79)
d_Bind×d_CDS	0.005	0.020**	0.022*	0.017*
	(0.57)	(2.17)	(1.71)	(1.81)
d_CDS	0.007	0.002	-0.006	0.018*
	(0.78)	(0.16)	(-0.59)	(1.93)
ΣCoeff	-0.003	0.013	0.014	0.007
	(-0.32)	(1.55)	(1.11)	(0.78)
N	5352	4009	5922	3097
Adj. R^2	0.426	0.491	0.467	0.436
Firm Controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Year-Quarter FE	✓	✓	✓	✓

Table VI: Renegotiated loan spread

This table examines the loan spreads that were renegotiated/amended post covenant violation in the presence and absence of a traded CDS on the covenant violating a firm's debt. The sample of renegotiated/amended loans are initiated by the same borrower-lender pair before and after covenant violation. *Loan spread* (LoanSpread) is the main dependent variable in the regression analysis. The main independent variable of interest is the interaction term *d_AfterCovViol*×*d_CDS*. *d_AfterCovViol* is an indicator variable set equal to one for loan facilities initiated or amended after the covenant violation date and is set to zero otherwise. *d_CDS* is an indicator variable equal to one if the loan facility announcement occurs when CDS is traded on the underlying firm's debt, and zero otherwise. *d_TradedCDS* is an indicator variable equal to one if the firm in our sample has CDS traded on the debt at any point during our sample period, and zero otherwise.

Data for column (1) results are for the full sample of renegotiated/amended loans and is at the loan facility level. Data in columns (2)-(9) are further divided based on the lender activity in the credit derivatives market. The observations in this sample are at the lender-facility level. Detailed definitions for the lender variables are provided in the Appendix. t-statistics displayed in parentheses are robust to within-firm correlation and heteroscedasticity. *, **, and *** indicate significance greater than 10%, 5%, and 1%, respectively.

	Firm-level	**CD Bought**		**Loans Securitized**		**Non-Interest Income**		**Syndicate Size**	
	Full	*Low*	*High*	*Low*	*High*	*Low*	*High*	*Low*	*High*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
d_AfterCovViol×d_CDS	0.51**	0.58	0.52**	0.50	0.60**	0.77**	0.54**	-0.51*	0.77***
	(2.12)	(1.64)	(2.11)	(1.37)	(2.33)	(2.06)	(2.32)	(-1.75)	(3.21)
d_AfterCovViol	0.14***	0.14**	0.20***	0.24***	0.12	0.10	0.18***	0.25***	0.06
	(2.93)	(2.04)	(2.88)	(3.46)	(1.48)	(1.38)	(2.71)	(4.59)	(0.69)
d_CDS	-0.85***	-0.97***	-0.96***	-0.99***	-1.27***	-0.98***	-0.99***	-0.57*	-1.09***
	(-4.16)	(-2.82)	(-3.86)	(-2.64)	(-5.55)	(-2.93)	(-4.37)	(-1.88)	(-5.11)
d_TradedCDS	-0.57***	-0.28	-0.46**	-0.15	-0.26	-0.26	-0.51***	-0.77**	-0.35**
	(-4.30)	(-1.28)	(-2.27)	(-0.54)	(-1.31)	(-1.18)	(-2.69)	(-2.57)	(-2.32)
ΣCoeff	0.65***	0.73**	0.72***	0.74**	0.73***	0.87**	0.72***	-0.26	0.82***
	(2.76)	(2.08)	(3.07)	(2.04)	(3.01)	(2.36)	(3.28)	(-0.90)	(3.70)
N	849	463	399	347	289	454	463	464	453
Adj. R^2	0.383	0.337	0.479	0.383	0.565	0.310	0.471	0.306	0.422
Loan type FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table VII: Regression discontinuity: Stock performance

This table compares the stock return of firms post covenant violation in the presence and absence of a traded CDS on the firm's underlying debt. Following the regression framework developed in Thompson (1985) and Sefcik and Thompson (1986) and implemented in Nini, Smith, and Sufi (2012), monthly abnormal returns are computed using a four-factor model (three Fama-French factors and the momentum factor) over the entire sample period by including dummy variables for the covenant violation event month and for months prior and post the event month for which we need to compute the monthly abnormal returns.

Panels A and B present results for the full sample and the RD sample, respectively. The RD sample in Panel B is defined as those firm-quarter observations that have a relative distance (absolute value) of less than 0.3 around the covenant violation boundary. The dependent variable is the monthly cumulative abnormal return (CAR) computed at various horizons at each firm-quarter observation. For instance, for every firm i and quarter q, *CAR(1,m)* is computed by summing up the monthly abnormal returns of firm i from the first month following quarter q until the m^{th} month. The main independent variables of interest are *d_Bind* and *d_Bind*$\times$*d_CDS*, where *d_Bind* is an indicator variable equal to one if a firm-quarter observation is determined to be in covenant violation and zero otherwise; and *d_CDS* is an indicator variable equal to one if there is a traded CDS contract for that firm-quarter observation. The control variables included in the regressions are *assets (log)*, *tangible assets*, *operating cash flow*, *book leverage*, *interest expense* and *market-to-book*. All control variables are lagged by one quarter and their definitions are provided in the Appendix. All t-statistics displayed in parentheses are robust to within-firm correlation and heteroscedasticity. *, **, and *** indicate significance greater than 10%, 5%, and 1%, respectively.

Panel A – Full sample: Monthly CAR regressions post covenant violation

	CAR(1,3)	**CAR(1,6)**	**CAR(1,9)**	**CAR(1,12)**	**CAR(1,18)**	**CAR(1,24)**	**CAR(1,30)**	**CAR(1,36)**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
d_Bind	0.020	0.051**	0.083**	0.110***	0.124***	0.150***	0.144***	0.142***
	(1.55)	(2.24)	(2.41)	(2.73)	(2.70)	(2.85)	(2.75)	(2.70)
d_Bind×d_CDS	0.003	0.018	0.000	-0.029	-0.080	-0.176*	-0.208*	-0.221*
	(0.14)	(0.45)	(0.00)	(-0.45)	(-0.95)	(-1.69)	(-1.81)	(-1.81)
d_CDS	-0.017	-0.038	-0.022	-0.010	0.018	0.056	0.074	0.081
	(-0.78)	(-0.97)	(-0.50)	(-0.19)	(0.27)	(0.70)	(0.80)	(0.75)
ΣCoeff	0.023	0.069**	0.083*	0.082	0.044	-0.026	-0.064	-0.080
	(1.18)	(2.11)	(1.91)	(1.58)	(0.61)	(-0.28)	(-0.61)	(-0.70)
N	11787	11787	11787	11787	11787	11787	11787	11787
Adj. R^2	0.222	0.465	0.670	0.724	0.734	0.756	0.755	0.762
Firm Controls	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓
Year-Quarter FE	✓	✓	✓	✓	✓	✓	✓	✓

Panel B – RD sample: Monthly CAR regressions post covenant violation

	CAR(1,3)	**CAR(1,6)**	**CAR(1,9)**	**CAR(1,12)**	**CAR(1,18)**	**CAR(1,24)**	**CAR(1,30)**	**CAR(1,36)**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
d_Bind	0.037**	0.065**	0.078***	0.086***	0.088**	0.081*	0.057	0.056
	(2.25)	(2.43)	(2.86)	(2.61)	(2.21)	(1.87)	(1.34)	(1.36)
d_Bind×d_CDS	-0.015	-0.008	0.002	-0.003	-0.070	-0.168**	-0.180**	-0.190**
	(-0.35)	(-0.14)	(0.03)	(-0.05)	(-0.95)	(-2.32)	(-2.18)	(-2.13)
d_CDS	0.009	-0.014	-0.025	-0.036	-0.009	-0.019	-0.062	-0.077
	(0.23)	(-0.25)	(-0.36)	(-0.39)	(-0.08)	(-0.18)	(-0.52)	(-0.63)
ΣCoeff	0.021	0.057	0.079	0.083	0.018	-0.087	-0.123	-0.134
	(0.53)	(1.08)	(1.29)	(1.20)	(0.27)	(-1.31)	(-1.59)	(-1.58)
N	5812	5812	5812	5812	5812	5812	5812	5812
Adj. R^2	0.373	0.643	0.801	0.775	0.731	0.764	0.775	0.785
Firm Controls	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓
Year-Quarter FE	✓	✓	✓	✓	✓	✓	✓	✓

Table VIII: Cox hazard regressions: Distress and outperformance

This table conducts a survival analysis for firms after a covenant violation in the presence and absence of traded CDS on its underlying debt. Firm exits in our sample are classified based on the CRSP delisting codes and Moody's URD database. Financial failure from the CRSP codes is defined as liquidation (400 – 490), bankruptcy (574). Failure in URD is defined as missed/delayed interest/principal payments, bankruptcy, or distressed exchange. Other forms of firm exit include mergers (200 – 290) or going private (573). Distress and outperformance is defined based on Gilson (1989) and Gilson, John, and Lang (1990) as the firms in the bottom and top 5% of the entire universe of firms in the CRSP based on the past three-year cumulative return.

The data is constructed at the firm-quarter level. The main independent variable of interest is *d_CDS*, which is an indicator variable equal to one if a CDS is traded on the underlying firm's debt for that firm-quarter observation, and zero otherwise. *t*-statistics displayed in parentheses are robust to within-firm correlation and heteroscedasticity. *, **, and *** indicate significance greater than 10%, 5%, and 1%, respectively.

	All exits	**Distress related**	**Non-distress related**	**Equity distress**	**Equity outperformance**
	(1)	(2)	(3)	(4)	(5)
d_CDS	0.09	0.24	0.03	0.45	-1.62***
	(0.17)	(0.40)	(0.05)	(1.24)	(-2.82)
d_Rated	0.29	0.55*	0.15	-0.23	-0.11
	(1.50)	(1.69)	(0.63)	(-1.35)	(-0.53)
Assets(log)	-0.19***	-0.25**	-0.16**	-0.05	0.11*
	(-3.02)	(-2.55)	(-2.15)	(-0.79)	(1.65)
Profitability	-2.39***	-6.45***	-0.88	-4.14***	0.64
	(-4.50)	(-6.77)	(-1.52)	(-8.69)	(1.24)
Book Leverage	-0.54	0.05	-0.63	2.24***	-0.14
	(-1.19)	(0.07)	(-1.21)	(5.95)	(-0.23)
Interest Expense/Assets	9.83***	24.19***	1.76	5.93**	-0.23
	(2.60)	(3.68)	(0.37)	(1.99)	(-0.04)
Market-to-Book	-0.14	-0.50**	-0.10	-1.63***	0.54***
	(-1.62)	(-2.41)	(-1.02)	(-8.95)	(6.13)
Initial Covenant Tightness	-0.03	-0.13	-0.01	0.06	0.01
	(-0.56)	(-1.33)	(-0.07)	(0.87)	(0.19)
N	29077	29077	29077	29077	29077
Nob. events	1478	432	1046	2059	1561
Pseudo. R^2	0.03	0.11	0.03	0.06	0.06
Industry FE	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓

Table IX: Ratings change Cox proportional hazard rate model

This table conducts rating change hazard regression using Cox hazard regressions and a 2SLS IV regression using a linear probability model for firms after a covenant violation in the presence and absence of traded CDS on its underlying debt. Downgrade and upgrade rating change event data are gathered from FISD. The instrument used for CDS trading is the average amount of forex derivatives used for hedging purposes relative to total assets of the lead syndicate banks and bond underwriters with which the firms have conducted business in the past five years.

The data is constructed at the firm-quarter level. The main independent variable of interest is *d_CDS*, which is an indicator variable equal to one if a CDS is traded on the underlying firm's debt for that firm-quarter observation, and zero otherwise. *t*-statistics displayed in parentheses are robust to within-firm correlation and heteroscedasticity. *, **, and *** indicate significance greater than 10%, 5%, and 1%, respectively.

	Cox hazard		**2SLS IV**	
	DNG	**UPG**	**DNG**	**UPG**
	(1)	(2)	(3)	(4)
d_CDS	1.43***	1.56		
	(3.07)	(1.61)		
CDS IV			0.18**	0.05
			(2.00)	(1.33)
Assets(log)	0.04	0.04	-0.01	-0.01
	(0.33)	(0.17)	(-0.59)	(-0.85)
Profitability	-5.67***	3.65**	-0.56***	0.03
	(-5.08)	(2.16)	(-3.13)	(0.65)
Book Leverage	-0.05	0.72	0.10	0.04
	(-0.04)	(0.26)	(0.95)	(0.68)
Interest Expense/Assets	13.04	-25.97	-0.03	-0.72
	(1.11)	(-0.91)	(-0.03)	(-1.11)
Market-to-Book	0.05	1.16**	-0.01	0.03
	(0.14)	(2.32)	(-0.20)	(1.58)
Initial Covenant Tightness	0.20	-0.11	0.00	-0.01
	(1.20)	(-0.69)	(0.10)	(-0.87)
Observations	11228	11228	7805	7805
Nob. events	652	208		
Pseudo. R^2	0.07	0.15		
Adj. R^2			0.15	0.03
Industry FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓

Table X: Loan announcement univariate results

This table reports stock price reactions to firm loan announcements. The sample consists of loan announcements from 1990 to 2012. The full sample consists of all the loan announcements in the period 1990-2012. The traded-CDS sample consists only of firms that have a CDS traded on their underlying debt at any point in our sample period, i.e., from 1990 to 2012. In each panel, we report cumulative abnormal returns (CAR) calculated over the 5-day event window (-2,+2), where day zero represents the loan announcement event day. CAR is calculated using the market model. *Count* reports the number of loan announcements used in each CAR calculation. We report averaged CAR values separately for the "CDS=0" period and the "CDS=1" period. Loan announcements that occur in the presence of CDS trading are considered to be in the "CDS=1" period, while loan announcements that occur in the absence of CDS trading are considered to be in the "CDS=0" period. *Difference* reports the difference in averaged CAR values between the "CDS=1" period and the "CDS=0" period. *t*-statistics displayed in parentheses are robust to within-firm correlation and heteroscedasticity. *, **, and *** indicate significance greater than 10%, 5%, and 1%, respectively

	Full Sample		**Traded-CDS Sample**	
	Mean CAR (%)	Count	Mean CAR (%)	Count
CDS=0	0.39***	24376	0.31***	3713
	(9.61)		(4.08)	
CDS=1	0.10	3074	0.08	2959
	(0.90)		(0.95)	
Difference	-0.29**		-0.23**	
	(-2.37)		(-2.01)	
Total	0.36***	27450	0.21***	6672
	(9.36)		(3.67)	

Table XI: Loan announcement CAR regression

The specifications in Panel A report regression results of stock price reactions to firm loan announcements. The dependent variable is the cumulative abnormal return (CAR) calculated over the five-day event window (-2,+2), where day zero represents the loan announcement event day. CAR is calculated using the market model. Our main variable of interest is *d_CDS*, which is an indicator variable equal to one if the loan announcement occurs when CDS is traded on the underlying firm's debt, and zero otherwise. *d_TradedCDS* is an idicator variable equal to one if the firm in our sample has CDS traded on the debt at any point during our sample period, and zero otherwise. We control for *loan-level* characteristics, *pre-announcement* characteristics, *firm-level* characteristics, and *CDS-trading* characteristics which are defined in detail in the Appendix.

Loan announcement CAR (-2,+2) regression

	(1)	(2)	(3)	(4)
d_CDS	-0.51***	-0.59***	-0.71***	-0.55***
	(-3.10)	(-3.42)	(-2.84)	(-3.14)
d_TradedCDS	0.28**	0.26*		0.25*
	(2.07)	(1.83)		(1.75)
Loan-level controls				
Loan Spread	0.00	0.00	0.00	0.00
	(0.04)	(0.09)	(0.15)	(0.20)
Loan Size (log)	0.13**	0.07	0.05	0.08
	(2.07)	(1.09)	(0.57)	(1.20)
Maturity (Months)	-0.00	-0.00	-0.00	-0.00
	(-0.81)	(-1.28)	(-0.12)	(-1.04)
Syndicate Size	-0.01	-0.00	-0.00	-0.00
	(-1.01)	(-0.39)	(-0.21)	(-0.56)
Pre-announcement controls				
Beta	-0.25**	-0.11	0.07	-0.15
	(-2.18)	(-0.81)	(0.31)	(-0.99)
Idiosyncratic Volatility	20.70***	7.20	3.51	6.37
	(3.76)	(0.86)	(0.27)	(0.76)
Runup	-2.03***	-1.97***	-2.08***	-1.98***
	(-15.07)	(-12.03)	(-8.95)	(-11.84)
Firm-level controls				
d_Rated	-0.20	-0.24*	-0.34	-0.24*
	(-1.54)	(-1.72)	(-1.23)	(-1.70)
Assets (log)	-0.07	0.04	-0.39**	0.03
	(-1.15)	(0.49)	(-2.10)	(0.41)
Book Leverage	0.71**	0.48	1.23	0.47
	(2.26)	(1.35)	(1.60)	(1.30)
Market-to-Book	-0.15**	-0.11	-0.24	-0.11
	(-2.39)	(-1.46)	(-1.56)	(-1.51)
Profitability	1.10**	0.44	-0.19	0.66
	(1.97)	(0.66)	(-0.16)	(0.97)
Current Ratio	-0.03	-0.01	-0.11	-0.01
	(-0.69)	(-0.22)	(-1.01)	(-0.11)
CDS-trading controls				
Analyst Coverage (log)		-0.06	-0.03	-0.06
		(-0.76)	(-0.24)	(-0.77)
Institutional Ownership		0.15	0.01	0.15
		(1.58)	(0.04)	(1.64)
Stock Illiquidity		0.50	1.68**	0.46
		(1.24)	(2.34)	(1.14)
Analyst Dispersion		-0.08	-0.17*	-0.08
		(-1.40)	(-1.93)	(-1.31)
N	20683	15436	15436	15436
Adj. R^2	0.024	0.024	0.123	0.026
Deal Purpose FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✗
Industry FE	✓	✓	✗	✗
Firm FE	✗	✗	✓	✗
Industry×Year FE	✗	✗	✗	✓

Appendix

A Variable Definitions

- *Total assets* = atq
- *Average assets* = ((Total assets) + (lagged Total assets))/2
- *Market value* = prccq*cshoq - (Total assets-ltq + txditcq) + total assets
- *Market-to-book ratio* = (Market value)/(Total assets)
- *Total debt* = dltcq + dlttq
- *Leverage ratio* = (Total debt)/(Total assets)
- *Macro q* = (prccq*cshoq+dlttq+dlcq-invtq)/lagged ppentq
- *Net worth* = atq - ltq
- *Tangible net worth* = actq + ppentq + aoq - ltq
- *Current ratio* = actq/lctq
- *Cash scaled by assets* = cheq/(Total assets)
- *Operating income scaled by average assets* = oibdpq/(Average assets)
- *Interest expense scaled by average assets* = xintq/(Average assets)
- *Capital expenditures quarterly* = capxy adjusted for fiscal quarter accumulation
- *Cash acquisitions quarterly* = aqcy adjusted for fiscal quarter accumulation
- *Capital expenditures scaled by average assets* = Capital expenditures quarterly/(Average assets)
- *Investment* = Capital expenditures quarterly/(Lagged ppentq)
- *Net debt issuance* = (Total debt-Total lagged debt)/(Lagged total assets)
- *Sales* = saleq
- *Operating costs* = Sales-(Operating income)
- *Sales scaled by average assets* = Sales/(Average assets)
- *Operating costs scaled by average assets* = Sales/(Average assets)

- *Beta* = Borrower's market model beta calculated using daily stock returns for a given firm over the estimation period of one year ranging from one month prior to the loan announcement day and extending back one year.
- *Runup* = Cumulative return of the borrower's stock during the estimation period of one year ranging from one month prior to the loan announcement day and extending back to one year.
- *Idiosyncratic risk* = Standard deviation of the prediction errors (i.e., borrower's stock return residual) during the estimation period of one year ranging from one month prior to the loan announcement day and extending back to one year.
- *Loan Size* = The total deal amount in a given package.
- *Relative Loan Size* = The total deal amount divided by total assets of the firm at the point when the loan is made.
- *Maturity* = The maturity of a package or deal, measured in months.
- *Loan Spread* = The all-in-drawn spread over LIBOR in basis points for a given loan.
- *Number of lenders* = The number of lenders at loan syndication.
- *Lending Relationship* = The number of loans to borrower i by bank m scaled by the total number of loans to the borrower made until then.
- *Loan Types* = Loans are classified as (a) *Revolvers:* if the LoanType field in Dealscan consists of *Revolver*, *364-Day*, *Demand Loan*, or *Limited Line*; (b) *Term loan A:* if the LoanType field in Dealscan consists of *Term Loan A*; (c) *Term Loan B:* if the LoanType field in Dealscan consists of *Term Loan*, *Term Loan B* to *Term Loan E*.
- *CR Distance* = $\mathbb{1}_{CurrentRatio_{it}} \times (CurrentRatio_{it} - CurrentRatio^{0}_{it})$ where $\mathbb{1}_{CurrentRatio_{it}}$ is an indicator variable equal to one if the firm-quarter observations are bound by a current ratio covenant. $CurrentRatio^{0}_{it}$ is the current ratio covenant threshold and $CurrentRatio_{it}$ is the current ratio in quarter t for firm i.
- *NW Distance* = $\mathbb{1}_{NetWorth_{it}} \times (NetWorth_{it} - NetWorth^{0}_{it})$ where $\mathbb{1}_{NetWorth_{it}}$ is an indicator variable equal to one if the firm-quarter observations are bound by a net worth covenant. $NetWorth^{0}_{it}$ is the net worth covenant threshold and $NetWorth_{it}$ is the net worth in quarter t for firm i.
- *Analyst Coverage* = The number of analyst EPS forecasts made in the 90 days prior to the earnings announcement date. It is calculated using I/B/E/S unadjusted estimates and actual files. We adjust for any stock splits using adjustment factors obtained from the CRSP dataset (cfacshr) to ensure that EPS values in the Estimates and Actuals are on the same basis.
- *Analyst Dispersion* = The standard deviation of analyst EPS estimates made in the 90 days prior to the earnings announcement date scaled by the actual reported EPS. It is calculated using I/B/E/S Unadjusted Estimates and Actual files.

- *Institutional Ownership* = The ratio of total shares held by institutional investors to the total shares outstanding for a given stock. Institutional holding data are obtained from Thomson-Reuters Institutional Holdings (13F) Database.

- *Stock Illiquidity* = The monthly average stock illiquidity defined as the squared root of the Amihud measure. It is the monthly average of the following daily values:

$$\sqrt{1000000 * |\text{Ret}_t| / (\text{Volume} \times \text{Price}_t)},$$

  where Ret_t and Price_t are daily return and price of the stock.

- *Forex Derivative Hedging* = The average amount of foreign exchange derivatives used for hedging purposes (i.e., non-trading purposes) relative to total assets of the lead syndicate banks and bond underwriters that the firm has done business with in the past five years. Banks' derivatives usage data is obtained from Bank Holding Company (BHC) Y9-C filings. Data on the firm's lead bank syndicate are obtained from LPC Dealscan, and the firm's underwriter information is obtained from Mergent FISD.

- *Non-Interest Income* = Item number BHCK4079 from the FR Y-9C reports expressed as a percentage of total income (BHCK4074 + BHCK4107)

- *Loans Securitized* = Sum of residential loans sold and securitized (BHCKB705), other consumer loans sold and securitized (BHCKB709), commercial loans and industrial loans (C&I loans) sold and securitized expressed as a percentage of total loans and leases (BHCK2122). Data for these items is available from 2001 Q2 onwards.

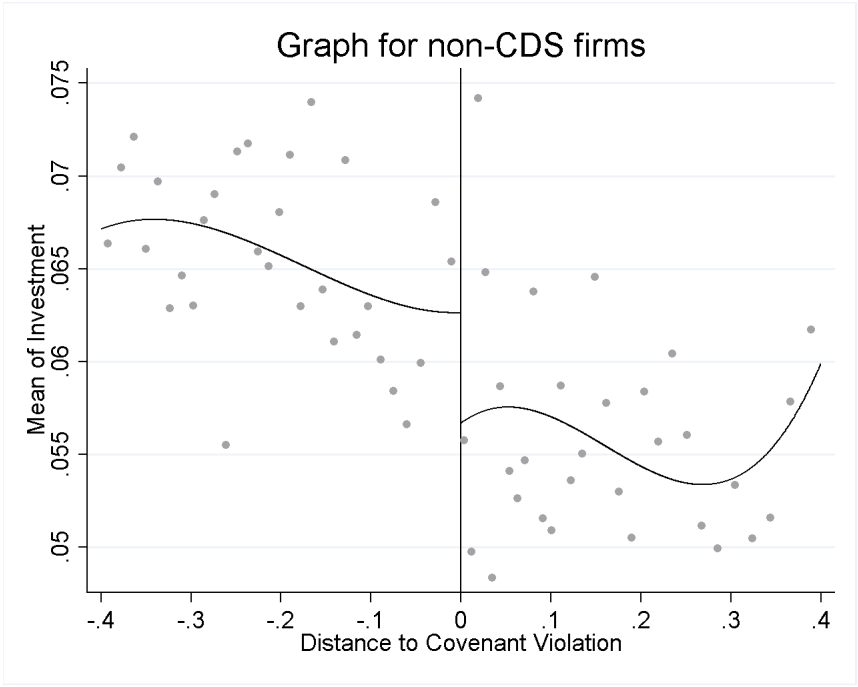
- *CD Bought* = the total credit derivatives on which the reporting bank is the beneficiary, which is reported as item number BHCKA535 from 1997 Q1 to 2005 Q4, and the sum of item numbers BHCKC969, BHCKC971, BHCKC973, BHCKC975 from 2006 Q1 onwards expressed as a percentage of total assets (BHCK2170).

- *CD Sold* = the total credit derivatives on which the reporting bank is the guarantor, which is reported as item number BHCKA534 from 1997 Q1 to 2005 Q4, and the sum of item numbers BHCKC968, BHCKC970, BHCKC972, BHCKC974 from 2006 Q1 onwards expressed as a percentage of total assets (BHCK2170).

B Additional Tables & Figures

Figure B.1: Investment vs distance to violation: Polynomial Fit

This figure plots investment vs distance to covenant violation. Distance to covenant violation is defined as the negative of the relative covenant distance for every firm-quarter observation ($-\frac{Ratio-CovenantThresholdRatio}{CovenantThresholdRatio}$). In case both, net worth and current ratio covenants are present, the tighter of the two is chosen to compute the distance to covenant violation. The plot displays the mean investment for bins defined along the distance to covenant violation. The solid lines represent the fitted values of a third-degree polynomial in distance to covenant violation.



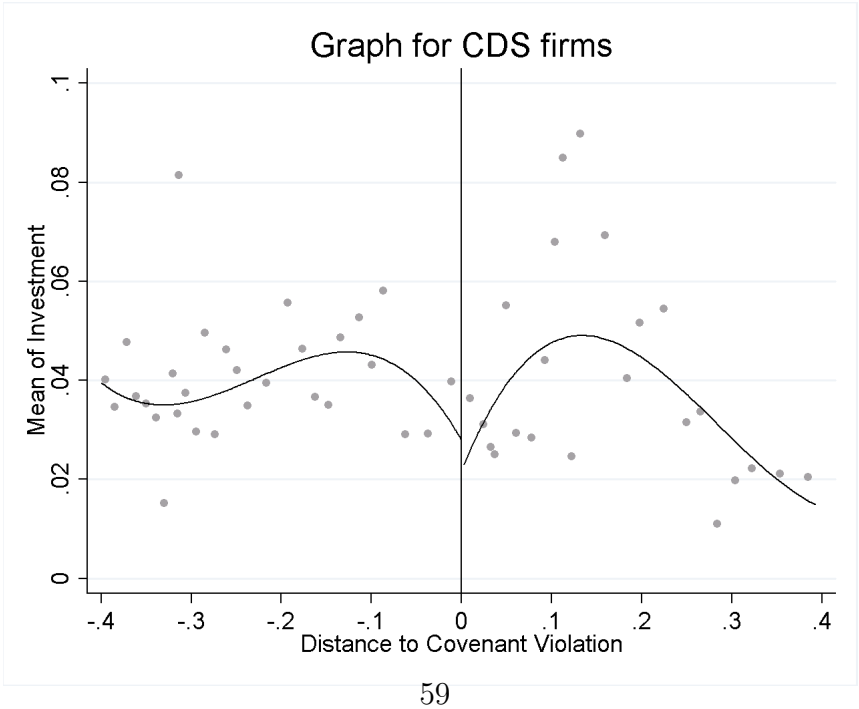


Table B.1: 2SLS IV regressions: Distress and outperformance

This table conducts a 2SLS IV regression using a linear probability model for firms after a covenant violation in the presence and absence of traded CDS on its underlying debt. Firm exits in our sample are classified based on the CRSP delisting codes and Moody's URD database. Financial failure from the CRSP codes is defined as liquidation (400 – 490), bankruptcy (574). Failure in URD is defined as missed/delayed interest/principal payments, bankruptcy, or distressed exchange. Other forms of firm exit include mergers (200 – 290) or going private (573). Distress and outperformance is defined based on Gilson (1989) and Gilson, John, and Lang (1990) as the firms in the bottom and top 5% of the entire universe of firms in the CRSP based on the past three-year of cumulative return. The instrument for CDS trading is the average amount of forex derivatives used for hedging purposes relative to total assets of the lead syndicate banks and bond underwriters with which the firms have conducted business in the past five years.

The data is constructed at firm-quarter level. The main independent variable of interest is CDS IV, which is obtained from the first stage where d_CDS is instrumented. d_CDS is an indicator variable equal to one if a CDS is traded on the underlying firm's debt for that firm-quarter observation, and zero otherwise. t-statistics displayed in parentheses are robust to within-firm correlation and heteroscedasticity. *, **, and *** indicate significance greater than 10%, 5%, and 1%, respectively.

	All exits	**Distress related**	**Non-distress related**	**Equity distress**	**Equity outperformance**
	(1)	(2)	(3)	(4)	(5)
CDS IV	-0.05*	-0.01	-0.04	0.08	-0.10**
	(-1.81)	(-0.86)	(-1.58)	(1.45)	(-2.16)
d_Rated	-0.00	0.00	-0.00	-0.04	0.01
	(-0.00)	(0.27)	(-0.17)	(-1.41)	(0.18)
Assets(log)	0.00	0.00	0.00	-0.02	0.01
	(0.71)	(0.34)	(0.63)	(-1.45)	(1.16)
Profitability	-0.15**	-0.14***	-0.00	-0.30***	0.06
	(-2.36)	(-2.65)	(-0.12)	(-4.52)	(0.76)
Book Leverage	-0.03	0.02	-0.05	0.17*	-0.02
	(-0.72)	(0.43)	(-1.60)	(1.65)	(-0.26)
Interest Expense/Assets	0.95**	0.55	0.40	-0.10	-0.37
	(2.08)	(1.42)	(1.24)	(-0.11)	(-0.50)
Market-to-Book	-0.00	0.00	-0.01	-0.04***	0.10***
	(-0.21)	(0.63)	(-0.82)	(-3.74)	(5.23)
Initial Covenant Tightness	-0.00	0.00	-0.01	0.01	-0.01
	(-0.22)	(1.55)	(-1.26)	(0.57)	(-1.10)
N	14506	14506	14506	14358	14358
Adj. R^2	0.04	0.06	0.02	0.10	0.16
Industry FE	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓

Table B.2: Propensity of CDS trading: First-stage IV regression

This table conducts the first stage of the IV regression (reported in Table B.1) using a probit model. The instrument for CDS trading is the average amount of forex derivatives used for hedging purposes relative to total assets of the lead syndicate banks and bond underwriters with which the firms have conducted business in the past five years. The independent variable is *d_CDS*, which is an indicator variable equal to one if a CDS is traded on the underlying firm's debt for that firm-quarter observation, and zero otherwise. *t*-statistics displayed in parentheses are robust to within-firm correlation and heteroscedasticity. *, **, and *** indicate significance greater than 10%, 5%, and 1%, respectively.

	Probit Model	
	(1)	(2)
Instrument		
Forex Derivative Hedging (%, log)		0.16***
		(2.64)
Firm-level controls		
d_Rated	1.00***	0.99***
	(9.31)	(9.19)
Assets(log)	0.75***	0.74***
	(13.54)	(13.09)
Profitability	-0.13	-0.12
	(-0.44)	(-0.41)
Book Leverage	0.82***	0.81***
	(3.70)	(3.65)
Market-to-Book	-0.10**	-0.11**
	(-2.39)	(-2.54)
Monthly Volatility (log)	-0.26***	-0.26***
	(-5.37)	(-5.44)
Monthly Trading Volume (log)	0.20***	0.21***
	(4.47)	(4.49)
Monthly Return	-0.02	-0.02
	(-0.29)	(-0.24)
CDS-trading controls		
Analyst Coverage (log)	0.03	0.03
	(0.79)	(0.81)
Institutional Ownership	0.07	0.07*
	(1.61)	(1.65)
Stock Illiquidity	0.17	0.17
	(1.22)	(1.24)
Analyst Dispersion	0.00	0.00
	(0.26)	(0.26)
N	74330	74330
Pseudo R^2	0.5810	0.5820
Industry FE	✓	✓
Year FE	✓	✓

Table B.3: Firm quality at loan issuance

This table regresses various measures of firm quality on *d_CDS* at loan issuance dates. *d_CDS* is an indicator variable equal to one if the loan announcement occurs when CDS is traded on the underlying firm's debt, and zero otherwise. Controls include *firm-level* characteristics, such as whether the firm has a rating, which may indicate different access to credit markets, *firm size*, *leverage*, *market-to-book*, *profitability*, and *current ratio*, and *CDS-trading* controls that may affect the probability of CDS trading such as *analyst coverage*, *institutional ownership*, *stock illiquidity*, and *analyst dispersion*. The control variables are defined in detail in the Appendix. t-statistics displayed in parantheses are robust to within-firm correlation and heteroscedasticity. *, **, and *** indicate significance greater than 10%, 5%, and 1%, respectively.

	Risk measures regressed on 1-quarter lagged variables			
	Altman Z-score	**Intangible Assets**	**Interest Coverage**	**Cash-Flow Volatility**
	(1)	(2)	(3)	(4)
d_CDS	0.178***	0.001	0.020	0.001
	(3.35)	(0.14)	(1.41)	(0.46)
d_HasRating	0.007	-0.011	0.009	-0.002
	(0.14)	(-1.18)	(0.67)	(-0.84)
Assets (log)	0.122***	0.076***	0.010	-0.011***
	(3.17)	(9.10)	(1.17)	(-5.42)
Book Leverage	-5.536***	0.026	0.416***	0.019**
	(-29.66)	(1.03)	(10.71)	(2.56)
Market-To-Book	1.563***	-0.030***	-0.022***	0.010***
	(34.39)	(-5.20)	(-3.64)	(6.88)
Profitability	1.516***	0.026	-0.141**	-0.045***
	(7.40)	(1.24)	(-2.23)	(-4.47)
Current Ratio	0.657***	-0.027***	-0.006	0.001
	(17.50)	(-7.77)	(-1.11)	(0.90)
Analyst Coverage (log)	0.011	-0.001	-0.002	0.000
	(0.60)	(-0.42)	(-0.47)	(0.45)
Institutional Ownership	0.001	-0.001	-0.013*	-0.005***
	(0.04)	(-0.49)	(-1.72)	(-3.28)
Stock Illiquidity	-0.054	0.001	0.006	0.001
	(-0.63)	(0.03)	(0.17)	(0.24)
Analyst Dispersion	-0.008	-0.001	0.007*	-0.000
	(-0.97)	(-1.58)	(1.94)	(-0.01)
N	17060	8302	17544	17648
Adj. R^2	0.905	0.889	0.287	0.685
Industry FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓

Table B.4: Loan Announcement CAR Regressions: Within-Lender Analysis

The table report regression results of stock price reactions to firm loan announcements. The dependent variable is the cumulative abnormal return (CAR) calculated over the 3-day event window (-2,+2), where day 0 represents the loan announcement event day. CAR is calculated using the market model. Our main variable of interest is *d_CDS*, which is an indicator variable equal to one if the loan announcement occurs when CDS is traded on the underlying firm's debt, and zero otherwise. *d_TradedCDS* is an idicator variable equal to one if the firm in our sample has CDS traded on the debt at any point during our sample period, and zero otherwise. We control for *Loan-level* characteristics, *Pre-announcement* characteristics, *Firm-level* characteristics, and *CDS-Trading* characteristics which are defined in detail in the appendix section. The observations in this sample are at lender-package level. *t*-statistics displayed in parentheses are robust to within-firm correlation and heteroscedasticity. *, **, and *** indicate significance greater than 10%, 5%, and 1% , respectively.

	Lender FE		**Lender FE & Firm FE**	
	(1)	(2)	(3)	(4)
d_CDS	-0.35***	-0.41***	-0.34*	-0.39**
	(-2.78)	(-2.99)	(-1.92)	(-2.14)
d_TradedCDS	0.23**	0.19		
	(1.97)	(1.55)		
N	26755	21108	26755	21108
Adj. R^2	0.048	0.046	0.199	0.208
Deal Purpose FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Firm FE	✗	✗	✓	✓
Lender FE	✓	✓	✓	✓
Loan Controls	✓	✓	✓	✓
Firm Controls	✓	✓	✓	✓
Pre-announcement Controls	✓	✓	✓	✓
CDS-trading Controls	✗	✓	✗	✓