Credit Default Swaps and Moral Hazard in Bank Lending*

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Abstract

We analyze whether introduction of Credit Default Swaps (CDSs) on a borrowers' debt leads to lender moral hazard around covenant violations, wherein lending banks can terminate or accelerate the bank loan. Using a regression discontinuity design, we show that CDS firms, even those that are more prone to agency issues, do not decrease their investment after a covenant violation. But, CDS firms pay a significantly higher spread on loans issued after covenant violations and perform poorly when compared with 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, conditional on a covenant violation, CDS firms do not become distressed or go bankrupt at a higher rate than firms without CDS. Our results suggest that introduction of CDS misaligns incentives between lenders and borrowers but doesn't lead to a severe empty creditor problem in the private debt market.

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1 Introduction

Credit Default Swaps (CDS) are a relatively new financial instrument that allow lenders to reduce exposure to the credit risk of their borrowers. Credit risk transfer, through CDS or other such means, can be used to hedge credit risks of on-balance sheet assets [1]. Commercial banks and other lenders are natural buyers of CDS protection to mitigate credit risk which helps free up regulatory capital[2], diversify risk and can potentially increase credit supply to firms (See Pennacchi (1988); Gorton and Haubrich (1987); Bolton and Oehmke (2011); Saretto and Tookes (2013)). On the flip side, credit risk transfer through CDS can reduce the incentives of the banks to screen and monitor their borrowers (see Demarzo and Duffie (1999) and Parlour and Plantin (2008)). Banks that purchase CDS on their borrowers can reduce or eliminate economic exposure to their borrowers but still retain control rights.[3] This separation of cash flow exposure and control rights can give rise to an even stronger form of incentive misalignment, the *empty creditor problem* (see Hu and Black (2008), Bolton and Oehmke (2011)). Bolton and Oehmke (2011) show that even in the presence of fairly priced CDS, lenders overinsure in equilibrium, leading to an inefficiently higher incidence of costly bankruptcy. Consistent with these arguments, Subrahmanyam, Tang, and Wang (2014) find a positive relationship between CDS trading and bankruptcy risk in the public debt market.

In this paper, we focus on the private debt market to study whether the initiation of CDS trading on the borrowers' debt misaligns incentives between lenders and borrowers. It

[1]The CDS market has grown with an outstanding notional value as high as 5 Trillion U.S. dollars in 2008, and about 2.5 trillion in recent years. In fact CDS trading reached approximately 15% of the total over the counter derivative markets in the 2007–2008 period. But, CDS is not the only mechanism that lenders have to reduce their exposure to the borrowers. Some other possibilities are loan syndication, loan sales and loan securitization.

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

[3]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.

is generally believed that renegotiations are easier in the private debt market compared with the public debt market. Reputational concerns, future lending and non-lending business from established relationships, lower debt renegotiation frictions due to concentrated ownerships are few factors that mitigate moral hazard concerns in the private debt market and maintain the lender's stake in the loan. In order to answer whether lender moral hazard exists when the lenders can easily engage in credit risk tranfer, we study covenant violations in bank loans. Covenant violations and the consequent renegotiation between banks and borrowers provide an ideal setting to understand this question as covenant violations give creditors contractual rights similar to those in case of payment defaults – rights include requesting immediate repayment of principal and termination of further lending commitments. In the event of covenant violations by borrowers, control rights shift to the lender giving them a stronger bargaining power vis-a-vis the borrowers. If the lenders are indeed empty creditors and want to impose harsher renegotiated loan terms to extract rents or if they intend to push borrowers into bankruptcy, covenant violations by their borrowers give them an 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. First, banks, in contrast to public bond holders, may face reputational costs if they push borrowers into inefficient bankruptcy or liquidation. These reputation costs are two fold and are not modeled in the one period setup of Bolton and Oehmke (2011). One reputation cost that lead lenders face is the damage to their reputation in the loan syndication market in case 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 in to bankruptcy, would be at a disadvantage. Moreover, lenders risk losing all the relationship specific information and

future profits in 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. However, Gopalan, Nanda, and Yerramilli (2011) show evidence that large lenders suffer lower reputational costs highlighting the limitation of the reputational-based disciplining mechanism. Moreover, Minton, Stulz, and Williamson (2009) show that it is mainly the large banks which are active in the credit derivatives market. Thus, whether lender moral hazard exists in the private debt market is ultimately an empirical issue.

In order to answer this question, we analyze changes in corporate policies of borrowers conditional on covenant violations in a regression discontinuity framework. Borrowers' covenant violations enhance the bargaining power of lenders and provide them with an opportunity to intervene in the borrowers' corporate policies. On the other hand, banks that hedge borrower exposure with CDS, may be prone to moral hazard and not expend costly effort in negotiating and intervening in 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 CDS which experience a significant reduction in firm investment (Chava and Roberts (2008)). These results are broadly supportive of lender moral hazard. Lenders do not expend much effort in intervening in firm policies after covenant violation in presence of CDS, leading to insignificant change in firm's investment.

One shortcoming of our analysis so far is we do not directly observe whether a lender has purchased CDS on the borrower and what the resulting net exposure of the lender to the borrower is. In the absence of availability of this data, we use other measures of lenders' propensity to engage in credit risk transfer and consequent lender moral hazard. We consider three proxies: bank's 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 an impact on firm's investment.

Another potential explanation for our results could be that investment projects of firms with CDS are more valuable and hence investment is not cut even after covenant violations. Following Chava and Roberts (2008), we consider cash holdings and length of relationship with the lender as two proxies for agency and information issues at the borrower. Chava and Roberts (2008) show that firm investment post-covenant violation decreases significantly more when borrowers have information or agency issues highlighting that inefficient investment is cut. In contrast, we find that when lenders could purchase CDS on borrowers, we don't find a drop in investment even when the borrowers are more exposed to information and agency problems. These results provide further support to credit risk transfer through CDS causing lender moral hazard.

One implication of a severe empty creditor problem is that CDS leads to higher borrower bankruptcies (see Bolton and Oehmke (2011); Subrahmanyam, Tang, and Wang (2014)). Our results from a Cox hazard 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.[4] These results indicate that banks may not be actively causing firm bankruptcies due to overinsurance (empty creditor problem). Regulation could be one potential explanation for this result. 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 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

[4]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 CRSP on the basis of past three year cumulative return.

credit exposure. However if CDS purchases lead to overinsurance, they are deemed as speculative assets and receive higher risk weights. Thus, overinsurance can be quite costly for banks and consequently 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. However, consistent with the lender's use of credit derivatives for higher bargaining power vis-a-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.

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. Nini, Smith, and Sufi (2012) find that after a covenant violation, the actions taken by creditors to change the firm policies increase the value of the firm. We find that this is the case only for non-CDS firms confirming the findings of Nini, Smith, and Sufi (2012). However, for firms with traded CDS, the post-covenant violation cumulative abnormal returns are not significantly different from zero and are negative in the long-run indicating deteriorating firm performance. This result is also consistent with lenders imposing harsher renegotiated loan spreads post-covenent violations thereby reducing firm value. Overall, these results support the existence of lender moral hazard wherein the lender doesn't intervene in firm policies to improve firm value in order to recover its debt.

Finally, we explore whether these ex-post lender moral hazard in the presence of CDS trading on borrowers is consistent with ex-ante loan announcement returns. Theoretically, Diamond (1984) suggests that bank monitoring improves firm value and 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),

Billett, Flannery, and Garfinkel (1995) and other papers. If capital markets anticipate the lender moral hazard in the presence of CDS trading and consequently lower lender monitoring (see Demarzo and Duffie (1999) and Parlour and Plantin (2008)), then loan announcement returns for a firm with CDS, should be relatively lower than returns for firms without CDS. In the absence of any agency problems between banks and firms, the loan announcement returns of firms with CDS should be statistically indistinguishable from firms without CDS. We find that loan announcement return for CDS firms are muted and not statistically different from zero. Whereas the loan announcement returns for non-CDS firms are positive and significant in line with the previous studies.

As robustness checks, we address the potential ex-ante adverse selection concern by documenting that on average CDS firms at loan initiation tend to be of better credit quality than non-CDS firms. We also show that our results are not driven by the type of banks lending to CDS firms but rather by the existence of a traded CDS on a firm's debt which enables lenders to hedge against its default. In summary, our results suggest that when banks can reduce economic exposure to lending firms through CDS contracts, they do not actively cause borrower bankruptcy due to overinsurance. However, the banks do face moral hazard to the extent of neutrality regarding the firm's prospects, thereby intervening less to improve them.

Our paper is related to work that examines impact of other credit transfer mechanisms on lenders. 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 disseminates to the market the selling bank's private negative information on the borrower. Wang and Xia (2014) show that banks exert less effort on monitoring 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 CDS have very different economic implications for lenders. 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 CDS traded against them are in similar if not in better financial health than other firms. 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. Lummer and McConnell (1989) focus on the status of the lending relationship and find that new bank loans generate zero average abnormal return, 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. Billett, Flannery, and Garfinkel (1995) find no significant difference between the market's response to bank and nonbank loans, but find that lenders with a higher credit rating are associated with larger abnormal borrower returns – suggesting that the quality of the lender affects market's perception of firm value.

The remaining sections are organized as follows. Section 2 discusses sources of data and summary statistics. Section 3 discusses results. Section 4 discusses robustness tests and Section 5 concludes.

2 Data

2.1 Data sources and sample selection

We utilize five main datasets for our analysis: (i) CMA Datavision dataset (ii) Bloomberg (iii) Markit (iv) LPC's Dealscan database (v) BHC Y9C and bank call report data. We obtain firm-quarter level financial data from COMPUSTAT and equity related information from CRSP.

Loan information is extracted from Loan Pricing Corporation's 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. As discussed in Chava and Roberts (2008), Dealscan database contains between 50% to 70% of all commercial loans in the U.S. during the early 1990s. From 1995 onwards, Dealscan coverage increases to include an even greater fraction of commercial loans. We construct our covenant violation sample following Chava and Roberts (2008) for the period between 1994 and 2012. We focus on loans of non-financial firms having 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 and standardized.

The data on the timing of CDS introduction is obtained from three separate sources: Markit, CMA Datavision (CMA) and Bloomberg. The CMA Datavision database collects data from 30 buy-side firms which consist of major investment banks, hedge funds, and asset manager. 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, and the CDS data from it has mainly been available through Bloomberg since October 2006. 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. Markit CDS database reports a composite daily CDS spread from 2001 through 2012. The spread is calculated as the average across all the quotes provided by market makers. 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 as computed in Chava and Roberts (2008) and (ii) an indicator that shows if the firm has traded CDS outstanding in the corresponding quarter. We do not have access to data on which particular firm does a lending bank obtain CDS protection against. However, since CDS protection can only be obtained for firms with traded CDS, we divide firms based on traded CDS. We use utilize the lead bank's Y9C and call report data in identifying 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 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 so when we try to assess the stock market reaction to loan announcements and covenant violations.

2.2 Descriptive statistics

Table I reports the summary 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 the loan is 4 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 increases from 1990 to 1997, and has plateaued since. The recent financial crisis period however, saw a reduced number of issuances. 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 CDS contracts traded. On the other hand, there are 24,375 loan announcements for 5,962 unique firms when the borrowing firms do not have CDS contracts traded. 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 later part of the analysis.

Table II 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 divided again on whether the observation is determined to be in covenant violation for either the current ratio, net worth covenant or both. The outcome variables and control variables used in the analysis for change 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

Sections 3.1, 3.2 and 3.3 test for moral hazard based on lender intervention in the firm's operations, loan renegotiations after covenant violation and the realized stock market returns in the post covenant violation period respectively. Section 3.4 tests for the presence of 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 the potential agency problems by comparing the stock market returns to loan announcement conditional on whether CDS trades for a firm.

3.1 Lender action upon credit event

We follow the regression discontinuity approach for firm investment as in Chava and Roberts (2008) to test for creditor intervention after a credit event – specifically the covenant violation of a firm. 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. If a lending bank has hedged or reduced its credit exposure by purchasing CDS on the borrowing firm, then the bank may not have incentives to stage a costly intervention in the firm's operations and renegotiate firm policy and monitor them to recover their debt. On the other hand, as a result of laying off credit exposure by purchasing CDS on the borrowing firm, the bank is an empty creditor and thus arguably has a higher

bargaining power in renegotiations with the firm. In a much severe case, one in which the bank is over-hedged (as discussed in Bolton and Oehmke (2011)), it has incentives to impose harsher terms in renegotiations and push the firm to bankruptcy.

The empirical model we run to test our hypothesis that a traded CDS firm will have a smaller cut in investment compared with a non-traded CDS firm after they violate a covenant is the following:

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

where $Investment_{it}$ is the main dependent variable defined as the ratio of the capital expenditures to the capital in the beginning of the period. Our main variables of interest are d_Bind_{it-1} and the interaction term $d\_Bind_{it-1} \times d\_CDS_{it-1}$. d_Bind_{it-1} is an indicator variable equal to 1 if a firm i in quarter $t-1$ observation is determined to be in covenant violation and 0 otherwise. Similarly d_CDS_{it-1} is an indicator variable equal to 1 if there is a traded CDS contract for a firm i and quarter$t-1$ observation.The coefficient β_2 captures the ATE of covenant violation for the firms which do not have a traded CDS while the coefficient β_1 captures the difference in the ATEs of a traded CDS firm and a non-traded CDS firm after covenant violation. While β_2 estimates the extent of lender inaction in terms of cutting investment, $\beta 1 + \ beta2$ estimates the ATE of covenant violation for traded CDS firms. X_{it-1} is a vector of control variables to control for potential differences in factors above and below the covenant threshold which affect a firm's investment. η_i is a firm fixed effect and δ_t is a year-quarter fixed effect to control for unobserved heterogeniety across firms and time.

Table III Panel A reports the results for change in firm investment. Variable definitions of the dependent variable and all the firm controls included in the regression specifications are provided in detail in the Appendix section. 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 distance from covenant violation as additional controls.

Our negative and statistically significant coefficients on the *d_Bind* indicator variable confirms the findings of Chava and Roberts (2008), who show that firms face significant reduction in investment after a covenant violation due to creditor intervention. The positive coefficient on the interaction *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 close to zero for firms with traded CDS. The results hold through all six specifications. This supports the hypothesis that in the presence of CDS, banks can lay off their credit risk and hence 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 distance of the firm characteristics from covenant violation threshold. 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 distance to covenant violation. The top panel reports the relationship between firm investment and distance to covenant violation for firms which do not have CDS traded against them. The bottom panel is for firms with traded CDS. In the case of firms without CDS, we note a significant decline in investments once a covenant is violated. This confirms the findings of Chava and Roberts (2008). However, in the bottom panel we do not see any marked change in firm investment for firms with a traded CDS.

3.1.1 Lender action upon credit event: Lender heterogeneity

If bank moral hazard leads to a lower intervention in cutting firm investment for CDS traded firms, then lender characteristics that affect bank moral hazard should have similar predictable effects on firm investment. In order to test this, we divide the sample of lead lenders based on characteristics that may affect the level of intervention post covenant violation. Lenders from Dealscan are matched to their parent bank holding companies (BHCs), following which we gather data from the parent BHC's FR Y-9C reports on the extent of 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, loan sales and securitization 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 is in the Appendix section. *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. Similar to specifications in Table III, the dependent variable is *Investment* and the main independent variables of interest are *d_Bind* and *d_Bind*$\times$*d_CDS*. Along with firms controls such as *Macro q*, *Cash Flow*, *Assets (log)*, we also include the initial distance to the covenant threshold. The last control is included to take into account the potential future agency problems that lenders might anticipate while setting the initial covenant tightness.

As one would expect, banks that actively lay off their credit – 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 – will intervene less in the borrowing firm's operations after a credit event. Table IV Panels A & B reports these results. By noting the coefficients of covenant violation *d_Bind* in Columns (1) and (2) for the full sample and

the regression discontinuity sample, we note that banks that have higher amount 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, we see 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. Overall, banks that are more likely to lay off credit risk seem to intervene less in the firm's investment policy. These results are consistent with a bank driven moral hazard argument for the observed differences in firm investment with and without CDS trading post covenant violation.

3.1.2 Lender action upon credit event: Borrower heterogeneity

A test similar in spirit to the above is carried out based on borrower characteristics in Table V Panels A & B. Agency problems are exacerbated for firms which have a higher fraction assets held as cash as suggested in Jensen (1986). Also, firms with a shorter history of relationship lending with a bank may suffer from higher agency and information problems. We exploit the variations in these cross-sectional attributes of the borrowing firm to test its relationship with firm investment after covenant violation conditional on there being a traded CDS on the borrowing firm. While it is rational to expect that banks which are exposed to such agency and information problems have higher incentives to intervene in firm policies after a credit event; a hedged creditor, on the other hand has less liability and might not intervene after a credit event even for firms with higher agency and information problems.

We divide our main sample based on borrower characteristics that may affect the level of intervention post covenant violation. We measure the borrowing firm's cash holdings 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. *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. *Low* lending relationship sample corresponds to loans in which a borrower has no historical relationship with the lenders in the syndicate. Detailed definitions for these borrower variables are in the Appendix section.

Again, our dependent variable is *Investment* and the main independent variables of interest are *d_Bind* and *d_Bind*$\times$*d_CDS*. Along with firms controls, we again include the initial distance to the covenant threshold to take into account the potential future agency problems that lenders might anticipate. The positive and significant coefficient for the interaction term $d\_Bind \times d\_CDS$ for firms with a greater fraction of cash holdings and smaller history of lending relationship with the lending bank suffer a lower cut in investment when they have a traded CDS. These results are robust to both – the full sample as well as the RD sample. Overall, these additional results further bolster the argument of bank moral hazard and the resulting inaction after a credit event.

3.2 Debt Renegotiation after covenant violation

If a lending bank has hedged or reduced its credit exposure to a borrowing firm by purchasing CDS, then the lender may not have incentives to intervene and help improve firm prospects for the future. At the same time, the lending bank still has control rights over the firm, which allow it to renegotiate loans and grant waivers after covenant violation. Typically, granting waivers 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 a significant costly monitoring effort to be put in by the lending bank.

However, in the presence of CDS, if lending banks can hedge themselves to potential

future losses then they can minimize the cost needed to engage in costly monitoring efforts post covenant violation. If the lending banks can overinsure themselves, then arguably they will have higher incentive to accelerate the loan payment by not granting a waiver and push the borrowing firm into bankruptcy. On the other hand, if banks cannot get overinsured – either due to (a) regulatory reasons[5], (b) adverse selection[6], (c) reputational concerns[7] – they could choose to grant waivers to borrowing firms and extract rents via the renegotiated loan terms instead (for instance by imposing higher spreads or fees on renegotiated loans of borrowing banks which have violated a covenant).

Table VI investigates changes in the major loan contract terms post covenant violation. In order to conduct these tests, we focus on loans initiated by the same borrower-lead lender pair before and after covenant violation. The loan issuance date post covenant violation is however restricted to be before the minimum date value of the maturity of the loan facility which was affected by the covenant violation, and the date one year after covenant violation. Additionally, for such binding loan facilities, we also gather data from the facility amendment datafile for which the amendment date is within one year after 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*$\times$*d_CDS*. *d_AfterCovViol* is an indicator variable set equal to one for loan facilities initiated or amended after the covenant

[5]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. CDS purchased to hedge credit exposure receives 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 discouraging them from doing so.

[6]One can purchase CDS protection only if there is an entity willing to sell it. Arguably, a lending bank is in an advantageous position when it is regarding information on a borrowing firm's health. Therefore it may be harder for such lending banks to find protection sellers to lay off credit risk, especially during or after a credit event like a covenant violation.

[7]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. Although, typically as large banks and banks with diversified businesses are more active in the credit derivatives market, reputation may be a weak disciplining mechanism for such lending banks.

violation date and is set to zero otherwise. *d_CDS*, which 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*, 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).[8] 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 90 bps on average compared to firms that do not have a traded CDS. Consequently, the summation of coefficients in Column (1) show that post covenant violation, firms with CDS experience a 65% increase in loan spread (by approximately 120 bps). Since the only change in terms is the spread, arguably the loan term through which the lending banks can extract most rents, the renegotiation does not benefit the firm.[9]

The remaining columns investigate if this extraction of rents is higher in case banks have a higher probability of hedging their economic exposure to borrowing firms. Columns (2)–(9) in Table VI report the results for the change in loan spreads by dividing the sample by credit derivative market activity, securitization activity, proportion of non-interest income and syndicate size respectively. We note that the coefficient of interaction variable $d\_AfterCovViol \times d\_CDS$ suggests that banks that are more active in the first three markets and the banks that have larger syndicates, and are thus more likely to hedge credit

[8]We also find that the maturity decreases and the syndicate size also reduces significantly.

[9]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.

risk of their borrowers, are the ones that extract higher surplus by charging a higher loan spread. Overall, this evidence supports the hypothesis that banks attempt to extract additional surplus from firms where they have a higher bargaining resulting from a lower credit exposure.

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 an average, if creditor intervention improves firm quality then the equity markets should respond with higher cumulative abnormal returns on an average in the long run. However, as a result of moral hazard stemming from the ability to buy CDS protection, if (a) creditor inaction results in the continuation of wasteful and inefficient firm spending and investment or if (b) greater bargaining power enables creditors to impose harsher conditions on firms post covenant violation, then such firms should experience lower cumulative abnormal returns after a covenant violation. Therefore, in the long run, CDS traded firms 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 CDS outstanding with firms without CDS outstanding for the full sample as well as the regression discontinuity sample. As discussed 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) over the entire

sample period by including dummy variables for the event month and months prior to and post the event month for which we need to compute the monthly abnormal returns. We also account for delisting return which is calculated from CRSP delisting file. We then use the estimated model to calculate the monthly abnormal return for each firm and the cumulative abnormal returns over various horizons after covenant violation. For our analysis, we define a "new covenant violation" for a firm if the firm has not violated a covenant in the previous four quarters as in Nini, Smith, and Sufi (2012).

Figure 2 plots event-time abnormal returns after the report of a new covenant violation for both violators – firms that violated a covenant and did and did not have a traded CDS. The figure shows that in the post-violation period, violating firms without a traded CDS show substantially higher positive abnormal return than firms with traded CDS. The equity price of violating firms with 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 and Panel B reports the results for only the regression discontinuity sample. 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 cumulative abnormal returns of firm i from the 1^{st} 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 1 if a firm-quarter observation is determined to be in covenant violation and 0 otherwise. 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 their definitions are provided in the Appendix section. All columns include firm level accounting variable as controls along with firm fixed

effects and year quarter fixed effects.

Consistent with the findings of Nini, Smith, and Sufi (2012), we note that the coefficient estimates of *d_Bind* indicator variable suggests that on average violating firms experience positive stock returns after covenant violation. This can be attributed to a reduction in inefficient investment and improvement of management discipline in general by lending banks that gain control rights. The coefficient estimates of the *d_CDS* indicator variable is not significant suggesting that having only a traded CDS does not lead to a different stock market performance. The variable of interest is, as before, the estimated coefficients of the interaction between *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 CDS traded against them post covenant violation is statistically indistinguishable from zero, as observed by the sum of the three reported coefficients.

We next carry out similar CAR regressions for our regression discontinuity sample. In support of our results for the full sample, we again find that the violating firms with CDS have much lower abnormal stock returns. 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 provide evidence for the absence of lender intervention in the borrowing firm's interest when the firm has a traded CDS which potentially allows creditors to lay off their credit risk.

3.4 Firm survival after covenant violation

Financial covenant violations provide an ideal setting for studying agency problems that banks face in presence of CDS. Covenant violations give creditors contractual rights similar to those in case of payment defaults – rights include requesting immediate repayment of

principal and termination of 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.

We conduct a survival analysis for firms after a covenant violation. This allows us to test our hypothesis that if banks face a severe empty creditor problem, then firms should default more often in presence of CDS trading. This is because overinsured banks benefit from firm bankruptcy in case of an empty creditor problem. As banks gain control rights after covenant violation, they should use their control rights to push firms into bankruptcy.

We first examine the frequency of firm exit from our sample classifying firm exit based on CRSP delisting codes [10] and Moody's Ultimate Recovery Database (Moody's URD) which contains information on all bonds rated by Moody's [11]. Firms for which we cannot obtain delisting codes from CRSP are classified as dropped firms owing to financial distress if we 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 with a firm exit of 3.30% when there is no covenant violation. However, distress related exits (exits due to financial failure) 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 an Cox hazard model on loan-quarter observations by modeling the hazard rate of the firm's exit as the survival time measured in quarters from the firm's covenant violation

[10] 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).

[11] Moody's defines default as the event that one or more of the following happen: (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. (c) A distressed exchange takes place

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

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

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 incentives 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 CRSP based on past three years of cumulative return. The reason we focus on distress is because it is a precondition for bankruptcy – distressed firms are generally more likely to be bankrupt. The insignificant coefficient estimates on the d_CDS indicator variable for the distress regression in specifica-

tion (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. Interestingly, the negative and significant results on the d_CDS indicator variable suggests that firms with 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.

Next, to address the potential selection concerns regarding presence of CDS trading, we employ an instrumental variables approach. 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 firms have conducted business in the past five years (see Saretto and Tookes (2013)). Data on bond underwriters is obtained from FISD.Following the method described in Wooldridge (2001), we use the fitted variable from a probit model for $dCDS$ as the instrumental variable. Table B.1 in the appendix section reports the probit model for the determinants of CDS trading. We run the probit model on firm-quarter observations for the full sample including additional controls that might affect the propensity CDS trading on a firm. We then run a 2SLS regression using a linear probability model with the fitted CDS probability as an instrument.

We also 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 observation 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, Moodys or Fitch – then a dummy varible d_DNG (d_UPG) is set to 1 otherwise it is set to 0. We then run

a hazard model similar to the firm exit regressions only on those loan-quarter observations which belong to rated firms. Table X displays the results for the rating change hazard model. Specification (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. These results are robust to using the instrument variable regression for CDS trading as well.

Overall, the evidence above suggests that the passive behaviors as noted by the reduced creditor intervention and also the imposition of harsher renegotiated loan terms to extract rents in the presence of CDS possibly leads to the under-performance of firms but does not increase the likelihood of distress or default.

3.5 Loan announcement results

If the purchase of CDS protection by banks creates agency conflicts, then equity holders anticipating such agency problems, would discount the special nature of bank loans. This would in turn lead to a lower loan announcement abnormal returns for CDS firms when compared with non-CDS firms.

To test this hypothesis, we conduct an event study on the stock price performance of borrowing firms around the loan announcement date (using the deal active date of a loan in Dealscan). We employ an event study approach to examine the loan announcement effect for firms with CDS and those without. We use a five day window (-2,+2) to capture the effects of loan announcement on firms' stock abnormal returns. 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 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 CDS

traded at some point in the sample period. Table XI 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 the firms that never have CDS traded. The right hand side of the table reports the results only for firms that have 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 CDS, the average five day loan announcement abnormal return is 0.31%, significant at 1% level, before the introduction of CDS trading, and in the period after introduction of CDS trading, the five day abnormal return drops to 0.08%, which is not statistically significant.

The univariate comparison of loan announcement effects described above provides evidence of a decline in the traditional value the market places on a bank's role after 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 a CDS indicator variable, 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.[12] If CDS trading leads to bank moral hazard that 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 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 have 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 loan and accompanied monitoring, than shareholders of a less risky firm (See Billett, Flannery, and 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 high current ratio could convey a different signal to the market than an unprofitable firm or a firm with low current ratio, that 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

[12]As discussed before, we do not have access to data regarding which bank obtains protection using CDS against which firm. We divide firms based on traded CDS. 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 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.

with high Market-to-Book ratio 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 impact of CDS trading on bank behavior, we also included controls that may determine which firms have CDS traded against their debt.

Table XII 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. All 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 have CDS traded. As shown in all specification, we find that the coefficient on CDS indicator variable (*d_CDS* is indeed negative and statistically significant for all regression specifications. As shown in the most exhaustive specification (4) in Panel A, firms with traded CDS conservatively have approximately a 0.5% lower abnormal loan announcement return. These results are robust to controlling for purpose of the deal, industry and time fixed effects. These results are consistent with the hypothesis that suggests that capital markets anticipate bank moral hazard ex-ante when firms with CDS obtain loans.

4 Additional Discussion and Robustness

4.1 Evidence against adverse selection

In this section, we further investigate whether selection in terms of quality of firms that have traded CDS or type of banks that lend to CDS firms 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, presence of CDS allows lower quality firms to obtain loans, and hence markets

discount the loan announcements since the markets believe banks are not screening firms with CDS carefully.

Table XIII 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 (See Faulkender and Petersen (2006)), firm size, leverage, market to book, profitability and current ratio, and other characteristics that may affect probability of CDS trading.

In Column (1) we note that the indicator variable CDS loads positively on Altman Z-score, suggesting that firms with traded CDS are 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 CDS traded do not have statistically different interest coverage than firms without traded CDS. Cash flow volatility can also indicate firm level risk. Column (4) shows again that firms with traded CDS are similar in this dimension as well to firms without traded CDS. These results suggest that firms with traded CDS are not in relatively worse financial health at the time of loan announcement. This evidence suggests that 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 that lend to firms that have CDS traded against them are different, and the market discounts loans by such banks. Table XIV investigates this concern. Columns (1) – (4) investigate the impact of various dimensions along which lending banks differ, on loan announcement CAR. The indicator variable for $HighLenderVariable$ in Column (1) – (4) are

constructed based on whether bank activity is greater or lesser than the median bank activity. Large banks are typically more active in the credit derivatives and securitization market and also carry out a larger proportion of non-core banking activities. On the other hand, large banks are also well reputed and result in a higher certification effect for the borrowing firm when it borrows or contracts with these banks. The statistically insignificant coefficient of interaction variable $d\_CDS \times HighLenderVariable$ indicates that firms with a traded CDS borrowing from banks which are more likely to lay off credit risk do not have a different loan announcement return as a result of it. The main source of muted loan announcement return is the *d_CDS* indicator variable. Overall, we find that bank characteristics are not driving loan announcement returns.

5 Conclusion

The growth of credit default swaps 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 from in 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 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 empty creditor problem, where banks

over insure themselves and cause firms to go bankrupt more often. Our loan announcement return results are also more consistent with lender moral hazard but not empty creditor problem. Markets seem to anticipate this lender moral hazard, leading to insignificant loan announcement return (but not negative returns) for firms with CDS, as compared to positive return for non-CDS firms. It seems reputation of the lenders or regulatory capital requirements constrain lenders to not over insure them selves with CDS and push firms in inefficient bankruptcy or liquidation.

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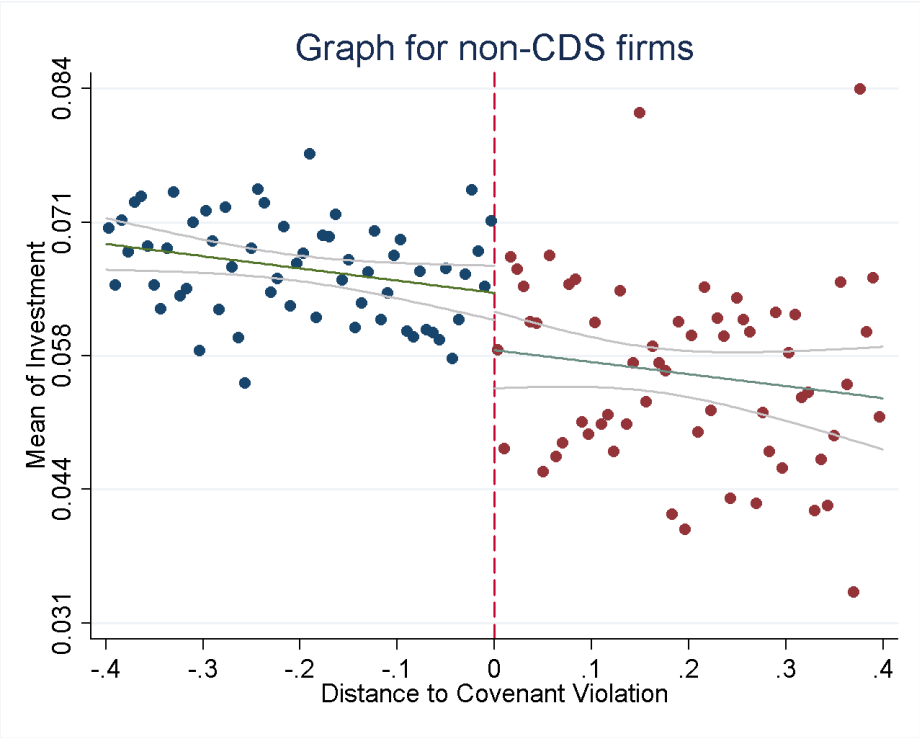
Figure 1: Investment vs Distance to Violation: CDS vs Non-CDS firms

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 bins defined along the distance to default with 95% confidence bands.



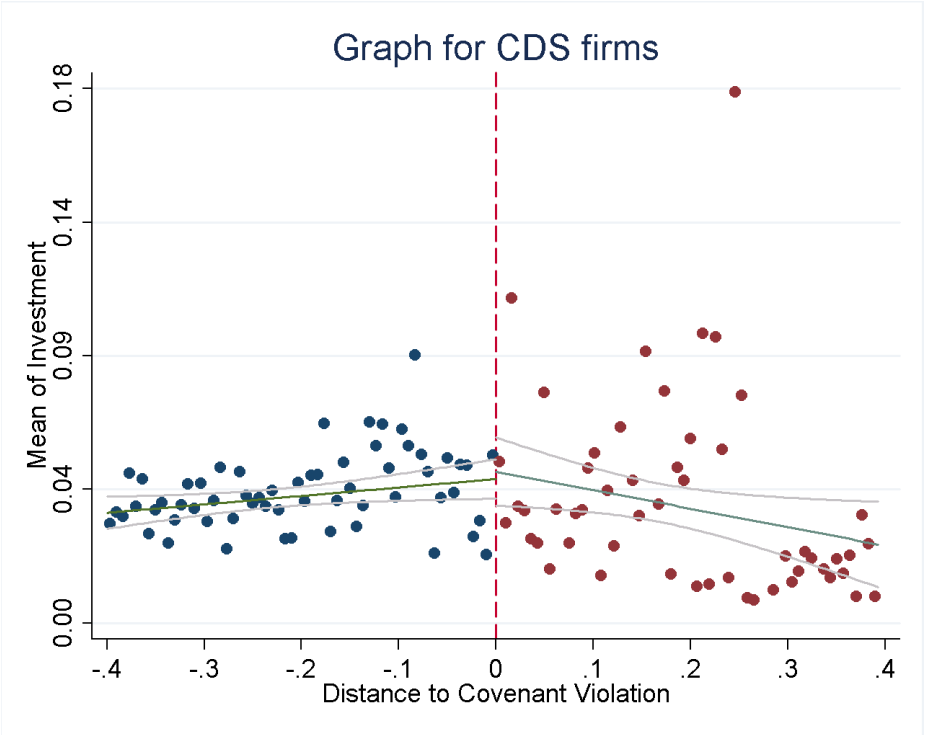


Figure 2: Financial covenant violations and stock price performance

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 return 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 is gathered from Kenneth French's web data library.

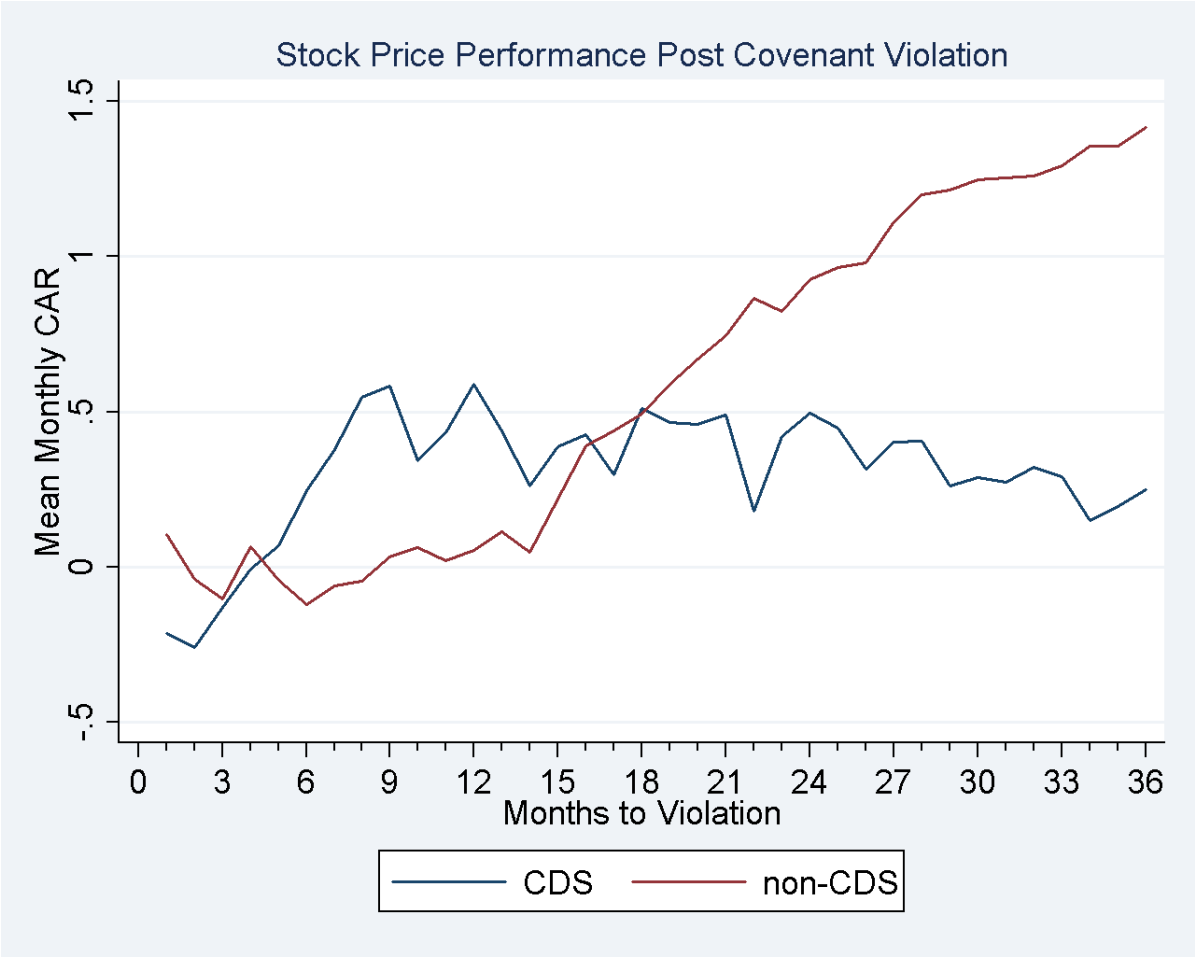


Table I: Loan Sample Summary Statistics

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 5951 firms and 27450 packages and the following loan characteristics are at 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 Stats 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.

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 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 SE

	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]	
MarketToBook	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]	
TangibleCapital	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]	
BookLeverage	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 SE

	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]	
MarketToBook	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]	
TangibleCapital	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]	
BookLeverage	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: Regression Discontinuity: Investment Conservatism

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. Panel A, 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 1 if a firm-quarter observation is determined to be in covenant violation and 0 otherwise; and *d_CDS* is an indicator variable equal to 1 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 heteroskedasticity. *, **, and *** indicate significance greater than the 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	0.000	0.000	0.000	0.000	0.010	0.010
	(-1.380)	(-0.920)	(-0.720)	(1.020)	(0.940)	(1.310)
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 Conservatism Robustness: Lender Characteristics

Panels A & 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.

Panel A & B present results for the full sample and the RD sample respectively. The RD sample in Panel B1, 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 1 if a firm-quarter observation is determined to be in covenant violation and 0 otherwise; and *d_CDS* is an indicator variable equal to 1 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 heteroskedasticity. *, **, and *** indicate significance greater than the 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***	-0.011***	-0.016***	-0.009***	-0.016***	-0.011***
	(-6.34)	(-3.96)	(-4.73)	(-2.82)	(-6.75)	(-4.31)
d_Bind×d_CDS	-0.001	0.011**	-0.001	0.009*	0.004	0.010**
	(-0.07)	(2.13)	(-0.06)	(1.69)	(0.46)	(2.00)
d_CDS	0.012	0.005	0.020*	-0.001	0.016**	0.005
	(1.44)	(1.64)	(1.67)	(-0.18)	(2.29)	(1.55)
ΣCoeff	-0.02	0.00	-0.02	0.00	-0.01	0.00
	(-1.33)	(0.02)	(-1.32)	(-0.12)	(-1.57)	(-0.07)
N	14484	14687	8662	8471	15508	16051
Adj. R^2	0.428	0.472	0.426	0.495	0.438	0.452
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	-0.009***	-0.006	-0.011***	-0.009**	-0.011***	-0.004
	(-3.17)	(-1.58)	(-2.82)	(-2.13)	(-3.52)	(-1.33)
d_Bind×d_CDS	0.002	0.016**	0.010	0.015**	0.010	0.014**
	(0.13)	(2.40)	(0.86)	(2.39)	(0.89)	(2.11)
d_CDS	0.015	0.009	0.020	0.011	0.018	0.012*
	(0.91)	(1.34)	(1.02)	(1.00)	(1.24)	(1.78)
ΣCoeff	-0.01	0.01*	0.00	0.01	0.00	0.01
	(-0.56)	(1.77)	(-0.14)	(1.34)	(-0.09)	(1.61)
N	4819	4840	2684	2546	5229	5386
Adj. R^2	0.480	0.496	0.482	0.562	0.482	0.498
Firm Controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Year-Quarter FE	✓	✓	✓	✓	✓	✓

Table V: Investment Conservatism Robustness: Borrower Characteristics

Panels A & 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 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. *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. *Low* lending relationship sample corresponds to loans in which borrower has no historical relationship with the lenders in the syndicate.

Panel A & B present results for the full sample and the RD sample respectively. The RD sample in Panel B1, 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 1 if a firm-quarter observation is determined to be in covenant violation and 0 otherwise; and *d_CDS* is an indicator variable equal to 1 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 heteroskedasticity. *, **, and *** indicate significance greater than the 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***	-0.018***	-0.015***	-0.014***
	(-4.32)	(-5.71)	(-5.17)	(-6.25)
d_Bind×d_CDS	0.005	0.017***	0.019**	0.008
	(0.76)	(3.09)	(2.37)	(1.38)
d_CDS	0.005	0.008	0.007	0.008*
	(1.47)	(1.43)	(1.23)	(1.88)
ΣCoeff	0.00	0.00	0.00	-0.01
	(-0.69)	(-0.30)	(0.54)	(-1.02)
N	14327	15123	11819	16971
Adj. R^2	0.398	0.435	0.442	0.432
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***	-0.006	-0.008**	-0.009***
	(-2.99)	(-1.35)	(-2.20)	(-3.24)
d_Bind×d_CDS	0.006	0.020**	0.025*	0.016**
	(0.71)	(2.24)	(1.74)	(2.13)
d_CDS	0.007	0.003	-0.007	0.017*
	(0.87)	(0.29)	(-0.89)	(1.92)
ΣCoeff	0.00	0.01*	0.02	0.01
	(-0.26)	(1.73)	(1.21)	(0.97)
N	5762	4197	3950	5763
Adj. R^2	0.429	0.513	0.468	0.475
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 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*, which 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 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 lender-facility level. Detailed definitions for the lender variables are provided in the appendix section. t-statistics displayed in parentheses are robust to within-firm correlation and heteroskedasticity. *, **, and *** indicate significance greater than the 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.

Panel A and Panel 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 cumulative abnormal returns of firm i from the 1^{st} 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 1 if a firm-quarter observation is determined to be in covenant violation and 0 otherwise; and *d_CDS* is an indicator variable equal to 1 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 their definitions are provided in the Appendix section. All t-statistics displayed in parentheses are robust to within-firm correlation and heteroskedasticity. *, **, and *** indicate significance greater than the 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	0.020	0.070**	0.080*	0.080	0.040	-0.030	-0.060	-0.080
	(1.180)	(2.110)	(1.910)	(1.580)	(0.610)	(-0.280)	(-0.610)	(-0.700)
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)
Idist_nwcov								
Idist_currcov								
ΣCoeff	0.020	0.060	0.080	0.080	0.020	-0.090	-0.120	-0.130
	(0.530)	(1.080)	(1.290)	(1.200)	(0.270)	(-1.310)	(-1.590)	(-1.580)
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 CRSP delisting codes and Moody's URD database. Financial failure from 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) to be the firms in the bottom and top 5% of the entire universe of firms in CRSP based on past three years of cumulative return.

The data is constructed at 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 heteroskedasticity. *, **, and *** indicate significance greater than the 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)
BookLeverage	-0.54	0.05	-0.63	2.24***	-0.14
	(-1.19)	(0.07)	(-1.21)	(5.95)	(-0.23)
InterestExpense/Assets	9.83***	24.19***	1.76	5.93**	-0.23
	(2.60)	(3.68)	(0.37)	(1.99)	(-0.04)
MarketToBook	-0.14	-0.50**	-0.10	-1.63***	0.54***
	(-1.62)	(-2.41)	(-1.02)	(-8.95)	(6.13)
InitialCovenantTightness	-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: 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 CRSP delisting codes and Moody's URD database. Financial failure from 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) to be the firms in the bottom and top 5% of the entire universe of firms in CRSP based on past three years 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 *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 heteroskedasticity. *, **, and *** indicate significance greater than the 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)
BookLeverage	-0.03	0.02	-0.05	0.17*	-0.02
	(-0.72)	(0.43)	(-1.60)	(1.65)	(-0.26)
InterestExpense/Assets	0.95**	0.55	0.40	-0.10	-0.37
	(2.08)	(1.42)	(1.24)	(-0.11)	(-0.50)
MarketToBook	-0.00	0.00	-0.01	-0.04***	0.10***
	(-0.21)	(0.63)	(-0.82)	(-3.74)	(5.23)
InitialCovenantTightness	-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 X: Rating Change Hazard

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 is 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 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 heteroskedasticity. *, **, and *** indicate significance greater than the 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)		
CDSIV			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)
BookLeverage	-0.05	0.72	0.10	0.04
	(-0.04)	(0.26)	(0.95)	(0.68)
InterestExpense/Assets	13.04	-25.97	-0.03	-0.72
	(1.11)	(-0.91)	(-0.03)	(-1.11)
MarketToBook	0.05	1.16**	-0.01	0.03
	(0.14)	(2.32)	(-0.20)	(1.58)
InitialCovenantTightness	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 XI: Stock 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 0 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 heteroskedasticity. *, **, and *** indicate significance greater than the 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 XII: 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 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.

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	✗	✗	✗	✓

Table XIII: 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 probability of CDS trading such as *analyst coverage*, *institutional ownership*, *stock illiquidity*, *analyst dispersion*. The control variables are defined in detail in the appendix section. t-statistics displayed in parantheses are robust to within-firm correlation and heteroskedasticity. *, **, and *** indicate significance greater than the 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 XIV: Loan Announcement CAR Regressions: Lender Heterogeneity

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-facility level. *d_HighLenderVariable* is a dummy variable equal to 1 if the lender activity is greater than median lender activity and zero otherwise. Detailed definitions for the lender variables are provided in the appendix section. *t*-statistics displayed in parentheses are robust to within-firm correlation and heteroskedasticity. *, **, and *** indicate significance greater than the 10%, 5%, and 1% , respectively.

	Large Bank (1)	**CD Bought** (2)	**Loans Securitized** (3)	**Non-Interest Income** (4)
d_CDS	-1.06***	-0.96***	-0.17	-0.98***
	(-2.99)	(-2.58)	(-0.45)	(-2.75)
d_TradedCDS	0.52	1.32*	2.16**	0.52
	(0.79)	(1.72)	(2.07)	(0.79)
d_CDS*d_HighLenderVariable	0.53	0.48	0.37	0.44
	(1.62)	(1.48)	(1.23)	(1.39)
d_HighLenderVariable	-0.16	0.16	-0.16	0.11
	(-0.92)	(0.73)	(-0.72)	(0.49)
N	17488	13915	9771	17488
Adj. R^2	0.154	0.168	0.186	0.154
Loan Controls	✓	✓	✓	✓
Firm Controls	✓	✓	✓	✓
CDS-trading Controls	✓	✓	✓	✓
Large Bank Dummy	✓	✓	✓	✓
Deal Purpose FE	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
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 1-year ranging from 1-month prior to the loan announcement day and extending back to 1-year.
- *Runup* = Cumulative return of the borrower's stock during the estimation period of 1-year ranging from 1-month prior to the loan announcement day and extending back to 1-year.
- *Idiosyncratic risk* = Standard deviation of the prediction errors (i.e., borrower's stock return residual) during the estimation period of 1-year ranging from 1-month prior to the loan announcement day and extending back to 1-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 *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 is 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 is bound by a net worth covenant. $NetWorth^{0}_{it}$ is the wet 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 factor obtained from CRSP (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 reporte 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 is obtained from LPC Dealscan, and the firm's unwriter 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), commerical 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 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 sum of item numbers BHCKC968, BHCKC970, BHCKC972, BHCKC974 from 2006 Q1 onwards expressed as a percentage of total assets (BHCK2170).

B Additional Tables

Table B.1: Propensity of CDS Trading: First-Stage IV Regression

	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	✓	✓