How Does CDS Trading Affect Bank Lending Relationships?*

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Abstract

Credit default swaps (CDS) make it easier for lenders to lay off their credit risk exposure on their CDS-referenced borrowers, potentially helping banks retain clients. However, this new instrument of credit risk transfer may reduce banks' monitoring incentives that could alter the firm-bank relationship. We document that borrowers are more likely to switch to new lenders after the inception of CDS trading on their debt. Moreover, all else being equal, loan spreads increase after CDS trading than before, but bond spreads remain intact. CDS trading on their debt also leads firms to increase the use of public bonds relative to bank loans for new debt financing. The evidence indicates that CDS trading weakens firm-bank lending relationships and affects borrowers' debt structure.

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Abstract

Credit default swaps (CDS) make it easier for lenders to lay off their credit risk exposure on their CDS-referenced borrowers, potentially helping banks retain clients. However, this new instrument of credit risk transfer may reduce banks' monitoring incentives that could alter the firm-bank relationship. We document that borrowers are more likely to switch to new lenders after the inception of CDS trading on their debt. Moreover, all else being equal, loan spreads increase after CDS trading than before, but bond spreads remain intact. CDS trading on their debt also leads firms to increase the use of public bonds relative to bank loans for new debt financing. The evidence indicates that CDS trading weakens firm-bank lending relationships and affects borrowers' debt structure.

1. Introduction

Credit default swaps (CDS) are major credit risk transfer tools for financial institutions and constitute a multi-trillion-dollar market. A popular view is that CDS facilitate bank credit risk management without disturbing banking relationships, and hence they help banks retain clients. Tett (2009) documents the invention of CDS by JPMorgan in 1994 when it faced heightened risk and a new loan request from its large but troubled client, Exxon. By creating a novel swap contract to offload its credit exposure to a third party (i.e., the European Bank for Reconstruction and Development, the CDS seller), JPMorgan continued to serve Exxon without calling outstanding loans and even granted the client new loans. Notwithstanding this compelling anecdote, it is unclear whether this case represents the norm or an exception. In this paper, we conduct a large sample analysis to determine how CDS trading affects the firm-bank lending relationship.

Banking relationships are valuable to most corporate borrowers, including those with access to the public bond market (Johnson, 1997), and banks should have incentives to retain their existing clients after accumulating information about them. Nevertheless, banks and borrowers choose each other in a repeated search-and-match process. The observed outcome of retained or switched lenders for a particular borrower represents an equilibrium that balances the benefit of staying with an existing relationship and the potential cost of doing so such as the "hold up" problem.[1] One focal point in the cost-benefit analysis of a lending relationship is the role of creditor monitoring, which produces information about the borrower and makes banks special in managing the lending relationship. However, lenders may be less interested in monitoring their borrowers when they can use CDS for credit protection. Consequently, the value of the banking relationship could decrease, and banks' specialness may fade with the development of the CDS market. Moreover, Acharya and Johnson (2007) document the evidence associated with CDS insider trading by banks. If a major goal of banks in entering the CDS market is to exploit their information advantage, then the privileged lending relationship with their clients could be compromised. Furthermore, CDS may make lenders excessively tough in debt renegotiations, and consequently firms

[1] See Sharpe (1990) and Rajan (1992), among others, for details.

may shun such lenders.[2] These arguments predict that the inception of CDS trading may lead to less stable firm-bank relationships and result in firms switching to alternative banks or other markets such as public bonds for debt financing.

We examine the lender-switching hypothesis using a comprehensive dataset of single-name CDS trading and loan and bond issuance from 1994 to 2012. Consistent with above conjecture, we find that firms are more likely to switch away from their existing bank lenders after the inception of CDS trading on their debt. It is possible that increased credit risk may lead to the onset of CDS trading as lenders seek hedging instruments, while at the same time, borrower credit deterioration can destabilize the firm-bank relationship and lead to bank switching. We account for this possibility by conducting a matching analysis with alternative sets of matching criteria, following Ioannidou and Ongena (2010), and continue to find significantly more switches of lenders after CDS introduction.[3] Moreover, our evidence shows that the CDS effect is more pronounced for financially constrained firms, which makes sense because they incur larger monitoring costs and face higher hold-up costs due to capture by their current banks.

The CDS effects on the lending relationship should be positively associated with the actual usage of CDS by the lending banks. Not all lending banks take part in CDS contracts on their borrowers' debt. If a bank does not take positions in its borrower's CDS contracts, then its incentives for monitoring should not be directly affected by the mere existence of CDS contracts in the borrower's name. We extract CDS usage information for lead lenders of our sample loans from the Federal Reserve's Consolidated Financial Statement of Holding Companies and the quarterly report on bank derivative activities prepared by the Office of the Comptroller of Currency (OCC), and find that, among CDS-referenced firms, those that have previously borrowed from CDS-using banks are more likely to switch to a different lead bank for their new loans than those that have previously borrowed from non-CDS-using

[2] Some borrowers put lenders on a blacklist for this reason. See, for example, "the blacklist that rules Wall Street's loan market", *Bloomberg*, December 18, 2014.
[3] We also consider other approaches to addressing the endogeneity problem, such as instrumenting CDS trading with other derivatives hedging by the bank. We explain the details in the empirical section.

banks. Of course, among firms with no CDS contracts in their names, the CDS-using status of previous lead lenders does not matter for the switching decision of the next lender.

If CDS reduce bank monitoring of their borrowers and lead to more borrower switching to new lenders, then banks should charge higher loan spreads to compensate for the possible loss of revenues from the client's switch of a lender in the future. Indeed, we find that loan spreads increase after the introduction of CDS trading on a borrower's debt. In contrast, corporate bond spreads are unaffected by CDS trading, consistent with the view that bond investors play little monitoring role in the first place. Our findings on loan and bond spreads are supportive of theoretical arguments about bank monitoring in the context of CDS (Morrison, 2005).

While CDS contracts usually refer to senior unsecured bonds instead of loans,[4] bonds and loans are linked by cross-default clauses and share the same default events. Contrary to the intuition that corporate bonds are naturally more likely to be affected by CDS trading, bond issuance spreads are not affected by CDS trading. However, further examination of borrowing firms' overall debt structure shows that bond issuance is indeed directly impacted by CDS trading. As one major advantage of bank loans over public debt is related to banks' advantage in delegated monitoring (Diamond, 1984), if CDS affect banks' monitoring incentives, this key advantage would diminish, making financing through public bonds more attractive. We follow Becker and Ivashina (2009) and employ a choice model by examining firms that have positive debt financing demand in a given quarter. We find that firms are more likely to substitute corporate bonds for bank loans as debt financing after the onset of CDS trading. Aggregating loan and bond issuances by firm-quarter, we show that CDS-referenced firms issue more bonds relative to loans. We also calculate a borrowing firm's fraction of bank debt out of their total debt. Consistent with the flow measure (new issuances), bank debt ratios decline significantly after CDS introduction. In a joint analysis with a multinomial logit model, we find that both types of switches, switch between banks for loans and switch from loans to bonds, increase appreciably after CDS introduction.

[4] A small loan CDS market has developed only recently.

The role of banks is prevalent in major theories on the implications of CDS trading. For example, Bolton and Oehmke (2011) argue that CDS can serve as a commitment device for banks to be tough negotiators and help deter strategic default. Parlour and Winton (2013) discuss the implications arising from creditors reducing monitoring of their borrowers when they can buy CDS protection. Therefore, it is important to clearly understand the role of banks in the CDS market. Our empirical results on banking relationships are useful for evaluating these theoretical models on CDS and shed light on "the social benefits and costs of credit default swaps" discussed by Stulz (2010).

The CDS effect documented in this study is new and different from what has been shown in the literature, especially the empty creditor problem.[5] The empty creditor theory predicts a higher bankruptcy risk for borrowers, as documented by Subrahmanyam, Tang and Wang (2014), which may result in a shift from bonds to bank loans because higher credit risk borrowers use loans more than bonds (Denis and Mihov, 2003). Additionally, the empty creditor theory would predict both higher loan spreads and higher bond spreads because riskier firms should face higher pricing by *all* creditors. On the other hand, if CDS trading carries useful information for bank lenders, then we expect a lower loan rate after CDS trading because banks lower their interest rate upon major information revelation on their borrowers (Hale and Santos, 2009). However, our findings concerning loan spreads are the opposite. We argue that the information revelation effect of CDS documented by Batta, Qiu, and Yu (2016) should be more relevant for bonds as improved information quality should lower bond spreads (Yu, 2005). In contrast, banks have access to corporate insiders and are less reliant on public information quality. Thus, changes in loan spreads are hardly explained by the information channel. While the implications drawn from the risk story and the information channel are inconsistent with our observations, neither the empty creditor problem nor information revelation is driving our findings on bank loans. Instead, our findings are consistent with the changing monitoring role of banks in the presence of CDS contracts, as modeled by Arping (2014) and Parlour and Winton (2013), which would affect bank lending relationships.

[5] See Augustin, Subrahmanyam, Tang, and Wang (2014) for an overview. Bolton and Oehmke (2013) discuss strategic behavior in the CDS market.

The remainder of the paper is organized as follows. We review the extant literature and develop testable hypotheses in Section 2. Section 3 describes the data and the sample construction. Our main findings on how CDS affect bank lending relationships are presented in Section 4. Section 5 discusses the impact of CDS on firms' debt structure. We conclude the paper in Section 6.

2. Related Literature and Hypothesis Development

One advantage of bank financing is that a bank lender can produce information about a borrowing firm through direct interactions with the borrower and use it in credit decisions (Diamond, 1984), but diverse bondholders cannot engage in similar monitoring efforts. Both borrowers and banks can benefit from a durable lending relationship. Borrowers can benefit from a larger credit supply, a lower cost of debt, and even better corporate governance from monitoring by bank lenders (Petersen and Rajan, 1994; Dass and Massa, 2011). The lending relationship may also benefit lenders, including non-banking businesses (Bharath, Dahiya, Saunders and Srinivasan, 2007). Nevertheless, there are potential disadvantages of bank lending relationships. For instance, Rajan (1992) highlights that bank lenders can have bargaining power over a borrower's profits and thus create distortions in the firm's investments.

Although CDS provide lenders with an opportunity to hedge credit risks, this capability of credit risk transfer may reduce banks' incentives to monitor and foster a relationship with the borrower, ultimately shifting relationship banking toward transaction-oriented banking (Morrison, 2005; Parlour and Plantin, 2008). The separation of cash flow risk from control rights resulting from buying CDS on loans creates an empty creditor problem such that banks become less interested in renegotiating debt with a firm when a CDS market is available (Bolton and Oehmke, 2011). These effects of CDS on bank lenders' incentives may be reflected in the firm-bank relationship, as firms could become more active in searching for new lenders when CDS are traded in their names. Contrary to the conventional wisdom of CDS helping banks retain clients, this argument leads us to the following hypothesis:

Hypothesis 1. *Borrowers are more likely to switch to new lenders after the introduction of CDS trading on their debt, ceteris paribus.*

In addition to switching to a different lender, firms may choose to raise debt capital from the public bond market. To better understand the CDS effect on the choice of lenders and debt types, we first examine firms' cost of debt. If the economy of scale exists in information production, firms that have a close relationship with financial institutions should, *ceteris paribus*, have a lower cost of capital (Peterson and Rajan, 1994). If CDS reduce bank monitoring, banks may require a higher loan spread to compensate for the potential risk that may arise from relaxed monitoring. Indeed, Parlour and Winton (2013) argue that banks may create riskier borrowers when they reduce the monitoring of their borrowers after buying CDS on them. On the other hand, an unstable lending relationship could lead to more expensive credit for the borrower because the credit supplier expects to gain less from future business and will attempt to maximize current period returns. However, this effect may be muted in the bond market because corporate bonds are diversely held and monitoring is less relevant for bond investors in the first place. Ashcraft and Santos (2009) and Hirtle (2009) find mixed evidence on how CDS affect the cost of debt. This empirical gap motivates us to test Hypothesis 2:

Hypothesis 2. *For CDS-referenced firms, their loan spreads are higher, ceteris paribus, after the onset of CDS trading. In contrast, their bond spreads do not increase, ceteris paribus, after the onset of CDS trading.*

The consequence of differential monitoring incentives of lending banks and bond investors can be the deciding factor for the choice between bank debt and public debt from a borrowing firm's perspective (Diamond, 1991). Bank lenders are better informed and more effective in monitoring than bondholders (Rajan, 1992), but if banks' monitoring and renegotiating incentives are attenuated by CDS, a major advantage of bank debt over public debt would diminish, making bank lending less attractive.

Acharya and Johnson (2007) document information spillover from the CDS market to the publicly traded equity market. While CDS trading is less likely to reveal useful information to bank lenders because they have already gathered borrower information from their past lending experience, their participation in the CDS market may allow CDS trading to provide useful information for the firm's bond investors. Thus, the improved information transparency can help mitigate agency costs and other frictions in the bond underwriting process and promote liquidity in the bond market, and hence reduce the cost of capital for bond issuance. The differential impact of CDS trading on information revelation in the private and public debt markets may further reduce the advantage of bank financing, thus inducing more borrower shifts to the bond market.

Therefore, borrowers may react to the increased costs of bank financing and issue public debt to limit relationship banks' monopoly power. This leads to the following hypothesis.

Hypothesis 3. *Firms with positive debt financing need are more likely to finance through public debt after the onset of CDS trading than before, ceteris paribus.*

Our study of the effects of CDS trading on borrowers' choice between public and private debt is new to the literature. Industry anecdotes and academic studies suggest that CDS provide hedging opportunities and may increase the credit supply to borrowers (Bolton and Oehmke, 2011; Hirtle, 2009; Saretto and Tookes, 2013); however, the question of how CDS affect firms' debt financing choice between bank debt and public bonds remains unanswered. Our empirical analysis below will provide evidence to address these questions.

3. Data and Sample Construction

We employ several datasets that include single-name corporate CDS transactions, loan and bond issuances, and characteristics of corporate borrowers for the empirical analysis. We merge the CDS transaction information for *individual* U.S. publicly listed firms with the loan/bond issuance information.

The dataset on loan and bond issuances contains information on individual loans and bonds with the contract terms at origination, including lender identity for loans, issue size, spread, maturity, and security status. We also collect information about firms' debt structure on a quarterly basis during the sample period.

3.1. Data on CDS Referencing Individual Borrowing Firms

To investigate the effect of CDS trading, we first need to determine whether CDS contracts referencing a borrower's debt exist at the time of loan issuance. We use two major datasets on CDS transactions: CreditTrade and GFI Group. The CreditTrade data cover the period from June 1997 to March 2006; the GFI data cover the period from January 2002 to April 2009. The overlap of the two datasets allows us to perform a crosscheck to ensure data accuracy. We further validate the data by using Markit quotes. The CDS data allow us to observe the transactions on the CDS contracts referencing a particular firm's debt, including the time stamp. Following Subrahmanyam, Tang, and Wang (2014), we use the first CDS transaction record appearing in the data in the name of a firm as its CDS introduction date.

The data also contain information about daily CDS transactions, which allow us to construct measures for CDS market liquidity. In total, we identify 921 U.S. firms with debt referenced in CDS trades and quotes from June 1997 to April 2009. Those firms account for 8.1% of the total number of unique borrowers during the same period and account for 54% of the total market capitalization.[6]

3.2. Loan Issuances and Lender Information

Our loan issuance data are derived from Thompson Reuters' Dealscan database. We collect loan issuance information from the tables "Facility" and "LenderShares". We conduct the analysis of lending relationships at the loan facility level because the main information that we use to construct the lending

[6] The percentage of CDS-referenced borrowers out of all borrowers in terms of total market capitalization increased sharply during the sample period. It started at 18.3% in 1998 and rose to 83% in 2007. We link the Dealscan firms to Compustat to obtain firm financial data. Because not all firms can be matched with a Compustat ID, this link may be incomplete. Thus, we check this ratio using the entire Compustat sample as well. The percentage of market capitalization of CDS-referenced firms among all Compustat firms increased from 16.2% in 1998 to 68% in 2007 before declining after the 2008 global financial crisis to 61.5% in 2014.

relationship measure, lender identity, is reported at the facility level. Other loan-level control variables, including loan issuance amount, all-in-drawn spread, maturity and security, are also reported at the facility level. We merge the firm financial information from Compustat/CRSP with Dealscan loan records by using the updated link file provided by Chava and Roberts (2008). This matching procedure produces a dataset of 106,772 loan deals during the 1994-2012 period.[7] We read into the loan type information provided in Dealscan and delete those with the types "fixed-rate bond", "other bond", "guarantee" and "undisclosed", as these deals are actually bond issues or other types of issues for which we cannot identify whether they are corporate loans. For a similar reason, we further delete data entries with the distribution methods "syndication (Bond)", "Undisclosed (Bond)" and those that are missing. These selection criteria leave us with 96,557 loan deals. Because our data cover CDS transaction information for individual U.S. corporate names, we restrict the sample to issues that are denominated in US dollars and that originated within the United States. This process yields a sample of 55,815 observations. We exclude financial firms (SIC 6000-6999), utilities firms (SIC 4900-4999), and small firms with book assets below 5 million US dollars.[8] This step leaves us with 38,154 observations. Finally, we exclude observations with missing loan amounts or with obvious data entry errors for the loan amount. Our final sample includes 36,278 loan deals issued by 15,508 corporate borrowers during the period from 1994-2012.

Some data entries have missing lender information such as the name of the lending bank or finance company, which is crucial for our study. We exclude observations with missing loan characteristics (such as lender information, loan amount, spread, maturity, and security status) from our multivariate regression analysis. Observations with missing firm financial data in the quarter prior to loan initiation, including total assets, cash-to-total assets ratio, current ratio, book leverage, market-to-book ratio, return-on-assets ratio, and Altman's Z-score, automatically drop out of the multivariate analysis. For the analysis of lender

[7] The reliable Dealscan-Compustat link information provided by Chava and Roberts (2008) is updated to 2012.
[8] Small firms do not represent a meaningful comparison with CDS-referenced firms because the latter are usually large. Moreover, very small asset values lead to outliers in financial measures such as return-on-assets ratios, which substantially bias the multivariate analysis; thus, it is appropriate to exclude them in the sample.

switching, we start with the second loan of each firm because we can observe whether this loan involves a lender switch or not. Our base regression sample thus contains 22,818 loan issuances.

We extract lender information for each loan facility from the "LenderShare" table in Dealscan. For syndicate loans, we are mainly interested in the lead lenders because they collect information about the borrower and set the loan contract terms, and they are the ones with a primary lending relationship with the borrower. Participant lenders do not have a direct relationship with the firm; instead, they have syndication relationships with the lead arranger (Esty, 2001). Therefore, we consider a change of lead lenders as firms' switching of lenders. We refer to a field in Dealscan called "Lead Arranger Credit", which takes values of either "Yes" or "No" for every lender, to identify syndicate lead arrangers. Having identified the lender information for each loan issuance, we are able to observe a borrower's choice of lenders and to investigate whether the borrower's CDS status affects the choice.

Table I shows the distribution of loan issuances by year. The number of loan issuances fluctuates over the years and bottoms at 692 in 2009, while the deal size measured by facility amount steadily increases. The average loan size measured at the facility level rose from $189 million in 1994 to $546 million in 2007, dropped to $418 million in 2008 and recovered to $604 million in 2012. Our sample includes many relatively small borrowing firms, whereas Saretto and Tookes (2013) restrict their sample to S&P 500 firms. Among the 36,278 Dealscan syndicated loans, 6,284 are made to 605 firms that have CDS referencing their debt at some point during the sample period ("CDS Traded"), and 4,990 loans are made to 572 CDS-referenced firms (i.e., those with active CDS trading at the time of loan syndication/closing).

Panel A of Table II presents summary statistics for sample loans and borrowers. The average issue size and all-in-drawn spread for the whole sample is $302.5 million and 215.6 basis points, respectively. Most of our sample loans have maturities of between 2 and 5 years, with the average loan maturing in 4 years. In addition, 85% of the loans are secured with collaterals, 27% of the loans are "sole-lender" loans, and 73% are syndicate loans with more than one lender. The average number of lenders for the loans is 7, and the average number of lead lenders is 1.3. The average book value of assets for our sample of

borrowing firms is $4.8 billion. We obtain Standard & Poor's long-term issuer ratings from Compustat and merge them with our sample of borrowers. In total, 44% of our sample borrowers are rated, and approximately half of them (21%) have investment grade ratings (BBB- and above).

3.3. Corporate Bond Issuances

Our corporate bond issuance sample is obtained from the Mergent Fixed Income Securities Database (FISD) for the same period of 1994-2012. We extract deal size, spread, maturity and security status for each bond issue from FISD. FISD reports the bond spread, which is calculated as the bond yield less the contemporaneous Treasury rate matched on maturity. We keep only U.S. corporate debentures with bond type "CDEB" in FISD. Similar to the loan sample, we also require bond issuers to have a non-missing identity in Compustat so that we can match the issuer ID to the Compustat/CRSP firm ID and obtain financial information for them. This process yields a sample of 12,616 bond issuances. Applying the same criteria for the sample selection as for loans, we delete firms from the financial and utility sectors and firms with book assets below $5 million. Our final sample of corporate bonds includes 7,665 issuances by 1,574 U.S. firms. Out of the 7,665 bond issuances, 4,395 are by 449 CDS firms (firms that have ever had CDS trading), and 3,029 are by 392 CDS-referenced firms (firms that have CDS trading at bond issuance). Similar to the pattern for loans, the average bond issuance amount steadily increased from $200 million in 1994 to $610.2 million in 2012.

Panel B of Table II summarizes bond and issuer characteristics. The average issuance amount is $413.1 million, and the average spread is 250.2 basis points. A majority of the bond issues mature in 7 to 10 years. The average bond issuers are larger than the average loan issuers. The average book assets for bond issuers in the sample is $16.4 billion. Bond issuers on average also have better credit ratings than bank loan borrowers. In total, 87% of the issuers have an S&P long-term issuer rating, and 64% of those rated have investment grade ratings.

4. CDS Trading and Bank Lending Relationships

In this section, we empirically test how the availability of CDS in a firm's name affects the firm's relationship with its lending bank. We are primarily interested in the effect of CDS trading on firms' decision to switch to a new bank, as switching lenders is a deciding moment in a firm-bank relationship. We also discuss how the effect varies with borrower characteristics and lenders' CDS usage status.

4.1. CDS Trading and Borrower Switches to New Lenders

Our key dependent variable is the indicator "switch" for the bank-borrower pair, which measures whether the loan is granted by a bank from which the firm has never borrowed money in the past. Specifically, the "switch" dummy takes the value of one if one or more lead lenders of a new loan are new to the borrower and zero otherwise, as we can identify whether a bank has acted as the lead lender for a borrowing firm for the first time based on the lender name and ID information from Dealscan. In the Internet Appendix, we employ three alternative measures of lender switch, following Ioannidou and Ongena (2010), and find that our main results are robust to using the alternative measures.

We use a difference-in-differences estimator to examine the CDS effect on firms' switching to new bank lenders. The first difference is between firms whose debt is ever referenced by CDS contracts sometime during our sample period ("*CDS Traded*" = 1) versus firms whose debt is never referenced by CDS contracts during the sample period ("*CDS Traded*"=0). We use the dummy *CDS Traded* to account for potential unobservable factors that may drive systematic differences between CDS firms and non-CDS firms. The second difference is for CDS firms after CDS trading begins ("*CDS Trading*" = 1) versus before CDS trading begins ("*CDS Trading*"=0). *CDS Trading* is the key independent variable of interest, and it equals one if the issuer has been used as a reference entity in a CDS contract before the loan origination and zero otherwise.

Because a firm's decision to switch lenders can be jointly determined with loan conditions such as loan amount, spread, maturity and security status, we include these loan characteristic variables in the regression model specification. A switch decision may also be affected by the current lender base. We include two indicators representing the current loan's lender composition and concentration. One is

Multiple Lenders, which is a dummy that takes the value of one if there is more than one lead lender in the loan facility. The other is *Primary Lender*, which is a dummy that takes the value of one if one lead lender takes more than a 50% share in terms of the loan amount. A switch decision is also affected by firm-level financial conditions and other characteristics, so we extract a set of firm characteristic variables that are measured at the end of the prior quarter and incorporate them in the specifications. The set of variables includes the logarithm of total assets, market-to-book ratio, current ratio, cash-to-total assets ratio, leverage, return-on-assets ratio and Altman's Z-score. We also include an indicator for whether the firm has an S&P long-term issuer rating ("Rated") and an indicator for whether the firm has a rating of BBB- or better ("Investment Grade"). We account for loan origination year fixed effects and borrower 1-digit SIC industry fixed effects in all specifications. Specifically, we estimate the following panel regression:

$$\text{Switch}_{\text{it}} = \alpha + \beta_1 CDS\ Trading_{it} + \beta_2 CDS\ Traded_j + \gamma_1 X_{1it} + \gamma_2 X_{2jt-1} + \gamma_3 \lambda_t + \gamma_4 \mu_k + \epsilon_{\text{it}} \quad (1)$$

where subscript i denotes the loan issuance; j denotes the borrowing firm; t denotes the quarter of loan issuance; and k denotes the 1-digit SIC industry that the borrower belongs to. Thus, X_{1it} refers to the loan characteristic variables, and X_{2jt-1} refers to the borrower characteristic variables at the prior quarter end. λ_t and μ_k denote the loan initiation year and borrower industry fixed effects, respectively. Because *CDS Trading* and *CDS Traded* are correlated, we exclude *CDS Traded* to form alternative specifications in separate regressions.

[Insert Table III about Here]

Table III reports the results of estimations that examine how the availability of CDS contracts on a borrower affects borrowers' switching to new lenders. The coefficients of *CDS Trading* are positive and significant in all specifications. Based on the coefficient in Column 1, on average, a firm is 6.7% more likely to switch to a new lead lender if it has CDS trading in its name at the time of loan initiation. Because "*CDS Trading*" is designed to capture the time-varying effects resulting from CDS introduction,

the positive coefficients highlight an increase in the likelihood of switching compared with the case where CDS trading has not started yet.

The coefficients of "*CDS Traded*" are negative and significant, indicating that the firms that have CDS contracts in their names at some point in time are, as a group, less likely to switch to new lenders compared with the other firms that have never been referenced with CDS. Because those CDS firms tend to be large in size, this result is consistent with the findings in the existing literature that smaller firms are more likely to switch banks (see, e.g., Ongena and Smith, 2001; Farinha and Santos, 2002). Column 2 shows a smaller effect from CDS trading if "*CDS traded*" is excluded from the regression. This result further corroborates our finding that the observed higher likelihood of switching is not driven by factors that select a firm into the group of firms with CDS. Instead, the effect reflects time-varying changes associated with the onset of CDS trading.

The findings from Table III suggest that CDS trading significantly affects the firm-bank lending relationship. Firms' decision to stay with their current lenders is an equilibrium outcome that weighs the benefits versus the costs of maintaining the firms' current lending relationship. When hedged with CDS in a borrower's name, the lender's cash flow rights from the loan are protected, and thus the lender may not have the same incentives to monitor and maintain an accommodative relationship with the borrower as before. This diminishes the value of the firm-bank relationship, leading the firm to seek alternative lenders.

Because the dependent variable, "switch", is a dummy variable that takes either 0 or 1, we conduct probit regressions in columns 3 and 4 for robustness. As column 3 shows, the effect of CDS trading remains positive and significant when the CDS firm fixed effect is controlled for. In addition, we employ alternative measures for borrower switches to new lenders to conduct the analysis.[9] We also employ an alternative sample of loans by incorporating loans denominated in foreign currencies or that originated

[9] We follow Ioannidou and Ongena (2010) and construct three alternative measures for "switch". "Switch Measure 1" takes the value of one if the firm chooses a bank as the lead lender for the first time or if a firm chooses a bank multiple times but it has been more than 12 months since the last lending relationship. Measures 2 and 3 are constructed in a similar way, except the cut-off is changed to 24 and 36 months, respectively.

outside the US, as we do not expect the effect of CDS on lender switching to be different for foreign loans and foreign issuers. We report the regression results in Table IA1. Overall, the effects of CDS trading are qualitatively unchanged.

A caveat in interpreting the CDS effect on lender switching is that the increased likelihood of switching could be driven by some confounding factors that are associated with the onset of CDS trading. For instance, the increased credit risk associated with CDS may lead to unstable firm-bank relationships; at the same time, it also increases lenders' demand for hedging and is thus positively associated with the likelihood that CDS contracts on the firm start to trade. Thus, the observed positive impact of CDS on switching could be driven by spurious factors. Therefore, accounting for this endogeneity issue is crucial for interpreting the CDS effect on borrowers' lender switch behavior. We employ a matching procedure to address this issue.

[Insert Table IV about Here]

We employ both one-to-multiple and one-to-one matching. Our aim is to form a sample of CDS-referenced firms ("CDS firm") and matched non-CDS-referenced firms (firms that are never named in a CDS contract, "non-CDS firm") with similar credit risk, so that the effects of credit risk would be well controlled for. To form the first group of matching loans, we require loans issued by CDS firms and non-CDS firms to be originated in the same year, denominated in the same currency and originated in the same country. The borrowing firms should also belong to the same 2-digit SIC industry. At the firm level, the most important matching criterion is credit risk, which can be proxied by the S&P long-term issuer rating. We require that a CDS firm and its matched non-CDS firm carry the same credit rating at the time of loan initiation. This matching process leaves us with 4,934 loans issued by CDS-referenced firms matched to 76,279 loans issued by non-CDS firms.[10] Next, we compare the tendency of switching between loans issued by CDS firms and their rating-matched non-CDS firms. The difference in switching tendency is captured by the coefficient of CDS trading. As Column 1 of Table IV shows, loans issued by

[10] In this matching process, one CDS loan can be matched to multiple non-CDS loans, and one non-CDS loan can be matched to more than one CDS loan, so the total observations exceed the baseline sample.

CDS-referenced firms are 2.1% more likely to involve new lead lenders than loans issued by their matched non-CDS firms.

In the second column of Table IV, we add firm size as an additional matching criterion because firm size measures financial constraints and is a deciding factor for many other aspects of the firm. We select from the group of non-CDS firms the one with the closest book assets to the CDS firm and examine the loans issued by the matched non-CDS firms in comparison to those of the CDS firms. We impose the same matching criteria (loan origination year, country of origination, denominated currency, borrower industry and credit rating) that we used in the first model on the sample of matched loans. This step leaves us with 4,529 loans issued by CDS firms with the loans issued by their one-to-one matched non-CDS counterparts. The difference in the tendency of switching between the treatment and the matching groups is statistically significant at the 1% level.

In Column 3, we match on additional firm characteristics. When we match on multiple firm characteristics, we first calculate the differences in each matching variable between CDS firms and their matching candidates. Then, we rank the differences and sum the ranks across the variables. For each CDS firm to be matched, we sort all candidates by their total rank and select the one with the smallest total rank number as the matching firm. In Column 4, we add more loan characteristics as matching criteria, including loan amount, spread, maturity and security status, and we apply the same procedure as in Column 3 to select the matching firm and form the matched sample of loans. In the last column, we consider the impact of lender base and include the number of lead lenders in the matching criteria. In the matched samples we use for Columns 3 to 5, the coefficients of CDS trading remain positive and significant. Overall, firms with active CDS trading on their debt switch lenders more frequently than their otherwise similar counterparts without CDS trading.

Alternatively, we employ the instrumental variable approach to address endogeneity concerns. Complying with the relevance and exclusion requirements for IVs, we follow Hirtle (2009) and construct *Other Derivatives for Trading Purposes/Loan Amount* as the instrument. This variable represents the notional dollar amount of outstanding derivative contracts other than CDS held for trading purposes

averaged across banks that acted as a firm's lead lenders in the past five years, scaled by the amount of the loan. This variable is highly correlated with CDS trading, as Column 1 of Table IA2 shows, which suggests that banks that use one type of derivative are likely to take positions in other types of derivatives as well. In addition, this ratio measures the firm's past creditors' trading activities, which should not directly affect firms' choice of lenders for the *current* loan. The second-stage regression with the fitted value of CDS trading is reported in Column 2 of Table IA2. The results remain qualitatively unchanged from our baseline finding.

The magnitude of CDS effects should depend on CDS market liquidity. The more liquid the CDS market is, the easier it is for lenders to find a feasible contract to enter into, and therefore the more likely it is that the firm-bank relationship is affected. We use CDS trading volume in a given quarter to measure CDS market liquidity for each CDS-referenced firm. By aggregating the number of transactions by firm-quarter, we obtain the number of CDS trades for each index firm and use it to replace "CDS Trading" in the multivariate analysis. The regression results are reported in Column 1 of Table IA3, which shows that, on average, a one-standard deviation increase in the number of CDS trades is associated with a 0.5% increase in the likelihood of switching.

4.2. Borrowers' Financial Constraints and the CDS Trading Effect

Thus far, we have shown that CDS affect the firm-bank relationship by inducing firms to turn to new lenders. The increased tendency of switching could be a consequence of the current lending relationship becoming less valuable. The magnitude of this CDS effect should vary with firm characteristics that determine a firm's willingness and ability to find a new lender. On the one hand, the theoretical literature, including Diamond (1991), argues that firms with poor credit ratings benefit most from the monitoring services provided by banks. If CDS reduce bank monitoring, firms that benefitted more from monitoring before should be affected more strongly. Hence, financially constrained firms should have a stronger incentive to leave their current lender and find new lenders when CDS are in place. On the other hand, however, firms that have a strong balance sheet and cash flow should find it easier to shift to a new lender, while the opposite should be true for firms that are in a weaker financial condition.

Therefore, whether CDS make financially constrained firms more or less likely to switch lenders is an empirical issue.

[Insert Table V about Here]

To answer this question, we conduct the bank switch regressions for two sub-samples: financially constrained firms and unconstrained firms, which are determined by the 50% cut-off of return-on-assets ratio across firms.[11] The larger coefficient of CDS trading in Column 1 in comparison to that in Column 2 shows that the CDS effect on lender switching is more pronounced for financially constrained firms. If CDS increase the opportunity cost of bank monitoring, the effect should be stronger for firms that are more costly to monitor. Financially constrained firms are closer to bankruptcy and thus require more intense monitoring from their lenders. Moreover, firms that are closer to default face more severe debt-equity conflicts. To protect themselves from possible shareholder exploitation, creditors have to exert more monitoring effort to mitigate the problem. Therefore, financially constrained firms are expected to have larger monitoring costs. When banks have an opportunity to reduce monitoring, they will reduce their monitoring efforts more for financially constrained firms. From a borrower's perspective, lenders' position can be strengthened by holding CDS, which enables lenders to extract more informational rents from their locked-in borrowers. Such an effect may be more pronounced for financially constrained firms because they have little bargaining power. Therefore, these firms will have a stronger incentive to switch.

Alternatively, we conduct the analysis using the whole sample and adding an interaction term of the indicators *Financially Constrained* and *CDS Trading*. We define *Financially Constrained* as firms with a return on assets below the 50% cut-off of firms that have a loan initiation in the same quarter. Column 3 of Table V shows that the interaction takes a positive and significant loading in the lender switch regressions, meaning that CDS increase the tendency of switching to new lenders to a greater extent for financially constrained firms. The standalone variable, *Financially Constrained*, also takes a positive loading. This result is consistent with Ongena and Smith (2001), who document that firms that are most in

[11] We also use alternative measures of financial constraints and find similar results.

need of bank financing maintain shorter bank relationships and switch faster. The main message of Column 3 is consistent with that from Columns 1 and 2.

Firms can benefit from lower financing costs associated with turning to a new lender. Ioannidou and Ongena (2010) document that new banks initially charge a lower loan rate and increase it as the relationship gets longer, consistent with the view that bank relationships create hold-up costs. We find similar results in our sample. As Table IA4 shows, the loan amount (scaled by firm assets) increases and all-in-drawn spreads decrease after switching. Such effects are stronger for financially constrained firms, as shown in Columns 3 to 6. Comparing the coefficients of "Switch" in Columns 3 and 5, we find that the loan issuance amount scaled by total assets increases significantly more (by 0.022) for financially constrained firms after switching, and the loan spread at issuance decreases more for financially constrained firms by 5.7 bps. This finding suggests that financially constrained firms may have benefited more from lender switching in future loan issuances in terms of quantity and pricing. Our findings are also consistent with Shan, Tang and Winton (2016), who document that CDS may benefit borrowers by loosening the initial loan contract terms, and the loosening effect is stronger for financially stronger borrowers. Because financially weak firms benefit less from contract loosening, they may switch to new banks for better terms in future loan financing.

4.3. Banks' CDS Usage and their Lending Relationships

The interpretation of our findings so far hinges on the assumption that the lender indeed uses its borrower's CDS. If a firm has CDS contracts in its name and the lending bank takes no position in those contracts, then the bank is not using CDS to hedge its exposure to the firm and its monitoring incentive should not be affected. However, a bank's credit derivative position related to a particular name is confidential information that is not observable to us. As an alternative, banks' aggregate credit derivative activities are observable and can be used to proxy for banks' CDS usage on their borrowing firms. At least, we will know that a bank is definitely not using CDS if it is not engaged in the credit derivative markets in any way. It is expected that any effect of borrower CDS should be stronger when the lead bank is indeed taking non-zero CDS positions. The reasoning is that a CDS-using bank is more likely to take a

position in its borrower name-referenced CDS. In particular, we expect that the lending relationship is more likely to be affected if the lender is a CDS-using bank.

Our primary source of bank CDS position data is the Federal Reserve Consolidated Financial Statements for Holding Companies ("FR Y-9C").[12] Banks with more than $150 million in assets are required to file FR Y-9Cs (the threshold increased to $500 million in 2006). We manually match an RSSD ID in the bank dataset to the name of a lead lender in Dealscan to identify a list of lending banks that use CDS in a given quarter.[13] We ensure that the matching is performed in the same year to account for possible bank name changes. Dealscan lenders cover both US and non-US banks, while CDS position data for foreign banks are not available from FR Y-9C filings. Thus, we collect additional bank CDS position data from the Quarterly Report on Bank Derivatives prepared by the Office of the Comptroller of the Currency (OCC). This report includes U.S. subsidiaries of large foreign banks and documents the top banks with the largest credit derivative positions every quarter beginning in 1998, whether or not the bank is domiciled in the US. Both the FR Y-9C filings and the OCC reports provide aggregate CDS positions and positions held by banks as beneficiaries ("bought") or guarantors ("sold"). We crosscheck the CDS position data covered by the two datasets and find that they are consistent with one another. Based on the quarterly CDS positions held by banks reported in the FR Y-9C and OCC reports, we define banks that have non-zero CDS positions at loan origination, either a long position or a short position, as "CDS-using banks".[14] Banks with no CDS position at loan origination are denoted as "non-CDS-using banks".

[12] http://www.chicagofed.org/webpages/banking/financial_institution_reports/bhc_data.cfm. Our sample does not include thrifts, which are regulated differently from bank holding companies in the U.S.

[13] There are thousands of unique lenders in the Dealscan dataset in our sample period (although some different names actually refer to the same bank), so we use a text matching method. We perform a rough matching on the key words in bank names across the two datasets, Dealscan and FR report, and we calculate a score ranging from 0 to 1 for each matched pair. Higher scores represent more overlapping letters across the two names and therefore mean that the matching is more precise. Pairs with scores equal to 1 are exact matches. For those with scores lower than 1, we visually examine the names and retain those that are reasonably matched. Sometimes we search online to ensure the match is performed correctly. In this way, we identify 308 CDS-using lending banks out of 1,348 unique lending banks in our sample.

[14] The banks act as the beneficiary for long positions, which are specified by the variable BHCKC969 in the FR Y-9C report and the "CDS bought" column in the OCC report. The banks act as the guarantor for short positions, which are specified by the variable BHCKC968 in the FR Y-9C report and the "CDS sold" column in the OCC report.

Table VI shows the estimation results. The dependent variable is "termination", which is a dummy that takes the value of one if the firm no longer uses the lead bank of its prior loan in its current loan. The independent variable is *CDS-using Bank Past Loan*, which is a dummy that takes the value of one if the lead lender of its prior loan is a CDS-using bank. We conduct the analysis for two sub-samples based on borrower CDS availability: CDS-referenced firms and their one-to-one *matched* non-CDS-referenced firms. The former refer to firms that have CDS referencing their debt at the time of loan initiation. Because there are more non-CDS firms than CDS firms in our sample and CDS firms are usually larger in size, we pair each CDS firm with a non-CDS firm by matching on 2-digit SIC industry code and book assets. This matching exercise helps us mitigate the concern that the observed effects could be driven by significant differences in firm size between the two groups. We expect no effect of past lender CDS status on "termination" for the non-CDS group.

Consistent with our expectation, in Column 1 of Table VI, the coefficient of *CDS-using Bank Past Loan* is positive and significant for the sample of CDS-referenced firms, suggesting that a CDS-referenced firm is more likely to terminate the lending relationship with a CDS-using bank. In contrast, Column 2 shows that past lender's CDS status does not matter if a borrower does not have CDS contracts available in its name.

Overall, our analysis shows a positive relation between borrower CDS availability and tendency of borrower switching to new lenders. A lending relationship is more likely to be affected when the lead lender is using CDS. We interpret these findings as a consequence of diminished bank monitoring and reduced lender commitment to any ex-post actions, such as renegotiation, that can improve the borrower's situation. Theories on lending relationships suggest that a borrower decision to stay in a lending relationship is affected by the trade-offs between the benefits from repeated borrowing (such as a price discount) and the costs of being locked in (Rajan, 1992). When CDS reduce banks' incentive for monitoring, the value of the lending relationship declines, making the cost of staying in the relationship outweigh the benefit. As a result, firms are more inclined to turn to new lenders.

5. Debt Financing Choice between Loans and Bonds

Thus far, we have shown evidence that CDS trading has a material impact on the firm-lender relationship. In addition to bank financing, borrowers can also consider raising external capital from the public bond market, especially if bonds can act as a substitute for loans. We turn to the firm financing choice between loans and bonds in this section, starting with the effect of CDS trading on the issuance costs of loans and bonds.

5.1. CDS Trading and Debt Financing Costs

We first separately examine new-issue credit spreads of loans and bonds. The dependent variables in the regressions are the loan spread and the bond spread at issuance. Loan spread refers to the all-in-drawn spread, which is calculated as the loan rate less the contemporaneous LIBOR matched on maturity. The bond spread is calculated as the gross yield less the contemporaneous Treasury rate matched on maturity. The empirical specification is similar to that in the lending relationship analysis. We regress loan and bond spreads at issuance, respectively, on the "*CDS Trading*" dummy, controlling for the CDS firm fixed effect ("*CDS Traded*"), other loan/bond contract terms specified at issuance, borrower/issuer characteristics extracted at the end of the prior quarter, and fixed effects for issuance year and borrower/issuer industry.

[Insert Table VII about Here]

Table VII presents the estimation results. In Columns 1 and 2, the coefficients of *CDS Trading* are positive and significant, showing an incremental effect of borrower CDS trading on the loan spread at issuance. CDS-referenced firms, on average, issue loans at a higher cost than non-CDS firms by 14 basis points, *ceteris paribus*. This effect is robust to a set of controls, including loan size, maturity, security status, and firm characteristics, which include asset size, profitability, cash holdings, growth opportunity and credit risk. If CDS play a disintermediation role and discourage bank monitoring, lenders may change other loan contract terms such as charging a higher price to compensate for any adverse effects that may arise. Our finding of an increased loan spread after CDS introduction echoes our previous results that CDS destabilize the bank lending relationship.

The incremental effect of CDS trading on the loan spread is also consistent with the empty creditor problem documented by Subrahmanyam, Tang and Wang (2014). Chakraborty, Chava and Ganduri (2015) show that loan announcement returns for CDS firms are muted, while the loan announcement returns for non-CDS firms are positive and significant. Their finding is consistent with ours and can be explained by our results that firms face a higher cost of loans after they become CDS-referenced. A higher loan spread may further increase borrowers' probability of bankruptcy. Anticipating this, the market does not react positively to a CDS firm's loan initiation. Note that we do not aim to rule out alternative explanations for the increased loan spread through the design of the test. Instead, our focus is to present the contrasting effects of CDS on the pricing of loans and bonds, which we will elaborate upon next.

In sharp contrast, the onset of CDS trading does not increase the bond spread at issuance. Instead, Columns 3 and 4 show that there is a negative relation between the inception of CDS trading and the bond spread. On average, the bond issuance spread is lowered by 2.9 bps after the issuer becomes CDS-referenced, although the effect is not statistically significant. In contrast to the case of bank loans, public bonds involve a much larger base of investors for whom monitoring of the borrower is not feasible in the first place. Public bond contracts are also less likely to be renegotiated during the life of the bond. Therefore, the effect of CDS trading on creditor monitoring is much weaker in the case of corporate bonds. The findings with regard to the bond spread present a "benchmark" for us to understand the mechanism underlying the CDS effects on bank loans and corroborate our previous finding concerning the lending relationship.

We conduct an alternative regression on a pool of our sample loan facilities and bond issuances to ensure the robustness of our results. The independent variable of primary interest is the interaction of a loan indicator and the CDS trading dummy. The indicator "Loan" takes the value of one if the observation is a loan issuance and zero if it is a bond issuance. As Table IA5 shows, the interaction term takes positive and significant coefficients, showing that CDS increase loan spreads to a greater extent than bond spreads. Note that the coefficients of the standalone dummy "loan" are negative and significant, suggesting that the average spread for loans is lower than the average spread for bonds in our sample. One reason for this

result is that our sample bonds have longer maturities than loans on average, which further supports our interpretation by ruling out the possibility that the observed increasing loan spread for CDS-referenced firms is driven by our selection of a sample of loans may generally have a higher average spread.

If CDS trading reveals information to the market, then the public bond market should benefit more from information leakage than the private loan market. Indeed, CDS trading may reveal new information to the public (Acharya and Johnson, 2007) and therefore can make bond investors better informed and facilitate the underwriting process. In contrast, banks are sophisticated market participants who already have superior information about borrowers. Banks are likely to have collected proprietary information about their borrowers during the years that they have built relationships with their client firms, and hence are better informed in the first place. Banks are also the major participants in the CDS market. The information advantage of banks may mitigate any informational benefit to them from CDS trading. Therefore, any benefits associated with information leakage from the CDS market should be more useful to public bond investors than banks. Our findings of the contrasting effects of CDS trading on loan and bond spreads seem to support the conjecture that bank loans do not benefit from the informational role of CDS.

5.2. Substitution between Loans and Bonds

Our goal here is to understand how the CDS market affects firms' debt financing choice between loans and bonds which could serve as a contrast to the effect of CDS trading on bank lending relationships. It may also inform us about the impact on firms' debt structure. We start by examining the flow measure: the amount of loan or bond issuance. We estimate a debt financing choice model with the aim of isolating the demand-side effect. Then, we turn to examine a static measure of the ratio of a firm's bank loans to its total debt.

To control for a firm's debt financing demand, we follow the approach adopted by Becker and Ivashina (2014) and construct two alternative firm-quarter samples: one is firm-quarters in which a firm has *at least* one type of debt issuance (either bond or loan, or both) in a given quarter; the other is firm-quarters in which the firm has *only* one type of debt issuance (either bond or loan issuance) in a given

quarter. In this way, we are able to study the supply-side effect by ensuring that we focus on a sample of firms that have positive debt financing demand, which helps us rule out the demand explanation. In the choice model, the independent variable of interest is the *CDS Trading* indicator, and the dependent variable is an indicator that takes the value of one if the firm issues a loan in a given quarter and zero otherwise.

Specifically, we estimate the following debt choice model:

$$\text{Loan}_{\text{jt}} = \alpha + \beta_1 CDS\ Trading_{jt} + \beta_2 CDS\ Traded_j + \gamma_1 X_{jt-1} + \gamma_2 \lambda_t + \gamma_3 \mu_k + \epsilon_{\text{it}} \quad (2)$$

where Loan_{jt} is an indicator that takes the value of one if the firm has loan issuance in a given quarter; j denotes the firm; t denotes the quarterly observation; and k denotes the 1-digit SIC industry that the firm belongs to. *CDS Trading* is a dummy that takes the value of one if the CDS referencing the firm's debt is available for trading in this quarter and zero otherwise. *CDS Traded* is a dummy that takes the value of one if the firm had ever had CDS in its name during the sample period. X_{jt-1} denotes a set of control variables that may affect a firm's debt financing choice.

[Insert Table VIII about Here]

Table VIII presents the regression results. The coefficients of CDS trading are negative and significant across all four specifications, suggesting that firms tend to substitute bond issuance for bank loan financing after the inception of CDS trading. We include CDS firm fixed effects in Columns 1 and 3 and exclude them in Columns 2 and 4. On average, firms are more likely to raise financing in the public debt market by a probability of 2.3% after they become CDS-referenced with CDS firm fixed effects being controlled for. The CDS trading dummy picks up the change in debt financing choice before and after the onset of CDS trading for the *same* firm. Note that for the first sample, the loan indicator captures both the case where the firm issues loans only and the case where the firm issues both loans and bonds. Our second sample allows a finer analysis by limiting the situations that the loan indicator represents. By construction, in Columns 3 and 4, the loan indicator takes the value of one if the firm issues loans *only* in

a given quarter and zero if the firm issues bonds *only*. The marginal effect of CDS trading on the choice of loan financing is slightly larger at 3.1% and is significant at the 5% level.

To ensure robustness and to further explore the effects of CDS market liquidity on firm financing choice between loans and bonds, we replace CDS trading with the number of CDS trades as the independent variable and conduct a similar test. Column 2 of Table IA3 shows that more CDS trades in a borrower's name are associated with a lower likelihood of choosing loan financing with CDS firm fixed effects being controlled for. The magnitude of this effect is economically large.

Our results implies an increased tendency for firms to migrate from the loan market to the bond market for external financing after CDS introduction. CDS provide lenders with a market-based hedging tool that may increase borrowers' lender base. Thus, CDS may make loans more "bond-like" in the sense that bank loans are shared by more lenders than before, similar to public bonds which usually have a massive investor base. Meanwhile, the disintermediation role of CDS lowers the value of maintaining a continuing lending relationship, diminishing banks' specialness and making bank financing less attractive. Although prior studies document that CDS may benefit firms by increasing credit supply, our findings suggest that for the case of bank loans, the costs induced by CDS may outweigh the benefits, leading to firms switching to the bond market.

What is the impact of a firm's propensity for substituting corporate bonds for bank loans due to CDS trading on the firm's debt structure? We now move from an issue-level analysis to a firm-quarter analysis. We aggregate loan and bond issuances by firm-quarter and examine how the total amount of loan issuance is affected by CDS. We scale the amount of loan issuance by the total amount of loans and bonds issued by the same firm in the same quarter and use this ratio as the dependent variable. While this ratio still concerns about the substitution in debt issuance, an alternative measure points to firms' debt structure: the ratio of outstanding loans to total outstanding debt measured at quarter-end.

[Insert Table IX about Here]

Table IX reports the estimation results using the two measures of the bank debt ratio. As Column 1 shows, CDS trading reduces the share of loan issuance out of both debt issuance by 0.041. Columns 3 and

4 show the regression results for the bank debt ratio. As the coefficients of CDS trading show, the marginal effect of CDS trading on the bank debt ratio is 0.081. To alleviate the concern with the endogeneity issue in the difference-in-differences approach (*CDS Trading* versus *CDS Firm*), as discussed before, we again employ a matching approach to minimize the observed differences between CDS and non-CDS firms in order to mitigate the possibility that the marginal effects of CDS are driven by some pre-determined systemic differences.[15] The regression results estimated with the matched sample are reported in Panel B of Table IA6. We observe that the CDS effect remains qualitatively intact.

We interpret firm switches from bank loan financing to bond financing as a consequence of an impacted firm-bank relationship associated with CDS. When the lending relationship becomes less stable, the advantage of bank financing diminishes and financing through public bonds gains popularity. Indeed, we find a negative relation between the tendency of switching to new lenders and the tendency of choosing bank financing. In Table IA7, we regress the relative loan issuance or bank debt ratio on the ratio of the number of loans with switched lenders (out of the total number of loans initiated in the same quarter) and find a significant and negative coefficient of the ratio of switched loans. This implies that the more likely a firm switches lenders, the more likely the firm is to turn to the bond market for financing. The results imply that although switching to new lenders helps improve loan conditions such as quantity and pricing, it still does not make up for the adverse effects caused by CDS on the lending relationship. Thus, CDS may have put bank loans at a disadvantage compared with public bonds.

To analyze the effects of CDS trading on lender switching and on the firm's debt financing choice in a unified framework, we conduct a multinomial regression analysis. In this analysis, the dependent variable is a categorical variable that denotes a firm's different types of debt financing choices. There are four outcome categories in our setting: (i) the firm issues neither loans nor bonds in a given quarter; (ii) the firm issues loans and *does not* switch lenders; (iii) the firm issues loans and switches to a new lender;

[15] Among all firm characteristic variables, difference in asset size is the most pronounced and may have determined the discrepancies in other aspects. Thus, we use size-industry matching to form the control group. In the quarter prior to CDS introduction, we select from non-CDS firms within the same 2-digit SIC industry the firm with book assets nearest to that of the treatment firm. We obtain one-to-one matching firms for 824 out of 873 CDS firms. The matched sample diagnostics are reported in Panel A of Table IA6 of the Internet Appendix.

and (iv) the firm issues bonds only. We choose category (ii), the firm issues loans and *does not* switch lenders, as the baseline category in our estimation.

[Insert Table X about Here]

Table X presents the estimation results. Columns 1 to 2 report the estimated CDS trading effect on the two outcomes concerning firms' debt financing choice that we are interested in. Column 1 shows that the onset of CDS trading is associated with a 0.236 increase in the relative log odds of choosing to switch lenders versus choosing the baseline case, i.e., staying with the current lender. The likelihood of choosing to switch lenders relative to the likelihood of choosing to stay with the current lender is 1.267 (exp(0.236)) This result is consistent with our previous finding that CDS trading increases the tendency of borrower switching to new lenders. Column 2 shows that the inception of CDS trading is associated with a 0.115 increase in the relative log odds of choosing bond financing versus choosing loan financing without switching to new lenders, and the odds ratio for the same indicator of CDS trading is 1.122 (exp(0.115)) for choosing bond financing versus the baseline case. The last column presents how CDS trading affects the relative likelihood of firms not choosing either loan or bond issuance. The negative coefficient of CDS trading shows that the relative odds of choosing neither loan nor bond issuance decrease after CDS introduction. Put differently, firms increase their debt issuance, either loans or bonds, after CDS become available. The analyses from the multinomial regressions help us to quantitatively understand the changes in the likelihood of choosing among different debt financing channels. The regression results are consistent with our findings from the separate analyses examining the lending relationship and the loan-bond choice. That is, firms become more likely to switch lenders when they obtain loans and to switch from loan financing to bond financing after the onset of CDS trading, as a consequence of weakened firm-bank relationships.

6. Conclusion

Credit default swaps (CDS) were invented by banks to manage their credit risk exposure to their borrowers. A popular view is that CDS help banks to retain valuable clients. While prior studies have found that CDS facilitate debt financing and increase corporate leverage, how CDS affect the firm-bank relationship has not been previously studied. In this paper, we document that the onset of CDS trading increases the tendency for firms referenced in CDS contracts to switch to new lenders. The interpretation of this effect of CDS trading is that when banks can use CDS to hedge their credit risk, they become less interested in monitoring, and hence the value of the lending relationship declines. This conjecture is corroborated by the evidence that the effect of CDS trading is stronger for financially constrained firms for whom monitoring may be a more important aspect of the bank lending relationship, and that the tendency to switch away from CDS-using banks is also stronger. Moreover, banks charge higher loan spreads to borrowers after CDS on the borrower's debt become available, and these firms increasingly turn to the bond market to meet their financing needs.

Besides the findings on banking relationship, this study is also the first to examine how the credit derivative market affects corporate debt structures. We show that CDS trading has differential effects on private debt and public bonds. Although firms are more likely to use bonds after CDS trading, bond investors do not charge higher yields for those bonds. Our findings provide evidence about the disintermediation role of CDS in debt financing. Therefore, CDS are not just pure derivative contracts referencing existing debt, to the contrary, they appear to have feedback effects on corporate financing decisions.

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Appendix: Variable Definitions

Variable Name	Description
Loan-Level Variables	
Switch	A dummy taking the value of one if one or more of lead lenders is new to the borrower (the firm has never borrowed money from in the past) and zero otherwise. We also construct three alternative measures of switch: "Switch Measure 1" takes the value of one if the firm chooses a bank as the lead lender for the first time, or if the firm chooses a bank as the lead lender for multiple times, however, it has been more than 12 months after the last relationship ends. "Switch Measure 2" and "Switch Measure 3" are defined in a similar way, except we change the cut-off to 24 months and 36 months, respectively
Loan Amount/Total Assets	The ratio of loan issuance amount at loan facility level relative to the borrower's total assets measured at the end of the quarter prior to loan initiation
Loan Spread	The all-in-drawn spread at the facility-level, measured as loan rate less the contemporaneous LIBOR matched on maturity
Maturity	Maturity in months specified at loan issuance
Secured	A dummy indicating whether the loan is secured by collateral
Multiple Lenders	A dummy taking one if there are more than one lead lenders in the loan syndicate
Primary Lenders	A dummy taking one if one lead lender takes more than 50% share of the loan issuance amount
Bond-Level Variables	
Issuance Amount/Total Assets	The ratio of bond issuance amount relative to the issuer's total assets measured at the end of the quarter prior to bond issuance
Bond Spread	Bond yield over the contemporaneous treasury rate matched on maturity
Maturity	Maturity in months specified at bond issuance
Secured	A dummy indicating whether the bond issue is secured by collateral
Firm-Level Variables	
CDS Trading	A dummy indicating that the firm has an active CDS market referencing its debt at the time of loan or bond issuance
CDS Firm	A dummy indicating that the firm ever had an active CDS market referencing its debt during the sample period
Number of CDS Contracts Trades	The number of trades in CDS contracts referencing a borrower's debt in a given quarter
Other Derivatives for Trading Purposes/Loan Amount	The sum of amount of derivative contracts other than credit derivatives, such as derivatives linked to foreign exchange, equity, commodity and interest rates, used for trading purpose by the lead banks that the firm has borrowed from in the past five years relative to the loan issuance amount
Log (Total Assets)	The natural logarithm of the firm's total book assets
Current Ratio	The ratio of current assets over current liabilities
Cash/Total Assets	The ratio of cash holdings relative to total book assets
ROA	The ratio of earnings before interest and taxes to book assets
Market-to-Book	The ratio of market value of equity relative to the book value of equity

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Appendix: Variable Definitions – Cont'd

Variable Name	Description
Firm-Level Variables	
Leverage	Total debt/total assets, total debt is calculated as short-term debt + 0.5*long-term debt
Investment Grade	A dummy taking one if the borrower has an S&P long-term issuer rating equal to or higher than BBB-
Rated	A dummy indicating whether the issuer of a loan has a S&P long-term issuer rating at the time of loan initiation
Altman's Z-score	Z-score developed by Altman (1968) calculated from the formula Z=1.2*Working Capital/Total Assets+1.4*Retained Earnings/Total Assets+3.3*EBIT/Total Assets+0.6*Market Value of Equity/Book Value of Total Liabilities+0.999*Sales/Total Assets
Excess Return	Monthly stock return over S&P 500 index, aggregated to quarter level
Return Volatility	Standard deviation of monthly return, measured at quarter level
Market Value	Stock price multiplied by the number of outstanding shares
CDS-Using Bank	A dummy equal to one if the lead bank takes a nonzero CDS long or short position in a given quarter, and zero otherwise. The CDS data for U.S. banks are extracted from FR Y-9C report, in which CDS long position is reported by variable BHCKC969 (the bank as the beneficiary) and CDS short position is reported by variable BHCKC968 (the bank as the guarantor). The CDS data for US subsidiaries of foreign banks are extracted from OCC report, in which CDS long position is reported as "CDS bought" and CDS short position is reported as "CDS sold"
CDS-Using Bank Past Loan	A dummy equal to one if the lead bank of the firm's prior loan takes a nonzero CDS position at loan origination, and zero otherwise.

Table I
Sample Distribution

This table describes the distribution of loan and bond issuance of our sample firms by year. We extract loan issuance data from Thompson Reuter's LPC Dealscan database, and bond issuance data from the Fixed Income Securities Database from January 1994- August 2012. To form the loan sample, we delete from Dealscan loan initiations those with types as "fixed-rate bond", "other bond", "guarantee" and "undisclosed", as these deals are actually bond issues or other types of issues that we cannot identify whether they are corporate loans. For a similar reason, we further delete deals with distribution method "syndication (Bond)", "Undisclosed (Bond)" or missing. We restrict the sample to issues that are denominated in US dollars and originated within the United States. For the bond sample, we keep only bond issuance with bond type as "CDEB" (corporate bond). We keep only issues by firms that can be matched with a firm ID in Compustat. For both loan and bond sample, we exclude issuances missing issuance amount. We exclude financial firms (SIC 6000-6999), utilities firms (4900-4999), and firms with book assets lower than 5 million US dollars. Column 1 counts the number of loan issuances at facility level. Loan amount and spread are extracted at facility level and averaged across loans. Loan spread is the all-in-drawn spread in basis point that is calculated as loan rate subtracting the contemporaneous LIBOR matched on maturity. Bond yield spread refers to spread over contemporaneous treasury rate matched on maturity.

	Loan			Bond		
Year	Number of Loan Issuances	Average Issuance Amount ($ Million)	Average Spread (bps)	Number of Bond Issuances	Average Issuance Amount ($ Million)	Average Spread (bps)
	(1)	(2)	(3)	(4)	(5)	(6)
1994	1920	189.4	182.5	147	200.1	76.2
1995	1940	209.7	173.8	226	196.1	117.5
1996	2605	181.0	190.2	316	228.1	149.9
1997	3125	214.2	179.7	537	226.0	170.2
1998	2678	204.6	192.4	701	236.7	233.8
1999	2540	213.8	218.1	467	341.0	274.9
2000	2388	244.7	216.7	251	385.9	302.6
2001	2251	272.7	221.2	462	456.0	299.1
2002	2077	234.1	243.1	411	375.6	265.7
2003	1974	226.3	249.0	472	331.6	241.8
2004	2204	312.3	227.0	475	331.4	240.5
2005	2077	376.5	196.8	362	378.8	220.2
2006	1895	465.6	193.4	320	487.4	203.9
2007	1818	545.7	192.1	373	565.6	205.7
2008	967	418.4	243.9	260	715.9	311.9
2009	692	418.5	385.5	460	596.5	413.4
2010	1026	518.4	312.2	537	545.2	295.8
2011	1492	604.0	247.5	510	608.5	235.7
2012	609	603.9	256.3	378	610.2	299.8
Total	36278	302.5	215.6	7665	413.1	250.2

Table II

Summary Statistics

This table describes the summary statistics of loan and bond issuance of our sample firms. We extract loan issuance data from Thompson Reuter's LPC Dealscan database, and bond issuance data from the Fixed Income Securities Database from January 1994-August 2012. Panel A describes the loan and borrower characteristics at loan issuance. Loan characteristics are at facility level. Loan spread is the all-in-drawn spread over LIBOR matched on maturity. Panel B describes bond and issuer characteristics at bond issuance. Bond spread is the bond yield over treasury rate matched on maturity. All firm characteristic variables are extracted at the end of the year prior to loan or bond initiation. See Appendix for detailed variable definitions.

Panel A. Loan and Borrower Characteristics

	Mean	Median	Std	P25	P75
Facility Amount ($ Million)	302.5	100	642.5	30	300
Spread (bps)	215.6	200	148.7	100	300
Maturity (Month)	47	48	26	24	60
Secured	0.85	1	0.36	1	1
Loan Amount/Total Assets	0.24	0.15	0.46	0.07	0.30
Number of Lenders	7.04	4	8.62	1	9
Number of Lead Lenders	1.33	1	0.77	1	1
Number of Participant Lenders	7.90	5	9.04	2	10
Primary Lender (Share>50%)	0.12	0	0.32	0	0
Multiple Lenders	0.73	1	0.44	0	1
Total Assets ($ Million)	4765.7	631.9	23834.2	170	2309.6
Current Ratio	2.03	1.61	5.47	1.13	2.31
Leverage	0.20	0.18	0.17	0.10	0.27
Cash/Total Assets	0.07	0.03	0.10	0.01	0.09
Market-to-Book	2.69	3.09	1.44	1.65	3.09
ROA	0.01	0.01	0.08	0.00	0.03
Altman's Z-score	2.31	2.35	1.54	1.64	2.44
Rated	0.44	0	0.50	0	1
Investment Grade	0.21	0	0.41	0	0

Panel B. Bond and Issuer Characteristics

	Mean	Median	Std	P25	P75
Offering Amount ($ Million)	413.1	300.0	388.0	195.0	500.0
Spread (bps)	250.2	182.0	203.8	97.0	355.0
Maturity (Month)	132	117	116	81	120
Secured	0.19	0.00	0.40	0.00	0.00
Issuance Amount/Total Assets	0.17	0.07	0.50	0.03	0.17
Total Assets ($ Million)	16416.7	4493.6	37968.5	1317.9	15983.7
Current Ratio	1.70	1.36	1.86	0.98	1.96
Leverage	0.22	0.20	0.13	0.14	0.28
Cash/Total Assets	0.06	0.03	0.08	0.01	0.08
Market-to-Book	2.75	2.16	2.35	1.58	2.92
ROA	0.01	0.01	0.05	0.00	0.03
Altman's Z-score	1.75	1.59	1.36	1.11	2.15
Rated	0.87	1	0.34	1	1
Investment Grade	0.56	1	0.50	0	1

Table III

CDS Trading and Borrower Switches to New Lender: Baseline Regressions

This table reports the estimation results of the model that examines how CDS trading affects the probability that a borrower switches to a new lender. We conduct the regressions on the loan facility sample. The dependent variable is a "switch" dummy taking the value of one if one or more lead lenders of the loan syndicate are new to the borrower: i.e., the lender never acted as the lead lender of any syndicate loans of the firm before. *CDS Trading* takes one if a firm is referenced with CDS in a given quarter, and zero otherwise. *CDS Traded* takes one if a firm ever has CDS trading referenced its debt at any point of time during the sample period. We control for loan origination year and borrower industry fixed effects in all specifications. ***, ** and * denote statistical significance level at 1%, 5% and 10%, respectively. See Appendix for detailed variable definitions.

Dependent variable = 1 if one or more lead lenders are new to the borrower				
	OLS		Probit	
Variable	(1)	(2)	(3)	(4)
CDS Trading	0.067***	0.028**	0.193***	0.073**
	(0.013)	(0.012)	(0.039)	(0.031)
CDS Traded	-0.063***		-0.187***	
	(0.012)		(0.037)	
Loan Amount/Total Assets	0.080***	0.079***	0.236***	0.234***
	(0.015)	(0.015)	(0.036)	(0.036)
Log (Spread)	-0.046***	-0.044***	-0.131***	-0.125***
	(0.006)	(0.006)	(0.015)	(0.015)
Log (Maturity)	-0.032***	-0.032***	-0.094***	-0.094***
	(0.005)	(0.005)	(0.014)	(0.014)
Secured	-0.050***	-0.051***	-0.136***	-0.136***
	(0.009)	(0.009)	(0.025)	(0.025)
Multiple Lenders	-0.059***	-0.058***	-0.175***	-0.173***
	(0.010)	(0.010)	(0.027)	(0.027)
Primary Lender (Share>50%)	-0.008	-0.007	0.009	0.011
	(0.125)	(0.012)	(0.034)	(0.034)
Log (Total Assets)	-0.003	-0.007**	-0.008	-0.017*
	(0.004)	(0.003)	(0.009)	(0.009)
Current Ratio	0.001	0.001	0.011	0.013
	(0.001)	(0.001)	(0.009)	(0.009)
Leverage	-0.125***	-0.125***	-0.367***	-0.341***
	(0.026)	(0.026)	(0.076)	(0.077)
Cash/Total Assets	0.088**	0.088**	0.238**	0.202*
	(0.039)	(0.039)	(0.109)	(0.108)
Market-to-Book	-0.011***	-0.012***	-0.031***	-0.031***
	(0.002)	(0.002)	(0.006)	(0.006)
ROA	-0.019	-0.022	-0.052	-0.061
	(0.043)	(0.043)	(0.115)	(0.115)
Altman's Z-score	-0.003	-0.003	-0.010	-0.011
	(0.002)	(0.002)	(0.007)	(0.007)
Rated	0.020**	0.017*	0.062**	0.051**
	(0.009)	(0.009)	(0.026)	(0.026)
Investment Grade	-0.034***	-0.045***	-0.098***	-0.126***
	(0.012)	(0.012)	(0.034)	(0.033)
Intercept	0.903***	0.906***	1.156***	1.130***
	(0.084)	(0.082)	(0.192)	(0.193)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Clustered by Firm	Yes	Yes	Yes	Yes
R-squared (%)	6.17	6.06	6.12	6.11
Observations	22818	22818	22818	22818

Table IV

CDS Trading and Borrower Switches to New Lender: Matching

This table reports the estimation results of the model that examines how CDS trading affects the probability that a borrower switches to a new lender using a sample of matched firms. We select from non-CDS group matching firms based on loan and firm characteristics. We increase the matching criteria from model 1 to 4. In model 1, we require the matching firms are from the same 2-digit SIC industry and have the same S&P long-term issuer rating at loan issuance. We require that the treatment loans and their matching loans are issued in the same year, denominated in the same currency and originated in the same country. In model 2, we add firm book assets as the additional matching criteria. We select from non-CDS firms the one that has closest book assets to the treatment firm. In model 3, we add cash/total assets, leverage and market-to-book as additional matching criteria. For each CDS firm, we calculate the absolute value of differences in the matching variables of the treatment and all matching candidates. We next rank the differences and sum up the ranks across matching variables, and select the one with the smallest total rank as the matching firm. In model 4, we select from loans issued by matching firms the ones that have most similar loan characteristics to loans issued by treatment firms. Loan characteristics we match on include loan issuance amount, all-in-drawn spread, maturity and security status, using a similar summing of ranks approach. Column 5 adds the number of lead lenders as additional matching criteria. As the final step, we regress the switch indicator on borrower CDS availability dummy. For models 1 to 4, the dependent variable is a "switch" dummy taking one if one or more lead lenders of the loan syndicate are new to the borrower: i.e., the lender never acted as the lead lender of any syndicate loans of the firm before. The independent variable is *CDS Trading*, a dummy that takes one if a firm is referenced with CDS at loan origination, and zero otherwise. Standard errors are clustered at firm-level. ***, ** and * denote statistical significance level at 1%, 5% and 10%, respectively. See Appendix for detailed variable definitions.

Dependent variable = 1 if one or more lead lenders are new to the borrower					
Matching Criteria	(1)	(2)	(3)	(4)	(5)
Loan Initiation Year	Yes	Yes	Yes	Yes	Yes
Country of Origination	Yes	Yes	Yes	Yes	Yes
Currency Denomination	Yes	Yes	Yes	Yes	Yes
S&P Credit Rating	Yes	Yes	Yes	Yes	Yes
2-digit SIC	Yes	Yes	Yes	Yes	Yes
Total Assets		Yes	Yes	Yes	Yes
Cash/Total Assets			Yes	Yes	Yes
Leverage			Yes	Yes	Yes
Market-to-Book			Yes	Yes	Yes
Security				Yes	Yes
Loan Amount				Yes	Yes
Loan Spread				Yes	Yes
Loan Maturity				Yes	Yes
Number of Lead Lenders					Yes
CDS Trading	0.021***	0.037***	0.022**	0.023**	0.023**
	(0.007)	(0.010)	(0.011)	(0.009)	(0.008)
Clustered by Firm	Yes	Yes	Yes	Yes	Yes
One-to-One Matching	No	Yes	Yes	Yes	Yes
Observations	81213	9058	9058	7164	7164

Table V

CDS Trading and Borrower Switches to New Lender: Firm Financial Constraints

This table reports the regressions that examine how the effects of CDS on borrower switch depend on firm financial constraints. The dependent variable is *switch*, a dummy taking one if one or more of the lead lenders are new to the borrower, i.e., the firm has never borrowed from the bank in the past. Columns 1 and 2 report the estimation results for the two sub-samples: financially constrained firms and unconstrained firms. Classification of financially constrained firms and unconstrained firms is determined by the 50% cut-off points of ROA. The independent variable of interest is *CDS Trading*, a dummy taking one if the firm is CDS-referenced at loan initiation, and zero otherwise. *Financially Constrained* is a dummy taking one if the firm's ROA is below the 50% cutoff of the sample firms. The 50% cut-off point is determined for firms that have loan issuance in the same year and same quarter. In column 3, the independent variable of interest is the interaction of *CDS Trading and Financially Constrained.* In all specifications we include *CDS Traded*, a dummy representing a group of firms that ever have a CDS market at any time during the sample period. We include the same controls for loan and firm characteristics as we use in the baseline regressions. To conserve space we do not report coefficients of all control variables. ***, ** and * denote statistical significance level at 1%, 5% and 10%, respectively. See Appendix for detailed variable definitions.

Dependent variable = 1 if one or more lead lenders is new to the borrower			
	Financially Constrained Firm	Not-Constrained Firm	All Sample
Variable	(1)	(2)	(3)
CDS Trading	0.122***	0.035**	0.085***
	(0.022)	(0.017)	(0.018)
CDS Trading*Financially Constrained			0.041**
			(0.018)
Financially Constrained			0.014**
			(0.007)
CDS Traded	-0.069***	-0.063***	-0.064***
	(0.019)	(0.016)	(0.012)
Intercept	0.900***	0.913***	0.892***
	(0.102)	(0.119)	(0.085)
Coefficients of "CDS Trading" (1) – (2):	0.087***		
Loan Characteristics Controls	Yes	Yes	Yes
Firm Characteristics Controls	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Clustered by Firm	Yes	Yes	Yes
R-squared (%)	6.22	6.19	6.18
Observations	9326	12790	22818

Table VI

Termination of Current Lending Relationship: The Case of CDS Bank

This table reports the regressions that examine how the lead lender's CDS status in the past loan affects a CDS firm's choice of lead lender in its current loan. The dependent variable is a dummy taking one if the lead lender in the firm's prior loan no longer acts as the lead lender in its current loan. The independent variable of interest is *CDS-Using Bank Past Loan*, a dummy taking the value of one if one or more lead lenders in the firm's prior loan is CDS-using bank. We define CDS-using bank as banks that take nonzero CDS position at the time of loan initiation. We control for loan origination year and borrower industry in both specifications. We conduct the estimation separately for CDS-referenced firms and matched non-CDS-referenced firms in columns 1 and 2. Matched non-CDS firms are selected from the same industry as the CDS-referenced firms the one with the closest book assets at the time of loan initiation. ***, ** and * denote statistical significance level at 1%, 5% and 10%, respectively. See Appendix for detailed variable definitions.

Dependent variable = 1 if the lender in the prior loan no longer acts as the lead lender in the current loan		
	CDS Firm	Matched Non-CDS Firm
Variable	(1)	(2)
CDS-Using Bank Past Loan	0.024**	0.019
	(0.011)	(0.016)
Loan Amount/Total Assets	-0.011	-0.004
	(0.022)	(0.017)
Log (Spread)	-0.007	-0.010
	(0.005)	(0.011)
Log (Maturity)	-0.007	-0.007
	(0.005)	(0.009)
Secured	0.006	-0.014
	(0.006)	(0.011)
Multiple Lender	0.230***	0.211***
	(0.051)	(0.069)
Primary Lender (Share>50%)	0.018	0.049
	(0.041)	(0.064)
Log (Total Assets)	-0.001	-0.005
	(0.003)	(0.006)
Current Ratio	-0.005	-0.009
	(0.004)	(0.006)
Leverage	-0.015	-0.118*
	(0.027)	(0.067)
Cash/Total Assets	0.064*	0.009
	(0.037)	(0.061)
Market-to-Book	0.002	-0.009
	(0.002)	(0.007)
ROA	0.208	0.192
	(1.097)	(0.992)
Altman's Z-score	0.002	0.005
	(0.002)	(0.007)
Rated	0.011	0.042
	(0.016)	(0.048)
Investment Grade	-0.005	0.001
	(0.009)	(0.018)
Intercept	0.827***	0.226
	(0.074)	(0.216)
Year Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Clustered by Firm	Yes	Yes
R-squared (%)	11.15	20.47
Observations	3582	3582

Table VII

CDS Trading, Loan Spread and Bond Spread

This table reports the estimation results of the model that examines how CDS trading affects the spread of firms' loan and bond issuance. The dependent variables are loan or bond issuance spread. We examine all new loan issuance with non-missing loan and firm characteristics extracted from Dealscan and all new corporate bond issuance with non-missing bond and borrowing firm characteristics extracted from Mergent FISD for 1994-2012. For loans, *spread* is the loan rate over the contemporaneous LIBOR for the same maturity. For bonds, *spread* is calculated as the bond yield over the contemporaneous treasury rate for the same maturity. *CDS Trading* takes one if a firm is referenced with CDS at loan/bond origination, and zero otherwise. *CDS Traded* is takes one if a firm ever has CDS trading referenced its debt at any point of time during the sample period. We control for borrower/issuer characteristics extracted at the end of the quarter prior to loan/bond issuance. ***, ** and * denote statistical significance level at 1%, 5% and 10%, respectively. See Appendix for detailed variable definitions.

	Loan Spread		Bond Spread	
Variable	(1)	(2)	(3)	(4)
CDS Trading	14.053***	7.770***	-2.915	-7.625
	(2.420)	(2.290)	(8.922)	(8.401)
CDS Traded	-10.158***		-7.283	
	(2.168)		(8.607)	
Amount/Total Assets	-28.503***	-28.739***	4.033	17.264***
	(3.552)	(3.534)	(2.818)	(5.454)
Log (Maturity)	-0.656	-0.588	1.105	3.879
	(1.202)	(1.202)	(3.141)	(2.837)
Secured	61.679***	61.749***	29.266***	29.851***
	(1.448)	(1.448)	(10.139)	(10.085)
Log (Total Assets)	-28.245***	-28.862***	-32.727***	-32.988***
	(0.642)	(0.612)	(2.781)	(2.749)
Current Ratio	-0.197**	-0.197**	5.389**	5.399**
	(0.095)	(0.096)	(2.636)	(2.634)
Leverage	166.596***	167.050***	114.636***	115.239***
	(7.069)	(7.068)	(46.532)	(40.180)
Cash/Total Assets	59.577***	59.509***	102.314**	103.452**
	(10.291)	(10.286)	(51.988)	(51.893)
Market-to-Book	-4.023***	-4.098***	-4.244***	-4.315***
	(0.506)	(0.506)	(1.545)	(1.548)
ROA	-172.038***	-172.527***	-648.549***	-651.263***
	(32.163)	(32.239)	(69.961)	(69.925)
Altman's Z-score	-11.014***	-10.980***	-25.545***	-25.543***
	(0.537)	(0.537)	(2.631)	(2.629)
Rated	32.159***	31.832***	22.552*	21.755*
	(3.444)	(3.445)	(11.751)	(11.705)
Investment Grade	-29.986***	-72.110***	-164.705***	-165.541***
	(4.399)	(4.305)	(10.645)	(10.486)
Intercept	418.439***	421.113***	694.536***	695.390***
	(12.311)	(12.200)	(36.311)	(8.401)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Clustered by Firm	Yes	Yes	Yes	Yes
R-squared (%)	39.93	39.91	61.23	61.22
Observations	27566	27566	7665	7665

Table VIII

CDS Trading and Borrower Debt-Financing Choice between Loans and Bonds

This table reports the estimation results of the choice model that explores how CDS trading affects a firm's choice between loan and bond issuance. The dependent variable is an indicator that takes the value of one if the firm issues one or more loans in a given quarter, and zero if the firm issues one or more bonds. We examine two alternative samples: (1) firms that issue either loans or bonds, or both, in a given quarter; (2) firms that choose to issue only one type of debt, either loans or bonds, in a given quarter. *CDS Trading* takes one if a firm is referenced with CDS in a given quarter, and zero otherwise. *CDS Traded* is a dummy that takes one if a firm ever has CDS trading referenced its debt at any point of time during the sample period. We control for firm characteristics in the prior quarter. We control for year and 1-digit SIC industry fixed effects in all specifications. Standard errors are clustered at firm-level. ***, ** and * denote statistical significance level at 1%, 5% and 10%, respectively. See Appendix for detailed variable definitions.

Dependent variable = 1 if the firm chooses loan issuance in a given quarter				
	Sample of Firms that Use Either Loan or Bond, or Both		Sample of Firms that Use Either Loan or Bond	
Variable	(1)	(2)	(3)	(4)
CDS Trading	-0.023*	-0.058***	-0.031**	-0.072***
	(0.013)	(0.013)	(0.014)	(0.014)
CDS Traded	-0.049***		-0.056***	
	(0.013)		(0.015)	
Log (Total Assets)	-0.014***	-0.016***	-0.016***	-0.018***
	(0.002)	(0.002)	(0.003)	(0.003)
Current Ratio	-0.009*	-0.009*	-0.009	-0.009
	(0.005)	(0.005)	(0.006)	(0.006)
Leverage	-0.201***	-0.200***	-0.225***	-0.223***
	(0.023)	(0.023)	(0.025)	(0.025)
Cash/Total Assets	-0.452***	-0.451***	-0.480***	-0.479***
	(0.046)	(0.046)	(0.048)	(0.048)
Market-to-Book	0.011	0.009	0.015	0.014
	(0.032)	(0.034)	(0.056)	(0.056)
ROA	0.037*	0.036*	0.040*	0.039*
	(0.021)	(0.022)	(0.022)	(0.022)
Altman's Z-score	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Rated	-0.146***	-0.149***	-0.174***	-0.178***
	(0.008)	(0.008)	(0.010)	(0.010)
Investment Grade	0.024**	0.015	0.040***	0.030**
	(0.012)	(0.011)	(0.013)	(0.013)
Intercept	0.960***	0.972***	0.991***	1.006***
	(0.036)	(0.036)	(0.039)	(0.039)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Clustered by Firm	Yes	Yes	Yes	Yes
R-squared (%)	12.47	12.38	14.63	14.52
Observations	31518	31518	29737	29737

Table IX
CDS Trading and Borrower Debt Structure

This table reports the estimation results of the model that explores how CDS trading affects a firm's debt financing choice between loans and bonds. We examine a sample of firms that have either loan issuance or bond issuance, or both, in a given quarter. The dependent variables are: (1) the ratio of total loan issuance amount out of the sum of loan and bond issuance amount for a given quarter; (2) the ratio of bank debt out of total debt outstanding for a given quarter. Loan issuance amount is extracted from Dealscan at facility level. Bond issuance amount is extracted from Mergent FISD at issue-level. Data for bank debt ratio are extracted from Capital IQ. *CDS Trading* takes one if a firm is referenced with CDS in a given quarter, and zero otherwise. *CDS Traded* is takes one if a firm ever has CDS trading referenced its debt at any point of time during the sample period. We control for firm characteristics in the prior quarter. We control for year and 1-digit SIC industry fixed effects in all specifications. Standard errors are clustered at firm-level. ***, ** and * denote statistical significance level at 1%, 5% and 10%, respectively. See Appendix for detailed variable definitions.

	Loan Issuance Amount/(Loan Issuance Amount + Bond Issuance Amount)		Bank Debt/Total Debt	
Variable	(1)	(2)	(3)	(4)
CDS Trading	-0.041***	-0.085***	-0.081***	-0.084***
	(0.014)	(0.013)	(0.013)	(0.007)
CDS Traded	-0.034**		-0.003	
	(0.014)		(0.013)	
Log (Total Assets)	-0.006***	-0.008***	-0.054***	-0.054**
	(0.002)	(0.002)	(0.002)	(0.002)
Current Ratio	-0.003	-0.003	-0.009***	-0.009***
	(0.002)	(0.002)	(0.001)	(0.001)
Leverage	-0.169***	-0.167***	-0.215***	-0.215***
	(0.022)	(0.022)	(0.018)	(0.018)
Cash/Total Assets	-0.100***	-0.099***	-0.339***	-0.339***
	(0.028)	(0.028)	(0.032)	(0.032)
Market-to-Book	-0.002*	-0.002**	-0.001***	-0.001***
	(0.001)	(0.001)	(0.000)	(0.000)
ROA	-0.022	-0.023*	0.027	0.027
	(0.014)	(0.014)	(0.023)	(0.022)
Altman's Z-score	0.002**	0.002***	0.012***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)
Rated	-0.241***	-0.243***	-0.162***	-0.162***
	(0.009)	(0.009)	(0.006)	(0.006)
Investment Grade	0.032**	0.026**	-0.102***	-0.102***
	(0.013)	(0.012)	(0.008)	(0.008)
Intercept	0.942***	0.951***	1.123***	1.123***
	(0.039)	(0.039)	(0.033)	(0.033)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Clustered by Firm	Yes	Yes	Yes	Yes
R-squared (%)	19.14	19.08	34.98	34.92
Observations	29192	29192	29192	29192

Table X

CDS Trading, Borrower Switches and Debt Structure: Multinomial Logit Estimation

This table reports the maximum likelihood estimation results of the multinomial logit model that explores how CDS trading affects a firm's lender switching decision and its loan-bond issuance choice. The outcome variable is a multinomial indicator that takes four different values to represent the following four cases: (1) the firm issues neither loan nor bond in a given quarter; (2) the firm issues loans, and the firm does not involve new lead lenders in loans issued in this quarter ("issue loans and no switch"); (3) the firm issues loans, and the loans issued in this quarter involve new lenders that the firm has never borrowed from in the past ("issue loans and switch"); (4) the firm *only* issues corporate bonds in this quarter. We specify case (2), "issue loans and no switch", as the baseline category. Column 1 reports the effects of CDS trading on the relative odds of firm choosing to issue loans and to switch lender. Column 2 reports the effects of CDS trading on the relative odds of choosing to issue bond *only*. Column 3 reports the effects of CDS trading on the relative odds of choosing to issue neither loan nor bond issuance in a given quarter. The main predictable variable is *CDS Trading* , which takes the value of one if a firm is referenced with CDS in a given quarter, and zero otherwise. *Odds Ratio* refers to the relative risks of switching from *CDS Trading=0* to *CDS Trading=1* for being in each outcome category versus being in the baseline category (the case of "issue loan and no switch"). *CDS Traded* is a dummy which takes the value of one if a firm ever has CDS trading referenced its debt at some point of time during the sample period. We control for same firm characteristics in the prior quarter as we use in the baseline regressions. We control for year and 1-digit SIC industry fixed effects in all specifications. ***, ** and * denote statistical significance level at 1%, 5% and 10%, respectively. See Appendix for detailed variable definitions.

Maximum Likelihood Estimates: Issue Loans and Not Switch Lender as the Baseline Type			
	Issue Loans and Switch Lender	Issue Bonds	Issue Neither Loans Nor Bonds
Parameter	(1)	(2)	(3)
CDS Trading	0.236***	0.115*	-0.012
	(0.060)	(0.063)	(0.046)
Odds Ratio	1.267	1.122	0.988
95% Wald Confidence Limits	1.125	0.991	0.901
	1.427	1.270	1.083
CDS Traded	-0.223***	0.210***	-0.139
	(0.051)	(0.055)	(0.039)
Odds Ratio	0.799	1.234	0.870
95% Wald Confidence Limits	0.722	1.106	0.806
	0.885	1.376	0.939
Intercept	1.268***	-1.929***	7.324***
	(0.175)	(0.258)	(0.144)
Firm Characteristics Controls		Yes	
Year Fixed Effects		Yes	
Industry Fixed Effects		Yes	
Pseudo-R-Squared (%)		13.14	
Likelihood Ratio		35921.13***	
Wald Score		27322.02***	
Observations		441113	

Internet Appendix for
"How Does CDS Trading Affect Bank Lending Relationships?"

Table IA1. Borrower CDS and Switches to New Lenders: Alternative Measures and Samples

This table reports the estimation results of the model that examines how CDS trading affects the probability that a borrower switches to a new lead lender. We conduct the regressions on the loan facility sample. We use three alternative measures for the dependent variable "switch" and two alternative samples. "Switch Measure 1" takes the value of one if the firm chooses a bank as the lead lender for the first time, or a firm chooses a bank for multiple times, however, it has been more than 12 months since last relationship. "Switch Measure 2" takes the value of one if the firm chooses a bank as the lead lender for the first time, or a firm chooses a bank for multiple times, however, it has been more than 24 months since last relationship. "Switch Measure 3" takes the value of one if the firm chooses a bank as the lead lender for the first time, or a firm chooses a bank for multiple times, however, more than 36 months since last relationship. The independent variable of interest is *CDS Trading*, a dummy taking one if the borrower's debt is referenced with CDS at loan origination, and zero otherwise. In all specifications, we control for CDS firm fixed effects by including the variable *CDS Traded*, a dummy taking one if the borrowing firm has ever been referenced with CDS during the sample period. For columns 1 to 3, we conduct the regressions for the sample of loans denominated in US dollars and originated in USA. For columns 4 to 6, we conduct the regressions for a sample of loans that also include loans that are denominated in foreign currencies and originated outside USA. We control for loan origination year, borrower industry, denominated currency and loan origination country fixed effects in all specifications. ***, ** and * denote statistical significance level at 1%, 5% and 10%, respectively. See Appendix for detailed variable definitions.

	Loans Originated in USA and in USD			Including Loans Originated Outside USA and in Foreign Currency		
	Switch Measure 1	Switch Measure 2	Switch Measure 3	Switch Measure 1	Switch Measure 2	Switch Measure 3
Variable	(1)	(2)	(3)	(4)	(5)	(6)
CDS Trading	0.081***	0.080***	0.078***	0.074***	0.073***	0.071***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
CDS Traded	-0.052***	-0.051***	-0.051***	-0.063***	-0.061***	-0.061***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Loan Amount/Total Assets	0.078***	0.079***	0.080***	0.037*	0.038**	0.039**
	(0.013)	(0.013)	(0.013)	(0.019)	(0.020)	(0.020)
Log (Spread)	-0.052***	-0.051***	-0.051***	-0.058***	-0.058***	-0.058***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Log (Maturity)	-0.046***	-0.042***	-0.041***	-0.044***	-0.040***	-0.038***
	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)	(0.004)
Secured	-0.054***	-0.052***	-0.049***	-0.047***	-0.045***	-0.042***
	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)	(0.008)
Multiple Lender	-0.100***	-0.095***	-0.093***	-0.094***	-0.089***	-0.087***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Primary Lender (Share>50%)	0.035***	0.034***	0.035***	0.037***	0.036***	0.036***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Log (Total Assets)	-0.021***	-0.021***	-0.021***	-0.022***	-0.023***	-0.022***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Current Ratio	0.004	0.002	0.002	0.005*	0.003	0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Leverage	-0.131***	-0.128***	-0.125***	-0.118***	-0.114***	-0.111***
	(0.024)	(0.024)	(0.024)	(0.023)	(0.023)	(0.023)
Cash/Total Assets	0.224***	0.219***	0.222***	0.215***	0.210***	0.214***
	(0.033)	(0.033)	(0.033)	(0.032)	(0.032)	(0.032)
Market-to-Book	-0.006***	-0.005**	-0.004**	-0.006***	-0.005***	-0.005**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
ROA	-0.028	-0.026	-0.037	-0.027	-0.026	-0.038
	(0.045)	(0.044)	(0.046)	(0.045)	(0.045)	(0.047)
Altman's Z-score	-0.001	-0.002	-0.003	-0.001	-0.001	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Rated	-0.009	-0.008	-0.007	-0.012	-0.01	-0.01
	(0.009)	(0.009)	(0.009)	(0.008)	(0.009)	(0.009)
Investment Grade	-0.039***	-0.039***	-0.038***	-0.018	-0.019*	-0.018
	(0.012)	(0.012)	(0.012)	(0.011)	(0.011)	(0.011)
Country=USA				-0.068***	-0.068***	-0.068***
				(0.015)	(0.015)	(0.015)
Currency=USD				0.091***	0.091***	0.090***
				(0.018)	(0.018)	(0.018)
Intercept	1.185***	1.153***	1.131***	1.193***	1.157***	1.139***
	(0.083)	(0.083)	(0.082)	(0.085)	(0.085)	(0.085)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustered by Firm	Yes	Yes	Yes	Yes	Yes	Yes
R-squared (%)	6.11	5.96	29.74	5.98	5.67	5.54
Observations	22818	22818	22818	30633	30633	30633

Table IA2. Instrumental Variable Approach: The Use of Other Derivatives for Trading Purposes

This table reports the estimation results of model that examines how CDS trading is predicted by firm characteristics using the instrumental variable approach. Column 1 reports the first-stage regression. The dependent variable is the CDS trading indicator, which takes one if the firm has a CDS market that references its outstanding debt at loan origination. The instrument, *Other Derivatives for Trading Purposes/Loan Amount* is the total notional amount of derivative contracts other than credit derivatives (including those linked to foreign exchange, interest rates, commodity and equity) of lenders that the firm has borrowed from in the past five years, scaled by loan issuance amount. Other explanatory variables include borrower characteristic variables, which are lagged one quarter when entering the regressions. *Excess Return* is calculated as the firm's stock return minus contemporaneous market returns proxied by the S&P index returns. *Return Volatility* refers to the quarter standard deviation of the firm's monthly stock returns. *Market Value* is calculated as stock price multiplied by the number of outstanding shares. Column 2 reports the estimation results of the second-stage regression, which examines how the fitted value of CDS trading obtained from the first-stage affects borrower switch to new lenders. The instrumented CDS trading is estimated propensity from the first-stage Probit regressions reported in column 1. The dependent variable is a dummy taking one if one or more of the lead lenders are new to the borrower, i.e., the firm never borrowed money from the lender in the past. In all specifications, we control for loan origination year and 1-digit SIC borrower industry. ***, ** and * denote statistical significance level at 1%, 5% and 10%, respectively. See Appendix for detailed variable definitions.

	(1)	(2)
Variable	1st-stage: CDS Trading	2nd-stage: Switch
Instrument		
Other Derivatives for Trading Purposes/Loan Amount	0.033***	
	(0.005)	
Fitted Value		
CDS Trading		0.081***
		(0.020)
Other Explanatory Variable		
CDS Traded		-0.028**
		(0.011)
Log (Total Assets)	0.049***	-0.025***
	(0.003)	(0.003)
Current Ratio	0.005	0.055***
	(0.010)	(0.018)
ROA	-0.065**	-0.028
	(0.026)	(0.034)
Market-to-Book	0.006***	-0.004**
	(0.002)	(0.002)
Cash/Total Assets	0.132***	0.215***
	(0.024)	(0.032)
Leverage	0.004	-0.117***
	(0.022)	(0.024)
Investment Grade	0.272***	-0.055***
	(0.016)	(0.012)
Rated	0.001	-0.011
	(0.009)	(0.008)
Altman's Z-score	-0.016***	-0.001
	(0.002)	(0.002)
Return Volatility	1.015***	
	(0.233)	
Excess Return	-0.719***	
	(0.165)	
Log (Market Value)	1.297***	
	(0.097)	
Loan Characteristics		
Loan Amount/Total Assets		0.075***
		(0.013)
Log (Spread)		-0.048***
		(0.005)
Log (Maturity)		-0.037***
		(0.004)
Secured		-0.056***
		(0.009)
Multiple Lenders		-0.084***
		(0.009)
Primary Lender (>50%)		0.023**
		(0.010)
Intercept	-0.088	1.126***
	(0.117)	(0.080)
Year Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Clustered by Firm	Yes	Yes
R-squared (%)	40.99	5.74
Observations	30124	22116

Table IA3. Effects of CDS Market Liquidity: Number of CDS Trades

This table reports the estimation results of the model that explores how CDS market liquidity affects a firm's switch to new lenders and debt choice between loans and bonds. In column 1, the dependent variable is a dummy taking one if one or more lead lenders are new to the borrower. i.e., the firm never borrowed from the lender in the past. We employ the loan initiation sample for the regression in column 1. Loan characteristics at issuance, including loan amount scaled by total assets, all-in-drawn spread, maturity and security status, are being controlled for. In column 2, the dependent variable is an indicator that takes one if the firm issues loan in the firm-quarter, and zero if the firm issues bond. We examine a sample of firms that have either loan or bond issuances, or both, in a given quarter. *Number of CDS Trades* refers to the number of CDS transactions referenced a firm's debt in a given quarter, and zero otherwise. We aggregate daily number of CDS transactions by firm and quarter to obtain the number of CDS trades. *CDS Traded* is takes one if a firm ever has CDS trading referenced its debt at any point of time during the sample period. We control for firm characteristics in the prior quarter. We control for year and industry fixed effects in all specifications. Standard errors clustered by firms are reported in parentheses. ***, ** and * denote statistical significance level at 1%, 5% and 10%, respectively. See Appendix for detailed variable definitions.

	Switch	Issue Loans
Variable	(1)	(2)
Number of CDS Trades	0.001*	-0.046***
	(0.000)	(0.014)
CDS Traded	-0.028***	-0.113***
	(0.010)	(0.006)
Log (Total Assets)	-0.001	-0.001
	(0.003)	(0.001)
Current Ratio	0.004	-0.006***
	(0.003)	(0.001)
Leverage	-0.114***	-0.030***
	(0.026)	(0.010)
Cash/Total Assets	0.079**	-0.013
	(0.039)	(0.015)
Market-to-Book	-0.011***	-0.001**
	(0.002)	(0.001)
Z-score	-0.004*	-0.000**
	(0.002)	(0.000)
Rated	0.018**	-0.171***
	(0.009)	(0.005)
Investment Grade	-0.028**	0.013*
	(0.012)	(0.007)
Loan Amount/Total Assets	0.081***	
	(0.015)	
Log (Spread)	-0.044***	
	(0.005)	
Log (Maturity)	-0.032***	
	(0.004)	
Secured	-0.051***	
	(0.009)	
Intercept	0.887***	0.426***
	(0.001)	(0.032)
Year Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Clustered by Firm	Yes	Yes
R-squared (%)	6.09	19.81
Observations	22818	29192

Table IA4. Outcome of Borrower Switches to New Lenders: Loan Amount and Spread

This table reports the estimation results of the model that examines the outcome of borrowers' switch to a new lender on the amount and spread of firms' loan issuance. The dependent variables are loan issuance amount scaled by firm's total assets in the prior quarter and the logarithm of all-in-drawn spread. The independent variable of interest is the "*Switch*" dummy, which takes one if one or more lead lenders in this loan facility are new to the borrower, i.e., the bank never acted as the lead lender of loans to the firm in the past. Columns 4 to 6 report the estimation results for the two sub-samples: financially constrained firms and unconstrained firms. *Financially constrained firm* is defined as borrowers with its ROA below the 50% cutoff of the samples firms. Borrower characteristics are extracted at the end of the quarter prior to loan initiation. ***, ** and * denote statistical significance level at 1%, 5% and 10%, respectively. See Appendix for detailed variable definitions.

	All Sample		Financially Constrained Firm		Not Constrained Firm	
	Loan Amount /Total Assets	Spread	Loan Amount /Total Assets	Spread	Loan Amount /Total Assets	Spread
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Switch	0.031***	-17.952***	0.043***	-21.714***	0.021***	-15.962***
	(0.005)	(1.689)	(0.009)	(2.953)	(0.005)	(1.745)
Loan Amount /Total Assets		-18.686***		-24.736***		-7.347*
		(3.753)		(6.846)		(4.099)
Log (Spread)	-0.026***		-0.050***		-0.008*	
	(0.004)		(0.008)		(0.005)	
Log (Maturity)	0.036***	3.792**	0.045***	-7.166**	0.028***	13.852***
	(0.003)	(1.931)	(0.005)	(3.246)	(0.004)	(1.922)
Secured	-0.009	56.821***	-0.014	76.048***	-0.008	46.847***
	(0.007)	(2.294)	(0.023)	(4.872)	(0.006)	(2.337)
Multiple Lender	0.148***	-17.888***	0.166***	-11.434**	0.132***	-18.004***
	(0.009)	(3.544)	(0.016)	(5.283)	(0.011)	(4.434)
Primary Lender (>50%)	-0.093***	20.227***	-0.075***	23.115***	-0.111***	15.377***
	(0.009)	(4.326)	(0.015)	(6.306)	(0.011)	(5.453)
Log (Total Assets)	-0.082***	-22.750***	-0.088***	-21.210***	-0.074***	-23.182***
	(0.004)	(1.236)	(0.007)	(2.028)	(0.004)	(1.199)
Current Ratio	-0.004	-0.962	-0.009**	-0.462	-0.001	-1.735*
	(0.003)	(0.600)	(0.005)	(0.631)	(0.003)	(0.923)
Cash/Total Assets	0.07	160.885***	0.143	145.855***	-0.001	133.891***
	(0.058)	(11.718)	(0.096)	(15.150)	(0.070)	(14.049)
Leverage	0.044	47.157***	0.032	3.454	0.087**	64.432***
	(0.031)	(13.310)	(0.044)	(19.976)	(0.040)	(16.320)
Market-to-Book	0.006***	-4.113***	0.003	-0.523	0.008***	-5.130***
	(0.002)	(0.867)	(0.004)	(1.434)	(0.002)	(0.881)
ROA	0.052	-167.73***	-0.085	-126.39***	0.307**	40.129*
	(0.036)	(38.546)	(0.060)	(44.726)	(0.126)	(21.956)
Rated	-0.014**	-9.169***	-0.01	-10.302***	-0.016*	-6.610***
	(0.006)	(0.894)	(0.008)	(1.551)	(0.008)	(0.872)
Investment Grade	0.025***	29.479***	0.024	19.456***	0.020**	32.965***
	(0.008)	(3.703)	(0.015)	(5.417)	(0.009)	(4.191)
Altman's Z-score	0.001	-75.608***	0.002	-84.064***	0.001	-61.558***
	(0.002)	(4.394)	(0.004)	(7.209)	(0.002)	(4.584)
Intercept	0.684***	385.951***	0.890***	430.994***	0.521***	331.622***
	(0.072)	(19.665)	(0.143)	(31.252)	(0.063)	(20.954)
Coefficients of CDS Trading			(3)-(5):	0.022***	(4)-(6):	-5.752***
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared (%)	16.52	41.48	14.87	32.24	20.01	42.75
Observations	22116	22116	9326	9326	12790	12790

Table IA5. CDS Trading, Loan Spread and Bond Spread: Pooling Sample Results

This table reports the estimation results of the model that compares how CDS trading differently affects the spread of a firm's newly issued loan and bond. We conduct the regressions with a pool of loan and bond issuances of our samples during the period 1994-2012. We examine all new loan and bond issuances with non-missing issue and borrowing firm characteristics. The dependent variable of interest is the interaction of *Loan* and *CDS Trading*. *Loan* is a dummy taking one if the observation is a loan issue, and zero if it is a bond issue. *CDS Trading* takes one if a firm is referenced with CDS in a given quarter, and zero otherwise. *CDS Traded* is takes one if a firm ever has CDS trading referenced its debt at any point of time during the sample period. We control for value-weight average of loan amount-to-total assets ratio, spread, logarithm of maturity and security by firm-quarter. Firm-level characteristics are the same as we use in the baseline regressions. ***, ** and * denote statistical significance level at 1%, 5% and 10%, respectively. See Appendix for detailed variable definitions.

Loan or Bond Issuance Spread		
Variable	(1)	(2)
CDS Trading*Loan	37.246***	36.485***
	(6.298)	(6.290)
CDS Trading	-11.250*	-15.868**
	(6.260)	(6.304)
CDS Traded	-8.526**	
	(4.059)	
Loan	-157.200***	-156.833***
	(4.963)	(4.964)
Loan Amount/Total Assets	-10.556***	-10.607***
	(3.997)	(4.002)
Log (Maturity)	-3.866**	-3.848**
	(1.565)	(1.567)
Secured	55.496***	55.558***
	(2.313)	(2.316)
Log (Total Assets)	-26.641***	-27.119***
	(1.076)	(1.016)
Current Ratio	-0.179**	-0.180**
	(0.078)	(0.079)
Leverage	155.104***	155.510***
	(10.831)	(10.829)
Cash/Total Assets	52.418***	52.419***
	(10.656)	(10.652)
Market-to-Book	-3.148***	-3.213***
	(0.765)	(0.766)
ROA	-209.36***	-210.02***
	(24.975)	(24.990)
Altman's Z-score	-11.764***	-11.730***
	(0.764)	(0.763)
Rated	36.264***	35.855***
	(3.540)	(3.541)
Investment Grade	-95.545***	-97.241***
	(4.545)	(4.378)
Intercept	580.538***	582.323***
	(20.120)	(19.443)
Year Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Clustered by Firm	Yes	Yes
R-squared (%)	44.38	44.38
Observations	35231	35231

Table IA6. CDS Trading and Borrower Loan-Bond Choice: Matching Firm Approach

This table presents regression results of loan amount on CDS trading using a matched sample, based on the propensity scores estimated from the probit model of the likelihood of CDS trading. The treatment group is confined to CDS firms that borrow both before and after their CDS started to be traded. To form the matched sample of firms, we choose from non-CDS firms that have book assets that are closest to the CDS-referenced firms in the year prior to CDS introduction. We require that matched firms are from the same 2-digit SIC industry as the CDS firm. To form the control groups, we keep all loans and corporate bonds issued by the treatment firms, and loans and corporate bonds issued by the matching firms in the same year. Panel B reports the estimates of regressions that examine how borrower CDS trading affects the firm's debt financing choice between loan and bond for CDS firms and their size-industry matched non-CDS firms. The dependent variable takes one if there is loan issuance in the firm-quarter. We conduct the analysis for two alternative samples: (1) firm-quarters that issue either loan or bond, or both; (2) firm-quarters that issue either loan or bond.

Panel A. Diagnostics of Size-Industry Matched Sample

Variable	CDS-Firm	Matching Firm	Difference
Log (Total Assets)	8.836	8.840	-0.004
Current Ratio	1.624	1.514	0.110*
Market-to-Book	1.009	1.208	-0.199*
ROA	0.011	0.010	0.001
Cash/Total Assets	0.042	0.040	0.002
Leverage	0.187	0.181	0.006
Z-score	3.213	3.149	0.065

Panel B. Matched Sample Regressions

Dependent variable = 1 if the firm issues loan in a given quarter

	Firm-quarter Issues Either Loan or Bond, or Both	Firm-quarter Issues Either Loan or Bond
Variable	(1)	(2)
CDS Trading	-0.015**	-0.012**
	(0.007)	(0.006)
Log (Total Assets)	-0.013***	-0.017***
	(0.004)	(0.005)
Current Ratio	-0.005*	-0.007*
	(0.003)	(0.004)
Leverage	-0.124***	-0.165***
	(0.035)	(0.038)
Cash/Total Assets	0.158**	0.165**
	(0.063)	(0.068)
Market-to-Book	-0.011***	-0.011***
	(0.003)	(0.004)
ROA	-0.012	-0.014
	(0.045)	(0.046)
Z-score	-0.001***	-0.001***
	(0.000)	(0.000)
Rated	-0.145***	-0.172***
	(0.009)	(0.010)
Investment Grade	-0.012	0.001
	(0.010)	(0.010)
Intercept	0.587***	0.687***
	(0.093)	(0.094)
Year Fixed Effects	Yes	Yes
Firm Fixed Effects	Yes	Yes
R-squared (%)	22.56	25.99
Observations	14966	13842

Table IA7. Outcome of Borrower Switches to New Loan Lenders: Firm Loan-Bond Choice

This table reports the estimation results of the model that examines the outcome of borrowers' switch to a new lender on the firm's debt financing choice between loan and bond. We conduct the regression analysis in the firm-quarter sample from 1994 to 2012. The dependent is the ratio of outstanding bank debt out of total amount of debt measured at quarter end. The independent variable of interest is the *Ratio of Switching Loans*, which is calculated as the number of loans in which one or more of the lead lenders is new to the borrower out of total number of loans the firm issued in a given quarter. We control for firm characteristics extracted at the end of the quarter prior to loan initiation. ***, ** and * denote statistical significance level at 1%, 5% and 10%, respectively. Standard errors are clustered at firm-level. See Appendix for detailed variable definitions.

	Loan Issuance Amount /(Loan Issuance Amount + Bond Issuance Amount)	Bank Debt/Total Debt
Ratio of Switching Loans	-0.005*	-0.042***
	(0.003)	(0.004)
Log (Total Assets)	-0.008***	-0.029***
	(0.001)	(0.002)
Cash/Total Assets	-0.006	-0.514***
	(0.018)	(0.044)
Current Ratio	-0.004**	-0.025
	(0.001)	(0.050)
Leverage	-0.063***	-0.005
	(0.012)	(0.019)
Market-to-Book	-0.001**	0.001
	(0.000)	(0.001)
ROA	-0.006	-0.006
	(0.009)	(0.031)
Z-score	0.001***	0.001
	(0.000)	(0.001)
Rated	-0.077***	-0.083***
	(0.005)	(0.008)
Investment Grade	0.023***	-0.110***
	(0.006)	(0.009)
Intercept	1.088***	0.742***
	(0.025)	(0.036)
Year Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Clustered by Firm	Yes	Yes
R-squared (%)	6.33	39.04
Observations	16515	16515