The Role of CDS Trading in the Commercialization of New Lending Relationships

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Abstract

We investigate how the development of the credit default swap (CDS) market affects lenders' incentives to initiate new lending relationships. We predict that CDSs reduce the adverse selection that non-relationship lenders face when competing for loans, by allowing those lenders to hedge loan exposure and by the revelation of private information through CDS spreads. We find that, following CDS initiation on a borrower's debt, non-relationship lead arrangers are more likely to originate its loans and non-relationship participants are more likely to join loan syndicates. We also show that lead arrangers that initiate lending relationships following CDS initiation focus more on commercial aspects of lending relationship. These lead arrangers are more likely to pursue new borrowers with high cross-selling potential, which are expected to generate substantial fee business. Further, non-relationship lenders have lower incentives for costly borrower monitoring, as reflected in weaker control rights and in the lower loan share they retain. Relative to relationship lenders, non-relationship lenders are likely to be more distant from borrowers, foreign, and less reputable once CDSs become available, emphasizing their lower monitoring efficiency.

1. Introduction

The development of the credit default swap (CDS) market is one of the most important financial innovations of recent decades. CDSs allow lenders to hedge borrowers' credit risk while maintaining their lending relationships (e.g., Saretto and Tookes 2013). However, CDS hedging reduces lenders' incentives to monitor borrowers and may push borrowers into inefficient bankruptcy (e.g., Hu and Black 2008; Ashcraft and Santos 2009; Bolton and Oehmke 2011; Parlour and Winton 2013). Considering these positive and negative attributes, we examine how CDSs influence the loan origination and participation decisions in loan syndicates.

We predict that non-relationship lenders (that is, lenders with no relationship with a given borrower before CDS initiation) are more likely to serve as lead arrangers or join loan syndicates as participants once CDSs on a borrower's debt become available. Non-relationship lenders competing for a loan face adverse selection risk, as relationship lenders' prior experience with the borrower gives them a substantial information advantage (Boot 2000). Because relationship lenders exploit this advantage and bid for good loans while avoiding bad ones, non-relationship lenders will compete less aggressively for a loan, which typically results in them losing it to a better-informed incumbent lender (Rajan 1992). But once CDSs become available, an opportunity to hedge against potential credit losses should significantly mitigate non-relationship lenders' adverse selection concerns. CDS spreads also often reveal private information about a borrower through informed trading by relationship lenders, further diminishing non-relationship lenders' information disadvantage (e.g., Acharya and Johnson 2007; Qiu and Yu 2012; Batta et al. 2016). We expect lower adverse selection to increase the willingness of non-relationship lenders to bid for a loan, thus increasing their probability of winning a deal. This reasoning applies to non-relationship lenders competing with incumbent lead arrangers to serve as the lead arranger of a

loan as well as to non-relationship lenders competing to join the syndicate with other participants that have superior information about the borrower through prior lending.

Using staggered initiation of CDS trading across CDS firms, we use a difference-in-differences research design with firm and time fixed effects. We find a positive and significant effect of CDSs on non-relationship lending for both lead arrangers and syndicate participants. The probability that a non-relationship lead arranger (syndicate participant) arranges (joins) the loan syndicate is 1.39 (1.28) times higher following CDS trading initiation on a borrower's debt. These findings are robust when we perform short-window analyses around CDS initiation, propensity-score match CDS firms with non-CDS firms, and use the instrumental variable approach.

To better understand the underlying mechanisms of non-relationship lending decisions following CDS initiation, we next explore whether non-relationship lenders are more likely to focus on commercial aspects of the lending relationship. Lending decisions are typically driven by the overall profitability of the relationship with the borrower, including non-interest income (Standard & Poor's 2011). Lenders cross-sell various services, such as investment banking, derivatives, and structured finance, generally aiming to serve their borrowers as a "one-stop shop" for all financial services (Drucker and Puri 2005; Yasuda 2005; Fang et al. 2013). Because non-relationship lenders initiate a lending relationship only after CDSs become available and are therefore likely to hedge their exposure, thus reducing concerns about borrower credit risk, we predict that they will pursue new borrowers with high cross-selling potential. Cross-sold products typically generate substantial fee revenues, enhancing the profitability of the new relationship, but impose only insignificant pressure on regulatory capital ratios. These fees will also help compensate for the cost of purchasing CDS protection, further reinforcing our predictions.[1]

[1] Substantial loan origination fees charged by lead arrangers further help them compensate for CDS hedging costs. Origination fees typically range from one to five percent of the total loan commitment, depending primarily on the

Because lenders' expectations about borrowers' future business needs are difficult to assess, we use multiple measures of cross-selling potential: (a) media coverage of a borrower's activities, including public offerings, mergers and acquisitions (M&A), and investments; (b) a borrower's M&A after a loan's issuance; (c) whether a borrower is in the aviation, shipbuilding, oil, refinery, gas, or telecommunication industries, which offer lenders opportunities to sell structured finance products; (d) a borrower's use of derivatives; and (e) the extent of a borrower's foreign operations, which captures transaction banking opportunities and related foreign-currency hedging. For all measures, we find that, following CDS initiation, lead arrangers are more likely to enter into new lending relationships if a borrower has high cross-selling potential. The likelihood of non-relationship participants joining the syndicate is also enhanced by cross-selling potential, but to a lesser degree, which is likely explained by lead arrangers being the primary beneficiaries of those opportunities (e.g., Ivashina and Kovner 2011).

We also expect the commercialization of the new lending relationships to be reflected in lenders' weaker monitoring incentives. Non-relationship lenders that establish a relationship with the borrower following the onset of CDS trading should be more likely to rely on CDSs, rather than on borrower monitoring, to protect themselves against credit risk. Less intensive monitoring will allow these lenders to reduce monitoring costs, further enhancing the profitability of new relationships. Weak monitoring may also help a non-relationship lender attract new borrowers, as well as give these borrowers flexibility to pursue new business activities, which in turn will create additional cross-selling opportunities. Therefore, although prior studies show that CDSs diminish the strength of lender monitoring (e.g., Subrahmanyam et al. 2014; Martin and Roychowdhury 2015), we predict this adverse effect to be stronger for non-relationship lenders.

complexity of the transaction (Standard & Poor's 2011). In 2017, loan origination fees amounted to $11.5 billion in the US syndicated loan market.

We base lender monitoring analyses on lead arrangers because they perform the primary monitoring of the borrowers on behalf of syndicate participants (e.g., Lee and Mullineaux 2004; Sufi 2007; Ivashina 2009). We measure lead arrangers' monitoring incentives by the strength of their control rights, since lenders retain stronger rights when they intend to monitor a borrower more intensively (Roberts and Sufi 2009a, 2009b; Roberts 2015). Loan contracts with a higher ratio of performance (income-statement-based) covenants to total financial covenants and those that incorporate interest-increasing performance-pricing provisions endow lenders with stronger control rights (Roberts and Sufi 2009a; Christensen and Nikolaev 2012; Christensen et al. 2016). Consistent with our prediction, we find that, following CDS initiation, non-relationship lead arrangers impose a lower ratio of performance covenants and are less likely to impose interest-increasing provisions relative to relationship lead arrangers. Further, we show that, in contrast to non-relationship lead arrangers, relationship lead arrangers do not relinquish their control rights after CDS initiation. This evidence provides new insight into the previously documented negative effect of CDSs on lenders' monitoring incentives (e.g., Chakraborty et al. 2015; Shan et al. 2015). We show that this effect stems primarily from lenders that initiate a relationship with the borrower after CDS initiation, while relationship lenders do not reduce their monitoring efforts.

Lead arrangers also have stronger monitoring incentives when they have more skin in the game; that is, when they retain a larger loan share (e.g., Sufi 2007; Ivashina 2009). Therefore, we predict that, following CDS initiation, non-relationship lead arrangers retain a smaller loan share relative to relationship lead arrangers. We find strong support for this prediction. Importantly, consistent with covenant and performance-provision tests, we show the opposing responses to CDS initiation by relationship and non-relationship lenders. Although prior research shows that lead arrangers retain larger loan share in the post-CDS period (e.g., Amiram et al. 2017), we find

that this effect is driven primarily by relationship lenders, while non-relationship lenders do not increase their skin in the game.

We complement these analyses by exploring whether the characteristics of non-relationship lenders differ in the post- versus the pre-CDS initiation period. If CDS-protected non-relationship lead arrangers are less committed to monitoring, we predict that there is a higher likelihood that lead arrangers with lower monitoring efficiency will initiate relationships in the post period. Because greater distance to the borrower impedes a lender's information gathering and increases monitoring costs, we measure monitoring efficiency by the distance between the lead arranger and the borrower and by whether the lead arranger is a foreign institution (e.g., Berger et al. 2005; Degryse and Ongena, 2005; Agarwal and Hauswald 2010). Following prior research, we also view reputable lead arrangers as having stronger monitoring ability (e.g., Sufi 2007; Bushman and Wittenberg-Moerman 2012). We find that, relative to relationship lenders, non-relationship lenders are likely to be more distant from borrowers, foreign, and less reputable once CDSs become available, consistent with such lenders being less likely to engage in costly monitoring.

We acknowledge that the stronger negative influence of CDSs on the monitoring of non-relationship lead arrangers should negatively affect syndicate participants' willingness to join the syndicates they arrange. Prior studies suggest that agency problems within a syndicate are mitigated if participants with prior relationships with the borrower join the syndicate, since they are more informed about the borrower's performance and creditworthiness (e.g., Sufi 2007; Ivashina 2008). Thus, although we hypothesize and find that non-relationship participants are more likely to join the syndicate following CDS initiation, we predict that this effect will be attenuated if a non-relationship lead arranger syndicates a loan. We indeed find that, following CDS initiation, the probability that a non-relationship participant joins a syndicate is lower if the loan is arranged

by a non-relationship relative to a relationship lead arranger.

We conduct additional exploratory tests of the effect of CDSs on non-relationship lending. To disrupt existing lending relationships, non-relationship lenders may entice borrowers with favorable loan terms, such as a low interest rate and large loan size. However, because hedging via CDSs is costly, more favorable terms may diminish the benefits of the new lending relationship. We find that, following CDS initiation, non-relationship lead arrangers do not charge lower spreads but do issue smaller loans, relative to relationship lead arrangers. Coupled with the significant impact of cross-selling potential on non-relationship lenders' decisions, this evidence suggests that, even though these lenders provide new borrowers with less credit in order to reduce hedging costs, they still get a mandate to provide the borrowers with additional financial services.

To shed additional light on lenders' incentives to initiate new lending relationships following CDS initiation, we explore non-relationship lenders' performance. Lenders often experience low loan growth due to internal credit risk-management restrictions or regulatory capital constraints. Since CDSs offer more flexible credit risk management and alleviate capital constraints, we predict that lenders with low loan growth are more likely to seek new borrowers after the onset of CDS trading. We also expect lenders with low profitability to have stronger incentives to initiate new relationships once they can hedge their exposure through CDSs, as these relationships may boost profitability by generating additional interest revenue and cross-selling fees. Consistent with these predictions, we find that low loan growth and profitability amplify the effect of CDSs on the probability of initiating new relationships for both lead arrangers and syndicate participants.

Our paper contributes to the literature on the influence of the CDS market on private lending. Prior studies find a significant impact of CDSs both on borrowers' access to credit and on the strength of lenders' monitoring (e.g., Ashcraft and Santos 2009; Saretto and Tookes 2013;

Subrahmanyam et al. 2014; Martin and Roychowdhury 2015). These studies, however, mostly do not differentiate between existing and new lending relationships.[2] We extend this literature by exploring how CDSs affect the formation and commercialization of new relationships. Further, we supplement prior studies that examine the underlying mechanisms through which CDSs affect lenders' monitoring incentives, such as lead arrangers' loan shares and control rights (e.g., Chakraborty et al. 2015; Shan et al. 2015; Amiram et al. 2017). We show that the influence of CDS trading on these mechanisms depends to a large extent on whether lenders had an established relationship with a borrower before CDS initiation.

We also contribute to the large literature on relationship lending. While some studies show important benefits to borrowers from established lending relationships (e.g., Petersen and Rajan 1994, 1995; Berger and Udell 1995; Brahrath et al. 2009), others emphasize its dark side, where borrowers become locked in a relationship due to the information advantage of incumbent lenders (e.g., Sharpe 1990; Rajan 1992). We provide evidence consistent with CDS trading fundamentally altering competition in the loan market by enhancing the willingness of non-relationship lenders to compete for new borrowers. Relatedly, our findings underscore important implications of financial innovation for the evolution of the lender-borrower relationship.

[2] In a concurrent paper, Shan et al. (2016) also document the higher likelihood of loans syndicated by non-relationship lead arrangers following CDS initiation. They attribute this finding to borrowers switching to new lead arrangers because their current borrower–lead-arranger relationship is compromised by CDSs and becomes less valuable to the borrower. In contrast, building on Rajan (1992), we suggest that CDSs decrease adverse selection between incumbent and non-relationship lenders, thus increasing the latter's willingness to compete for new borrowers and consequently the likelihood of winning a loan deal. We also focus on the commercialization of the new lending relationship in the post-CDS period, as reflected by non-relationship lenders pursuing borrowers with higher cross-selling potential and by their weaker monitoring incentives, which Shan et al. (2016) do not explore. Note, too, that our findings with respect to non-relationship lead arrangers' monitoring incentives further undermine Shan et al.'s (2016) motivation. They argue that borrowers switch away from relationship lenders primarily because they are concerned about these lenders' weaker monitoring incentives. In contrast, we show that relationship lenders actually do not relinquish their control rights and do increase their "skin in the game" following CDS initiation, while non-relationship lenders monitor substantially less intensively than relationship lenders.

Finally, we add to the growing literature on the importance of noncredit revenue sources in private lending. Prior studies show that lenders gain future underwriting of a borrower's bonds and equity (e.g., Drucker and Puri 2005; Yasuda 2005). There is also evidence that lenders price into the loan spread a borrower's cross-selling potential as well as its board network, as this network offers an advantage in cross-selling services to other firms (e.g., Ivashina and Kovner 2011; Zhao 2017). We complement these studies by showing that a borrower's cross-selling potential is instrumental in lenders' decisions to initiate new relationships. We also show that CDS protection leads to the substantial commercialization of these relationships.

The next section presents hypothesis development. Section 3 describes data and sample selection. Section 4 reports our findings and Section 5 concludes.

2. Related Literature and Hypothesis Development

2.1 CDS trading and non-relationship lending in the syndicated loan market

The introduction of CDSs significantly influenced the private debt market by offering banks hedging opportunities to lay off borrowers' credit risk, while maintaining lending relationships (e.g., Saretto and Tookes 2013). Even if lenders do not hedge their loan exposure at loan initiation, the existence of CDSs offers them a liquid resale option and thus increases their willingness to extend credit. Further, CDSs allow lenders more flexible risk management and provide them an opportunity to reduce regulatory capital requirements by substituting the risk weight of the CDS counterparty (typically, a large financial institution) for that of the borrower (Saretto and Tookes 2013; Streitz 2015; Martin and Roychowdhury 2015; Shan et al. 2016).

Yet CDSs also induce empty creditor problems as CDS-protected lenders become intransigent in debt renegotiation or even push borrowers into inefficient liquidation (Hu and Black 2008; Bolton and Oehmke 2011). CDSs reduce lenders' monitoring incentives because hedging

their loan exposure may be less costly alternative to protect themselves against default risk than intensive information collection and monitoring. Consistent with weaker monitoring, prior studies find that, following CDS initiation, the cost of debt increases for risky and informationally opaque borrowers, borrowers experience more credit rating downgrades and bankruptcies and report less conservatively, and lenders impose looser financial covenants and weaker restrictions after covenant violations (Ashcraft and Santos 2009; Subrahmanyam et al. 2014; Martin and Roychowdhury 2015; Chakraborty et al. 2015; Shan et al. 2015). Amiram et al. (2017) show that syndicate participants, who largely delegate monitoring to the lead arranger, require the arranger to have more skin in the game to compensate for the reduction in its monitoring incentives after the initiation of CDS trading.

We extend these studies by examining how the availability of CDSs affects the likelihood of lenders without a prior relationship with the borrower serving as the lead arranger or joining its loan syndicate as a participant. Because relationship lenders have an information advantage, due to their extensive knowledge of a borrower's operations and creditworthiness, non-relationship lenders competing for a borrowers' loans face substantial adverse selection risk (Boot 2000). This typically results in a non-relationship lender losing competition for a borrower's loan to a better-informed incumbent lender. Specifically, Rajan (1992) shows that relationship lenders exploit their information advantage and bid for good loans while avoiding bad ones. Because relationship lenders avoid bad loans, non-relationship lenders face significant losses if they do bid. As a result, non-relationship lenders, being aware of the adverse selection problem, compete less aggressively, which reduces the probability that they win the loan.

The availability of CDSs on a borrower's debt mitigates adverse selection risk that non-relationship lenders face because it allows them to hedge loan exposure, thus assuaging their

concerns regarding potential credit losses when initiating a new relationship. CDS spreads also often reveal private information about a borrower, ahead of public disclosures and price discovery in other markets, largely due to insider trading of relationship lenders (e.g., The Financial Times 2005; Acharya and Johnson 2007; Qiu and Yu, 2013; Batta 2016). The revelation of a substantial private information through CDSs should mitigate non-relationship lenders' information disadvantage, further alleviating their adverse selection concerns.

This reasoning applies to lead arrangers as well as syndicate participants. Relationship lenders and non-relationship lenders compete to serve as the lead arranger on a borrower's loan. Lower adverse selection, due to CDS availability, is expected to increase non-relationship lead arrangers' willingness to compete for a borrower's loan, increasing the probability of their winning the deal (Rajan 1992). Similarly, lenders compete to join syndicates. Syndication represents an auction in which loan participants submit sealed bids to the lead arranger, and the number of invitations extended to potential participants typically exceeds the number of lenders who will fund the loan (Champagne and Kryzanowski 2007; Ivashina and Sun 2011). Lenders with superior information about the borrower, because of prior lending relationships, are likely to pursue participation in good loans, leaving bad ones to non-relationship participants. We expect lower adverse selection, due to CDS hedging and the revelation of private information through CDS spreads, to increase the willingness of non-relationship lenders to bid for loan participation. Building on these argument, we state our first hypothesis as follows:

H1: The probability that a non-relationship lead arranger (syndicate participant) arranges (joins) the loan syndicate is higher following the initiation of CDS trading on a borrower's debt.

2.2 The Commercialization of New Lending Relationships

We next investigate whether a borrower's cross-selling potential intensifies the effect of CDS

trading on non-relationship lending in the syndicated loan market. Lenders invest in loans for more than just the interest income; they consider the overall profitability of the relationship, including noncredit revenue (Standard & Poor's 2011). In particular, lenders typically adopt a portfolio-management approach, in which they allocate capital to borrowers based on the total return generated by a relationship, relative to its risk.

Lenders cross-sell various services, including investment banking, derivatives, and structured finance. Drucker and Puri (2005) and Yasuda (2005) show that serving as a lead arranger helps a bank gain future underwriting of a borrower's bonds and equity. Ivashina and Kovner (2011) also show that lenders account for cross-selling potential when pricing leveraged buyout loans. Fang et al. (2013) provide evidence consistent with banks aiming to serve their borrowers as "one-stop shop" for financial services.

Because non-relationship lenders initiate lending relationship only once CDSs become available, they are likely to hedge their exposure, thus diminishing concerns about a borrower's credit risk. Thus, we expect CDS-protected non-relationship lenders to focus more on commercial aspects of the lending relationship. We predict that these lenders will pursue new borrowers with high cross-selling potential. Cross-sold products are mostly fee-based and entail minimal risk-weighted assets. Therefore, cross-selling will generate substantial fee revenues for the lender, while imposing only insignificant pressure on regulatory capital ratios. Fees generated by cross-selling will also help compensate for the cost of purchasing CDS protection. Note that, although non-relationship lenders would have benefited from a lending relationship with high cross-selling potential borrower even before CDS initiation on the borrower's debt, they were reluctant to initiate such relationships, likely due to the high adverse selection they faced without credit protection via CDS. We therefore hypothesize:

H2: The increase in the probability that a non-relationship lead arranger (syndicate participant) arranges (joins) the loan syndicate following the initiation of CDS trading on a borrower's debt is higher when the borrower has high cross-selling potential.

We also expect that the commercialization of the lending relationships initiated following the onset of CDS trading leads to the reduction in lender monitoring incentives. Prior studies already document that CDSs undercut lenders' monitoring incentives (e.g., Ashcraft and Santos 2009; Subrahmanyam et al. 2014; Martin and Roychowdhury 2015; Amiram et al. 2017), but we predict that this effect is stronger for non-relationship lenders. Because non-relationship arrangers initiate new relationships with the borrowers only once CDSs become available, they are more likely to purchase CDS protection than to engage in intense borrower monitoring to address credit risk concerns. Lenders will bear lower monitoring costs with weaker borrower monitoring, thus boosting the profitability of new relationships. Moreover, monitoring less intensively may help non-relationship lead arrangers attract new borrowers, as borrowers prefer fewer constraints on their actions (e.g., Berlin and Mester 1992; Bradley and Roberts 2015). Allowing borrowers greater flexibility to engage in new business activities should also create additional cross-selling opportunities, further benefiting non-relationship lenders. Because it is lead arrangers that assume the primary monitoring responsibilities on behalf of syndicate participants and negotiate loan terms with the borrower (e.g., Lee and Mullineaux 2004; Sufi 2007; Ivashina 2009), we focus our third hypothesis on the lead arrangers of syndicates:

H3: Following CDS initiation, non-relationship lead arrangers have weaker monitoring incentives, relative to relationship lead arrangers.

3. Sample, Data, and Descriptive Statistics

3.1 Data sources and sample selection

We obtain syndicated loan characteristics from DealScan and CDS data from Markit. Borrowers' characteristics are from Compustat and CRSP, and banks' characteristics are from Call Reports (Form Y-9C regulatory filings). We collect firm credit ratings from Compustat and Mergent FISD, data on analyst coverage from I/B/E/S, data on media articles from RavenPack News Analytics, and data on mergers and acquisitions from SDC.

We start sample selection with all syndicated loans issued from 1994 to 2015, as reported in DealScan. There are 46,061 loan packages (deals) issued to US firms over this period. We match this sample to Compustat and eliminate observations with insufficient loan and firm data, resulting in 29,559 loan packages, issued to 6,956 firms. We match this sample to Markit and identify firms with traded CDSs at any point over our sample period (CDS firms hereafter). Following prior literature (e.g., Ashcraft and Santos 2009; Amiram et al. 2017), we identify the date of CDS trading initiation as the first date when a CDS quote for a firm is provided by Markit.[3] In line with Amiram et al. (2017), we eliminate firms for which the first CDS trade date falls in January 2001, the first month of Markit's coverage, because of the ambiguity of the exact date of initiation for these firms. We also require each CDS firm to have at least one loan issued in both the pre- and post-CDS initiation periods and non-CDS firms to have at least one loan issued starting in 2001, when CDS firms in our sample begin to have traded CDSs. Our final sample contains 843 CDS firms and 2,814 non-CDS firms, corresponding to 23,316 loan packages. This process yields 27,547 (177,936) arranger-loan (participant-loan) observations.

[3] Our main findings are unchanged when we identify CDS initiation date as the first date when the quote for a five-year USD-denominated CDS contract is provided by Markit, following Ashcraft and Santos (2009). These contracts are the most commonly traded in the CDS market.

3.2 Descriptive statistics

Table 1 presents descriptive statistics of the main variables used in our test. The mean value of *No Relationship - Lead Arranger* indicates that 38% of lead arrangers in our sample do not have a prior relationship with the borrower. For lead arrangers that syndicate loans to CDS firms following CDS initiation, we define the *No Relationship - Lead Arranger* indicator variable to be equal to 1 if the lead arranger has not syndicated a borrower's loans before the CDS initiation date and 0 otherwise. For lead arrangers that syndicate loans to CDS firms prior to CDS initiation or to non-CDS firms, we define *No Relationship - Lead Arranger* to be equal to 1 if the lead arranger has not syndicated a borrower's loans before the issuance date of the loan under consideration and 0 otherwise. The mean value of *No Relationship - Participant* indicates that 44% of syndicate participants in our sample do not have prior relationships with the borrower. For syndicate participants in loans to CDS firms following CDS initiation, we define the *No Relationship - Participant* indicator variable to be equal to 1 if the participant has not participated in a borrower's loans before the CDS initiation date and 0 otherwise. For participants in loans to CDS firms prior to CDS initiation or to non-CDS firms, we define *No Relationship - Participant* to be equal to 1 if the participant has not participated in a borrower's loans before the issuance date of the loan under consideration and 0 otherwise.[4]

For both the lead arranger and participant samples, the firms are relatively large, as reflected by the mean values of *Assets*, defined as the natural logarithm of total assets (detailed variable definitions are reported in Appendix A). The average ratio of net income to total assets (*ROA*) is

[4] We acknowledge that defining *No Relationship* based on the CDS initiation date for CDS firm and based on loan issuance date for non-CDS firms may raise a concern about the validity of our findings. In Section 4.2, we use difference-in-differences approach, where we assign a pseudo-CDS initiation date to the matched non-CDS firms using the initiation date of the paired CDS firms. This allows us to measure *No Relationship* over the same period for each pair of CDS and matched non-CDS firms.

0.03 for both samples, and 21% (16%) of sample observations relate to firms experiencing losses (*Loss*) for the lead arranger (participant) samples. The mean leverage ratio (*Leverage*), measured by the ratio of total liabilities to total assets, is 0.64 (0.66), and the average interest coverage ratio (*Interest coverage*), measured as EBIT divided by the interest expense, is 11.02 (9.65), while mean asset tangibility (*Tangibility*), measured as property, plant, and equipment divided by total assets, is 0.60 (0.59) for the lead arranger (participant) sample. In addition, 58% (72%) of the lead arranger (participant) sample observations relate to borrowers that are rated (*Rated*) and 33% (42%) to borrowers with investment-grade ratings (*Investment Grade*). We also report statistics for loan characteristics that serve as controls. For both samples, the mean and median value of loan size (*Amount*), measured by natural logarithm of the loan amount, suggest that sample observations relate to loans that are relatively large (*Amount*), have an average maturity (*Maturity*) of approximately four years, and are subject to less than two financial covenants (*#Covenants*). A majority of observations are characterized by performance pricing provisions (*PP*), and 10% (11%) of them have a loan guarantor (*Guarantor*) for the lead arranger (participant) sample.

4. Empirical Results

4.1 The effect of CDS Trading on Non-Relationship Lending

To examine our first hypothesis that lenders are more likely to issue loans to a new borrower following the CDS trading initiation on the borrower's debt, we estimate the following logit model.

$$\begin{aligned} No\ Relationship = {} & \beta_0 + \beta_1 POST + \beta_2 Assets + \beta_3 ROA + \beta_4 Loss + \beta_5 Leverage \\ & + \beta_6 Interest\ Coverage + \beta_7 Tangibility + \beta_8 Rated \\ & + \beta_9 Investment\ Grade + \beta_{10} Amount + \beta_{11} Maturity + \beta_{12} Guarantor \\ & + \gamma Fixed\ Effects + \varepsilon, \end{aligned} \quad (1)$$

where *No Relationship* is one of the two indicator variables — *No Relationship-Lead Arranger* and *No Relationship-Participant* — defined as previously. Our main variable of interest is the *POST* indicator variable, which equals to 1 if the loan is issued after the CDS trading initiation date and 0 otherwise (this variable takes the value of 0 for all loans to non-CDS firms). If non-relationship lending increases after CDS trading initiation on a borrower's debt, we expect a positive and significant coefficient on *POST*.

We control for firm and loan characteristics that can affect lenders' decisions to initiate new lending relationships, including a firm's size, profitability, the incidence of losses, interest coverage, tangibility and credit rating characteristics, as well as loan size, maturity and whether a loan has a guarantor. All firm characteristics are defined as previously and measured in the year preceding a loan's issuance. For loan packages that contain more than one loan (facility), we follow Ball et al. (2008) and Ivashina (2009) and use characteristics of the largest one. Our findings are unchanged when we control for the weighted-average loan characteristics of all loans in the package, where weights are based on loan (facility) size (untabulated).[5]

To aid identification strategy, we include in Model (1) firm and year fixed effects, allowing us to implement a difference-in-differences research design, because CDS initiation dates are staggered across CDS firms. Firm fixed effects control for the time-invariant differences between CDS and non-CDS firms, while year fixed effects control for the time-varying factors common to all sample firms (e.g., Bertrand and Mullainathan 2003; Sapienza 2002; Valta 2012; Amiram et al. 2017).[6] We acknowledge that, because firms may issue loans in months both before and after the

[5] We do not control for the number of covenants and performance pricing provisions, as these characteristics are typically determined during the loan negotiation and therefore cannot affect lenders' choice of whether to start a new lending relationship. In any case, in untabulated analyses, we find that our results are robust to the inclusion of these variables.

[6] In section 4.2 below, we propensity-score match CDS firm to non-CDS firm, which allows us to assign the CDS initiation date to each matched non-CDS firm. Our results are robust to this standard difference-in-difference approach.

initiation date during the CDS initiation year, employing year-month fixed effects is a better strategy to identify initiation effects. Due to concerns regarding a large number of fixed effects in nonlinear models (e.g., Maddalla 1987; Greene 2004), as an additional specification, we estimate Model 1 with a linear probability model, where we substitute year fixed effects with year-month fixed effects. Moreover, as many of our subsequent analyses incorporate interaction terms, linear probability estimations also mitigate concerns regarding the interpretation of interaction terms in our nonlinear model estimations (e.g., Norton et al., 2004). To correct for within-firm correlation in the error term, we cluster standard errors at the firm level.

We present our findings in Panel A of Table 2. In columns 1 and 2, we report the estimation of Model (1) employing Logit and OLS models, respectively, for the lead arranger sample. We find a positive and significant coefficient on *POST* for both Logit and OLS specifications. Economically, based on the OLS specification, the probability that a non-relationship lead arranger syndicates the loan is 1.39 times higher following the CDS trading initiation (note that we measure economic significance based on the OLS specification for all tests). We find similar results for syndicate participants, as reported in columns 3 and 4. The probability that a participant with no relationship with the borrower joins the syndicate is 1.28 times higher once CDSs become available. These results are consistent with our primary prediction that lenders are more likely to initiate a new lending relationship after the inception of CDSs referencing the borrower's debt.[7]

With respect to controls, the negative and significant coefficient on *Leverage* suggests that higher leverage deters non-relationship lenders. The positive and significant coefficient on *Tangible* for the lead arranger sample implies that higher asset tangibility attracts non-relationship arrangers. When borrowers issue longer maturity loans and those with guarantors, we find that it

[7] In untabulated analyses, we find that the effect of CDS trading on non-relationship lending is more pronounced for lead arrangers than syndicate participants.

is more likely for these loans to be arranged by non-relationship lenders.

One concern that might arise when using our difference-in-differences research design is whether the parallel trend assumption holds. To address it, we augment Model (1) with an indicator variable *Last Loan*, which is equal to 1 for the last loan issued before the CDS initiation date and 0 otherwise. If there exists a pre-tend of non-relationship lending before CDS initiation, we expect to find a higher likelihood of non-relationship lending for the last loan before initiation (Heider and Ljungqvist 2015; Amiram et al. 2017). As we report in Panel B, the coefficients on *Last Loan* are insignificant and negative across all model specifications, indicating that the likelihood of non-relationship lending is not higher for the last loan before CDS initiation date relative to the loans preceding this loan. This evidence suggests that the parallel trend assumption holds in our tests.

To further verify the robustness of our findings, we repeat our analyses using a short-window sample that limits observations of CDS firms to three years before and after CDS initiation. These analyses mitigate concerns that factors other than CDS initiation could drive our results. We report these tests in Panel C. Consistent with our main findings, the coefficients on *POST* is positive and significant for all lead arranger and participant specifications.

We provide additional support for our inferences by examining how the effect of CDSs on non-relationship lending varies with a borrower's information opacity. We expect hedging through CDSs and private information revealed by CDS spreads to be more valuable for non-relationship lenders when they lend to opaque firms, as adverse selection costs significantly increase with a borrower's opacity. To measure information opacity, we rely on a borrower's analyst coverage, which is helpful for lenders in assessing borrower creditworthiness (Güntay and Hackbarth 2010; Mansi et al., 2011). *Low Coverage* is an indicator variable equal to 1 if the number of equity analyst following the borrower is below the sample median in a year of a loan's issuance and 0 otherwise.

We augment model (1) with *Low Coverage* and the interaction term *POST* × *Low Coverage*. As we report in Appendix B, Table B1, the coefficient on *POST* × *Low Coverage* is positive and significant for the lead arranger specifications, suggesting that the effect of CDSs on the likelihood of a non-relationship lead arranger syndicating a loan is more pronounced for opaque borrowers. Following CDS initiation, lead arrangers are 1.21 times more likely to initiate a new lending relationship with opaque borrowers relative to more transparent borrowers.[8] However, the coefficient on *POST* × *Low Coverage* is positive but insignificant for the participant specifications. This evidence suggests that, because lead arrangers perform the primary screening and monitoring of the borrower, they are likely to incur higher adverse selection costs when initiating a new relationship with an opaque firm.

4.2 Addressing Endogeneity Concerns

Although Model (1) includes firm and time fixed effects, we next employ PSM and IV approaches to further assuage endogeniety concerns associated with fundamental differences between CDS and non-CDS firms. To construct a matched sample of CDS and non-CDS firms for PSM analysis, we employ the CDS initiation model following Martin and Roychowdhury (2015).

$$\begin{aligned} \textit{CDS Initiation} \quad = \quad & \beta_0 + \beta_1 \textit{Rated} + \beta_2 \textit{Investment Grade} + \beta_3 \textit{Assets} + \beta_4 \textit{Leverage} \\ & + \beta_5 \textit{Profit Margin} + \beta_6 \textit{Return Volatility} + \beta_7 \textit{MTB} + \varepsilon, \end{aligned} \tag{2}$$

where *CDS Initiation* is an indicator variable equal to 1 for the year of CDS initiation and 0

[8] Although our findings with respect to the coefficient on the *POST* × *Low Coverage* interaction term are consistent across Logit and OLS specifications, to further address the concern regarding the interpretation of interaction terms in non-linear models, we apply Buis' (2010) methodology. We continue to find positive and significant coefficient on *POST* × *Low Coverage* (untabulated). We perform this robustness test for all other analyses that include interaction terms in non-linear models. We find that the direction and economic significance of coefficients on interaction terms remains the same as in non-linear model estimations that we tabulate.

otherwise. *Rated*, *Investment Grade*, *Assets,* and *Leverage* are as previously defined. *Profit Margin* is net income divided by sales. *Return Volatility* is the standard deviation of the firms' monthly stock return over the year. *MTB* is the market value divided by the book value of equity. All variables are measured in the year before the year under consideration. We tabulate the estimation results of the first stage PSM model in Appendix B, Table B2, Panel A. In line with prior studies (Martin and Roychowdhury 2015; Kim et al. 2018), we find that the probability of CDS initiation is higher when a firm is rated, has an investment grade rating, and is larger. This probability is lower when a firm is more profitable.

Using the propensity score ("predicted probability of CDS initiation") estimated by the first-stage PSM model (2), we construct the one-to-one matched PSM sample by selecting for each CDS firm a non-CDS firm having the closest propensity score. The matched sample enables us to employ a standard difference-in-difference research design, because we can assign a pseudo-CDS initiation date to the matched non-CDS firms using the initiation date of the paired CDS firms. We allow non-CDS firms to be matched to multiple CDS firms to improve covariate balancing and retain sample size (e.g., Saretto and Tookes 2013). Our final sample contains 719 CDS firms and 395 matched non-CDS firms (referring to 161,831 lender-loan observations). We tabulate the results of the covariate balancing analyses in Panel B of Table B2. These analyses suggest that the PSM matched samples are well balanced across the covariates for most CDS initiation determinants. The CDS firms are larger than matched non-CDS firms at the 10% significance level, but, economically, the difference in firm size is relatively small, given the absolute firm size of the matched CDS and non-CDS firms (mean assets for CDS (non-CDS) firms are USD 4,447 million (USD 3,944 million).

Panel A of Table 3 presents the estimation results based on the PSM sample. We augment

Model (1) with *POST* × *CDS Traded* interaction term, where *CDS Traded* is equal to 1 for CDS firms and 0 for non-CDS firms (the *CDS Traded* indicator variable is subsumed by firm fixed effects). The coefficient on *POST* × *CDS Traded* is a difference-in-differences estimator and is expected to be positive. Consistently, we find positive and significant coefficients on *POST* × *CDS Traded* for both lead arranger and syndicate participant specifications, supporting our main hypothesis that non-relationship lenders are more likely to extend loans to new borrowers once CDSs become available. Economically, a lead arranger (participant) is 1.17 (1.13) times more likely to initiate non-relationship lending following CDS initiation. To further examine the robustness of our findings, we conduct PSM analysis for a short-window sample that limits observations to three years before and after CDS initiation date (pseudo-initiation date for non-CDS firms). The results presented in Panel B corroborate our prior findings: coefficients on *POST* × *CDS Traded* are significantly positive in all specifications.

In addition to addressing endogeneity, the analyses in Table 3 mitigate concerns regarding the measurement of non-relationship lending for CDS and non-CDS firms in our primary tests. While for loans of CDS firm issued following CDS initiation we measure lending relationship relative to the CDS initiation date, because this date cannot be defined for non-CDS firms, we define non-relationship lending for these firms based on whether a lender had a relationship with the firm before the current loan's issuance date. By assigning a pseudo-CDS initiation date to non-CDS firms, a standard difference-in-differences approach allows us to measure non-relationship lending over the same period for each pair of CDS and matched non-CDS firms.

Next, we perform additional analysis based on the IV approach to further address endogeneity concerns. Following prior literature, we use lenders' foreign exchange (FX) derivative position as an instrument for CDS trading (e.g., Saretto and Tookes 2013; Subrahmanyam et al.

2014; Shan et al. 2015; Amiram et al. 2017). Because banks that hedge one component of their portfolio are more likely to hedge others (e.g., Minton et al. 2009), we expect banks that hedge foreign exchange risk to also hedge credit risk via CDSs. Further, lenders' FX derivatives position is a macro, rather than a firm-specific, hedge (e.g., Saretto and Tookes 2013). Thus, while related to a bank's general propensity to hedge, the decision to hedge foreign exchange should be exogenous to a decision to start a lending relationship with a particular borrower.

To construct the *Forex* instrument, we collect notional amounts of FX derivatives from Call Reports filed by bank holding companies. For banks with available data, *Forex* is defined as the ratio of notional amounts of FX derivatives to total assets. We augment CDS initiation model (2) with *Forex* and present, in Panel C, the results of the second-stage IV regression estimated simultaneously with the first-stage CDS initiation model. For both specifications, the coefficients on *Post* are positive and significant. Although we cannot be certain that the *Forex* instrument is truly exogenous, the results of IV tests confirm that lead arrangers and participants are more likely to enter into a new lending relationship when CDSs are available on the borrower's debt.[9]

4.3 Borrower Cross-Selling Potential

In this section, we examine whether non-relationship lenders are more likely to pursue borrowers with higher cross-selling potential once CDSs become available. These analyses will help illuminate whether CDS-protected lenders pursue commercial aspects of the lending relationship when they initiate a new relationship. Since lenders' expectations about borrowers' future business needs are not directly observable, we employ multiple measures of high cross-

[9] Due to Stata computational limitations, we cannot estimate the second-stage IV regression simultaneously with the first-stage model (2) when the second stage is estimated as the non-liner model with firm and year fixed effects or an OLS model with firm and month-year fixed effects. Therefore, to perform IV tests, we estimate the second-stage model as OLS with firm and year fixed effects.

selling potential to test our prediction.

Our first measure of cross-selling potential is based on the media coverage of borrowers' business activities, as media is an important information source to non-relationship lenders (Bushman et al. 2016). We consider media articles that cover topics such as "public offering," "merger," "acquisition," and "investment" to relate to cross-selling opportunities. We focus on these topics because lenders benefit from cross-selling security underwriting and M&A advisory services, and receive significant originating fees if they syndicate loans to finance future investments of the borrower (e.g., Drucker and Puri 2005; Yasuda 2005; Ivashina and Kovner 2011; Fang et al. 2013; Euromoney 2014). Our discussions with loan officers at several banks suggest that lenders continuously monitor information in the media to gather information about borrowers' projected business activities and recent events, as these events may also indicate future business opportunities. Therefore, we consider media articles to be related to a borrower's cross-selling potential if they cover both past and expected borrower activities.

For each borrower in our sample, we obtain media articles from Ravenpack, which covers all news disseminated via Dow Jones Newswires. We limit media data to full-size articles with a relevance score of 75 and above. The relevance score is assigned by RavenPack to indicate when the firm is strongly related to the underlying news story (the scores range from 0 (low relevance) to 100 (high relevance)). We identify articles as cross-selling related if their news type, as assigned by Ravenpack, is public offering, merger, acquisition, or investment. We define the *High CS Potential-Media* indicator variable as equal to 1 if media articles about a borrower cover cross-selling related topics within three years before a loan's issuance date and 0 otherwise. We then augment Model (1) with *High CS Potential-Media* and the interaction term *POST* × *High CS Potential-Media.* Panel A of Table 4 presents our findings (we restrict these analyses to the post-

2000 period because of Ravenpack's data availability). Consistent with our prediction that following CDS initiation lead arrangers are more likely to enter into a new lending relationships if a borrower has higher cross-selling potential, we find the positive and significant coefficient on *POST* × *High CS Potential-Media* for the arranger specifications. Economically, non-relationship arrangers are 1.12 times more likely to syndicate loans to new borrowers with media coverage of cross-selling opportunities relative to borrowers without such coverage. The coefficient on *POST* × *High CS Potential-Media* is insignificant in participant specifications. This finding is likely to be explained by lead arrangers being the primary beneficiaries of cross-selling opportunities (e.g., Ivashina and Kovner 2011), as they maintain the direct relationship with the borrower.

Because M&A is a major line of business for investment banks, which offers lucrative business opportunities, such as M&A advisory and related financial services (Liaw 2011), our second measure of cross-selling potential further addresses a borrower's M&A activity. Although our media-based cross-selling potential measure reflects publicly available information about these deals, lenders' may also have private information concerning a borrower's future M&A transactions. Because we cannot capture lender's private information, we focus on actual M&A deals that occurred after loan issuance.

We define the *High CS Potential-M&A* indicator variable to be equal to 1 if a borrower engages in M&A deals within three years following a loan's issuance date and 0 otherwise. We then augment Model (1) with *High CS Potential-M&A* and the interaction term *POST* × *High CS Potential-M&A.* We report the results in Panel B of Table 4. Similar to our findings in Panel A, the coefficient on *POST* × *High CS Potential-M&A* is positive and significant for the lead arranger specifications. Economically, following CDS initiation, non-relationship lead arrangers are 1.23 times more likely to issue loans to new borrowers with M&A business opportunities relative to

borrowers without such opportunities. We do not find that cross-selling potential influences whether non-relationship syndicate participants join the syndicate.

Our third measure of high cross-selling potential is based on a borrower's industry, as certain industries offer unique opportunities related to structured finance. In particular, the aviation, shipbuilding, oil, refinery and gas, and telecom industries offer banks such opportunities, which have higher fees/margins and lower risk due to high asset collateralization (Oliver Wyman 2006). Lenders also enjoy additional cross-selling benefits by selling to borrowers in these industries related derivatives products, such as commodity derivatives (especially for oil, gas, and natural resources), interest rate derivatives, and foreign-currency derivatives. We define the industry-based measure of cross-selling potential — *High CS Potential-Industry* — to be equal to 1 if a borrower is in one of the listed industries and 0 otherwise.[10] As we report in Panel C, the coefficient on the interaction term *POST* × *High CS Potential-Industry* is positive and significant for the lead arranger specifications, but is insignificant for the participant specifications (note that *High CS Potential-Industry* indicator is subsumed by firm fixed effects). Following CDS initiation, lead arrangers are 1.23 times more likely to start a new lending relationship with borrowers in industries with high cross-selling opportunities relative to borrowers in other industries. These findings reinforce our inference that, post CDS initiation, non-relationship lead arrangers are more likely to initiate lending relationship with borrowers that offer high cross-selling opportunities.

Our fourth measure of cross-selling potential is based on borrowers' use of derivative-related products, which also provide lenders with lucrative cross-selling business (e.g., Oliver Wyman 2006; Euromoney 2014). Derivative transactions offer high margins, as lenders charge borrowers significant fees while entering into offsetting positions with other counterparties, which

[10] We report in Appendix B, Table B3, four-digit SIC codes we used to classify these industries.

are typically less expensive than what borrowers are charged. Furthermore, derivative positions translate into lower risk-weighted assets, as actual exposures are much smaller than the notional amounts, allowing lenders to reserve less capital for these transactions (e.g., Neilson et al. 2017). To proxy for borrower future derivative needs, we presume that borrowers with high demand for derivatives products are likely to have more derivative-related words in their 10-K filings. We define the *High CS Potential-Derivatives* variable to be equal to 1 if the ratio of derivative-related word counts (e.g., "derivative," "hedging") to total words count in the 10-K filing in the year preceding a loan's issuance is greater (less) than the sample median and zero otherwise. We find that the coefficient on *POST* × *High CS Potential-Derivatives* is positive and significant for both lead arrangers and participant specifications. Post CDS initiation, lead arrangers (participants) are 1.14 (1.12) times more likely to initiate lending relationships with borrowers having higher demand for derivative products relative to other borrowers (Panel D).

Our final measure of cross-selling potential addresses the extent of a borrower's foreign operations. Foreign operations provide lenders with transaction banking opportunities (e.g., trade finance) as well as related foreign-currency hedging demand from borrowers. We measure the extent of foreign operations by an indicator variable *High CS Potential-Foreign*, which is equal to 1 if the ratio of a number of a borrower's foreign operating segments to its total number of operating segments in the year preceding a loan's issuance is greater than the sample median and zero otherwise. As we report in Panel E, the coefficient on *POST* × *High CS Potential-Foreign* is positive and significant for all specifications. Following CDS initiation, lead arrangers (participants) are 1.15 (1.08) times more likely to initiate a new lending relationship with borrowers having more extensive foreign operations relative to other borrowers.

Overall, the results reported in Table 4 suggest that once CDSs become available lead

arrangers and syndicate participants pursue new borrowers with high cross-selling potential, consistent with their focus on commercial aspects of new lending relationships. Our findings also imply that, while lead arrangers are likely to be the primary beneficiaries from cross-selling of security underwriting, M&A advisory, and structured finance products, participants may also enjoy some cross-selling opportunities, such as derivative and foreign operation transactions.

4.4 Lenders' Monitoring Incentives

We next examine our prediction that the commercialization of the lending relationships leads to lower monitoring incentives of non-relationship lenders in the post CDS-initiation period. We perform our tests for the lead arranger-borrower relationships since lead arrangers perform the primary monitoring of the borrower on behalf of syndicate participants.

4.4.1 Lead Arrangers' Control Right

Because lenders retain stronger control rights when they aim to intensively monitor a borrower, following prior literature, we measure lenders' monitoring incentives by the strength of their control rights (Roberts and Sufi 2009a, 2009b; Roberts 2015; Kim et al. 2018). Performance (income statement-based) covenants act as tripwires and are used primarily to allocate control rights to lenders when a borrower underperforms, while capital (balance sheet-based) covenants address agency conflicts by aligning ex-ante incentives of a borrower and lenders (Christensen and Nikolaev 2012; Christensen et al. 2016). Therefore, the higher (lower) proportion of performance covenants should be associated with lenders' stronger (weaker) control rights. We define *Performance Covenants* as the ratio of the number of performance covenants to the sum of performance and capital covenants in a loan contract.[11]

[11] In line with Christensen and Nikolaev (2012), we classify cash interest coverage ratio, debt service coverage ratio, level of EBITDA, fixed charge coverage ratio, interest coverage ratio, ratio of debt to EBITDA, and ratio of senior debt to EBITDA covenants as performance covenants, while quick ratio, current ratio, debt to equity ratio, loan to

Roberts and Sufi (2009a) also suggest that performance pricing provisions affect lenders' control rights, by influencing the allocation of bargaining power between a borrower and lenders in ex post renegotiations. Performance pricing provisions define a pricing grid, which links a loan's interest rate to a borrower's performance (Asquith et al. 2005), where the interest rate increases (decreases) when a borrower's performance deteriorates (improves). Because the interest rate increasing provision typically imposes a sharp increase in the interest rate when performance deteriorates, borrowers are incentivized to renegotiate the loan contract, thus allocating control rights to lenders. We define *Interest Increasing PP* to be equal to 1 if a loan contract contains the interest rate increasing performance pricing provisions and 0 otherwise. We measure *Interest Increasing PP* based on the largest loan facility in the package.

We estimate the following model to examine the effect of CDS initiation on non-relationship lead arrangers' control rights.[12]

$$\begin{aligned} \textit{Control Rights} = {} & \beta_0 + \beta_1 \textit{POST} + \beta_2 \textit{No Relationship-Lead Arranger} \\ & + \beta_3 \textit{POST} \times \textit{No Relationship-Lead Arranger} + \beta_4 \textit{Assets} + \beta_5 \textit{ROA} + \\ & \beta_6 \textit{Loss} + \beta_7 \textit{Leverage} + \beta_8 \textit{Interest Coverage} + \beta_9 \textit{Tangibility} \\ & + \beta_{10} \textit{Rated} + \beta_{11} \textit{Investment Grade} + \beta_{12} \textit{Amount} + \beta_{13} \textit{Maturity} \\ & + \beta_{14} \textit{Guarantor} + \beta_{15} \textit{PP} + \beta_{16} \#\textit{Covenants} + \gamma \textit{Fixed Effects} + \varepsilon, \end{aligned} \quad (3)$$

where *Control Rights* is either *Performance Covenants* or *Interest Rate Increasing PP*, as defined above. *No Relationship-Lead Arranger* and all control variables are defined as previously. If non-relationship lead arrangers retain weaker control rights post CDS initiation, we expect a negative

value ratio, ratio of debt to tangible net worth, leverage ratio, senior leverage ratio, and net worth requirement covenants as capital covenants. Financial covenants are identical to all loan facilities in the package.

[12] If loan package has more than one lead arranger (6.5% of sample packages), all lead arrangers are accounted for in estimating model (3). Our results are unchanged when we exclude these deals from the analyses.

and significant coefficient on the interaction term *POST* × *No Relationship-Lead Arranger*. For covenant specifications, we estimate Model (3) as Tobit (OLS) with firm and year (firm and year-month) fixed effects. For performance pricing specifications, we estimate Model (3) as Logit (OLS) with firm and year (firms and year-month) fixed effects.[13]

As we report in columns 1 and 2 of Panel A, Table 5, the coefficient on *POST* × *No Relationship-Lead Arranger* is negative and significant in both specifications for *Performance Covenants*, indicating that non-relationship lead arrangers impose a lower proportion of performance covenants following CDS initiation relative to relationship lenders. Economically, in the post-CDS initiation period, the proportion of performance covenants is 0.89 times lower when non-relationship lead arrangers syndicate a loan relative to when a loan is syndicated by relationship lead arrangers. We continue to find negative and significant coefficients on *POST* × *No Relationship-Lead Arranger* for *Interest Rate Increasing PP* specifications in column 3 and 4, suggesting that CDS-protected non-relationship lead arrangers are less likely to impose provisions that would increase the interest rate if a borrower underperforms. In the post-CDS initiation period, non-relationship lead arrangers are 0.87 times less likely to impose the interest rate increasing performance provisions relative to relationship lead arrangers. To support the robustness of these findings, in columns 5 and 6 of Panel A, we perform the analyses for the weighted average *Interest Rate Increasing PP* variable for all facilities in the deal, where weights are based on loan (facility) size. We find very similar results.

Importantly, in contrast to the negative and significant coefficients on *POST* × *No Relationship-Lead Arranger*, the coefficients on *Post*, which captures the effect of CDSs on control rights of relationship lenders, are insignificant in all specifications. We infer that lead arrangers

[13] We exclude #Covenants (PP) from the model when we examine performance covenants (interest increasing provisions), as it is highly correlated with the dependent variable.

that had a prior relationship with the borrower do not relinquish their control rights after CDS initiation. This finding helps us understand prior evidence of the detrimental influence of CDSs on lenders' monitoring (e.g., Shan et al. 2015; Chakraborty et al. 2015). We show that weaker lender monitoring is actually attributed to lenders that initiate a new relationship with the borrower following CDS initiation, while relationship lenders do not reduce their monitoring efforts.

In untabulated analyses, we re-estimate Model (3) with covenant slack as the dependent variable, as covenant tightness also determines lenders' control rights (e.g., Dichev and Skinner 2002). Because financial ratios used in covenant definitions are adjusted extensively by lenders (e.g., Dichev and Skinner 2002; Li 2016; Li et al. 2016), we focus on the debt-to-EBITDA covenant, which slack can be measured reliably based on the DealScan data (e.g., Demerjian and Owens 2016). This covenant is also the most frequently used for our sample loans. We measure covenant tightness as the difference between a borrower's debt-to-EBITDA ratio in the year preceding the loan issuance measure minus the covenant threshold, divided by standard deviation of the debt to EBITDA ratio over the previous 12 quarters (e.g., Dichev and Skinner 2002). We find that, following CDS initiations, non-relationship lenders impose looser debt-to-EBITDA covenants, as indicated by the positive and significant (albeit at the 10% level) coefficient on *POST* × *No Relationship-Lead Arranger*. This evidence further suggests that lenders retain weaker control rights when entering into new lending relationships following CDS initiation.

4.4.2 Lead Arrangers' Share

Prior studies show that having more skin in the game (i.e., retaining a larger loan share) incentivizes the lead arranger to monitor a borrower more intensively (e.g., Sufi 2007; Ball et al. 2008; Ivashina 2009). Therefore, we supplement the analyses of lenders' monitoring incentives by investigating whether non-relationship lead arrangers retain a lower loan share relative to

relationship lenders following CDS initiation.

Following prior studies (Ball et al. 2008; Ivashina 2009; Amiram et al. 2017), we perform these analyses for the largest loan facility in the package and define *Lead Arranger Share* as the proportion of the loan retained by the arranger. We re-estimate Model (3) with *Lead Arranger Share* as the dependent variables and report the results in column 1 of Panel B. Consistent with our predictions, we find negative and significant coefficients on *POST* × *No Relationship-Lead Arranger*. Economically, in the post-CDS initiation period, lead arranger share is 0.92 times lower when non-relationship lead arrangers syndicate a loan relative to when a loan is syndicated by relationship lead arrangers. To support the robustness of these findings, in column 2 of Panel B, we perform the analyses for the weighted average *Lead Arranger Share* for all facilities in the deal, where weights are based on loan (facility) size. We find that our results are unchanged.

In line with our covenant- and performance-provision-based tests, the analyses presented in Panel B also indicate that relationship and non-relationship lenders respond differently to CDS initiation. Amiram et al.'s (2017) show that lead arrangers increase their loan share following CDS initiation to compensate syndicate participants for the reduction in their monitoring incentives. We find that this effect of CDSs is attributed primarily to lenders who had an established relationship with the borrower before CDS initiation. In contrast to the negative and significant coefficient on *POST* × *No Relationship-Lead Arranger*, the coefficient on *Post*, which reflects the effect of CDSs on the loan share of relationship lenders, is positive and significant.

4.5 Non-relationship Lender Characteristics

To better understand the effect of CDS availability on non-relationship lenders' monitoring incentives, we next examine how the characteristics of non-relationship lenders change from the pre-CDS initiation period to the post-CDS initiation period. If CDS-protected non-relationship

lead arrangers are less committed to intensively monitor the borrower, we predict that there is a higher likelihood that lead arrangers with lower monitoring efficiency will initiate lending relationships once CDSs on the borrower's debt become available.

We examine this prediction using three measures of monitoring efficiency. First, we rely on geographical distance between a lender and a borrower. Prior research suggests that greater distance impedes the lender's collection of private, soft information and increases its monitoring costs, thus reducing monitoring efficiency (e.g., Petersen and Rajan 2002; Berger et al. 2005; Degryse and Ongena, 2005; Sufi 2007; Agarwal and Hauswald, 2010; Dass and Massa 2011). Therefore, given the reduced monitoring incentives of CDS-protected non-relationship lead arrangers, we predict that, relative to relationship lead arrangers, they are likely to be more distant from borrowers in the post- versus the pre-CDS initiation period. For lead arrangers headquartered in the US, we measure the distance in miles between a lead arranger's and a borrower's headquarters *(Distance*). As an additional measure of lender-borrower distance, we use an indicator variable equal to 1 if the lender is not headquartered in US, and 0 otherwise (*Foreign*).

We next focus on the lead arranger's reputation, which reflects its ability and commitment to screen and monitor borrowers (e.g., Diamond 1989, 1991; Boot et al. 1993; Chemmanur and Fulghieri 1994). Lender reputation is especially important in the syndicated loan market, where repeated interactions occur between the arranger and the syndicate participants (Dennis and Mullineaux 2000; Lee and Mullineaux 2004; Sufi 2007; Gopalan et al. 2011; Bushman and Wittenberg-Moerman 2012). Following prior literature, we consider reputable arrangers as lenders with a strong monitoring ability and incentives. Because CDS-protected non-relationship lead arrangers are less likely to rigorously monitor the borrower, we predict that, relative to relationship lead arrangers, non-relationship lead arrangers are less likely to be reputable in the post- versus

the pre-CDS initiation period. We define *Reputation* as an indicator variable equal to 1 if a lead arranger is one of the top three lead arrangers, based on average market share in the syndicated loan market over our sample period, and equals 0 otherwise (Bushman et al. 2010).[14] We estimate the following model to examine our predictions:

$$\begin{aligned} \textit{Lender Characteristics} = {} & \beta_0 + \beta_1 \textit{POST} + \beta_2 \textit{No Relationship-Lead Arranger} \\ & + \beta_3 \textit{POST} \times \textit{No Relationship-Lead Arranger} + \beta_4 \textit{Assets} \\ & + \beta_5 \textit{ROA} + \beta_6 \textit{Loss} + \beta_7 \textit{Leverage} + \beta_8 \textit{Interest Coverage} \\ & + \beta_9 \textit{Tangibility} + \beta_{10} \textit{Rated} + \beta_{11} \textit{Investment Grade} + \beta_{12} \textit{Amount} \\ & + \beta_{13} \textit{Maturity} + \beta_{14} \textit{Guarantor} + \gamma \textit{Fixed Effects} + \varepsilon, \end{aligned} \quad (4)$$

where *Lender Characteristics* are *Distance, Foreign* and *Reputation,* as defined above. *No Relationship-Lead Arranger* and all control variables are defined as previously. We expect a positive (negative) and significant coefficient on the interaction term *POST* × *No Relationship-Lead Arranger* in the *Distance* and *Foreign* (*Reputation*) specifications.

Consistent with our prediction, the coefficient on *POST* × *No Relationship-Lead Arranger* is positive and significant for both lender-borrower distance measures. Economically, relative to relationship lead arrangers, non-relationship lead arrangers are 143 miles further away from a borrower and are 1.28 times more likely to be foreign in the post- versus the pre-CDS initiation period. The coefficient on *POST* × *No Relationship-Lead Arranger* is negative and significant in the *Reputation* specification. Relative to relationship lead arrangers, non-relationship lead arrangers are 0.5 times less likely to be reputable during the post-CDS initiation period.

Overall, the results in Table 6 indicate that, following CDS initiation, non-relationship lead arrangers are more likely to have lower monitoring efficiency, consistent with them being less

[14] We measure market share based on Bloomberg's lead-arranger league tables. Our findings are robust if we define reputable lead arrangers as the top five or top six rather than the top three.

likely to engage in costly monitoring of borrowers.

4.6 Resolving Agency Problems within the Loan Syndicate

Our findings presented in Tables 5 and 6 suggest a stronger adverse effect of CDSs on the monitoring incentives of non-relationship relative to relationship lenders. A natural question arises of how this weaker monitoring by CDS-protected non-relationship lead arrangers affects the structure of loan syndicates. Syndicate participants typically maintain an arm's-length relationship with a borrower and delegate information collection, contractual negotiations, and borrower screening and monitoring to the lead arranger. Participants thus face substantial agency issues when they join a syndicate (e.g., Lee and Mullineaux 2004; Sufi 2007; Ivashina 2009). We expect greater agency problems within the loan syndicate when it is arranged by a non-relationship relative to a relationship lead arranger after CDS initiation. A stronger decline in non-relationship lead arrangers' monitoring incentives should cause syndicate participants to be concerned that these arrangers will shirk more on their monitoring duties (e.g., Sufi 2007; Ivashina 2009). These agency problems can be significantly mitigated if lenders with prior relationships with the borrower become syndicate participants, because they have greater knowledge of the borrower's performance and creditworthiness (Sufi 2007). Thus, although we find that non-relationship participants are more likely to join the syndicate after CDS initiation (Table 3), we predict that this effect will be weaker when a loan is syndicated by a non-relationship lead arranger.

To test this prediction, we augment Model (1) with *No Relationship-Lead Arranger* and the interaction term *POST* × *No Relationship-Lead Arranger*. If non-relationship participants are less likely to join the syndicate in the post-CDS initiation period when the loan is syndicated by non-relationship lead arrangers relative to when it is syndicated by relationship lead arrangers, we expect a negative and significant coefficient on *POST* × *No Relationship-Lead Arranger*. We

report supporting evidence in Table 7. Non-relationship participants are 0.85 times less likely to join syndicates arranged by non-relationship lead arrangers. Coupled with the positive and significant coefficient on *Post*, as in previous analyses, these findings indicate that, while non-relationship lenders are more likely to join the syndicate once CDSs become available, this effect is attenuated when a loan is syndicated by a non-relationship lead arranger.[15]

Agency problems within the syndicate can also be mitigated if participants have a prior relationship with the lead arranger (e.g., Sufi 2007; Bushman et al. 2017). In untabulated analyses, we examine whether participants familiar with the lead arranger are more likely to join the syndicate when the lead arranger initiates a lending relationship following CDS initiation. We find no supporting evidence, but this result is generally consistent with Sufi (2007), who shows that, when agency problems are severe, previous lead-arranger–participant relationships are much less important than the previous relationships between the borrower and the participant.

4.7 Supplementary Analyses

In this section, we report a number of supplementary analyses. We begin with exploratory tests of the effect of CDSs on the interest rate and size of loans syndicated by non-relationship lead arrangers. On the one hand, these arrangers may bid aggressively for a loan by offering a low spread or more credit. On the other hand, hedging loan exposure via CDSs is costly. If non-relationship arrangers charge a low spread or have a high loan exposure, the new relationship may not be profitable enough to pursue.

We re-estimate Model (3) with *Interest Spread* as the dependent variable and report the results in column (1) and (2) of Panel A, Table 8. *Interest Spread* is the interest rate spread on the

[15] Note that the sum of the coefficients on *POST* and *POST* × *No Relationship – Lead Arranger* is positive and significant, suggesting that, even when a loan is syndicated by a non-relationship lead arranger, the probability of non-relationship participants joining the syndicate is higher in the post- relative to the pre-CDS initiation period.

largest loan facility in the package. For robustness, we also perform the analyses for the weighted average *Interest Spread* for all facilities in the deal, where weights are based on loan (facility) size. The coefficient on the interaction term *POST* × *No Relationship-Lead Arranger* is insignificant in the interest spread specifications, suggesting that non-relationship lenders do not charge a lower spread relative to relationship lenders following CDS initiation.

In column (3) and (4) of Panel A, we next re-estimate Model (3) with *Amount* as the dependent variables, where *Amount* is the natural logarithm of the loan amount of the largest facility in the loan deal. We also perform analyses for the *Deal Amount* variable, measured by the natural logarithm of loan deal (package) amount. Interestingly, the coefficient on *POST* × *No Relationship-Lead Arranger* is negative and significant in both loan amount specifications. Economically, in the post-CDS initiation period, the size of the largest loan (deal) size is 0.92 (0.93) times lower when a non-relationship lead arranger syndicates a loan relative to when it is syndicated by a relationship lead arranger. This evidence indicates that CDS-protected non-relationship lead arrangers have lower exposures to new borrowers, which allows them to reduce hedging costs via CDSs. Given our findings of a substantial influence of cross-selling potential on lead arrangers' decisions to enter new relationships, we infer that, although these lenders have a lower exposure to new borrowers to reduce hedging costs, borrowers still provide them with opportunities to serve their additional financial needs.[16]

In the next set of analyses, to further illuminate lenders' incentives to initiate new relationships after the onset of CDS trading, we investigate how lenders' performance affects the relation between CDS trading and non-relationship lending. Lenders often cannot expand their loan portfolio, because they are restricted by an internal credit risk management policy or face

[16] We acknowledge that lower deal size may result in lower loan origination fees for lead arrangers, but expect cross-selling fess to be substantially higher than the decrease in origination fees.

regulatory capital constraints. CDS hedging offers lenders more flexible credit risk management strategies and alleviate capital constraints (Streitz 2015; Shan et al. 2016). Therefore, we expect that lenders experiencing low loan growth will be more likely to extend their loan portfolio and seek new borrowers following CDS initiation. We also expect CDS initiation to more strongly affect less profitable lenders. When hedging via CDSs and information revelation through CDS spreads become available, these lenders are likely to be eager to pursue new relationships to enhance their profitability. By expanding loan portfolios, they will benefit from both higher interest income and fees from cross-selling additional services to new borrowers.

To test our predictions, we define an indicator variable *Low Loan Growth* to be equal to 1 if the lender's average loan growth over the three years before a loan's issuance is below the sample median and 0 otherwise. We augment Model (1) with *Low Loan Growth* and the interaction term *POST* × *Low Loan Growth*. We present our findings in Panel B of Table 8 (these analyses are restricted for lenders with data available from call reports). Consistent with our predictions, the coefficient on *POST* × *Low Loan Growth* is positive and significant for both lead arranger and participant subsamples. CDS-protected arrangers (participants) are 1.23 (1.29) times more likely to initiate non-relationship lending when they experience lower loan growth.

We further define an indicator variable *Low Profitability* to be equal to 1 if the lender's average ROE over the three years before a loan's issuance is below the sample median and 0 otherwise. We augment Model (1) with *Low Profitability* and the interaction term *POST* × *Low Profitability*. As we report in Panel C of Table 8, the coefficient on *POST* × *Low Profitability* is positive and significant for all specifications, in line with our prediction. Following CDS initiation, lead arrangers (participants) are 1.52 (1.49) times more likely to issue loans to new borrowers when they experience low profitability. Overall, the results suggest that lenders' low loan growth

and profitability amplify the effect of CDSs on initiating lending relationships for both lead arrangers and syndicate participants.

5. Conclusion

We examine how the development of the CDS market affects lenders' incentives to initiate new lending relationships. Due to the information advantage of incumbent relationship lenders, non-relationship lenders face adverse selection problems when competing for a loan deal, which inhibits their relationships with new borrowers (Rajan 1992). We predict that an opportunity to hedge against credit losses and the revelation of private information through CDS spreads significantly mitigate non-relationship lenders' adverse selection concerns, increasing their willingness to compete for loans to new borrowers. Consistent with our prediction, we find that both lead arrangers and syndicate participants are more likely to initiate new relationships once CDSs become available. Our findings also highlight the commercialization of the resulting new lending relationships. CDS-protected non-relationship lenders enhance the profitability of their new relationships by pursuing new borrowers with high cross-selling potential and by reducing their own monitoring efforts. Further emphasizing the lower commitment of non-relationship lenders to monitoring the borrower once CDSs become available, we find that, relative to relationship lenders, non-relationship lenders are likely to be more distant from borrowers, foreign, and less reputable in the post-CDS initiation period. We further show that the increase in the likelihood of non-relationship participants joining a syndicate following CDS initiation is attenuated if the loan is syndicated by a non-relationship lead arranger, which mitigates agency problems within the syndicate exacerbated by the lower monitoring incentives of non-relationship lead arrangers.

Our paper contributes to the growing literature on the influence of the CDS market on private

lending by exploring how CDSs affect the formation of new lending relationships and the commercialization of these relationships. We further contribute to the expansive literature on relationship lending by showing that CDS availability increases the willingness of non-relationship lenders to compete for new borrowers and thus enhances competition in the loan market. By documenting that a borrower's cross-selling potential significantly affects lenders' decisions to enter new relationships, we also add to the growing literature on the importance of noncredit business opportunities in private lending.

References

Acharya, V., and T. Johnson (2007). Insider trading in credit derivatives. Journal of Financial Economics, 84 (1), 110–141.

Agarwal, S., and R. Hauswald (2010). Distance and private information in lending. The Review of Financial Studies, 23(7), 2757-2788.

Amiram, D., W. Beaver, W. Landsman, and J. Zhao (2017). The effects of cds trading initiation on the structure of syndicated loans. Journal of Financial Economics, 126 (2), 364-382.

Ashcraft, A., and J. Santos (2009). Has the cds market lowered the cost of corporate debt? Journal of Monetary Economics, 56 (4), 514–523.

Asquith, P., A. Beatty, and J. Weber (2005). Performance pricing in bank debt contracts. Journal of Accounting and Economics, 40 (1), 101-128.

Ball, R., R. Bushman, and F. Vasvari (2008). The debt contracting value of accounting information and loan syndicate structure. Journal of Accounting Research, 46 (2), 247-287.

Batta, G., J. Qiu, and F. Yu (2016). Credit derivatives and analyst behavior. The Accounting Review, 91 (5), 1315–1343.

Berger, A., N. Miller, M. Petersen, R. Rajan, and J. Stein (2005). Does function follow organizational form? Evidence from the lending practices of large and small banks. Journal of Financial Economics, 76 (2), 237-269.

Berger, A., and G. Udell (1995). Relationship lending and lines of credit in small firm finance. Journal of Business, 68 (3), 351–381.

Berlin, M., and L. Mester (1992). Debt covenants and renegotiation. Journal of Financial Intermediation, 2 (2), 95–133.

Bertrand, M., and S. Mullainathan (2003). Enjoying the quiet life? Corporate governance and managerial preferences. Journal of Political Economy, 111 (5), 1043-1075.

Bharath, S., S. Dahiya, A. Saunders, and A. Srinivasan (2009). Lending relationships and loan contract terms. The Review of Financial Studies, 24 (4), 1141–1203.

Bolton, P., and M. Oehmke (2011). Credit default swaps and the empty creditor problem. Review of Financial Studies, 24 (8), 2617–2655.

Boot, A., S. Greenbaum, and A. Thakor. (1993). Reputation and discretion in financial contracting. The American economic review, 83 (5), 1165-1183.

Boot, A. (2000). Relationship banking: What do we know? Journal of Financial Intermediation, 9 (1), 7-25.

Bradley, M., and M. Roberts (2015). The structure and pricing of corporate debt covenants. The Quarterly Journal of Finance, 5 (02), 1550001.

Buis, M.L. (2010). Stata tip 87: Interpretation of interactions in non-linear models. The Stata Journal, 10 (2), 305-308.

Bushman, R., C. Williams, and R. Wittenberg Moerman (2017). The informational role of the media in private lending. Journal of Accounting Research 55 (1), 115-152.

Bushman, R., A. Smith, and R. Wittenberg-Moerman, 2010, Price discovery and dissemination of private information by loan syndicate participants, Journal of Accounting Research 48, 921-972.

Bushman, R. and R. Wittenberg Moerman (2012). The role of bank reputation in "certifying" future performance implications of borrowers' accounting numbers. Journal of Accounting Research, 50 (4), 883-930.

Chakraborty, I., S. Chava, and R. Ganduri (2015). Credit default swaps and moral hazard in bank lending, Working paper, Georgia Institute of Technology.

Champagne, C., and L. Kryzanowski (2007). Are current syndicated loan alliances related to past alliances? Journal of Banking and Finance, 31 (10), 3145-3161.

Chemmanur, T., and P. Fulghieri, (1994). Investment bank reputation, information production, and financial intermediation. The Journal of Finance, 49 (1), 57-79.

Christensen, H., and V. Nikolaev (2012). Capital versus performance covenants in debt contracts. Journal of Accounting Research, 50 (1), 75–116.

Christensen, H., V. Nikolaev, and R. Wittenberg Moerman (2016). Accounting information in financial contracting: The incomplete contract theory perspective. Journal of Accounting Research, 54 (2), 397–435.

Dass, N., and M. Massa (2011). The impact of a strong bank-firm relationship on the borrowing firm. The Review of Financial Studies, 24(4), 1204-1260.

Dennis, S., and D. Mullineaux (2000). Syndicated loans. Journal of Financial Intermediation, 9 (4), 404-426.

Degryse, H., and S. Ongena (2005). Distance, lending relationships, and competition. The Journal of Finance, 60 (1), 231-266.

Demerjian, P., and E. Owens (2016). Measuring the probability of financial covenant violation in private debt contracts. Journal of Accounting and Economics, 61 (2), 433-447.

Diamond, D. W. (1989). Reputation acquisition in debt markets. Journal of Political Economy, 97(4), 828-862.

Diamond, D. (1991). Monitoring and reputation: The choice between bank loans and directly placed debt. Journal of Political Economy, 99 (4), 689–721.

Dichev, I., and D. Skinner (2002). Large–sample evidence on the debt covenant hypothesis. Journal of Accounting Research, 40 (4), 1091-1123.

Drucker, S., and M. Puri (2005). On the benefits of concurrent lending and underwriting. The Journal of Finance, 60 (6), 2763–2799.

Euromoney (2014). Why no amount of cross-selling can make corporate lending profitable. February 26.

Gopalan, R., V. Nanda and V. Yerramilli (2011). Does poor performance damage the reputation of financial intermediaries? Evidence from the loan syndication market. The Journal of Finance, 66 (6), 2083-2120.

Greene, W. (2004). The behaviour of the maximum likelihood estimator of limited dependent variable models in the presence of fixed effects. The Econometrics Journal, 7 (1), 98-119.

Gntay, L., and D. Hackbarth (2010). Corporate bond credit spreads and forecast dispersion. Journal of Banking & Finance, 34 (10), 2328–2345.

Fang, L., V. Ivashina and J. Lerner (2013). Combining banking with private equity investing. The Review of Financial Studies, 26 (9), 2139-2173.

Financial Times, 2005, Banks warned about insider trading in credit derivatives, April 25.

Heider, F., and A. Ljungqvist (2015). As certain as debt and taxes: Estimating the tax sensitivity of leverage from state tax changes. Journal of Financial Economics 118 (3), 684–712.

Holmstrom, B., and J. Tirole (1997). Financial intermediation, loanable funds, and the real sector. The Quarterly Journal of Economics, 112 (3), 663–691.

Hu, H., and B. Black (2008). Debt, equity and hybrid decoupling: Governance and systemic risk implications. European Financial Management, 14 (4), 663– 709.

ISDA (2013). Summaries of market survey results, Available at: http://www.isda.org/statistics/recent.html

Ivashina, V. (2009). Asymmetric information effects on loan spreads. Journal of Financial Economics, 92 (2), 300–319.

Ivashina, V., and A. Kovner (2011). The private equity advantage: Leveraged buyout firms and relationship banking. The Review of Financial Studies, 24 (7), 2462–2498.

Ivashina, V., and Z. Sun (2011). Institutional stock trading on loan market information. Journal of Financial Economics, 100 (2), 284-303.

Kim, J., P. Shroff, D. Vyas, and R. Wittenberg Moerman (2018). Credit default swaps and managers' voluntary disclosure, Journal of Accounting Research, 56, 953-988.

Lee, S., and D. Mullineaux (2004). Monitoring, financial distress, and the structure of commercial lending syndicates. Financial Management, 33 (3), 107-130.

Liaw, K. (2011). The business of investment banking: a comprehensive overview, New Jersey: Wiley, 2011. pp. 1-7.

Li, N. (2016). Performance measures in earnings-based financial covenants in debt contracts. Journal of Accounting Research, 54 (5), 1149-1186.

Li, N., F. Vasvari and R. Wittenberg-Moerman (2016). Dynamic threshold values in earnings-based covenants. Journal of Accounting and Economics, 61 (2), 605-6

Maddala, G. (1987). Limited dependent variable models using panel data. Journal of Human Resources, 22 (3), 307-338.

Mansi, S., W. Maxwell, and D. Miller (2011). Analyst forecast characteristics and the cost of debt. Review of Accounting Studies, 16 (1), 116–142.

Martin, X. and S. Roychowdhury (2015). Do financial market developments influence accounting practices? Credit default swaps and borrowers reporting conservatism. Journal of Accounting and Economics, 59 (1), 80–104.

Minton, B., R. Stulz, and R. Williamson (2009). How much do banks use credit derivatives to hedge loans? Journal of Financial Services Research, 35 (1), 1–31.

Morrison, A. (2005). Credit derivatives, disintermediation, and investment decisions. The Journal of Business, 78 (2), 621–648.

Neilson, J., K. Wang, C. Williams and B. Xie, (2017). Offsetable derivative exposures and financial stability. Working Paper. University of Michigan.

Oliver Wyman (2006). Get smart or get out: structured finance, Available at: http://www.oliverwyman.com/.

Parlour, C., and A. Winton (2013). Laying off credit risk: Loan sales versus credit default swaps. Journal of Financial Economics, 107 (1), 25–45.

Petersen, M., and R. Rajan (1994). The benefits of lending relationships: Evidence from small business data. The Journal of Finance, 49 (1), 3–37.

Petersen, M., and R. Rajan (1995). The effect of credit market competition on lending relationships. The Quarterly Journal of Economics, 110 (2), 407–443.

Petersen, M., and R. Rajan (2002). Does distance still matter? The information revolution in small business lending. The Journal of Finance, 57(6), 2533-2570.

Qiu, J., and F. Yu (2012). Endogenous liquidity in credit derivatives. Journal of Financial Economics, 103 (3), 611-631.

Rajan, R. (1992). Insiders and outsiders: The choice between informed and arm's length debt. The Journal of Finance, 47 (4), 1367–1400.

Roberts, M., and A. Sufi (2009a). Renegotiation of financial contracts: Evidence from private credit agreements. Journal of Financial Economics, 93 (2), 159–184.

Roberts, M., and A. Sufi (2009b). Control rights and capital structure: An empirical investigation. The Journal of Finance, 64 (4), 1657–1695.

Roberts, M. (2015). The role of dynamic renegotiation and asymmetric information in financial contracting. Journal of Financial Economics, 116 (1), 61-81.

Sapienza, P. (2002). The effects of banking mergers on loan contracts. The Journal of Finance, 57, 329-367.

Saretto, A., and H. Tookes (2013). Corporate leverage, debt maturity, and credit supply: The role of credit default swaps. Review of Financial Studies, 26 (5), 1190–1247.

Shan, S., D. Tang, and A. Winton (2015). Do credit derivatives lower the value of creditor control rights? Evidence from debt covenants. Working paper, University of Minnesota.

Shan, S., D. Tang, and H. Yan (2016). Regulation-induced financial innovation: The case of credit default swaps and bank capital. Working paper, Shanghai University of Finance and Economics.

Shan, S., D. Tang, and H. Yan (2016). How does CDS trading affect bank lending relationships, Working paper, Shanghai University of Finance and Economics.

Sharpe, S. (1990). Asymmetric information, bank lending, and implicit contracts: A stylized model of customer relationships. The Journal of Finance, 45 (4), 1069–1087.

Standard&Poor's (2011). A guide to the loan market. Standard&Poor's New York.

Streitz, D. (2015). The impact of credit default swap trading on loan syndication. Review of Finance, 20 (1), 265–286.

Subrahmanyam, M., D. Tang, and S. Wang (2014). Does the tail wag the dog?: The effect of credit default swaps on credit risk. The Review of Financial Studies, 27 (10), 2927–2960.

Sufi, A. (2007). Information asymmetry and financing arrangements: Evidence from syndicated loans. The Journal of Finance, 62 (2), 629–668.

Valta, P. (2012). Competition and the cost of debt. Journal of Financial Economics, 105, 661-682.

Yasuda, A. (2005). Do bank relationships affect the firm's underwriter choice in the corporate bond underwriting market? The Journal of Finance, 60 (3), 1259– 1292.

Zhao, J. (2017). The economics of bank cross-firm selling: The value of borrower board connectedness and opacity, Working paper, The University of North Carolina at Chapel Hill.

APPENDIX A
Variable Definitions

Variable		Definition
Amount	=	The natural logarithm of loan amounts of the largest facility in the loan package (DealScan).
Assets	=	The natural logarithm of total assets, measured in the year preceding a loan's issuance (Compustat).
CDS Initiation	=	An indicator variable equal to 1 for the year of CDS initiation, and 0 otherwise (Markit).
Deal Amount	=	The natural logarithm of the package amount (DealScan).
Distance	=	The distance in miles between the lead arranger and the borrower (Compustat).
Forex	=	The ratio of notional amounts of FX derivatives to the lenders' total assets, measured in the year preceding a loan's issuance (Call Report).
Foreign	=	An indicator variable equal to 1 if a lead arranger is not headquartered in US and 0 otherwise (DealScan).
,Guarantor	=	An indicator variable equal to 1 if the loan is guaranteed, and 0 otherwise (DealScan).
High-CS Potential-Derivatives	=	An indicator variable equal to 1 if the ratio of derivative-related word count to total word count in the 10-K filing in the year preceding a loan's issuance is greater than the sample median, and 0 otherwise (10-K).
High-CS Potential-Foreign	=	An indicator variable equal to 1 if the ratio of the number of a borrower's foreign operating segments to its total number of operating segments in the year preceding a loan's issuance is greater than the sample median, and 0 otherwise (Compustat).
High-CS Potential-Industry	=	An indicator variable equal to 1 if a borrower is in the aviation, shipbuilding, oil, refinery, gas, or telecommunication industries, and 0 otherwise (Compustat).
High-CS Potential-M&A	=	An indicator variable equal to 1 if the borrower engages in M&A deals within 3 years after a loan's issuance, and 0 otherwise (SDC).
High-CS Potential-Media	=	An indicator variable equal to 1 if a media covers topics related to cross-selling opportunities (e.g., public offering, merger, acquisition, and investment) within 3 years before a loan's issuance, and 0 otherwise (RavenPack).
Interest Coverage	=	The ratio of earnings before interest and taxes to interest expense, measured in the year preceding a loan's issuance (Compustat).
Interest Spread	=	The natural logarithm of the all-in-drawn spread of the largest facility in the package (DealScan).
Interest Spread (weighted average)	=	The natural logarithm of the weighted average all-in-drawn spread for all facilities in the deal, where weights are based on loan (facility) size (DealScan).
Interest Rate Increase PP	=	An indicator variable equal to 1 if a loan contains an interest rate increasing performance-pricing provision, and 0 otherwise (DealScan).
Investment Grade	=	An indicator variable equal to 1 if the firm has an investment-grade rating in the year prior to a loan's issuance, and 0 otherwise (Compustat, Mergent FISD).

APPENDIX A (continued)

Variable		Definition
Last Loan	=	An indicator variable equal to 1 for the last loan issued prior to a borrower's CDS initiation date, and 0 otherwise (DealScan, Markit).
Lead Arranger Share	=	The proportion (%) of the loan retained by the lead arranger, measured for the largest facility in the loan package (DealScan).
Lead Arranger Share (weighted average)	=	The weighted average lead arranger share variable for all facilities in the deal, where weights are based on loan (facility) size (DealScan).
Leverage	=	The ratio of total liabilities to total assets, measured in the year preceding a loan's issuance (Compustat).
Loss	=	An indicator variable equal to 1 if a borrower's net income in the year preceding a loan's issuance is less than 0, and 0 otherwise (Compustat).
Low Coverage	=	An indicator variable equal to 1 if the number of equity analysts following the borrower in the year of a loan's issuance is less than the sample median, and 0 otherwise (I/B/E/S).
Low Loan Growth	=	An indicator variable equal to 1 if the lender's average loan growth over the 3-year period prior to a loan's issuance is below the sample median, and 0 otherwise (Call Report).
Low ROE	=	An indicator variable equal to 1 if the lender's average ROE over the 3-year period prior to the loan issuance is below the sample median, and 0 otherwise (Call Report).
Maturity	=	The maturity of a loan in months (DealScan).
MTB	=	The market value divided by the book value of equity, measured in the year prior to the year under consideration (Compustat).
No Relationship - Lead Arranger	=	For lead arrangers that syndicate loans to CDS firms, an indicator variable equal to 1 if the lead arranger has not syndicated a borrower's loans prior to the CDS initiation date, and 0 otherwise. For lead arrangers that syndicate loans to non-CDS firms, an indicator variable equal to 1 if the lead arranger has not syndicated a borrower's loans prior to the issuance date of the loan under consideration, and 0 otherwise (DealScan, Markit).
No Relationship - Participant	=	For syndicate participants in loans to CDS firms, an indicator variable equal to 1 if the participant has not participated in a borrower's loans prior to the CDS initiation date, and 0 otherwise. For syndicate participants in loans to non-CDS firms, an indicator variable equal to 1 if the participant has not participated in a borrower's loans prior to the issuance date of the loan under consideration, and 0 otherwise (DealScan, Markit).
Performance Covenants	=	The ratio of the number of performance covenants divided by the sum of performance and capital covenants in a loan contract (DealScan).
POST	=	An indicator variable equal to 1 if the loan is issued after the CDS trading initiation date, and 0 otherwise (Markit).
PP	=	An indicator variable equal to 1 if the loan has a performance pricing provision, and 0 otherwise (DealScan).
Profit Margin	=	The ratio of net income to sales, measured in the year prior to the year under consideration (Compustat).

APPENDIX A (continued)

Variable		Definition
Rated	=	An indicator variable equal to 1 if the firm is rated by S&P or Moody's in the year prior to a loan's issuance, and 0 otherwise (Compustat, Mergent FISD).
Reputation	=	An indicator variable equal to 1 if a lead arranger is one of the top 3 lead arrangers by the average market share over the sample period), and 0 otherwise (DealScan, Bloomberg).
Return Volatility	=	The standard deviation of the firm's monthly stock return, measured in the year prior to the year under consideration (Compustat, CRSP).
ROA	=	The ratio of net income to total assets (Compustat).
Tangibility	=	The ratio of property, plant, and equipment to total assets (Compustat).
#Covenants	=	The total number of financial covenants (DealScan).

Appendix B
Additional Analyses

TABLE B1
Borrower Information Opacity

This table examines whether the effect of CDS trading on non-relationship lending is more pronounced for more opaque borrowers. Columns 1 and 2 (3 and 4) report the analysis for the lead arranger (participant) specifications. Columns 1 and 3 (2 and 4) present results using a logit (OLS) model. We include firm and year (year-month) fixed effects in the logit (OLS) model. t-statistics in parentheses are based on standard errors clustered at the firm level. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. All variables are defined in Appendix A.

	No Relationship - Lead Arranger		*No Relationship - Participant*	
	(1)	(2)	(3)	(4)
POST	0.534***	0.092***	0.499***	0.112***
	(3.86)	(3.57)	(6.84)	(7.09)
Low Coverage	-0.179**	-0.035**	-0.055	-0.012
	(-2.43)	(-2.33)	(-0.88)	(-0.94)
*POST*Low Coverage*	0.338**	0.079***	0.092	0.018
	(2.30)	(2.82)	(1.16)	(1.06)
Model	Logit	OLS	Logit	OLS
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Year-month FE	No	Yes	No	Yes
Observations	24,582	27,196	175,677	177,815
Adj. (Pseudo) R^2	0.029	0.181	0.015	0.145

TABLE B2
Propensity Score Matching

This table presents the propensity score matching (PSM) analyses. Panel A provides results of the first-stage probit model of *CDS initiation*. Panel B reports the difference in the means of the explanatory variables between the CDS firms and matched non-CDS firms to provide evidence of covariate balancing in the PSM estimation. t-statistics in parentheses are based on standard errors clustered at the firm level. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. All variables are defined in Appendix A.

Panel A: First-stage CDS Initiation Probit Model

CDS Initiation	
Rated	0.848***
	(13.46)
Investment Grade	0.362***
	(6.39)
Assets	0.107***
	(5.44)
Leverage	-0.019
	(-0.20)
Profit Margin	-0.002***
	(-3.03)
Return Volatility	0.075
	(1.14)
MTB	0.004
	(0.96)
Model	Probit
Observations	27,553
Adj. (Pseudo) R^2	0.192

TABLE B2 (continued)
Propensity Score Matching

Panel B: Covariate Balancing

	Means		Difference in means
	CDS firms	non-CDS firms	(t-stats)
Rated	0.910	0.901	0.009
			(0.54)
Investment Grade	0.565	0.587	(0.022)
			(-0.85)
Assets	8.407	8.283	0.124*
			(1.77)
Leverage	0.647	0.651	(0.004)
			(-0.41)
Profit Margin	(1.446)	(0.003)	(1.443)
			(-0.98)
Return Volatility	0.043	0.041	0.002
			(0.14)
MTB	3.020	3.090	(0.070)
			(-0.30)

TABLE B3
Industries with High Cross-selling Potential

This table presents SIC codes of industries we classify as having high cross-selling potential.

Industry	SIC code	SIC industry name
Oil, Refinery and Gas	1311	CRUDE PETROLEUM & NATURAL GAS
	1381	DRILLING OIL & GAS WELLS
	1382	OIL & GAS FIELD EXPLORATION SERVICES
	1389	OIL & GAS FIELD SERVICES, NEC
	2911	PETROLEUM REFINING
	4922	NATURAL GAS TRANSMISSION
	4923	NATURAL GAS TRANSMISISON & DISTRIBUTION
	4924	NATURAL GAS DISTRIBUTION
Aviation	3720	AIRCRAFT & PARTS
	3721	AIRCRAFT
	3724	AIRCRAFT ENGINES & ENGINE PARTS
	3728	AIRCRAFT PARTS & AUXILIARY EQUIPMENT, NEC
	4512	AIR TRANSPORTATION, SCHEDULED
	4522	AIR TRANSPORTATION, NONSCHEDULED
Telecommunication	4813	TELEPHONE COMMUNICATIONS
Shipbuilding	3730	SHIP & BOAT BUILDING & REPAIRING

TABLE 1
Descriptive Statistics

This table provides descriptive statistics for the lead arranger and participant samples. All variables are defined in Appendix A.

	Lead arranger sample				Participant sample			
	N	Mean	Median	SD	N	Mean	Median	SD
No Relationship	27,457	0.38	0.00	0.49	177,936	0.44	0.00	0.50
Assets	27,457	7.79	7.70	2.06	177,936	8.28	8.20	1.69
ROA	27,457	0.03	0.04	0.09	177,936	0.03	0.04	0.07
Loss	27,457	0.21	0.00	0.41	177,936	0.16	0.00	0.37
Leverage	27,457	0.64	0.63	0.23	177,936	0.66	0.65	0.21
Interest Coverage	27,457	11.02	3.55	26.81	177,936	9.65	3.79	22.36
Tangibility	27,457	0.60	0.56	0.40	177,936	0.59	0.55	0.40
Rated	27,457	0.58	0.00	0.49	177,936	0.72	1.00	0.45
Investment Grade	27,457	0.33	1.00	0.47	177,936	0.42	1.00	0.49
Amount	27,457	19.47	0.00	1.54	177,936	20.06	0.00	1.14
Maturity	27,457	46.69	19.52	25.65	177,936	48.33	20.03	23.40
Guarantor	27,457	0.10	55.00	0.30	177,936	0.11	60.00	0.31
PP	27,457	0.42	1.00	0.49	177,936	0.57	1.00	0.50
#Covenants	27,457	1.14	0.00	1.31	177,936	1.38	0.00	1.32

TABLE 2
The Effect of CDS Trading on Non-relationship Lending

This table examines the effect of CDSs on non-relationship lending. Panel A reports results of the primary tests. Panel B reports results of the analysis that investigates whether the parallel trend assumption holds for our tests. Panel C reports results for the short-window analysis, in which observations of CDS firms are limited to 3 years before and after CDS initiation. Columns 1 and 2 (3 and 4) report the analysis for the lead arranger (participant) specifications. Columns 1 and 3 (2 and 4) present results using a logit (OLS) model. We include firm and year (year-month) fixed effects in the logit (OLS) model. t-statistics in parentheses are based on standard errors clustered at the firm level. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. All variables are defined in Appendix A.

Panel A: Primary Tests

	No Relationship - Lead Arranger		*No Relationship - Participant*	
	(1)	(2)	(3)	(4)
POST	0.778***	0.149***	0.563***	0.125***
	(8.12)	(8.46)	(10.79)	(11.39)
Assets	0.011	0.003	-0.180***	-0.037***
	(0.22)	(0.31)	(-4.98)	(-4.94)
ROA	-0.053	-0.002	0.049	0.007
	(-0.16)	(-0.03)	(0.17)	(0.11)
Loss	0.077	0.021	0.016	0.002
	(1.19)	(1.58)	(0.31)	(0.21)
Leverage	-0.263*	-0.054*	-0.206*	-0.039
	(-1.81)	(-1.87)	(-1.70)	(-1.50)
Interest Coverage	0.000	0.000	0.001*	0.000**
	(-0.24)	(-0.37)	(1.86)	(2.00)
Tangibility	0.505***	0.103***	0.019	0.009
	(3.02)	(3.18)	(0.17)	(0.38)
Rated	-0.014	0.000	0.032	0.006
	(-0.18)	(0.01)	(0.53)	(0.47)
Investment Grade	0.023	0.007	-0.128**	-0.027**
	(0.24)	(0.39)	(-2.37)	(-2.37)
Amount	-0.157***	-0.033***	0.041*	0.008*
	(-5.42)	(-5.92)	(1.81)	(1.69)
Maturity	0.008***	0.002***	0.010***	0.002***
	(8.10)	(8.80)	(14.12)	(14.40)
Guarantor	0.230***	0.047***	0.243***	0.052***
	(3.29)	(3.40)	(5.12)	(5.19)
Model	Logit	OLS	Logit	OLS
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Year-month FE	No	Yes	No	Yes
Observations	24,582	27,196	175,677	177,815
Adj. (Pseudo) R^2	0.029	0.181	0.015	0.145

TABLE 2 (continued)
The Effect of CDS Trading on Non-relationship Lending

Panel B: Pre-trend Analyses

	No Relationship - Lead Arranger		*No Relationship - Participant*	
	(1)	(2)	(3)	(4)
Last Loan	-0.151	-0.029	-0.031	-0.002
	(-1.18)	(-1.33)	(-0.47)	(-0.13)
POST	0.727***	0.138***	0.551***	0.124***
	(7.06)	(7.20)	(9.40)	(9.95)
Model	Logit	OLS	Logit	OLS
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Year-month FE	No	Yes	No	Yes
Observations	24,582	27,196	175,677	177,815
Adj. (Pseudo) R^2	0.029	0.181	0.015	0.145

Panel C: Short-window Analyses

	No Relationship - Lead Arranger		*No Relationship - Participant*	
	(1)	(2)	(3)	(4)
POST	0.354***	0.073***	0.249***	0.050***
	(3.18)	(3.63)	(4.18)	(4.18)
Model	Logit	OLS	Logit	OLS
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Year-month FE	No	Yes	No	Yes
Observations	18,377	21,423	129,685	131,879
Adj. (Pseudo) R^2	0.025	0.145	0.018	0.161

TABLE 3
Addressing Endogeneity Concerns

This table presents results of the analysis to address endogeneity concerns. Panel A reports results based on propensity score matching (PSM) analysis using the full sample. Panel B reports results of PSM analysis using a short-window sample, which limit observations to 3 years before and after the CDS initiation date (the pseudo-CDS initiation date for non-CDS firms). In Panels A and Panel B, Columns 1 and 2 (3 and 4) report the analysis for the lead arranger (participant) specifications. Columns 1 and 3 (2 and 4) present results using a logit (OLS) model. We include firm and year (year-month) fixed effects in the logit (OLS) model. Panel C presents results of the second-stage instrumental variable (IV) regression analyses, estimated simultaneously with the first-stage CDS initiation model. Column 1 (2) reports the IV regression analysis for the lead arranger (participant) specification. We include firm and year fixed effects in the model. Across all models, t-statistics in parentheses are based on standard errors clustered at the firm level. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. All variables are defined in Appendix A.

Panel A: PSM Analyses—Full Sample

	No Relationship - Lead Arranger		*No Relationship - Participant*	
	(1)	(2)	(3)	(4)
POST	-0.102	-0.014	-0.221***	-0.042***
	(-0.85)	(-0.72)	(-3.27)	(-3.30)
*POST*CDS Traded*	0.367**	0.074***	0.266***	0.060***
	(2.13)	(2.64)	(2.83)	(3.36)
Model	Logit	OLS	Logit	OLS
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Year-month FE	No	Yes	No	Yes
Observations	16,366	17,284	143,972	144,533
Adj. (Pseudo) R^2	0.100	0.295	0.130	0.172

Panel B: PSM Analyses—Short Window

	No Relationship - Lead Arranger		*No Relationship - Participant*	
	(1)	(2)	(3)	(4)
POST	-0.069	-0.014	-0.205***	-0.034***
	(-0.47)	(-0.62)	(-3.00)	(-2.66)
*POST*CDS Traded*	0.335*	0.064**	0.203**	0.046**
	(1.66)	(1.99)	(2.07)	(2.38)
Model	Logit	OLS	Logit	OLS
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Year-month FE	No	Yes	No	Yes
Observations	6,476	7,875	68,340	68,954
Adj. (Pseudo) R^2	0.040	0.275	0.011	0.158

Panel C: Instrumental Variable (IV) Analyses

	No Relationship - Lead Arranger	*No Relationship - Participant*
	(1)	(2)
POST	1.209**	10.114***
	(2.11)	(4.19)
Assets	-0.040	-0.393**
	(-1.62)	(-2.15)
ROA	-0.025	-0.366
	(-0.17)	(-0.41)
Loss	0.000	0.032
	(-0.01)	(0.20)
Leverage	-0.052	-1.276**
	(-0.65)	(-2.39)
Interest Coverage	0.000	0.006**
	(0.63)	(2.42)
Tangibility	0.223*	1.420**
	(1.77)	(2.43)
Rated	-0.023	0.132
	(-0.51)	(0.56)
Investment Grade	-0.059	-0.497*
	(-1.31)	(-1.90)
Amount	-0.022**	0.034
	(-2.09)	(0.46)
Maturity	0.001	-0.006*
	(1.44)	(-1.91)
Guarantor	0.031	0.095
	(1.25)	(0.69)
Model	OLS	OLS
Firm FE	Yes	Yes
Year FE	Yes	Yes
Observations	Yes	Yes
Adj. (Pseudo) R^2	8,483	33,759

TABLE 4
Borrower Cross-selling Potential

This table examines whether the effect of CDS trading on non-relationship lending is more pronounced when a borrower has high cross-selling potential. Panels A, B, C, D, and E report results of the analyses in which cross-selling potential is measured based on media coverage of public offerings, mergers, acquisitions, and investment topics in borrower-specific articles preceding a loan's issuance (*High CS Potential-Media*), a borrower's M&A transactions following a loan's issuance (*High CS Potential-M&A*), a borrower's participation in the aviation, shipbuilding, oil, refinery, gas, or telecommunication industries (*High CS Potential-Industry*), a borrower's demand for derivative-related products (*High CS Potential-Derivatives*), and the extent of a borrower's foreign operations (*High CS Potential-Foreign*), respectively. In all panels, Columns 1 and 2 (3 and 4) report the analyses for the lead arranger (participant) specifications. Columns 1 and 3 (2 and 4) present results using a logit (OLS) model. We include firm and year (year-month) fixed effects in the logit (OLS) model. t-statistics in parentheses are based on standard errors clustered at the firm level. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. All other variables are defined in Appendix A.

Panel A: Media Coverage

	No Relationship - Lead Arranger		*No Relationship - Participant*	
	(1)	(2)	(3)	(4)
POST	0.737***	0.135***	0.398***	0.088***
	(5.71)	(5.83)	(6.15)	(6.54)
High CS Potential-Media	-0.066	-0.010	0.089*	0.016*
	(-0.95)	(-0.79)	(1.99)	(1.74)
*POST*High CS Potential-Media*	0.250**	0.047**	-0.071	-0.010
	(2.03)	(2.12)	(-1.18)	(-0.81)
Model	Logit	OLS	Logit	OLS
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Year-month FE	No	Yes	No	Yes
Observations	19,025	22,148	141,898	143,912
Adj. (Pseudo) R^2	0.027	0.219	0.012	0.151

TABLE 4 (continued)
Borrower Cross-selling Potential

Panel B: Mergers and Acquisitions

	No Relationship - Lead Arranger		*No Relationship - Participant*	
	(1)	(2)	(3)	(4)
POST	0.756***	0.145***	0.572***	0.127***
	(7.84)	(8.16)	(10.94)	(11.52)
High CS Potential-M&A	-0.152	-0.025	0.118	0.025
	(-1.38)	(-1.31)	(1.56)	(1.64)
POST High CS Potential-M&A*	0.489**	0.087**	-0.142	-0.034
	(2.13)	(2.10)	(-1.03)	(-1.13)
Model	Logit	OLS	Logit	OLS
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Year-month FE	No	Yes	No	Yes
Observations	24,582	27,196	175,677	177,815
Adj. (Pseudo) R^2	0.029	0.181	0.015	0.145

Panel C: Industry Type

	No Relationship - Lead Arranger		*No Relationship - Participant*	
	(1)	(2)	(3)	(4)
POST	0.706***	0.136***	0.538***	0.119***
	(7.10)	(7.34)	(9.83)	(10.42)
*POST*High CS Potential-Industry*	0.520**	0.089**	0.173	0.042
	(2.11)	(2.03)	(1.37)	(1.51)
Model	Logit	OLS	Logit	OLS
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Year-month FE	No	Yes	No	Yes
Observations	24,582	27,196	175,677	177,815
Adj. (Pseudo) R^2	0.029	0.181	0.015	0.145

TABLE 4 (continued)
Borrower Cross-selling Potential

Panel D: Derivative Transactions

	No Relationship - Lead Arranger		*No Relationship - Participant*	
	(1)	(2)	(3)	(4)
POST	0.597***	0.115***	0.395***	0.089***
	(4.81)	(4.94)	(5.73)	(6.02)
High CS Potential-Derivatives	-0.027	-0.006	-0.014	-0.004
	(-0.45)	(-0.50)	(-0.34)	(-0.43)
*POST*High CS Potential-Derivatives*	0.298**	0.055**	0.253***	0.054***
	(2.38)	(2.31)	(3.78)	(3.75)
Model	Logit	OLS	Logit	OLS
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Year-month FE	No	Yes	No	Yes
Observations	24,582	27,196	175,677	177,815
Adj. (Pseudo) R^2	0.029	0.181	0.015	0.145

Panel E: Foreign Operations

	No Relationship - Lead Arranger		*No Relationship - Participant*	
	(1)	(2)	(3)	(4)
POST	0.667***	0.128***	0.512***	0.114***
	(6.21)	(6.29)	(9.17)	(9.55)
High CS Potential-Foreign	-0.107	-0.025*	-0.045	-0.009
	(-1.46)	(-1.77)	(-0.91)	(-0.88)
*POST*High CS Potential-Foreign*	0.295**	0.056**	0.153**	0.034**
	(2.07)	(2.12)	(2.01)	(2.09)
Model	Logit	OLS	Logit	OLS
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Year-month FE	No	Yes	No	Yes
Observations	24,582	27,196	175,677	177,815
Adj. (Pseudo) R^2	0.029	0.181	0.015	0.145

TABLE 5
Non-relationship Lead Arrangers' Monitoring Incentives

This table presents results of the analyses that examine non-relationship lead arrangers' monitoring incentives following CDS initiation. In Panel A, we measure monitoring incentives by the strength of lead arranger's control rights: in Columns (1) and (2) we examine the proportion of performance covenants in the total of performance and capital covenants (*Performance Covenants*) and, in Columns (3) – (6), the existence of the interest-rate-increasing pricing provision (*Interest Rate Increasing PP*). In Panel B, we measure monitoring incentives by the share retained by the lead arranger (*Lead Arranger Share*). We include firm and year (year-month) fixed effects in logit and Tobit (OLS) models. t-statistics in parentheses are based on standard errors clustered at the firm level. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. All variables are defined in Appendix A.

TABLE 5 (continued)
Non-relationship Lead Arrangers' Monitoring Incentives

Panel A: Lead Arrangers' Control Rights

	Performance Covenants		*Interest Rate Increasing PP*		*Interest Rate Increasing PP (weighted average)*	
	(1)	(2)	(3)	(4)	(5)	(6)
POST	0.081*	-0.009	0.091	0.015	0.050	0.013
	(1.88)	(-0.65)	(0.82)	(0.89)	(0.45)	(0.81)
No Relationship	-0.004	-0.003	0.008	0.000	0.052	0.002
- Lead Arranger	(-0.16)	(-0.49)	(0.15)	(-0.07)	(0.99)	(0.33)
*POST*No Relationship*	-0.263***	-0.041***	-0.251**	-0.039**	-0.238**	-0.039**
- Lead Arranger	(-4.98)	(-2.98)	(-2.16)	(-2.37)	(-2.06)	(-2.42)
Assets	-0.280***	-0.014*	-0.135**	-0.015*	-0.114*	-0.014
	(-19.76)	(-1.94)	(-2.13)	(-1.72)	(-1.80)	(-1.64)
ROA	-0.077	-0.028	-0.767	-0.055	-0.581	-0.047
	(-0.46)	(-0.53)	(-1.53)	(-0.82)	(-1.15)	(-0.71)
Loss	0.163***	0.026**	-0.258***	-0.030**	-0.251***	-0.031***
	(4.67)	(2.30)	(-2.93)	(-2.45)	(-2.88)	(-2.59)
Leverage	0.361***	0.034	-1.502***	-0.173***	-1.474***	-0.172***
	(6.13)	(1.38)	(-7.01)	(-6.37)	(-6.98)	(-6.42)
Interest Coverage	0.002***	0.000*	-0.001	0.000	-0.001	0.000
	(5.17)	(1.88)	(-0.80)	(-0.75)	(-0.56)	(-0.62)
Tangibility	-0.351***	-0.007	0.030	-0.003	0.102	0.001
	(-8.88)	(-0.29)	(0.16)	(-0.10)	(0.54)	(0.04)
Rated	0.221***	0.008	0.092	0.020	0.044	0.018
	(6.48)	(0.66)	(0.84)	(1.28)	(0.41)	(1.21)
Investment Grade	-0.438***	-0.031**	0.415***	0.072***	0.403***	0.069***
	(-10.80)	(-2.04)	(3.99)	(4.09)	(3.88)	(4.02)
Amount	0.115***	0.022***	0.448***	0.056***	0.495***	0.056***
	(8.76)	(5.54)	(11.36)	(12.05)	(12.17)	(12.38)
Maturity	0.004***	0.001***	0.002	0.000	0.002	0.000
	(8.15)	(4.37)	(0.90)	(1.63)	(1.13)	(1.37)
Guarantor	0.681***	0.158***	0.382***	0.056***	0.414***	0.056***
	(19.47)	(11.64)	(4.35)	(4.01)	(4.74)	(4.13)
PP	1.388***	0.310***				
	(54.22)	(36.74)				
#Covenants			0.740***	0.109***	0.768***	0.109***
			(27.11)	(30.32)	(28.44)	(31.00)
Model	Tobit	OLS	Logit	OLS	Logit	OLS
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No	Yes	No
Year-month FE	No	Yes	No	Yes	No	Yes
Observations	27,457	27,196	20,819	27,196	21,159	27,196
Adj. (Pseudo) R^2	N/A	0.517	0.164	0.298	0.180	0.307

TABLE 5 (continued)
Non-relationship Lead Arranger' Monitoring Incentives

Panel B: Lead Arrangers' "Skin in the Game"

	Lead Arranger Share	*Lead Arranger Share (weighted average)*
	(1)	(2)
POST	3.449***	5.018***
	(3.63)	(5.26)
No Relationship	3.784***	2.871***
- Lead Arranger	(6.59)	(4.51)
*POST*No Relationship*	-3.334***	-3.532***
- Lead Arranger	(-2.96)	(-3.29)
Assets	-2.103***	-1.882**
	(-3.12)	(-2.58)
ROA	1.359	0.880
	(0.22)	(0.13)
Loss	3.246***	2.552**
	(3.47)	(2.49)
Leverage	0.169	1.122
	(0.06)	(0.40)
Interest Coverage	0.024*	0.033**
	(1.72)	(2.06)
Tangibility	-1.374	-1.880
	(-0.64)	(-0.86)
Rated	0.884	2.337*
	(0.71)	(1.86)
Investment Grade	0.862	1.977*
	(0.77)	(1.79)
Amount	-10.094***	-9.967***
	(-19.08)	(-16.10)
Maturity	-0.098***	-0.096***
	(-6.20)	(-5.76)
Guarantor	1.128	0.760
	(1.28)	(0.84)
PP	-6.405***	-5.318***
	(-8.29)	(-6.35)
#Covenants	-0.230	-0.841**
	(-0.67)	(-2.22)
Model	OLS	OLS
Firm FE	Yes	Yes
Year FE	No	No
Year-month FE	Yes	Yes
Observations	8,398	8,398
Adj. (Pseudo) R^2	0.718	0.659

TABLE 6
Non-relationship Lead Arrangers' Characteristics

This table presents results of the analyses that examine non-relationship lead arranger characteristics following CDS initiation. In Columns (1) and (2), we examine whether the non-relationship lead arranger is more likely to be foreign (*Foreign*). In Column (3), we examine the distance (*Distance*) between the borrower and the lead arranger. In Columns (4) and (5), we examine whether the non-relationship lead arranger is more likely to be reputable (*Reputation*) We include firm and year (year-month) fixed effects in the logit and OLS models. t-statistics in parentheses are based on standard errors clustered at the firm level. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. All variables are defined in Appendix A.

	Foreign		*Distance*	*Reputation*	
	(1)	(2)	(3)	(4)	(5)
POST	-0.160	-0.026**	-59.583***	0.011	0.008
	(-1.08)	(-2.06)	(-3.51)	(0.09)	(0.52)
No Relationship	0.814***	0.075***	12.172	-0.317***	-0.034***
- Lead Arranger	(11.23)	(10.92)	(1.09)	(-5.35)	(-4.93)
*POST*No Relationship*	0.388**	0.069***	143.067***	-0.346*	-0.051**
- Lead Arranger	(2.00)	(3.21)	(4.34)	(-1.78)	(-2.05)
Assets	0.264***	0.033***	10.839	0.190***	0.015**
	(3.86)	(5.05)	(0.95)	(2.87)	(2.08)
ROA	0.603	0.062	-91.424	0.305	0.031
	(1.30)	(1.61)	(-1.07)	(0.72)	(0.61)
Loss	-0.072	-0.009	8.443	0.004	0.000
	(-0.72)	(-0.97)	(0.57)	(0.05)	(0.01)
Leverage	0.157	0.019	31.960	-0.250	-0.029
	(0.75)	(1.04)	(0.90)	(-1.12)	(-1.16)
Interest Coverage	-0.001	0.000	-0.168	0.000	0.000
	(-0.75)	(-1.21)	(-0.81)	(0.20)	(-0.13)
Tangibility	-0.345*	-0.022	-45.302	0.350	0.023
	(-1.65)	(-1.14)	(-1.31)	(1.59)	(0.96)
Rated	-0.018	-0.001	-30.878	0.160	0.016
	(-0.14)	(-0.13)	(-1.57)	(1.41)	(1.25)
Investment Grade	-0.185	-0.016	3.469	0.010	0.002
	(-1.43)	(-1.26)	(0.19)	(0.08)	(0.15)
Amount	-0.192***	-0.024***	-7.003	0.046	0.006
	(-4.29)	(-4.83)	(-1.05)	(1.17)	(1.39)
Maturity	0.010***	0.001***	0.493**	-0.005***	-0.000***
	(6.75)	(5.87)	(2.57)	(-3.68)	(-3.22)
Guarantor	0.257**	0.021*	-12.489	0.037	0.003
	(2.11)	(1.85)	(-0.67)	(0.41)	(0.30)
Model	Logit	OLS	OLS	Logit	OLS
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	Yes	No
Year-Month FE	No	Yes	Yes	No	Yes
Observations	13,541	27,196	16,222	17,056	27,196
Adj. (Pseudo) R^2	0.062	0.505	0.735	0.043	0.405

TABLE 7
Agency Problems within the Syndicate

This table presents results of the analyses that investigate how agency problems within the syndicate are mitigated following CDS initiation. Column 1 (2) presents results using a logit (OLS) model. We include firm and year (year-month) fixed effects in the logit (OLS) model. t-statistics in parentheses are based on standard errors clustered at the firm level. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. All other variables are defined in Appendix A.

	No Relationship - Participant	
	(1)	(2)
POST	0.559***	0.120***
	(10.12)	(10.46)
No Relationship - Lead Arranger	0.745***	0.161***
	(21.24)	(21.42)
*POST*No Relationship - Lead Arranger*	-0.343***	-0.068***
	(-5.57)	(-5.07)
Model	Logit	OLS
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	No
Year-month FE	No	Yes
Observations	175,677	177,815
Adj. (Pseudo) R^2	0.025	0.154

TABLE 8
Supplementary Analyses

This table presents results of the supplementary analyses. Panel A examines the effect of CDSs on the interest spread and size of loans syndicated by non-relationship lead arrangers. In Columns (1) and (2), we examine the interest spread (*Interest Spread)* and in Columns (3) and (4), we examine the size of a loan (*Amount, Deal Amount*). Analyses include firm and year-month fixed effects. Panels B and C examine whether the effect of CDS trading on non-relationship lending is more pronounced for lenders with low loan growth (*Low Loan Growth*) and low profitability (*Low Profitability*), respectively. Columns 1 and 2 (3 and 4) report the analyses for the lead arranger (participant) specifications. Columns 1 and 3 (2 and 4) present results using a logit (OLS) model. We include firm and year (year-month) fixed effects in the logit (OLS) model. t-statistics in parentheses are based on standard errors clustered at the firm level. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. All variables are defined in Appendix 1.

Panel A: Interest Spread and Loan Amount

	Loan Spread	*Loan Spread (weighted average)*	*Amount*	*Deal Amount*
	(1)	(2)	(3)	(4)
POST	0.040	0.038	-0.030	-0.043
	(1.55)	(1.49)	(-0.92)	(-1.26)
No Relationship	0.059***	0.058***	-0.058***	-0.038**
- Lead Arranger	(5.81)	(5.75)	(-3.84)	(-2.41)
*POST*No Relationship*	-0.020	-0.019	-0.084**	-0.077*
- Lead Arranger	(-0.81)	(-0.79)	(-2.19)	(-1.95)
Assets	-0.111***	-0.112***	0.462***	0.479***
	(-8.72)	(-8.76)	(18.47)	(18.95)
ROA	-0.468***	-0.454***	0.408**	0.441***
	(-4.96)	(-4.97)	(2.49)	(2.59)
Loss	0.164***	0.164***	-0.077***	-0.070**
	(8.02)	(8.03)	(-2.66)	(-2.36)
Leverage	0.313***	0.316***	0.020	0.081
	(8.48)	(8.50)	(0.28)	(1.10)
Interest Coverage	-0.001***	-0.001***	0.001***	0.001***
	(-6.83)	(-6.96)	(2.61)	(2.89)
Tangibility	-0.309***	-0.311***	-0.015	-0.003
	(-6.89)	(-7.09)	(-0.20)	(-0.03)
Rated	0.040*	0.037*	-0.100***	-0.109***
	(1.77)	(1.67)	(-3.61)	(-3.75)
Investment Grade	-0.203***	-0.194***	0.029	-0.001
	(-6.00)	(-6.20)	(0.76)	(-0.03)
Amount	-0.060***	-0.057***		
	(-6.46)	(-6.16)		
Maturity	0.000	0.000	0.004***	0.005***
	(1.19)	(1.28)	(6.90)	(8.73)
Guarantor	0.013	0.017	-0.066**	-0.072**
	(0.79)	(0.99)	(-2.36)	(-2.40)

Table 8 Panel A (continued)

PP	-0.102***	-0.102***	0.214***	0.197***
	(-7.10)	(-7.65)	(11.40)	(10.38)
#Covenants	0.055***	0.055***	0.031***	0.059***
	(11.09)	(11.25)	(4.34)	(7.75)
Model	OLS	OLS	OLS	OLS
Firm FE	Yes	Yes	Yes	Yes
Year FE	No	No	No	No
Year-month FE	Yes	Yes	Yes	Yes
Observations	27,196	27,196	27,196	27,196
Adj. (Pseudo)) R^2	0.756	0.76	0.790	0.774

Panel B: Lender Loan Growth

	No Relationship - Lead Arranger		*No Relationship - Participant*	
	(1)	(2)	(3)	(4)
POST	0.181	0.043	0.374***	0.066***
	(1.00)	(1.61)	(4.31)	(4.53)
Low Loan Growth	-0.408***	-0.062***	-0.362***	-0.062***
	(-4.32)	(-4.45)	(-9.71)	(-10.08)
*POST*Low Loan Growth*	0.382**	0.059**	0.464***	0.080***
	(2.03)	(2.23)	(6.79)	(6.67)
Model	Logit	OLS	Logit	OLS
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Year-month FE	No	Yes	No	Yes
Observations	6,149	9,333	34,909	36,589
Adj. (Pseudo) R^2	0.043	0.382	0.035	0.215

Panel C: Lender Profitability

	No Relationship - Lead Arranger		*No Relationship - Participant*	
	(1)	(2)	(3)	(4)
POST	-0.139	0.001	0.170*	0.040***
	(-0.61)	(0.04)	(1.80)	(2.78)
Low Profitability	0.038	0.015	0.043	0.008
	(0.41)	(0.98)	(1.14)	(1.20)
*POST*Low Profitability*	0.912***	0.134***	0.812***	0.136***
	(3.57)	(3.66)	(9.42)	(9.52)
Model	Logit	OLS	Logit	OLS
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No

Year-month FE	No	Yes	No	Yes
Observations	6,149	9,333	34,909	36,589
Adj. (Pseudo) R^2	0.044	0.176	0.038	0.150