Debt Specialization and Credit Default Swaps

JAMES DONATO[*]

Rensselaer Polytechnic Institute

This version: March 3, 2017

ABSTRACT

Do credit default swaps affect debt structure? I provide evidence that the inception of CDS trading on a firm's debt is associated with higher debt specialization. My results indicate that firms have greater debt concentration after the onset of CDS trading than before. Additionally, firms are more likely to specialize after CDSs begin trading on a firm's debt. I argue that CDS firms concentrate debt types as a way to mitigate creditor conflicts and costs in bankruptcy, which is made more likely because of the empty creditor problem. My results are robust to different model specifications and sub-samples.

[*] Lally School of Management, 110 Eighth Street, Pittsburgh Bldg., Troy, NY 12180; email: donatj@rpi.edu

1   Introduction

Over the past decade and a half, credit default swaps (CDSs) have grown into a significant derivatives market. The Bank for International Settlements puts the size of this market at $6.62 trillion of notional exposure (as of the first half of 2016).[1] In response, scholars have produced research examining the implications of CDSs on the dynamics of creditor-debtor negotiations (Bolton and Oehmke, 2011), debt maturity and firm leverage (Saretto and Tookes, 2013), and the probability of bankruptcy (Subrahmanyam et al., 2014). Meanwhile, corporate finance has turned to a closer analysis of the debt component of capital structure. Rauh and Sufi (2010) analyze the heterogeneity of debt structure by researching the "type, source, and priority" of balance sheet debt for a hand-collected sample of rated public firms (pg. 4242). Colla et al. (2013) research the composition of debt structure by examining how many debt types firms use when borrowing (i.e. whether firms "specialize" or "concentrate" by holding few types of debt or "diversify" by holding many types).

In this paper, I research whether CDSs impact debt structure; specifically, I ask how CDSs affect debt specialization. Do CDSs cause firms to borrow from fewer debt sources (specialization/concentration) or more (diversification) and why? Building on the prior work of Subrahmanyam et al. (2014) showing that CDSs *cause* an increase in a firm's credit risk, I argue that firms with CDS contracts traded on their debt ("CDS firms") exhibit higher debt specialization compared with firms that do not ("non-CDS firms") in order to minimize debtholder conflicts and costs in bankruptcy. In fact, my results indicate that firms have greater debt concentration after the onset of CDS trading than before as measured by the normalized Herfindahl-Hirschman Index (*HHI*). Additionally, firms have a significantly higher probability of specializing after CDSs begin trading on a firm's debt as well.

In summary, following the onset of CDS trading, firms borrow from fewer debt sources (or hold a higher proportion relative to other debt types) as a way to minimize the number of creditors in bankruptcy and alleviate potential costs and conflicts. My results are robust in sub-samples consisting only of CDS firms, rated firms, investment grade rated firms, and below investment grade rated firms, respectively, as well as quintiles sorted by leverage. To the best of

---

[1] https://www.bis.org/statistics/d5_2.pdf

my knowledge, this is the first paper to examine how and why credit default swaps affect debt specialization.

My study is motivated by Colla et al. (2013) who provide empirical evidence examining whether firms engage in debt specialization (i.e. whether firms concentrate their debt structure in a few or a multitude of debt types). By looking at the debt structure of a large sample of publicly listed U.S. companies, they demonstrate that the vast majority of these firms concentrate their borrowing in a few debt types. In fact, Colla et al. find that 85% of sample firms specialize in only one form of borrowing (p. 2118). Furthermore, the authors show that the degree of specialization is related to credit quality. Firms with higher credit ratings are less specialized (i.e. more diversified) in their debt structure than those with lower ratings while unrated firms have the highest concentration. Intuitively, I might expect to see greater specialization of debt types for riskier firms (such as firms with CDS contracts traded on them) as a way to mitigate the costs of financial distress; however, endogeneity may present a problem whereby specialization (for example, because of limited access to financing options) leads to increased credit risk not vice versa. Finally, as a firm's debt structure becomes more concentrated in fewer debt types, Colla et al. indicate that firms hold less senior unsecured bonds and notes while relying increasingly on drawn credit lines. This finding is consistent with Faulkender and Petersen (2006) who find that unrated firms that lack access to public debt markets are less levered due to market frictions. Rauh and Sufi (2010) examine the heterogeneity of debt structure further where they find that "25% of the observations in [their] sample experience no significant one-year change in their total debt but significantly adjust the underlying composition of their debt" (p. 4243).

But why do firms specialize or diversify their debt structure? The literature suggests one possible explanation. Firms engage in debt specialization as a way to minimize conflicts (renegotiation/restructuring of debt and/or negotiating sale of assets) and costs (loss in liquidation value) in bankruptcy. In fact, Bolton and Scharfstein (1996) argue that there is an inherent tradeoff for creditors between minimizing liquidation costs in bankruptcy and maximizing the benefits of maintaining a firm as a going concern. If a firm faces what they term "liquidity default" (where a firm simply lacks the cash flow to service debt), then creditors benefit by maximizing the liquidation value of the firm in the event of bankruptcy; however, maximizing the liquidation value may, in fact, incentivize managers to engage in "strategic

default" (where they file or threaten to file for bankruptcy as a means of writing down debt) if the payoffs are high and costs are low (p. 2). Of course, the opposite is true as well. As the authors note, "an optimal contract balances the benefits of deterring strategic defaults against the costs of realizing a low liquidation value in a liquidity default" (p. 2). Bolton and Scharfstein offer debt specialization as a solution to this problematic tradeoff. For riskier firms with low credit ratings that may be in danger of liquidity default, debt specialization (and by extension creditor concentration) may maximize the firm's liquidation value by easing conflicts associated with renegotiating debt or arranging for the sale of pieces of the business. For higher rated firms, debt diversification may decrease the probability of strategic default since a multitude of creditors may drive up costs in bankruptcy and increase the probability of liquidation of the firm.

Ivashina et al. (2015) provide empirical evidence of this phenomenon by examining debt specialization and outcomes of U.S. firms in bankruptcy. They define specialization as the percentage of total claims sought by the top ten creditors where a higher (lower) share indicates creditor concentration (diversification). The authors find that creditor concentration is positively associated with firms that are reorganized and emerge from bankruptcy as well as firms with prearranged bankruptcies and negatively associated with time spent in bankruptcy proceedings (Table 5, p. 40). If firms have a concentration of debtholders when entering bankruptcy, they are more likely to have a "prearranged or prepackaged" bankruptcy, which leads to a faster process with the firm leaving bankruptcy as a reorganized entity. Additionally, the authors find that "classes of debt that are more concentrated within a firm's capital structure have higher recovery rates at bankruptcy exit than classes that are less concentrated" (p. 2). In summary, Ivashina et al. find that, as expected, debt specialization lessens the costs and conflicts associated with entering bankruptcy. Firms with a greater concentration of creditors are less likely to be liquidated and more likely to successfully renegotiate with debtholders.

Given the above discussion, CDS firms should engage in increased debt specialization compared to non-CDS firms. After all, if firms seek to minimize creditor conflicts and bankruptcy costs, then riskier firms (i.e. firms with a greater probability of default) should have a higher degree of debt concentration. CDS firms certainly fall into this category.

Credit default swaps pervert the normal creditor-debtor relationship. Usually, lenders maintain a "package of economic rights (to receive payment of principal and interest); contractual control rights (to enforce, waive, or modify the terms of the debt contract); [and]

other legal rights (including rights to participate in bankruptcy proceedings)" (Hu and Black, 2008, p. 664). CDSs fundamentally alter this relationship by "decoupling" creditors from their economic rights associated with the debt. Hu and Black label this phenomenon "empty crediting" whereby lenders still retain all rights noted above but simply become disinterested in exercising them because of the "outside option" provided by CDSs (p. 665).

Furthermore, Hu and Black note that "investors can have control rights yet have negative economic ownership (sometimes loosely called a 'net short' position) and thus have incentives to cause the firm's value to fall" (p. 665). In fact, "[s]uch a creditor might prefer that the company fail, and hence oppose an out-of-court restructuring" (p. 682). Bolton and Oehmke (2011) refer to this phenomenon as "over-insurance:" "creditors have an incentive to over-insure" which "gives rise to inefficient empty creditors who refuse to renegotiate with lenders in order to collect payment on their CDS positions, even when renegotiation via an out-of-court restructuring would be the socially efficient alternative" (p. 2622). These authors theorize that empty crediting leads to a higher probability of bankruptcy as lenders at minimum are disinterested in out-of-court or strategic restructuring or become incentivized towards pushing debtors into bankruptcy to maximize the CDS payoff.

Subrahmanyam et al. (2014) provide an empirical test of the empty creditor problem. After controlling for endogeneity, they find that "credit ratings decline by approximately half a notch, on average, in the two years after the inception of CDS trading" and that the "likelihood of bankruptcy more than doubles (from 0.14% to 0.47%) once a firm is referenced by CDS trading" (p. 2927). This finding is consistent with Saretto and Tookes (2013) who show that "holding spreads constant, benefits from CDSs are manifested in non-price terms such as debt maturities or quantities," although not beneficial in lowering credit spreads (p. 1197). Given the result that CDS markets allow for increased corporate debt borrowing as well as longer bond maturities, firms may face additional default and bankruptcy risk. In short, credit default swaps, which are designed to hedge lenders' risk to the default of the underlying referenced firm, increase the firm's credit risk by increasing the likelihood of bankruptcy.

The empty creditor problem created by CDS contracts causes an increase in the probability of bankruptcy for the referenced firm. As a result, CDS firms may show a higher degree of debt specialization than non-CDS firms as a way to minimize conflicts and costs in bankruptcy. In other words, following the onset of CDS trading, a firm may choose to borrow

from fewer debt sources as a way to minimize the number of creditors in bankruptcy and alleviate potential costs and conflicts. In fact, after controlling for determinants of capital structure, my results indicate that firms have greater debt concentration (measured as *HHI*) after CDSs begin trading than prior. This result is sustained in numerous sub-samples of the data as well. For example, if I restrict the full sample to rated firms only, then the difference between pre- and post-CDS trading *HHI* is similar to what I find in my main results, which runs counter to the expectation that rated firms should exhibit a higher degree of debt diversification due to greater access to corporate bond markets.

However, endogeneity may be a problem here. Narrowly speaking, it seems unlikely that an increase in a firm's *HHI* causes a Wall Street trading desk to begin making markets in CDSs. But if we view debt specialization as a proxy for credit risk, then endogeneity may be present. In other words, does the inception of CDS trading cause an increase in debt concentration or do firms with greater specialization tend to have CDS contracts issued on them because they may be more risky (for ex., due to lack of access to debt markets)? Previously, Subrahmanyam et al. (2014) dealt effectively with the endogeneity of CDS trading and risk. As noted earlier, they demonstrate that the onset of CDS trading causes an increase in the probability of bankruptcy for a firm -- even after controlling for endogeneity through use of instrumental variables. However, their instruments may not work in this setting. For example, Subrahmanyam et al. use "lenders' Tier One capital ratio" as an IV since a firm's lenders can receive capital relief by hedging through use of CDSs, which may in turn prompt banks to begin issuing these contracts (p. 2928). The ratio is correlated with the onset of CDS trading (*CDS_Active*) but not correlated with the probability of a firm entering bankruptcy. But this IV may be correlated with my dependent variable, *HHI*, and, therefore, is not a suitable instrument in this context.

Although I don't directly control for endogeneity, in Section 3.2, Tables VIa, VIb, and VIc, I sub-sample the full dataset into rated, investment grade rated, and below investment grade rated firms as a way to control for credit risk and test the effect of CDS trading on debt concentration. For example, Table VIc consists of a sub-sample of CDS and non-CDS below investment grade rated firms, which are firms that are already inherently risky. In this sub-sample, I expect to witness a high degree of debt specialization given the likelihood of bankruptcy. Although the beginning of CDS trading would exacerbate this risk, I would expect the effect to minimal. Instead, I find a significant increase in *HHI* following the onset of CDS

trading, which provides support for a causal relationship between CDS trading and debt specialization.

The remainder of the paper is organized as follows: Section 2 outlines the data and methodology used in the analysis; Section 3 details my univariate and multivariate analysis; and Section 4 discusses my conclusions and further research.

2   Data & Methodology

Debt structure data is from Capital IQ, annual financial and accounting data is from Compustat, and CDS start dates are from the Bloomberg terminal. Following Colla et al. (2013), I only use firms traded on the NYSE, Amex, and Nasdaq, removing utilities (SIC codes 4900-4999) and financials (SIC codes 6000-6999). I drop missing or zero value observations for total assets and total debt, remove all firms with negative equity, and set missing values equal to zero for R&D expense. Additionally, I drop any firm-year observations outside the unit interval for book leverage per Lemmon et al. (2008). Finally, I merge leveraged firms from Compustat with Bloomberg and Capital IQ data.

The dataset consists of 14,127 firm-year observations with 2,189 individual firms (239 CDS and 1,950 non-CDS firms) in the sample for the years 2002 – 2014. The sample period begins in 2002 because -- according to Colla et al. (2013) -- Capital IQ is comprehensive beginning only in 2002 and thereafter, which also coincides with the start of the bulk of CDS trading (pg. 2120). Of total firm-year observations, 11,571 are non-CDS and 2,556 are CDS observations (651 *before* and 1,905 *after* the start of CDS trading).

Following the previous work of Colla et al. (2013), I construct two different measures for debt specialization. The first is the normalized Herfindahl-Hirschman Index (*HHI*) defined as follows:

Sum of squared debt ratios:
$$SS_{i,t} = (CP_{i,t} / TD_{i,t})^2 + (DC_{i,t} / TD_{i,t})^2 + (TL_{i,t} / TD_{i,t})^2 + (SN_{i,t} / TD_{i,t})^2 +$$
$$(SUB_{i,t} / TD_{i,t})^2 + (CL_{i,t} / TD_{i,t})^2 + (Other_{i,t} / TD_{i,t})^2 \tag{1}$$

Normalized HHI (Herfindahl-Hirschman Index):

$$HHI_{i,t} = SS_{i,t} - 1/7 \ / \ 1 - 1/7 \qquad (2)$$

where *CP* is commercial paper, *DC* is drawn credit (revolving credit facilities), *TL* is term loans, *SBN* is senior bonds and notes, *SUB* is subordinated bonds and notes, *CL* is capital leases, *Other* is all other debt types plus total trust-preferred stock, and *TD* is total debt. All debt structure variables are from Capital IQ with the exception of *TD* which is from Compustat. Although Compustat contains many of these same variables, Capital IQ has the advantage that all debt structure variables are self-contained while many of the Compustat versions appear to overlap. In order to harmonize the two different datasets, I drop any observations where the difference between total debt as reported by Compustat and the sum of the seven debt types from Capital IQ is greater than 10%. Grouping borrowing into these seven distinct categories arguably best captures the chief sources of financing for most firms (i.e. balance sheet debt used by non-financial firms). *HHI* provides a measure of concentration by debt size as a proportion of the total and ranges from zero (equal diversification among seven debt types) to one (debt specialized in a single type) inclusive. By normalizing *HHI*, I ensure that the lower bound will be zero (instead of 1/N); however, I should note that my sample contains only leveraged firms which have *HHI* greater than zero. Secondly, I construct a dummy variable, *Excl90*, equal to one if any debt type is 90% or greater of total debt and zero otherwise (see Colla et al. (2013), pg. 2123). I define variables *Excl80*, *Excl70*, and *Excl60* in the same fashion for firms that exclusively use one type of debt. Lastly, for robustness purposes, I re-construct *HHI* and *Excl* variables using different debt categories than those used in equations 1 and 2 and obtain similar results, which are detailed later in the paper.

The main variable of interest is *CDS_Active*, which is a dummy variable equal to one when the CDS contract begins trading on the firm's debt and thereafter. For non-CDS firms, *CDS_Active* always equals zero. I require CDS firms to have an observation for at least one year before and after the year of CDS inception; in other words, if the firm does not have at least -1 and +1 years around the event year, I remove the firm from the sample. *CDS_Firm* is an indicator variable equal to one if the firm has a CDS traded at any point in the sample period. I include *CDS_Firm* to control for time invariant unobservable differences between CDS and non-CDS firms (see similar treatment in Ashcraft and Santos (2009) and Saretto and Tookes (2013)).

I also include variables to control for determinants of capital structure. *lnSize* is the log of total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets, which represents my proxy variable for growth opportunities. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. I include *Tangibility* and *CFvol* as proxies for bankruptcy costs (Titman and Wessels (1988) and Rajan and Zingales (1995)). *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. Following Sufi (2007), I proxy for information opaqueness and monitoring costs with the variable *RDexp*, which is research and development expenses divided by total assets. *Unrated* is a dummy variable equal to one if the firm is not rated by S&P and zero otherwise. *BookLev* is total debt scaled by total assets. I winsorize all continuous control variables at the 1% and 99% levels. Lastly, all models include Fama-French 48 industry and year fixed effects.

[Table I]

Table 1 provides univariate statistics for variables used in regressions in this paper. In the overall sample, firms show a high degree of debt specialization with *HHI* of 69.9%, which is consistent with the earlier findings of Colla et al. (2013). I find a similar result with my second specialization measure, which ranges from 44.6% for *Excl90* to 81.9% for *Excl60*. Approximately 13.5% of the sample represents firm-year observations when a CDS contract is trading; 18.1% of the sample is comprised of observations for CDS firms; 41% of observations correspond to firms paying dividends; and 57.3% of firm-years are for unrated firms. Although the mean is $4,102.3 million, the median of *Total Assets* is only $892.3 million, suggesting that large firm size is not biasing the results.

3   Empirical Results

3.1   *Debt Specialization & CDSs*

In this paper, I argue that firms with credit default swap contracts traded on their debt should exhibit a higher degree of debt specialization (i.e. fewer debt types and, therefore, fewer creditors) than firms that do not. After all, CDS firms are inherently more risky because of the increased probability of bankruptcy due to the empty creditor problem (Subrahmanyam et al. 2014). As a result, I would expect to see CDS firms mitigate this increased risk by minimizing the number of creditors to be negotiated with in bankruptcy. By doing so, CDS firms increase the likelihood of restructuring debt or arranging an asset sale while decreasing the likelihood of liquidation of the firm (Bolton and Scharfstein (1996)).

However, I should note that debt specialization can occur in either of two ways. First, firms can specialize simply by employing fewer debt types with the assumption that fewer debt types equates with fewer creditors, which admittedly may not always be the case. For example, a firm may concentrate debt from three types to two while rolling over creditors from the third type into the other two, thus, keeping the number of creditors constant; however, this scenario appears unlikely given that many investors may not desire to so easily swap one form of debt for another. Also, many firms rely on a combination of corporate bonds and bank debt. It is doubtful that as firms concentrate into a higher proportion of senior and subordinated bonds and notes following the onset of CDS trading (which is what happens in my sample) that bank creditors will switch their lending from revolving credit lines to corporate bonds. In short, my assumption that fewer debt types leads to fewer creditors appears to be a sound one. Second, firms can specialize by holding a higher proportion of one type of debt in comparison to another form. For example, a firm's debt structure may initially consist of 50% bonds and notes and 50% bank debt. Following the beginning of CDS trading, debt structure changes to 70% bonds and notes and 30% bank debt. In this sense, the firm is specialized since bondholders now have a greater percentage of total debt than previously. In fact, Ivashina et al. (2015) make use of this fact when they measure creditor concentration as the top ten creditors' percentage of the total claim in bankruptcy.

Table II is consistent with the above argument. As noted in the previous section, the average *HHI* is 69.9% for the full sample from 2002 – 2014. However, when broken down by

CDS_Active, non-CDS firms show a debt specialization of 69.8% versus 70.4% for CDS firms (a paired t-test indicates that the difference is not significant though). Furthermore, if I restrict the sample to CDS firms only (firms that have a CDS contract traded on their debt at any time in the dataset), we observe the before and after effect of CDS trading on debt concentration more closely. Prior to the contract trading, CDS firms have an average *HHI* of 59.9% in contrast to 70.4% following the onset of CDS trading (a paired t-test indicates that the difference is significant at the 1% level). The difference of means between the full sample and CDS firm sub-sample is striking. The mean of 59.9% for CDS firms before inception is considerably lower than the full sample mean, which suggests that these firms are less risky. As I'll discuss later, higher rated firms not only have the benefit of access to the public corporate bond markets but also tend to have diversified debt structures as a way for creditors to minimize the risk of strategic default (Bolton and Scharfstein (1996)).

[Table II]

In Table III, I use multivariate regressions to test whether the onset of credit default swap trading impacts debt structure. Specifically, I fit Tobit models by regressing *HHI* on *CDS_Active* and controls for determinants of capital structure found in the literature. I chose Tobit regressions because my dependent variable for debt specialization, *HHI*, is bounded by the unit interval inclusive. For robustness purposes, I re-ran all Tobit regressions in the paper as OLS models and obtained similar results, although not presented here. Also, in order to demonstrate that firms with completely concentrated debt structures (i.e. total debt consisting of only one type) are not driving my results, I re-ran all regressions in Table III excluding firms with *HHI* equal to 100% and found similar estimates (for ex., the coefficient on *CDS_Active* is 12.01% compared with 13.27% below in Table III, model 6; see Table A1 in the Appendix; I also ran the same analysis in Table A2 after excluding firms with HHI greater than or equal to 90% with similar outcomes).

The results from Table III provide evidence that CDS trading affects debt structure through increased specialization. In fact, my main variable of interest, *CDS_Active*, is both economically and statistically significant in all specifications. In model 6, for example, the coefficient on *CDS_Active* is 13.27%, which indicates that following the inception of CDS

trading debt concentration increases considerably. This result is even more pronounced given the collinearity between *CDS_Active* and *CDS_Firm* (correlation of 78.7%), which runs the risk of inflating standard errors and leading to a false negative. Additionally, the control variables are nearly all significant with correct signs. The coefficient on *Unrated* is positive, which suggests that firms that are not rated by S&P have a higher degree of debt specialization due to the lack of access to public bond markets as well as increased credit risk. (Later in the paper, I explore this topic further with sub-samples of rated, investment grade, and below investment grade firms.) *BookLev* is strongly negative, indicating that as firms increase debt load they diversify out debt structure (i.e. seek financing from a multitude of sources). The coefficient on the variable *lnSize* is negative, which may be due to the fact that as firms grow larger they gain access to additional financing options and have less need to concentrate debt structure. I proxy for information opaqueness and monitoring costs with the variable *RDexp*, which shows a positive and economically and statistically significant estimate. As firms increase research & development expenses, it becomes increasingly difficult to perform a valuation where much of the value is conditional on future unrealized yet gains (Sufi, 2007). I include *Tangibility* and *CFvol* as proxies for bankruptcy costs (see Titman and Wessels (1988) and Rajan and Zingales (1995)). As *Tangibility* increases, debt specialization decreases; as *CFvol* increases, debt specialization increases: intuitively, as costs in bankruptcy increase (decrease), *HHI* increases (decreases) as a means to mitigate creditor conflicts and avoid liquidation. I include the interaction of *CDS_Active* and *Tangibility* because both are linked to bankruptcy – CDS trading increases the probability of bankruptcy while tangible assets serve as a proxy for bankruptcy costs – and help explain the variance of *HHI*. As a last note, many of these capital structure variables are related, which may make it difficult to disentangle one effect from another. For example, *RDexp* and *CFvol* are highly correlated (39.7%) while both variables are positively correlated with *HHI* as evidenced in the regressions. As a result, it may not be easy to isolate whether the opaqueness of a firm's financials or a higher probability of bankruptcy costs is the driver of the relationship. Finally, the pseudo R-squared of 36% suggests that the inclusion of a CDS trading variable adds significant explanatory power, especially in comparison to the results of Colla et al. (2013, pg. 2135).

[Table III]

12

In Table IV, I examine whether the onset of CDS trading affects debt specialization in a more direct test. I restrict the sample to include only those firms that have a CDS contract traded on their debt at any point in the dataset. By creating a sub-sample consisting entirely of CDS firms, I can better identify the ex ante and ex post change in debt structure. In all six regression models, the coefficient on *CDS_Active* is economically and statistically significant. In fact, the coefficient is of consistent magnitude through all model specifications, ranging from 6.83% (model 4) to 10.16% (model 6). A number of controls lack significance, which may be due to the small sample size; likewise, *Unrated* has the opposite sign of what I would expect which may be a product of the relatively few CDS firms that are not rated by S&P. However, *BookLev* (negative sign), *RDexp* (positive but not significant), and *Tangibility* (negative) are largely consistent with previous results, which lends support for the argument that the likelihood of bankruptcy (i.e. minimizing creditor conflicts and costs) and opaqueness of financials (i.e. monitoring and information collection costs) increases debt concentration.

One problem with Tobit models is the lack of a reliable pseudo R-squared. In some instances, it can be greater than one or even negative. As a result, I leave out the pseudo R-squared's for Table IV and any subsequent table where the numbers don't make sense.

In the sub-sample of CDS firms, the difference of debt specialization before and after the onset of trading is striking – even after controlling for variables that have been shown to be determinants of capital structure in the literature. Table IV illustrates the effect that CDS trading has on debt structure more explicitly by analyzing CDS firms in isolation in the data. Following Subrahmanyam et al. (2014) who demonstrate that CDSs cause an increase in a firm's default risk, I argue that CDS firms exhibit higher debt specialization compared to non-CDS firms in order to mitigate creditor conflicts and costs in bankruptcy, which is evidenced by the results in Table IV.

[Table IV]

As an additional test of whether CDSs impact debt structure, I run logistic regressions in Table Va on my second measure of debt specialization, *Excl90*, which is a dummy variable equal to one if any debt type is 90% or greater of total debt (zero otherwise). The results for the main variable of interest, *CDS_Active*, are stronger with this measure of debt concentration than

previously with *HHI*. In fact, the coefficient on *CDS_Active* is economically and statistically significant in all specifications with an average partial effect of approximately 24.2% for model 6. Even model 1 without controls shows an APE of 6%. As in Table III, the controls are nearly all significant with correct signs: *lnSize* is negative; *Unrated* is positive; *BookLev* is negative; *CFvol* and *RDexp* are strongly positive; and *Tangibility* is negative.

[Table Va]

For robustness purposes, I run logistic regressions for *Excl80*, *Excl70*, and *Excl60* (defined similarly to *Excl90*) in Table Vb in order to confirm whether the strong results of Table Va hold. The coefficient estimates are comparable if not stronger than in the prior table. The APE for *CDS_Active* ranges from 14.1% (for *Excl60*) to 20.6% (for *Excl80*). The controls for determinants of capital structure are consistent with previous results: my proxy variable for the opaqueness of a firm's financials and monitoring costs, *RDexp*, is strongly positive; my proxy for bankruptcy costs, *CFvol*, is strongly positive; and *Unrated* is positive. In summary, Tables III, Va, and Vb provide evidence that the effect of CDS trading on debt structure is not driven by the choice of dependent variable or its definition.

[Table Vb]

An additional way to understand the change in *HHI* pre- and post-CDS trading is to view the increase in debt specialization through event time. Figure 1 is a plot of average *HHI* over event years where zero is the year when a CDS contract begins trading on a firm's debt. Given sample size restrictions, I chose three years prior to and three years after the event as my window. Average *HHI* begins in event year -3 at 60.5% and finishes in event year +3 at 67.4%. A paired t-test of the difference in means yields significance at the 5% level. The difference of 3.8% from event years -1 to +1 is significant at the 10% level while the difference of 11.9% from event years -2 to +2 is significant at the 1% level. As noted in the Data & Methodology section, my sample of CDS firm-year observations tilts heavier towards observations after the onset of CDS trading (approximately two-thirds of the sample). By examining the increase in debt

concentration via event time, we get a more balanced view of the before and after effect of CDS trading on *HHI*.

[Figure 1]

One criticism that has been leveled against prior research focusing on CDSs is that the inception of CDS trading occurs in clusters. In my sample, clustering is present in years 2002, 2003, 2007, and 2008 (see Figure A1). (Years 2001 and 2014 contain no firms where CDSs begin trading because I require at least a before and after observation around the event year.) I include a dummy variable equal to one for the years noted above as a way to control for any clustering effect that may be influencing my estimates. In Table A3 in the appendix, I add in *Cluster_Yr* to my main regression table and find nearly identical results, which suggests that clustering of CDS trading is not significant in explaining the increase in debt concentration.

3.2 Ratings & CDS Firm Debt Specialization

I further sub-sample the dataset of CDS and non-CDS firms into those firms that are rated and, of those that are rated, investment grade and below investment grade. I then test for the impact of the inception of CDS trading on debt structure by regressing *HHI* on *CDS_Active* and controls for determinants of capital structure. For robustness purposes, I re-run all regressions using my second measure of debt specialization, *Excl90*, and obtain similar results, although not presented here. Of the 14,127 firm-year observations in my sample, 8,094 (8,066 for non-CDS and only 28 for CDS firms) are observations corresponding to unrated firms and 6,033 (3,505 for non-CDS and 2,528 for CDS firms) for rated firms. The vast majority of CDS firms are rated by S&P. They also tend to be larger on average (total real assets of $11.6 billion for CDS firms versus $2.6 billion for non-CDS firms) and higher rated (BBB versus BB). Figure A2 in the Appendix is an overlap histogram separately displaying the S&P credit ratings distributions for CDS and non-CDS firms, illustrating the relatively higher ratings of firms with credit default swaps trading on their debt.

Intuitively, I would expect that rated firms have more debt financing options than firms that are unrated. After all, a firm that is not rated most likely does not have access to the public

corporate bond markets and, therefore, has less debt types to choose from. Since rated firms may have more debt options than those that are unrated, I would expect a lower degree of specialization (i.e. higher diversification) of debt structure given the greater supply of capital. In Tables VIa, VIb, and VIc, I attempt to delineate the effect of CDS trading on rated firms and their debt structure by sub-sampling the dataset into rated, investment grade rated, and below investment grade rated firms. All three tables include CDS and non-CDS firms.

Table VIa reveals highly significant results, providing further support for the argument presented in this paper that CDSs are associated with higher debt specialization. The main variable of interest, *CDS_Active*, is both economically and statistically significant with a coefficient of 12.5% in model 6. Additionally, the control variables are consistent with previous estimates. My proxy variables for bankruptcy costs, *Tangibility* and *CFvol*, have a significant negative and positive coefficient, respectively, and my proxy for opaqueness and monitoring costs, *RDexp*, has a significant positive coefficient as expected. (I drop the variable *Unrated* for obvious reasons.) In comparison to Table III, the *CDS_Active* estimate is similar, which runs counter to intuition but speaks to the argument that CDSs increase the probability of bankruptcy and, therefore, the need for firms to mitigate this risk by increasing debt specialization -- even for rated firms with a greater supply of capital.

[Table VIa]

In tables VIb and VIc, I run Tobit regressions for debt concentration on investment grade and below investment grade rated firms, respectively. As in the previous table, I attempt to further test the effect CDS trading has on debt structure by examining sub-samples; however, doing so presents the problem of smaller and smaller sample sizes which may lead to estimates that are not statistically significant. In Table VIb, the results show that the onset of CDS trading on investment grade rated firms has a significant impact of 7.77% for the full model, although many of the controls are not significant. Again, this result runs counter to intuition where I would expect that highly rated (low credit risk) firms with a low probability of bankruptcy and greater supply of capital would diversify out debt structure.

[Table VIb]

16

Table VIc provides a test of how CDS trading impacts the debt structure of below investment grade firms. Intuitively, I would expect that CDSs exacerbate the bankruptcy risk of firms that are already high risk due to their S&P credit rating. In fact, the coefficient on *CDS_Active* in model 6 is 10.66%, which is highly significant. Additionally, my proxy variables for bankruptcy cost, *Tangibility* and *CFvol*, are both economically and statistically significant. Table VIc offers additional evidence that the inception of CDS trading affects debt structure through increased specialization of debt types – an effect made more pronounced by the below investment grade rating of these firms. However, Tables VIa and VIb show that this effect is present in all rated firms including even those rated investment grade whom I would expect to have greater financing options. In summary, this section illustrates how CDS trading impacts debt structure without regard to how the dataset is sub-sampled.

[Table VIc]

3.3   Leverage & CDS Firm Debt Specialization

In this section, I explore one possible alternative explanation for the positive association between the onset of CDS trading and debt concentration: leverage. Saretto and Tookes (2013) demonstrate empirically that following the onset of CDS trading firms benefit from increased supply of credit, which then affords them increased leverage. Their finding is consistent with the empty creditor problem theorized by Bolton and Oehmke (2011), which argues that CDS firms will have a greater probability of bankruptcy (due to decreased negotiating power with lenders). Not surprisingly, as firms increase leverage, they face a higher likelihood of default.

In my regression specifications, I include *BookLev* as a way to control for leverage while testing for the effect of *CDS_Active* on *HHI*. I attempt to illustrate the positive correlation between the inception of CDS trading and an increase in debt specialization while holding leverage constant; after all, as Saretto and Tookes (2013) make clear, firms tend to lever up following the beginning of CDS trading on their debt. If CDS firms borrow greater amounts than non-CDS firms, then perhaps the significant increase in debt concentration is simply a function of that increased leverage. For example, if a CDS firm has two sources of financing (say corporate bonds and a bank revolving credit line) and then proceeds to increase leverage

through issuing additional bonds, the firm's *HHI* will increase, although that increase in debt specialization is actually due to the increase in leverage. However, this hypothetical example runs counter to intuition and stands in contrast to what we see in the data, although it might ring true for marginal increases in leverage. As CDS firms increase their borrowing, I would expect that they diversify out their debt structure as they tap additional financing sources and in larger amounts in order to accommodate their increased leverage – similar to a retail consumer maxing out his credit cards. As these firms draw down one line of credit, they then turn to another and another. Empirically, the coefficient on *BookLev* is not only economically and statistically significant but also strongly negative, which provides support for my contention that increased leverage is associated with decreased debt concentration (i.e. increased diversification).

In order to further control for leverage, I divide the full dataset into equal sized quintiles by *BookLev* as a means to mitigate any effect that leverage may still have in confounding the positive correlation between CDS trading and debt specialization. I chose quintiles so as to maintain a large enough sample of observations corresponding to before and after the onset of CDS trading. Table VII provides means of *HHI* and *BookLev* by quintile group for the full sample as well as by *CDS_Active*. Firms within the top 20% quintile have average leverage of 57.3% with *HHI* of 59.8% -- the lowest degree of debt specialization of all groups; in comparison, the bottom 20% show *BookLev* of a mere 2.9% with *HHI* of 85.7%. As intuited above, when leverage increases, debt specialization may decrease because of the need to access multiple financing options.

When the quintiles are further divided by *CDS_Active*, there is a significant difference between the degree of debt concentration prior to CDS trading and after. In fact, a paired t-test of *HHI* by quintile shows positive increases ranging from 3.5% to 7.6%, which are all significant at the 1% level and consistent with previous results. The bottom quintile is an exception, which is most likely due to the small sampling of CDS firms with nearly non-existent leverage.

In contrast, when quintile means of *BookLev* are broken down by *CDS_Active*, I fail to show significant differences between these groups. There is no discernible difference in average leverage before and after CDS trading for the middle 20% while the fourth quintile is not economically significant. The top 20% quintile is statistically significant but in the opposite direction of what one might expect as outlined in the above argument. Although the bottom 20% quintile shows an increase in leverage following the onset of CDS trading, this effect is arguably

due to small sample size. With the exception of the second quintile, these results appear to contrast with Saretto and Tookes (2013) who find higher firm leverage following CDS trading. However, when I compare average leverage before and after CDS trading for the full dataset, I find a difference of 5.4% (mean *BookLev* of 30.9% after and 25.5% before), which is statistically significant at the 1% level.

Group four and the middle 20% cohorts provide the clearest test of whether leverage or CDS trading impacts *HHI* toward specialization. In both quantiles, there is no significant difference between the leverage of firms pre-CDS trading and post – the change in *BookLev* has been controlled for in effect. If changes in leverage explain the increase in debt concentration, then I would expect an attenuated or insignificant *CDS_Active* estimate. In fact, the differences in average *HHI* before and after the onset of CDS trading remain significant at 5% and 7.6% for group four and the middle 20% quantile, respectively. In summary, after dividing the dataset into quintiles, univariate tests reveal a significant increase in debt specialization following the inception of CDS trading but mixed results with regard to leverage. After CDS contracts begin trading on firm debt, the resulting increased leverage we expect appears to play little role in the increase in *HHI*, especially when controlling for *BookLev* by grouping similarly levered firms together.

[Table VII]

In Table VIII, I run Tobit regressions on the quintiles formed by *BookLev*. The dataset is sorted by leverage and cut into 20% groups containing approximately 2,825 observations each, although the regression sample sizes differ because of the effect of lagging on unbalanced panel data. With the exception of the bottom quantile, all groups show a significant positive association between the onset of CDS trading and debt specialization with coefficients ranging from 7.53% (group 4) to 18.3% (top 20%). The top 20% quantile represents firms in the dataset with the highest leverage ratios; essentially, I've grouped firms with similar percentages of debt as a way to control for any effect leverage may have on *HHI*. If changes in leverage are the actual driver of my results, then I would expect to see a small or insignificant coefficient on *CDS_Active*. Instead, I find that highly leveraged firms exhibit a considerable degree of debt concentration (larger, in fact, than found in my main results) following the inception of CDS

trading. As these already leveraged firms become more risky due to the empty creditor problem posed by CDSs, their debt structures appear to change from diversified to specialized as a way to mitigate potential costs and conflicts in bankruptcy. Furthermore, the degree of change towards concentration is even more pronounced at 18.3% compared with 13.27% in model 6 of Table III. Table VIII provides further evidence to support the causal relationship between the beginning of CDS trading and increased debt specialization.

[Table VIII]

3.4   Propensity Score Matching Estimation

Throughout my regression results, I include a dummy variable, *CDS_Firm*, as a way to control for time invariant unobservable differences between CDS and non-CDS firms.   In essence, *CDS_Firm* acts as an additional fixed effect in my models. By including it, I attempt to control for any omitted variable or unobserved heterogeneity that may explain why a particular firm has a CDS contract traded on its debt. However, propensity score matching offers an alternative approach whereby I match "treated" CDS firm-year observations (2,350) with "untreated" (8,978) based on control variables used previously: *lnSize*, *MktBk*, *Profitability*, *DivPayer*, *Tangibility*, *CFvol*, *RDexp*, *Unrated*, and *BookLev*. In effect, I create a counter-factual sample of CDS firms if they had never, in fact, had a traded CDS, which then allows me to test for the average treatment effect on the treated (ATET). Using Stata's "teffects psmatch" command, I obtain a matched sample (using 794 non-CDS firm-year observations with replacement) with *HHI* of 67.2% for CDS and 60.5% for non-CDS firms. The difference of 6.7% is statistically significant at the 1% level with Abadie-Imbens robust standard errors, which suggests that the beginning of CDS trading is the proximate cause of the increase in debt specialization -- even between firms matched on various determinants of capital structure.

I repeat the analysis by sub-sampling the data into rated, investment grade rated, and below investment grade rated firms and re-running propensity score matching. I choose to create a sub-sample of rated firms because these firms should have greater access to supply of capital. An unrated firm most likely does not have the ability to tap corporate bond markets and may specialize debt structure because of supply constraints not CDS trading; by focusing on rated

firms only, I attempt to alleviate that concern. Similar to the results above, I find a difference of approximately 6.1%, which is significant at the 1% level with Abadie-Imbens robust standard errors. For the sub-sample of investment grade rated firms, I do not obtain statistically significant results; in contrast, I do find a significant difference at the 1% level of approximately 8.8% for below investment grade rated firms. These results suggest that for rated firms the onset of CDS trading is positively associated with debt specialization, although these firms should have greater access to financing options; however, for poorer credit quality firms, the effect is even more pronounced, which suggests that the increased credit risk imposed by CDS trading is compounded by below investment grade ratings.

Additionally, I divide the dataset into five equally sized groups by *BookLev* and re-run propensity score matching on each quintile. Although I include the *BookLev* variable in all regression models as a control, I want to demonstrate the effect of the inception of CDS trading on *HHI* while further controlling for leverage by grouping firms into buckets of similarly levered firms. In effect, I attempt to show that *CDS_Active* is significant and not simply a function of the change in leverage. Intuitively, however, I expect a negative correlation between leverage and *HHI*; after all, as firms increase their amount of borrowing, they'll need to tap additional financing options (debt diversification). For the top quintile of firms (average *BookLev* of 57.3% and *HHI* of 59.8%), propensity score matching produces a difference in *HHI* between CDS firms and non-CDS firms of 4.55%, which is significant at the 5% level with Abadie-Imbens robust standard errors. The next quintile of firms (average *BookLev* of 34.3% and *HHI* of 63.5%) reveals a difference of 11.1%, which is significant at the 1% level; for the middle quintile of firms (average *BookLev* of 23.3% and *HHI* of 67.4%), I find an ATET of 10.9%, which is significant at the 1% level. The results for the remaining groups are not significant. My findings suggest that the onset of CDS trading is driving the increase in debt specialization. Even after I group similarly leveraged firms into equal sized quintiles by *BookLev*, the difference between CDS firms and the counter-factual matched sample is significant, which provides further evidence that the inception of CDS trading causes an increase in *HHI*.

Propensity score matching allows me to create a counter-factual sample of CDS firms if they had never had a CDS traded on their debt. By matching on determinants of capital structure, I create matches that very closely resemble the sample of CDS firms – except for the treatment effect of CDS trading. The average treatment effect on the treated (reported above)

indicates an economically and statistically significant difference in *HHI* between CDS and non-CDS firms. Theoretically, if an unobservable variable (such as some confounding firm characteristic not controlled for in my regression models) were to be driving the results instead of the treatment effect of CDS trading, then I would expect that that latent variable should also affect the *HHI* of the non-CDS matched firms; after all, the treated and untreated matched observations should be very similar based on propensity score. Instead, my findings suggest that the inception of CDS trading is the cause of the increase in debt specialization as measured by the variable *HHI*.

In addition, I explore two alternative explanations for the positive association between *CDS_Active* and *HHI* that may lay with credit risk and leverage. In order to explore the viability of these explanations, I sub-sample the dataset into rated, investment grade rated, and below investment grade rated firms. I also form quintiles by *BookLev* in order to better control for leverage. Even after sub-sampling and sorting and dividing the data into separate groups, the difference of *HHI* between CDS and non-CDS matched firms remains significant. By using propensity score matching on sub-samples and quintiles, I further isolate the treatment effect of CDS trading in order to identify the likely causal effect of the beginning of CDS trading on debt structure.

3.5   *Robustness Test for HHI Construction*

It is possible that my results so far have been driven artificially by the way I originally construct *HHI*. Perhaps the increase in debt specialization associated with CDS trading is an artifice of the particular seven categories I chose to use in defining the variable initially. To help allay this concern, I re-construct *HHI* two different ways. First, I disaggregate out subordinated bonds and notes (*SUB*) into three distinct categories: *SrSubDebt* (senior subordinated debt), *JrSubDebt* (junior subordinated debt), and *SubDebt* (all subordinated debt not classified as either senior or junior). I keep all other debt categories the same and re-construct *Sum of Squares* and *HHI* as follows:

Sum of squared debt ratios:

$$SS\_1_{i,t} = (CP_{i,t} / TD_{i,t})^2 + (DC_{i,t} / TD_{i,t})^2 + (TL_{i,t} / TD_{i,t})^2 + (SBN_{i,t} / TD_{i,t})^2 +$$
$$(SrSubDebt_{i,t} / TD_{i,t})^2 + (JrSubDebt_{i,t} / TD_{i,t})^2 + (SubDebt_{i,t} / TD_{i,t})^2 +$$
$$(CL_{i,t} / TD_{i,t})^2 + (Other_{i,t} / TD_{i,t})^2 \quad\quad (3)$$

Normalized HHI (Herfindahl-Hirschman Index):

$$HHI\_1_{i,t} = SS_{i,t} - 1/9 \ / \ 1 - 1/9 \quad\quad (4)$$

Second, I construct *HHI_2* as follows:

Sum of squared debt ratios:

$$SS\_2_{i,t} = (CP_{i,t} / TD_{i,t})^2 + (DC_{i,t} / TD_{i,t})^2 + (TL_{i,t} / TD_{i,t})^2 + (LTRD_{i,t} / TD_{i,t})^2 +$$
$$(TotSecDebt_{i,t} / TD_{i,t})^2 + (TotUnsecDebt_{i,t} / TD_{i,t})^2 + (CL_{i,t} / TD_{i,t})^2 +$$
$$(Other_{i,t} / TD_{i,t})^2 \quad\quad (5)$$

Normalized HHI (Herfindahl-Hirschman Index):

$$HHI\_2_{i,t} = SS_{i,t} - 1/8 \ / \ 1 - 1/8 \quad\quad (6)$$

where *TotSecDebt* is total secured debt, *TotUnsecDebt* is total unsecured debt, and *LTRD* is all other senior or subordinated bonds and notes not classified as either secured or unsecured. As in equations 3 and 4, all other debt types remain the same.

In Table IX, I present my results combining all three variations of the Herfindahl-Hirschman Index, *HHI*, *HHI_1*, and *HHI_2*. I run Tobit regressions as before on the full sample (models 1 – 3) and the CDS sub-sample (models 4 – 6). Models 1 and 4 represent my original results reported earlier in the paper. Even after constructing the Herfindahl-Hirschman Index with different debt types, my results remain consistent. *CDS_Active* in models 2 and 3 (5 and 6) is both statistically and economically significant and very close in magnitude to my original result in model 1 (4), although somewhat smaller. Table IX provides evidence that the onset of CDS trading is associated with increased debt specialization – regardless of how the measure of debt structure is constructed.

3.6   Bank Loan Lenders & Debt Specialization

In this paper, I present evidence that the increased bankruptcy risk as a result of CDS trading is associated with debt specialization, meaning that these CDS firms concentrate debt structure as a way to mitigate creditor conflicts and costs in bankruptcy. An assumption inherent in this line of reasoning is that debt concentration equates with creditor concentration. As I argue in Section 3.1, I think this is a reasonable assumption to make; however, in Table X, I provide a direct test by examining the number of bank loan lenders before and after the onset of CDS trading. In order to do so, I merge syndicated bank loan data from Dealscan with my dataset and create the variable, *lnNumLenders*, which is the natural logarithm of the number of unique bank lenders per firm-year. Additionally, I add in loan type (term loan, revolver, 364-day facility, and other) and loan purpose (corporate purposes, debt repayment, leveraged buyout/management buyout, takeover, working capital, commercial paper backup, acquisition line, and other) controls for loan characteristics. Table X illustrates that following the inception of CDS trading the number of bank loan lenders decreases (for all specifications except for the first). This finding provides evidence that firms concentrate debt structure – and, therefore, creditor structure – as a way to lessen potential problems in bankruptcy.

4   Conclusions

This paper researches how CDSs impact debt structure. Specifically, I examine the *before* and *after* effect of CDS trading on a firm's specialization or diversification of debt types. I argue that firms with CDS contracts traded on them exhibit higher debt concentration in comparison to firms that do not have CDSs traded on them as a way to minimize creditor conflicts and costs in bankruptcy. My results show that firms have greater debt specialization after the inception of CDS trading than before. In addition, firms have a higher probability of specializing after CDSs begin trading on a firm's debt. My results are robust in sub-samples

consisting only of CDS firms and rated firms (rated, investment grade, and below investment grade) as well as quantiles divided by leverage.

To the best of my knowledge, this is the first paper to examine how and why credit default swaps impact debt specialization. This paper contributes in a number of important ways to the corporate finance literature including demonstrating the explanatory power of CDS trading and providing additional research into the heterogeneity of debt structure. However, further research is necessary to analyze how CDSs affect the composition of debt and not simply the overall structure. Additionally, research into how different terms of CDS contracts impact debt structure is needed as well.

References

Ashcraft, A. B., and J. A. C. Santos. 2009. Has the CDS market lowered the cost of corporate debt? *Journal of Monetary Economics* Vol. 56, 514–23.

Bolton, P., and M. Oehmke, 2011, Credit Default Swaps and the Empty Creditor Problem, *Review of Financial Studies* Vol. 24 (8), 2617-2655.

Bolton, P., and D. Scharfstein, 1996, Optimal Debt Structure and the Number of Creditors, *Journal of Political Economy* Vol. 104 (1), 1-25.

Colla, P., F. Ippolito, and K. Lai, 2013, Debt Specialization, *Journal of Finance* Vol. 68 (5), 2117-2141.

Faulkender, M., and M. Petersen, 2006, Does the Source of Capital Affect Capital Structure, *Review of Financial Studies* Vol. 19 (1), 45-79.

Hu, H., and B. Black, 2008, Debt, Equity, and Hybrid Decoupling: Governance and Systemic Risk Implications, *European Financial Management* Vol. 14 (4), 663-709.

Lemmon, M., M. Roberts, and J. Zender, 2008, Back to the Beginning: Persistence and the Cross-Section of Corporate Capital Structure, *Journal of Finance* Vol. 63 (4), 1575-1608.

Ivashina, V., B. Iverson, and D. Smith, 2015, The Ownership and Trading of Debt Claims in Chapter 11 Restructurings, *Journal of Financial Economics (Forthcoming)*.

Rajan, Raghuram G., and Luigi Zingales, 1995, What Do We Know About Capital Structure: Some Evidence from International Data, *Journal of Finance* 50, 1421–1460.

Rauh, J., and A. Sufi, 2010, Capital Structure and Debt Structure, *Review of Financial Studies* Vol. 23 (12), 4242-4280.

Saretto, Alessio and Heather E. Tookes, 2013, Corporate Leverage, Debt Maturity, and Credit Supply: The Role of Credit Default Swaps, *Review of Financial Studies* Vol. 26 (5), 1190-1247.

Subrahmanyam, M., D. Tang, S. Wang, 2014, Does the tail wage the dog?: The effect of credit default swaps on credit risk, *Review of Financial Studies* Vol. 27 (10), 2926-60.

Sufi, Amir, 2007, Information Asymmetry and Financing Arrangements: Evidence from Syndicated Loans, *Journal of Finance* 62, 629–668.

Titman, Sheridan, and Roberto Wessels, 1988, The Determinants of Capital Structure Choice, *Journal of Finance* 43, 1–19.

Table I
Descriptive Statistics

This table presents descriptive statistics for all variables used in the paper. *HHI* is the Herfindahl-Hirschman Index. *Excl90* is an indicator value equal to one if any debt type is 90% or greater of total debt and zero otherwise. *Excl80*, *Excl70*, and *Excl60* are defined similarly. *CDS_Active* is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. *CDS_Firm* is a dummy variable equal to one if a firm has a traded CDS contract at any point in the dataset and zero otherwise. *Total Assets* is total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. *RDexp* is research and development expenses divided by total assets. *Unrated* is a dummy variable equal to one if the firm is not rated by S&P and zero otherwise. *BookLev* is total debt scaled by total assets. All continuous control variables are winsorized at the 1% and 99% levels.

	Mean	Std. Dev.	1st Pct.	25th Pct.	Median	75th Pct.	99th Pct.	N
HHI	0.699	0.256	0.204	0.457	0.720	0.975	1.000	14,127
Excl90	0.446	0.497	0.000	0.000	0.000	1.000	1.000	14,127
Excl80	0.577	0.494	0.000	0.000	1.000	1.000	1.000	14,127
Excl70	0.699	0.459	0.000	0.000	1.000	1.000	1.000	14,127
Excl60	0.819	0.385	0.000	1.000	1.000	1.000	1.000	14,127
CDS_Active	0.135	0.342	0.000	0.000	0.000	0.000	1.000	14,127
CDS_Firm	0.181	0.385	0.000	0.000	0.000	0.000	1.000	14,127
Total Assets (mill.)	4,102.3	8,994.2	8.558	218.8	892.3	3,296.9	55,651	14,127
MktBk	1.594	1.503	0.321	0.823	1.175	1.804	7.558	14,127
Profitability	0.082	0.241	-0.880	0.068	0.118	0.167	0.376	14,127
DivPayer	0.410	0.492	0.000	0.000	0.000	1.000	1.000	14,127
Tangibility	0.292	0.241	0.007	0.099	0.218	0.426	0.910	14,127
CFvol	0.021	0.036	0.002	0.006	0.011	0.021	0.216	14,127
RDexp	0.042	0.137	0.000	0.000	0.000	0.028	0.616	14,127
Unrated	0.573	0.495	0.000	0.000	1.000	1.000	1.000	14,127
BookLev	0.262	0.198	0.000	0.108	0.233	0.374	0.852	14,127

Table II
Debt Specialization (HHI) & CDSs Over Time

HHI is the Herfindahl-Hirschman Index. *CDS_Active* is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. Panel A represents the full sample of firms in the dataset while Panel B consists of only CDS firms (firms that have a CDS contract traded on their debt at any point in the sample). The full sample t-test did not yield a significant difference in means. However, the sub-sample t-test of a mean of 0.599 (non-CDS firms) versus 0.704 (CDS firms) yields a difference significant at the 1% level.

Panel A: HHI Before & After Onset of CDS Trading (Full Sample)													
						Year							
CDS_Active	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1	0.690	0.752	0.718	0.678	0.651	0.631	0.627	0.731	0.733	0.712	0.741	0.738	0.720
0	0.670	0.688	0.696	0.691	0.698	0.705	0.690	0.707	0.712	0.705	0.709	0.702	0.690
Difference	0.020	0.064**	0.022	-0.013	-0.047	-0.074***	-0.063***	0.024	0.021	0.007	0.032	0.036*	0.030

Panel B: HHI Before & After Onset of CDS Trading (Sub-Sample of CDS Firms)													
						Year							
CDS_Active	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1	0.690	0.752	0.718	0.678	0.651	0.631	0.627	0.731	0.733	0.712	0.741	0.738	0.720
0	0.602	0.581	0.653	0.594	0.601	0.581	0.560	0.531	0.594	0.483	0.629		
Difference	0.088**	0.171***	0.065*	0.084**	0.050	0.050	0.067	0.200***	0.139*	0.229***	0.112		

Table III
Multivariate Regressions on Debt Specialization (HHI) & CDS Trading

This table tests the effect of the onset of CDS trading and traditional determinants of capital structure on debt specialization. The dependent variable is *HHI* (Herfindahl-Hirschman Index). All right-hand side variables are lagged except for *CDS_Firm*. *CDS_Active* is the main variable of interest and is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. *CDS_Firm* is a dummy variable equal to one if a firm has a traded CDS contract at any point in the dataset and zero otherwise. *lnSize* is the log of total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. *RDexp* is research and development expenses divided by total assets. *Unrated* is a dummy variable equal to one if the firm is not rated by S&P and zero otherwise. *BookLev* is total debt scaled by total assets. All continuous control variables are winsorized at the 1% and 99% levels. All models include Fama-French 48 industry and year fixed effects. Robust standard errors are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) HHI	(2) HHI	(3) HHI	(4) HHI	(5) HHI	(6) HHI
L.CDS_Active	0.0223***	0.1061***	0.1057***	0.1014***	0.1031***	0.1327***
	(0.0068)	(0.0112)	(0.0112)	(0.0112)	(0.0111)	(0.0150)
CDS_Firm		-0.0001	-0.0010	0.0176	-0.0004	-0.0005
		(0.0108)	(0.0108)	(0.0108)	(0.0107)	(0.0107)
L.lnSize		-0.0335***	-0.0318***	-0.0193***	-0.0177***	-0.0177***
		(0.0020)	(0.0021)	(0.0024)	(0.0023)	(0.0023)
L.MktBk		0.0208***	0.0144***	0.0136***	0.0128***	0.0129***
		(0.0024)	(0.0024)	(0.0024)	(0.0023)	(0.0023)
L.Profitability		0.0464***	0.1867***	0.1715***	0.1466***	0.1466***
		(0.0143)	(0.0240)	(0.0236)	(0.0222)	(0.0222)
L.DivPayer		0.0260***	0.0252***	0.0221***	0.0049	0.0044
		(0.0060)	(0.0060)	(0.0059)	(0.0058)	(0.0058)
L.Tangibility		-0.1302***	-0.1281***	-0.1266***	-0.0537***	-0.0449***
		(0.0151)	(0.0151)	(0.0150)	(0.0149)	(0.0153)
L.CFvol			0.5272***	0.5457***	0.4744***	0.4737***
			(0.1102)	(0.1094)	(0.1095)	(0.1093)
L.RDexp			0.3256***	0.3163***	0.2784***	0.2803***
			(0.0460)	(0.0453)	(0.0434)	(0.0435)
L.Unrated				0.0780***	0.0299***	0.0301***
				(0.0074)	(0.0075)	(0.0075)
L.BookLev					-0.3849***	-0.3848***
					(0.0151)	(0.0151)
L.CDS_Active X L.Tangibility						-0.0903***
						(0.0293)
_cons	0.7941***	0.9976***	0.9730***	0.8464***	0.9637***	0.9596***
	(0.0436)	(0.0446)	(0.0454)	(0.0475)	(0.0407)	(0.0407)
N	11295	11295	11295	11295	11295	11295
Model	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit
pseudo R^2	0.114	0.210	0.228	0.247	0.359	0.360
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table IV
Sub-Sample of CDS Firms
Multivariate Regressions on Debt Specialization (HHI) & CDS Trading

This table tests the effect of the onset of CDS trading and traditional determinants of capital structure on debt specialization. The sample is restricted to include only those firms that have a CDS contract traded on their debt at any point in the dataset. The dependent variable is *HHI* (Herfindahl-Hirschman Index). All right-hand side variables are lagged. *CDS_Active* is the main variable of interest and is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. *lnSize* is the log of total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. *RDexp* is research and development expenses divided by total assets. *Unrated* is a dummy variable equal to one if the firm is not rated by S&P and zero otherwise. *BookLev* is total debt scaled by total assets. All continuous control variables are winsorized at the 1% and 99% levels. All models include Fama-French 48 industry and year fixed effects. Robust standard errors are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) HHI	(2) HHI	(3) HHI	(4) HHI	(5) HHI	(6) HHI
L.CDS_Active	0.0824***	0.0701***	0.0692***	0.0683***	0.0709***	0.1016***
	(0.0134)	(0.0140)	(0.0140)	(0.0140)	(0.0137)	(0.0214)
L.lnSize		-0.0120*	-0.0118*	-0.0102*	-0.0121**	-0.0114*
		(0.0062)	(0.0062)	(0.0061)	(0.0060)	(0.0060)
L.MktBk		-0.0284***	-0.0294***	-0.0297***	-0.0252***	-0.0247***
		(0.0067)	(0.0066)	(0.0066)	(0.0067)	(0.0067)
L.Profitability		0.3125***	0.3072***	0.3113***	0.2333***	0.2382***
		(0.0848)	(0.0838)	(0.0836)	(0.0847)	(0.0839)
L.DivPayer		0.0684***	0.0709***	0.0720***	0.0615***	0.0601***
		(0.0129)	(0.0130)	(0.0130)	(0.0130)	(0.0130)
L.Tangibility		-0.1476***	-0.1506***	-0.1402***	-0.0949***	-0.0400
		(0.0364)	(0.0366)	(0.0360)	(0.0359)	(0.0444)
L.CFvol			0.8800**	0.7952*	0.8578**	0.8674**
			(0.4154)	(0.4134)	(0.4211)	(0.4168)
L.RDexp			0.2839	0.3150	0.1602	0.1517
			(0.3312)	(0.3320)	(0.3164)	(0.3152)
L.Unrated				0.1363**	0.1215**	0.1220**
				(0.0555)	(0.0548)	(0.0548)
L.BookLev					-0.2128***	-0.2142***
					(0.0364)	(0.0363)
L.CDS_Active X L.Tangibility						-0.0913**
						(0.0441)
_cons	0.7597***	0.8486***	0.8055***	0.7593***	0.8211***	0.7946***
	(0.0815)	(0.1024)	(0.1045)	(0.1200)	(0.1173)	(0.1172)
N	2350	2350	2350	2350	2350	2350
Model	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table Va
Multivariate Regressions on Debt Specialization (Excl90) & CDS Trading

This table tests the effect of the onset of CDS trading and traditional determinants of capital structure on debt specialization. The dependent variable is *Excl90* which is an indicator value equal to one if any debt type is 90% or greater of total debt and zero otherwise. All right-hand side variables are lagged except for *CDS_Firm*. *CDS_Active* is the main variable of interest and is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. *CDS_Firm* is a dummy variable equal to one if a firm has a traded CDS contract at any point in the dataset and zero otherwise. *lnSize* is the log of total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. *RDexp* is research and development expenses divided by total assets. *Unrated* is a dummy variable equal to one if the firm is not rated by S&P and zero otherwise. *BookLev* is total debt scaled by total assets. All continuous control variables are winsorized at the 1% and 99% levels. Coefficients are exponentiated. Average partial effect is for *CDS_Active*. All models include Fama-French 48 industry and year fixed effects. Robust standard errors are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) Excl90	(2) Excl90	(3) Excl90	(4) Excl90	(5) Excl90	(6) Excl90
L.CDS_Active	1.295***	2.326***	2.319***	2.245***	2.339***	3.129***
	(0.075)	(0.239)	(0.238)	(0.230)	(0.246)	(0.434)
CDS_Firm		0.978	0.976	1.126	1.002	1.002
		(0.096)	(0.096)	(0.112)	(0.103)	(0.103)
L.lnSize		0.810***	0.818***	0.885***	0.891***	0.891***
		(0.012)	(0.013)	(0.016)	(0.017)	(0.017)
L.MktBk		1.153***	1.095***	1.089***	1.084***	1.084***
		(0.022)	(0.021)	(0.021)	(0.021)	(0.021)
L.Profitability		1.359***	3.961***	3.554***	3.126***	3.116***
		(0.147)	(0.751)	(0.666)	(0.559)	(0.557)
L.DivPayer		1.121**	1.121**	1.100**	0.992	0.989
		(0.053)	(0.053)	(0.053)	(0.049)	(0.048)
L.Tangibility		0.371***	0.376***	0.379***	0.579***	0.637***
		(0.045)	(0.046)	(0.047)	(0.075)	(0.084)
L.CFvol			37.018***	41.405***	28.616***	28.099***
			(32.563)	(36.439)	(26.197)	(25.574)
L.RDexp			17.761***	16.257***	12.631***	13.043***
			(8.146)	(7.317)	(5.500)	(5.721)
L.Unrated				1.666***	1.221***	1.224***
				(0.100)	(0.078)	(0.078)
L.BookLev					0.074***	0.075***
					(0.010)	(0.010)
L.CDS_Active X L.Tangibility						0.401***
						(0.114)
_cons	1.422	5.369***	4.610***	2.051*	4.725***	4.530***
	(0.512)	(2.007)	(1.742)	(0.813)	(1.854)	(1.785)
N	11295	11295	11295	11295	11295	11295
Model	Logit	Logit	Logit	Logit	Logit	Logit
Avg. Partial Effect	6%	18.9%	18.6%	17.8%	18%	24.2%
pseudo R^2	0.032	0.059	0.065	0.070	0.096	0.097
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table Vb
Multivariate Regressions on Debt Specialization (varying Excl) & CDS Trading

This table tests the effect of the onset of CDS trading and traditional determinants of capital structure on debt specialization. The dependent variable is *Excl90* which is an indicator value equal to one if any debt type is 90% or greater of total debt and zero otherwise. *Excl80*, *Excl70*, and *Excl60* are defined similarly. All right-hand side variables are lagged. *CDS_Active* is the main variable of interest and is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. *CDS_Firm* is a dummy variable equal to one if a firm has a traded CDS contract at any point in the dataset and zero otherwise. *lnSize* is the log of total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. *RDexp* is research and development expenses divided by total assets. *Unrated* is a dummy variable equal to one if the firm is not rated by S&P and zero otherwise. *BookLev* is total debt scaled by total assets. All continuous control variables are winsorized at the 1% and 99% levels. Coefficients are exponentiated. Average partial effect is for *CDS_Active*. All models include Fama-French 48 industry and year fixed effects. Robust standard errors are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) Excl90	(2) Excl80	(3) Excl70	(4) Excl60
L.CDS_Active	3.129***	2.541***	2.278***	2.622***
	(0.434)	(0.349)	(0.342)	(0.492)
CDS_Firm	1.002	1.225**	1.191*	1.064
	(0.103)	(0.115)	(0.114)	(0.115)
L.lnSize	0.891***	0.916***	0.947***	0.958*
	(0.017)	(0.017)	(0.018)	(0.022)
L.MktBk	1.084***	1.060***	1.056**	1.089***
	(0.021)	(0.021)	(0.024)	(0.034)
L.Profitability	3.116***	2.974***	2.887***	2.270***
	(0.557)	(0.530)	(0.527)	(0.514)
L.DivPayer	0.989	1.093*	1.072	1.152**
	(0.048)	(0.052)	(0.053)	(0.067)
L.Tangibility	0.637***	0.845	0.891	1.192
	(0.084)	(0.108)	(0.117)	(0.179)
L.CFvol	28.099***	37.340***	135.395***	39.214**
	(25.574)	(36.881)	(165.541)	(56.681)
L.RDexp	13.043***	11.889***	17.732***	33.326***
	(5.721)	(5.855)	(9.622)	(25.197)
L.Unrated	1.224***	1.246***	1.165**	1.071
	(0.078)	(0.075)	(0.072)	(0.077)
L.BookLev	0.075***	0.097***	0.121***	0.131***
	(0.010)	(0.012)	(0.015)	(0.018)
L.CDS_Active X	0.401***	0.532**	0.821	0.651
L.Tangibility	(0.114)	(0.149)	(0.257)	(0.264)
_cons	4.530***	5.643***	8.052***	10.097***
	(1.785)	(2.333)	(3.832)	(5.491)
N	11295	11295	11295	11295
Model	Logit	Logit	Logit	Logit
Avg. Partial Effect	24.2%	20.6%	16.4%	14.1%
pseudo R^2	0.097	0.083	0.072	0.069
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Figure 1

This figure illustrates average *HHI* before and after the inception of CDS trading. *HHI* is the Herfindahl-Hirschman Index, which is on the vertical axis while event years are on the horizontal axis. Event year zero corresponds to the year when a CDS contract begins trading on a firm's debt.
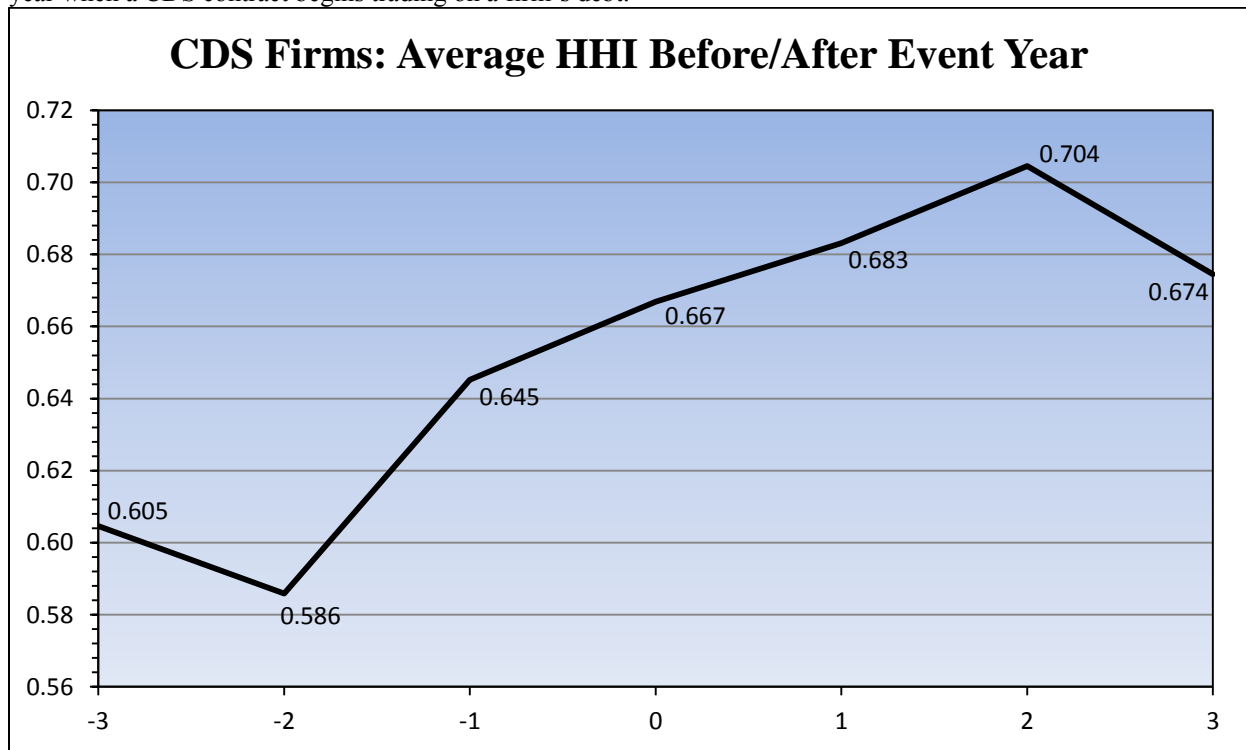
CDS Firms: Average HHI Before/After Event Year

This table tests the effect of the onset of CDS trading and traditional determinants of capital structure on debt specialization. The sample (including CDS and non-CDS firms) is restricted to include only those firms that are rated by S&P. The dependent variable is *HHI* (Herfindahl-Hirschman Index). All right-hand side variables are lagged except for *CDS_Firm*. *CDS_Active* is the main variable of interest and is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. *CDS_Firm* is a dummy variable equal to one if a firm has a traded CDS contract at any point in the dataset and zero otherwise. *lnSize* is the log of total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. *RDexp* is research and development expenses divided by total assets. *BookLev* is total debt scaled by total assets. All continuous control variables are winsorized at the 1% and 99% levels. All models include Fama-French 48 industry and year fixed effects. Robust standard errors are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) HHI	(2) HHI	(3) HHI	(4) HHI	(5) HHI	(6) HHI
L.CDS_Active	0.0899***	0.1009***	0.0991***	0.0966***	0.1030***	0.1250***
	(0.0074)	(0.0118)	(0.0118)	(0.0117)	(0.0116)	(0.0160)
CDS_Firm		0.0222*	0.0234**	0.0247**	0.0208*	0.0203*
		(0.0118)	(0.0117)	(0.0117)	(0.0116)	(0.0116)
L.lnSize		-0.0228***	-0.0208***	-0.0214***	-0.0277***	-0.0275***
		(0.0038)	(0.0039)	(0.0038)	(0.0038)	(0.0038)
L.MktBk		0.0141**	0.0125**	0.0069	0.0133**	0.0133**
		(0.0056)	(0.0055)	(0.0055)	(0.0056)	(0.0056)
L.Profitability		0.0822	0.0876	0.1063*	0.0156	0.0186
		(0.0573)	(0.0567)	(0.0558)	(0.0547)	(0.0546)
L.DivPayer		0.0186**	0.0192**	0.0239***	0.0117	0.0113
		(0.0076)	(0.0076)	(0.0077)	(0.0076)	(0.0076)
L.Tangibility		-0.1240***	-0.1297***	-0.1191***	-0.0682***	-0.0538**
		(0.0211)	(0.0211)	(0.0212)	(0.0209)	(0.0221)
L.CFvol			1.1005***	1.0169***	1.0792***	1.0653***
			(0.2362)	(0.2335)	(0.2389)	(0.2386)
L.RDexp				0.9604***	0.7593***	0.7647***
				(0.2075)	(0.1896)	(0.1890)
L.BookLev					-0.2794***	-0.2782***
					(0.0215)	(0.0215)
L.CDS_Active X L.Tangibility						-0.0665**
						(0.0315)
_cons	0.7832***	0.9315***	0.9019***	0.8882***	1.0250***	1.0179***
	(0.0433)	(0.0512)	(0.0518)	(0.0533)	(0.0572)	(0.0575)
N	5307	5307	5307	5307	5307	5307
Model	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table VIb
Sub-Sample of S&P Investment Grade Rated Firms
Multivariate Regressions on Debt Specialization (HHI) & CDS Trading

This table tests the effect of the onset of CDS trading and traditional determinants of capital structure on debt specialization. The sample (including CDS and non-CDS firms) is restricted to include only those firms that are rated investment grade by S&P. The dependent variable is *HHI* (Herfindahl-Hirschman Index). All right-hand side variables are lagged except for *CDS_Firm*. *CDS_Active* is the main variable of interest and is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. *CDS_Firm* is a dummy variable equal to one if a firm has a traded CDS contract at any point in the dataset and zero otherwise. *lnSize* is the log of total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. *RDexp* is research and development expenses divided by total assets. *BookLev* is total debt scaled by total assets. All continuous control variables are winsorized at the 1% and 99% levels. All models include Fama-French 48 industry and year fixed effects. Robust standard errors are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) HHI	(2) HHI	(3) HHI	(4) HHI	(5) HHI	(6) HHI
L.CDS_Active	0.0778***	0.0700***	0.0698***	0.0692***	0.0724***	0.0777***
	(0.0104)	(0.0146)	(0.0146)	(0.0146)	(0.0146)	(0.0208)
CDS_Firm		0.0140	0.0136	0.0148	0.0150	0.0145
		(0.0162)	(0.0162)	(0.0162)	(0.0162)	(0.0162)
L.lnSize		-0.0025	-0.0024	-0.0043	-0.0045	-0.0043
		(0.0061)	(0.0061)	(0.0061)	(0.0061)	(0.0061)
L.MktBk		-0.0349***	-0.0346***	-0.0384***	-0.0364***	-0.0363***
		(0.0064)	(0.0064)	(0.0062)	(0.0063)	(0.0063)
L.Profitability		0.4244***	0.4003***	0.3806***	0.3590***	0.3597***
		(0.0953)	(0.0955)	(0.0948)	(0.0949)	(0.0948)
L.DivPayer		0.0025	0.0040	0.0151	0.0160	0.0158
		(0.0145)	(0.0146)	(0.0149)	(0.0149)	(0.0149)
L.Tangibility		-0.1346***	-0.1372***	-0.1259***	-0.1105***	-0.1022**
		(0.0354)	(0.0355)	(0.0355)	(0.0359)	(0.0417)
L.CFvol			0.9459*	0.8594*	0.8223*	0.8277*
			(0.5005)	(0.4895)	(0.4918)	(0.4899)
L.RDexp				1.2848***	1.2168***	1.2160***
				(0.3063)	(0.3072)	(0.3073)
L.BookLev					-0.0874**	-0.0876**
					(0.0377)	(0.0377)
L.CDS_Active X L.Tangibility						-0.0170
						(0.0451)
_cons	0.7638***	0.8099***	0.7851***	0.7151***	0.7299***	0.7258***
	(0.0827)	(0.1009)	(0.1018)	(0.1000)	(0.1003)	(0.1009)
N	2371	2371	2371	2371	2371	2371
Model	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table VIc
Sub-Sample of S&P Below Investment Grade Rated Firms
Multivariate Regressions on Debt Specialization (HHI) & CDS Trading

This table tests the effect of the onset of CDS trading and traditional determinants of capital structure on debt specialization. The sample (including CDS and non-CDS firms) is restricted to include only those firms that are rated below investment grade by S&P. The dependent variable is *HHI* (Herfindahl-Hirschman Index). All right-hand side variables are lagged except for *CDS_Firm*. *CDS_Active* is the main variable of interest and is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. *CDS_Firm* is a dummy variable equal to one if a firm has a traded CDS contract at any point in the dataset and zero otherwise. *lnSize* is the log of total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. *RDexp* is research and development expenses divided by total assets. *BookLev* is total debt scaled by total assets. All continuous control variables are winsorized at the 1% and 99% levels. All models include Fama-French 48 industry and year fixed effects. Robust standard errors are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) HHI	(2) HHI	(3) HHI	(4) HHI	(5) HHI	(6) HHI
L.CDS_Active	0.0523***	0.1040***	0.1010***	0.0981***	0.0789***	0.1066***
	(0.0134)	(0.0203)	(0.0203)	(0.0203)	(0.0195)	(0.0298)
CDS_Firm		0.0236	0.0250	0.0259	0.0414**	0.0406**
		(0.0182)	(0.0182)	(0.0181)	(0.0175)	(0.0175)
L.lnSize		-0.0445***	-0.0429***	-0.0435***	-0.0498***	-0.0496***
		(0.0054)	(0.0054)	(0.0054)	(0.0052)	(0.0052)
L.MktBk		0.0492***	0.0452***	0.0396***	0.0530***	0.0528***
		(0.0078)	(0.0078)	(0.0081)	(0.0075)	(0.0075)
L.Profitability		-0.1554**	-0.1444**	-0.1251*	-0.1928***	-0.1899***
		(0.0680)	(0.0677)	(0.0675)	(0.0645)	(0.0643)
L.DivPayer		0.0023	0.0002	0.0021	-0.0084	-0.0092
		(0.0100)	(0.0100)	(0.0100)	(0.0099)	(0.0099)
L.Tangibility		-0.1190***	-0.1212***	-0.1127***	-0.0550**	-0.0470*
		(0.0272)	(0.0272)	(0.0272)	(0.0266)	(0.0271)
L.CFvol			1.0140***	0.9779***	1.0286***	1.0190***
			(0.2719)	(0.2698)	(0.2749)	(0.2749)
L.RDexp				0.6422***	0.4042**	0.4042**
				(0.2310)	(0.2014)	(0.2001)
L.BookLev					-0.3500***	-0.3473***
					(0.0268)	(0.0269)
L.CDS_Active X L.Tangibility						-0.0754
						(0.0557)
_cons	0.7788***	1.0367***	1.0206***	1.0304***	1.1858***	1.1819***
	(0.0491)	(0.0591)	(0.0594)	(0.0597)	(0.0631)	(0.0631)
N	2936	2936	2936	2936	2936	2936
Model	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit
pseudo R^2	0.453	0.656	0.676	0.692	0.932	0.935
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table VII
Leverage Quintiles: Univariate Tests

The full sample is divided into quintiles by *BookLev* where *BookLev* is total debt scaled by total assets. *HHI* is the Herfindahl-Hirschman Index. *CDS_Active* is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

| | Full Sample | | CDS (=1) vs. non-CDS (=0) Active Firms | | | | | |
Quintile	Avg. HHI	Avg. BookLev	Avg. HHI 1	Avg. HHI 0	T-Test *Difference*	Avg. BookLev 1	Avg. BookLev 0	T-Test *Difference*
Top 20%	0.598	0.573	0.636	0.591	0.045***	0.545	0.578	-0.033***
4	0.635	0.343	0.676	0.626	0.050***	0.346	0.342	0.004*
Middle 20%	0.674	0.233	0.736	0.660	0.076***	0.233	0.233	0.000
2	0.730	0.134	0.760	0.725	0.035***	0.144	0.132	0.012***
Bottom 20%	0.857	0.029	0.780	0.859	-0.079***	0.041	0.029	0.012***

Table VIII

Leverage Quintiles: Regressions on Debt Specialization (HHI) & CDS Trading

This table tests the effect of the onset of CDS trading and traditional determinants of capital structure on debt specialization. The full sample is divided into quintiles by *BookLev*. The dependent variable is *HHI* (Herfindahl-Hirschman Index). All right-hand side variables are lagged except for *CDS_Firm*. *CDS_Active* is the main variable of interest and is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. *CDS_Firm* is a dummy variable equal to one if a firm has a traded CDS contract at any point in the dataset and zero otherwise. *lnSize* is the log of total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. *RDexp* is research and development expenses divided by total assets. *Unrated* is a dummy variable equal to one if the firm is not rated by S&P and zero otherwise. *BookLev* is total debt scaled by total assets. All continuous control variables are winsorized at the 1% and 99% levels. All models include Fama-French 48 industry and year fixed effects. Robust standard errors are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Bottom 20%	(2)	Middle 20%	(4)	Top 20%
	HHI	HHI	HHI	HHI	HHI
L.CDS_Active	0.0540	0.1827***	0.1144***	0.0753**	0.1830***
	(0.0782)	(0.0312)	(0.0284)	(0.0303)	(0.0362)
CDS_Firm	-0.0270	-0.0671**	0.0044	0.0533**	-0.0074
	(0.0571)	(0.0271)	(0.0208)	(0.0216)	(0.0201)
L.lnSize	-0.0393***	-0.0037	0.0054	-0.0126**	-0.0246***
	(0.0064)	(0.0053)	(0.0050)	(0.0050)	(0.0044)
L.MktBk	0.0046	0.0054	0.0231***	0.0178***	0.0163***
	(0.0047)	(0.0039)	(0.0069)	(0.0068)	(0.0057)
L.Profitability	0.1962***	0.0805**	0.1552***	0.0850	0.1826***
	(0.0458)	(0.0397)	(0.0583)	(0.0550)	(0.0480)
L.DivPayer	0.0602***	-0.0425***	-0.0242*	0.0128	0.0367***
	(0.0178)	(0.0143)	(0.0130)	(0.0116)	(0.0112)
L.Tangibility	-0.1062*	-0.0519	-0.0571	-0.0043	0.0199
	(0.0569)	(0.0392)	(0.0354)	(0.0307)	(0.0267)
L.CFvol	0.5763**	-0.0772	0.1510	0.5350**	0.6006***
	(0.2295)	(0.2390)	(0.2307)	(0.2277)	(0.2154)
L.RDexp	0.2929***	0.3212***	0.4473***	0.3471**	0.1639*
	(0.0709)	(0.0918)	(0.1188)	(0.1367)	(0.0843)
L.Unrated	-0.0234	0.0106	0.0566***	0.0225	0.0065
	(0.0300)	(0.0199)	(0.0161)	(0.0150)	(0.0135)
L.BookLev	-0.7546***	-0.1927**	0.0747	0.0730	-0.1546***
	(0.1290)	(0.0798)	(0.0675)	(0.0579)	(0.0327)
L.CDS_Active X	-0.3187	-0.1531**	0.0112	-0.0566	-0.2187***
L.Tangibility	(0.2506)	(0.0674)	(0.0599)	(0.0594)	(0.0619)
_cons	1.4001***	0.9035***	0.6526***	0.7183***	0.7317***
	(0.1249)	(0.0879)	(0.0799)	(0.0839)	(0.0888)
N	1959	2235	2380	2366	2355
Model	Tobit	Tobit	Tobit	Tobit	Tobit
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Table IX
Robustness Test for *HHI* Construction

This table tests the robustness of my results given *HHI* (Herfindahl-Hirschman Index) constructed three different ways (my original results are in models 1 and 4). The dependent variables are *HHI*, *HHI_1*, *HHI_2*, which are defined in the paper. All right-hand side variables are lagged except for *CDS_Firm*. *CDS_Active* is the main variable of interest and is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. *CDS_Firm* is a dummy variable equal to one if a firm has a traded CDS contract at any point in the dataset and zero otherwise. *lnSize* is the log of total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. *RDexp* is research and development expenses divided by total assets. *Unrated* is a dummy variable equal to one if the firm is not rated by S&P and zero otherwise. *BookLev* is total debt scaled by total assets. All continuous control variables are winsorized at the 1% and 99% levels. All models include Fama-French 48 industry and year fixed effects. Robust standard errors are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Full Sample			CDS Sub-Sample		
	(1) HHI	(2) HHI_1	(3) HHI_2	(4) HHI	(5) HHI_1	(6) HHI_2
L.CDS_Active	0.1327***	0.1191***	0.1210***	0.1016***	0.0886***	0.0900***
	(0.0150)	(0.0151)	(0.0154)	(0.0214)	(0.0216)	(0.0219)
CDS_Firm	-0.0005	-0.0005	-0.0005			
	(0.0107)	(0.0111)	(0.0113)			
L.lnSize	-0.0177***	-0.0176***	-0.0179***	-0.0114*	-0.0169***	-0.0172***
	(0.0023)	(0.0024)	(0.0024)	(0.0060)	(0.0060)	(0.0061)
L.MktBk	0.0129***	0.0096***	0.0097***	-0.0247***	-0.0272***	-0.0277***
	(0.0023)	(0.0022)	(0.0023)	(0.0067)	(0.0065)	(0.0066)
L.Profitability	0.1466***	0.1368***	0.1390***	0.2382***	0.2232***	0.2268***
	(0.0222)	(0.0220)	(0.0224)	(0.0839)	(0.0864)	(0.0878)
L.DivPayer	0.0044	0.0010	0.0010	0.0601***	0.0476***	0.0484***
	(0.0058)	(0.0060)	(0.0061)	(0.0130)	(0.0132)	(0.0134)
L.Tangibility	-0.0449***	-0.0508***	-0.0516***	-0.0400	-0.0504	-0.0512
	(0.0153)	(0.0159)	(0.0162)	(0.0444)	(0.0461)	(0.0469)
L.CFvol	0.4737***	0.4907***	0.4985***	0.8674**	0.8073*	0.8201*
	(0.1093)	(0.1070)	(0.1087)	(0.4168)	(0.4187)	(0.4254)
L.RDexp	0.2803***	0.2483***	0.2522***	0.1517	-0.1689	-0.1715
	(0.0435)	(0.0421)	(0.0428)	(0.3152)	(0.3372)	(0.3425)
L.Unrated	0.0301***	0.0177**	0.0180**	0.1220**	0.0861	0.0875
	(0.0075)	(0.0078)	(0.0079)	(0.0548)	(0.0536)	(0.0545)
L.BookLev	-0.3848***	-0.3497***	-0.3552***	-0.2142***	-0.1718***	-0.1745***
	(0.0151)	(0.0159)	(0.0162)	(0.0363)	(0.0376)	(0.0382)
L.CDS_Active X L.Tangibility	-0.0903***	-0.0768***	-0.0781***	-0.0913**	-0.0684	-0.0694
	(0.0293)	(0.0296)	(0.0301)	(0.0441)	(0.0454)	(0.0462)
_cons	0.9596***	0.9786***	0.9783***	0.7946***	0.9087***	0.9072***
	(0.0407)	(0.0401)	(0.0407)	(0.1172)	(0.1130)	(0.1147)
N	11295	9886	9886	2350	2164	2164
Model	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table X
Multivariate Regressions on Number of Bank Lenders & CDS Trading

This table tests the effect of the onset of CDS trading and traditional determinants of capital structure on the number of bank lenders. The dependent variable is *lnNumLenders*, which is the natural logarithm of the number of unique bank lenders per firm-year. All right-hand side variables are lagged except for *CDS_Firm*. *CDS_Active* is the main variable of interest and is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. *CDS_Firm* is a dummy variable equal to one if a firm has a traded CDS contract at any point in the dataset and zero otherwise. *lnSize* is the log of total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. *RDexp* is research and development expenses divided by total assets. *Unrated* is a dummy variable equal to one if the firm is not rated by S&P and zero otherwise. *BookLev* is total debt scaled by total assets. All continuous control variables are winsorized at the 1% and 99% levels. OLS regressions. All models include Fama-French 48 industry and year fixed effects and loan type (term loan, revolver, 364-day facility, other) and loan purpose (corporate purposes, debt repayment, leveraged buyout/management buyout, takeover, working capital, commercial paper backup, acquisition line, other) controls. Robust standard errors are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	lnNumLenders	lnNumLenders	lnNumLenders	lnNumLenders	lnNumLenders	lnNumLenders
L.CDS_Active	0.2836***	-0.0997**	-0.0968**	-0.0934**	-0.0916**	-0.1449**
	(0.0351)	(0.0450)	(0.0451)	(0.0451)	(0.0453)	(0.0633)
CDS_Firm		-0.0682	-0.0682	-0.0748	-0.0764*	-0.0755*
		(0.0452)	(0.0452)	(0.0456)	(0.0457)	(0.0458)
L.lnSize		0.3310***	0.3293***	0.3219***	0.3217***	0.3211***
		(0.0113)	(0.0115)	(0.0127)	(0.0127)	(0.0127)
L.MktBk		-0.0047	0.0007	0.0008	0.0020	0.0015
		(0.0131)	(0.0137)	(0.0137)	(0.0138)	(0.0138)
L.Profitability		0.6309***	0.5901***	0.5990***	0.5853***	0.5864***
		(0.1469)	(0.1531)	(0.1529)	(0.1542)	(0.1544)
L.DivPayer		0.0944***	0.0927***	0.0946***	0.0929***	0.0936***
		(0.0257)	(0.0257)	(0.0258)	(0.0259)	(0.0259)
L.Tangibility		-0.0712	-0.0686	-0.0714	-0.0607	-0.0847
		(0.0696)	(0.0694)	(0.0693)	(0.0713)	(0.0752)
L.CFvol			-0.4575	-0.4396	-0.4321	-0.4058
			(0.6047)	(0.6054)	(0.6084)	(0.6093)
L.RDexp			-0.3995	-0.3856	-0.4067	-0.4126
			(0.3637)	(0.3637)	(0.3671)	(0.3670)
L.Unrated				-0.0415	-0.0468	-0.0480
				(0.0306)	(0.0313)	(0.0312)
L.BookLev					-0.0522	-0.0522
					(0.0747)	(0.0747)
L.CDS_Active X L.Tangibility						0.1616
						(0.1282)
_cons	1.5143***	-0.6712***	-0.6403***	-0.5585**	-0.5371**	-0.5240**
	(0.2490)	(0.2374)	(0.2411)	(0.2499)	(0.2512)	(0.2515)
N	3907	3907	3907	3907	3907	3907
R^2	0.227	0.401	0.402	0.402	0.402	0.402
adj. R^2	0.213	0.390	0.390	0.390	0.390	0.390
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Loan Type Controls	Yes	Yes	Yes	Yes	Yes	Yes
Loan Purpose Controls	Yes	Yes	Yes	Yes	Yes	Yes

APPENDIX

Table AI
Multivariate Regressions on Debt Specialization (HHI) & CDS Trading
Excluding Firms with HHI of 100%

This table tests the effect of the onset of CDS trading and traditional determinants of capital structure on debt specialization. The dependent variable is *HHI* (Herfindahl-Hirschman Index) where values equal to one have been removed. All right-hand side variables are lagged except for *CDS_Firm*. *CDS_Active* is the main variable of interest and is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. *CDS_Firm* is a dummy variable equal to one if a firm has a traded CDS contract at any point in the dataset and zero otherwise. *lnSize* is the log of total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. *RDexp* is research and development expenses divided by total assets. *Unrated* is a dummy variable equal to one if the firm is not rated by S&P and zero otherwise. *BookLev* is total debt scaled by total assets. All continuous control variables are winsorized at the 1% and 99% levels. All models include Fama-French 48 industry and year fixed effects. Robust standard errors are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) HHI	(2) HHI	(3) HHI	(4) HHI	(5) HHI	(6) HHI
L.CDS_Active	0.0670***	0.0961***	0.0962***	0.0937***	0.0951***	0.1201***
	(0.0064)	(0.0108)	(0.0108)	(0.0108)	(0.0107)	(0.0145)
CDS_Firm		0.0118	0.0110	0.0212**	0.0107	0.0106
		(0.0103)	(0.0103)	(0.0104)	(0.0104)	(0.0103)
L.lnSize		-0.0176***	-0.0165***	-0.0091***	-0.0090***	-0.0090***
		(0.0018)	(0.0019)	(0.0022)	(0.0021)	(0.0021)
L.MktBk		0.0137***	0.0088***	0.0084***	0.0084***	0.0084***
		(0.0021)	(0.0022)	(0.0022)	(0.0022)	(0.0022)
L.Profitability		0.0267**	0.1376***	0.1296***	0.1128***	0.1129***
		(0.0134)	(0.0209)	(0.0208)	(0.0197)	(0.0198)
L.DivPayer		0.0182***	0.0175***	0.0157***	0.0052	0.0048
		(0.0055)	(0.0055)	(0.0055)	(0.0054)	(0.0054)
L.Tangibility		-0.0801***	-0.0795***	-0.0788***	-0.0364***	-0.0284**
		(0.0137)	(0.0138)	(0.0137)	(0.0138)	(0.0142)
L.CFvol			0.3646***	0.3723***	0.3289***	0.3281***
			(0.0946)	(0.0940)	(0.0967)	(0.0964)
L.RDexp			0.2734***	0.2685***	0.2415***	0.2434***
			(0.0390)	(0.0388)	(0.0377)	(0.0378)
L.Unrated				0.0461***	0.0177**	0.0180***
				(0.0068)	(0.0070)	(0.0070)
L.BookLev					-0.2364***	-0.2363***
					(0.0142)	(0.0142)
L.CDS_Active X L.Tangibility						-0.0759***
						(0.0285)
_cons	0.7314***	0.8346***	0.8151***	0.7411***	0.8272***	0.8234***
	(0.0382)	(0.0402)	(0.0404)	(0.0428)	(0.0388)	(0.0389)
N	10031	10031	10031	10031	10031	10031
Model	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table A2
Multivariate Regressions on Debt Specialization (HHI) & CDS Trading
Excluding Firms with HHI >= 90%

This table tests the effect of the onset of CDS trading and traditional determinants of capital structure on debt specialization. The dependent variable is *HHI* (Herfindahl-Hirschman Index) where values greater than or equal to 90% have been removed. All right-hand side variables are lagged except for *CDS_Firm*. *CDS_Active* is the main variable of interest and is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. *CDS_Firm* is a dummy variable equal to one if a firm has a traded CDS contract at any point in the dataset and zero otherwise. *lnSize* is the log of total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. *RDexp* is research and development expenses divided by total assets. *Unrated* is a dummy variable equal to one if the firm is not rated by S&P and zero otherwise. *BookLev* is total debt scaled by total assets. All continuous control variables are winsorized at the 1% and 99% levels. All models include Fama-French 48 industry and year fixed effects. Robust standard errors are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

|	(1) HHI	(2) HHI	(3) HHI	(4) HHI	(5) HHI	(6) HHI
L.CDS_Active	0.0755***	0.0810***	0.0800***	0.0783***	0.0790***	0.0939***
	(0.0062)	(0.0098)	(0.0097)	(0.0097)	(0.0097)	(0.0138)
CDS_Firm		0.0092	0.0086	0.0146	0.0078	0.0078
		(0.0089)	(0.0088)	(0.0089)	(0.0089)	(0.0089)
L.lnSize		-0.0088***	-0.0075***	-0.0027	-0.0025	-0.0025
		(0.0016)	(0.0016)	(0.0019)	(0.0019)	(0.0019)
L.MktBk		0.0067***	0.0025	0.0022	0.0024	0.0024
		(0.0019)	(0.0020)	(0.0020)	(0.0020)	(0.0020)
L.Profitability		0.0219	0.0945***	0.0900***	0.0753***	0.0752***
		(0.0139)	(0.0181)	(0.0181)	(0.0179)	(0.0179)
L.DivPayer		0.0246***	0.0247***	0.0234***	0.0165***	0.0163***
		(0.0048)	(0.0048)	(0.0048)	(0.0048)	(0.0048)
L.Tangibility		-0.0186	-0.0179	-0.0172	0.0080	0.0128
		(0.0119)	(0.0120)	(0.0119)	(0.0120)	(0.0122)
L.CFvol			0.3913***	0.3981***	0.3521***	0.3509***
			(0.0947)	(0.0944)	(0.0971)	(0.0969)
L.RDexp			0.1990***	0.1953***	0.1687***	0.1703***
			(0.0440)	(0.0439)	(0.0435)	(0.0436)
L.Unrated				0.0292***	0.0132**	0.0133**
				(0.0059)	(0.0061)	(0.0061)
L.BookLev					-0.1447***	-0.1447***
					(0.0126)	(0.0126)
L.CDS_Active X L.Tangibility						-0.0434
						(0.0278)
_cons	0.6546***	0.6918***	0.6746***	0.6281***	0.6870***	0.6852***
	(0.0415)	(0.0436)	(0.0442)	(0.0468)	(0.0437)	(0.0438)
N	7800	7800	7800	7800	7800	7800
Model	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Figure A1
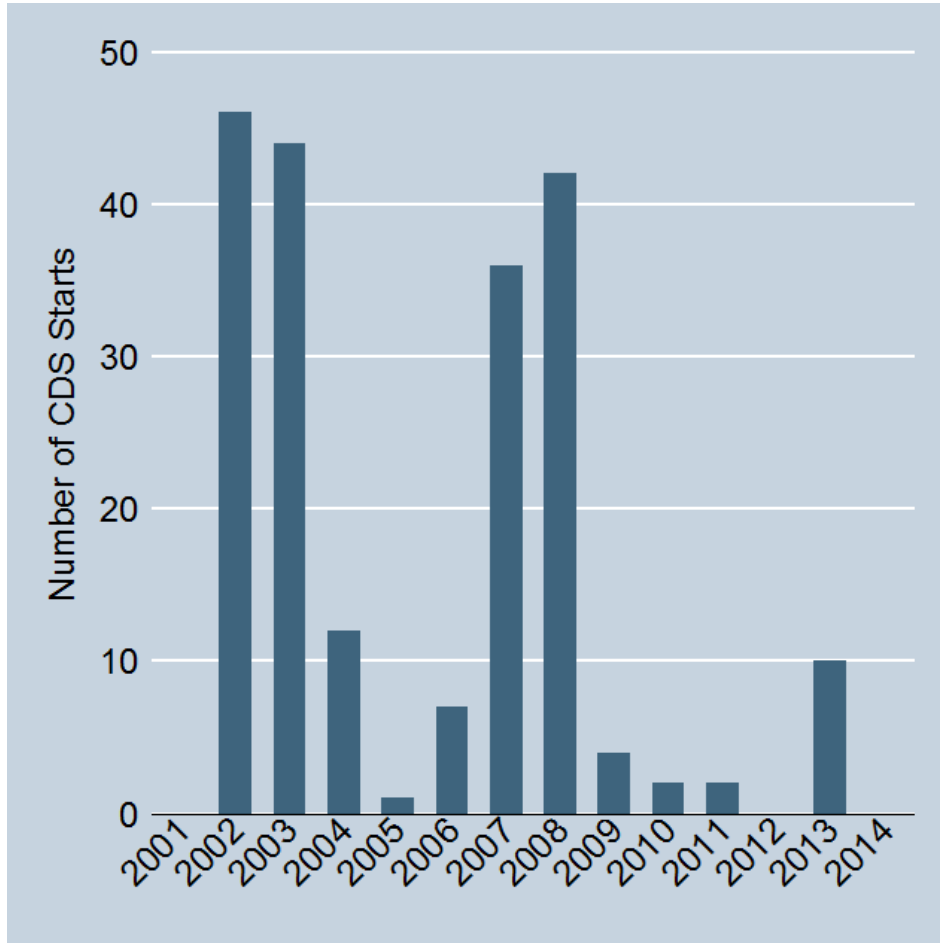
Table A3
Multivariate Regressions on Debt Specialization (HHI) & CDS Trading w/Cluster Variable

This table tests the effect of the onset of CDS trading and traditional determinants of capital structure on debt specialization. The dependent variable is *HHI* (Herfindahl-Hirschman Index). All right-hand side variables are lagged except for *CDS_Firm* and *Cluster_Yr*. *CDS_Active* is the main variable of interest and is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. *CDS_Firm* is a dummy variable equal to one if a firm has a traded CDS contract at any point in the dataset and zero otherwise. *Cluster_Yr* is a dummy variable equal to one if the year is 2002, 2003, 2007 or 2008. *lnSize* is the log of total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. *RDexp* is research and development expenses divided by total assets. *Unrated* is a dummy variable equal to one if the firm is not rated by S&P and zero otherwise. *BookLev* is total debt scaled by total assets. All continuous control variables are winsorized at the 1% and 99% levels. All models include Fama-French 48 industry and year fixed effects. Robust standard errors are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) HHI	(2) HHI	(3) HHI	(4) HHI	(5) HHI	(6) HHI
L.CDS_Active	0.0223***	0.1061***	0.1057***	0.1014***	0.1031***	0.1327***
	(0.0068)	(0.0112)	(0.0112)	(0.0112)	(0.0111)	(0.0150)
CDS_Firm		-0.0001	-0.0010	0.0176	-0.0004	-0.0005
		(0.0108)	(0.0108)	(0.0108)	(0.0107)	(0.0107)
Cluster_Yr		-0.0097	-0.0132	-0.0131	-0.0155	-0.0153
		(0.0137)	(0.0136)	(0.0135)	(0.0132)	(0.0132)
L.lnSize		-0.0335***	-0.0318***	-0.0193***	-0.0177***	-0.0177***
		(0.0020)	(0.0021)	(0.0024)	(0.0023)	(0.0023)
L.MktBk		0.0208***	0.0144***	0.0136***	0.0128***	0.0129***
		(0.0024)	(0.0024)	(0.0024)	(0.0023)	(0.0023)
L.Profitability		0.0464***	0.1867***	0.1715***	0.1466***	0.1466***
		(0.0143)	(0.0240)	(0.0236)	(0.0222)	(0.0222)
L.DivPayer		0.0260***	0.0252***	0.0221***	0.0049	0.0044
		(0.0060)	(0.0060)	(0.0059)	(0.0058)	(0.0058)
L.Tangibility		-0.1302***	-0.1281***	-0.1266***	-0.0537***	-0.0449***
		(0.0151)	(0.0151)	(0.0150)	(0.0149)	(0.0153)
L.CFvol			0.5272***	0.5457***	0.4744***	0.4737***
			(0.1102)	(0.1094)	(0.1095)	(0.1093)
L.RDexp			0.3256***	0.3163***	0.2784***	0.2803***
			(0.0460)	(0.0453)	(0.0434)	(0.0435)
L.Unrated				0.0780***	0.0299***	0.0301***
				(0.0074)	(0.0075)	(0.0075)
L.BookLev					-0.3849***	-0.3848***
					(0.0151)	(0.0151)
L.CDS_Active X L.Tangibility						-0.0903***
						(0.0293)
_cons	0.7941***	1.0073***	0.9862***	0.8594***	0.9792***	0.9748***
	(0.0436)	(0.0443)	(0.0451)	(0.0472)	(0.0404)	(0.0405)
N	11295	11295	11295	11295	11295	11295
pseudo R^2	0.114	0.210	0.228	0.247	0.359	0.360
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Figure A2

Overlap of Credit Ratings

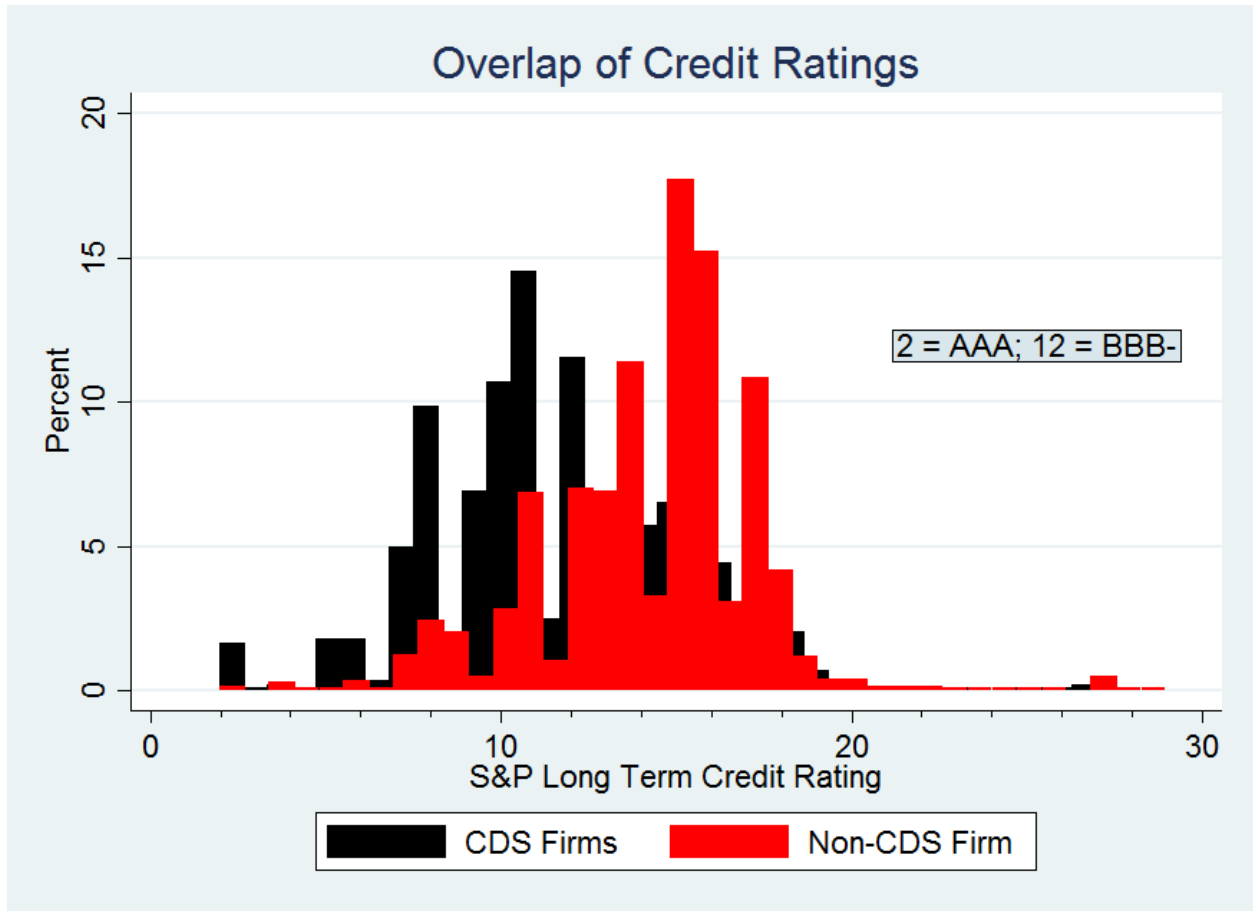2 = AAA; 12 = BBB-

CDS Firms   Non-CDS Firm

Table A4
Conditional on % of Public Debt Financing: Debt Specialization (HHI) & CDS Trading

This table tests the effect of CDS trading and traditional determinants of capital structure on debt specialization. I add senior bonds and notes, subordinated bonds and notes, commercial paper, and capital leases together as a % of total debt and form sub-samples based on firms that are financed with 90%, 80%, 70%, 60%, and 50% of public debt in the previous period. The dependent variable is *HHI* (Herfindahl-Hirschman Index). All right-hand side variables are lagged (except for *CDS_Firm*). *CDS_Active* is the main variable of interest and is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. *CDS_Firm* is a dummy variable equal to one if a firm has a traded CDS contract at any point in the dataset and zero otherwise. *lnSize* is the log of total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. *RDexp* is research and development expenses divided by total assets. *Unrated* is a dummy variable equal to one if the firm is not rated by S&P and zero otherwise. *BookLev* is total debt scaled by total assets. All continuous control variables are winsorized at the 1% and 99% levels. All models include Fama-French 48 industry and year fixed effects. Robust standard errors are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(90%)	(80%)	(70%)	(60%)	(50%)
	HHI	HHI	HHI	HHI	HHI
L.CDS_Active	0.0540**	0.0787***	0.0925***	0.0942***	0.1134***
	(0.0218)	(0.0189)	(0.0174)	(0.0167)	(0.0163)
CDS_Firm	0.0077	-0.0011	-0.0043	0.0029	-0.0006
	(0.0178)	(0.0149)	(0.0136)	(0.0128)	(0.0123)
L.lnSize	-0.0239***	-0.0236***	-0.0266***	-0.0239***	-0.0207***
	(0.0041)	(0.0037)	(0.0035)	(0.0033)	(0.0032)
L.MktBk	0.0027	0.0051	0.0067**	0.0088***	0.0121***
	(0.0036)	(0.0034)	(0.0033)	(0.0032)	(0.0032)
L.Profitability	0.0520	0.0448	0.0674**	0.0676**	0.0729**
	(0.0318)	(0.0303)	(0.0296)	(0.0293)	(0.0288)
L.DivPayer	-0.0202*	-0.0155*	-0.0056	-0.0107	-0.0096
	(0.0108)	(0.0094)	(0.0085)	(0.0080)	(0.0076)
L.Tangibility	-0.1429***	-0.1523***	-0.1570***	-0.1531***	-0.1338***
	(0.0312)	(0.0270)	(0.0241)	(0.0223)	(0.0208)
L.CFvol	0.1226	0.1524	0.2185	0.2811*	0.3836**
	(0.1666)	(0.1556)	(0.1490)	(0.1532)	(0.1517)
L.RDexp	0.0733	0.0801	0.1205**	0.1384***	0.1592***
	(0.0529)	(0.0513)	(0.0510)	(0.0515)	(0.0521)
L.Unrated	0.0311**	0.0331***	0.0213*	0.0246**	0.0198*
	(0.0141)	(0.0124)	(0.0113)	(0.0107)	(0.0101)
L.BookLev	-0.1992***	-0.2211***	-0.2529***	-0.2961***	-0.3372***
	(0.0269)	(0.0241)	(0.0223)	(0.0212)	(0.0202)
L.CDS_Active X L.Tangibility	0.0632	0.0078	-0.0014	-0.0056	-0.0268
	(0.0409)	(0.0358)	(0.0332)	(0.0318)	(0.0314)
_cons	0.9512***	0.9566***	0.9875***	0.9763***	0.9603***
	(0.0680)	(0.0657)	(0.0601)	(0.0596)	(0.0579)
N	3554	4466	5210	5859	6429
Model	Tobit	Tobit	Tobit	Tobit	Tobit
pseudo *R*^{2}	0.428	0.468	0.495	0.490	0.478
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Table A5
Public (Bonds & Notes) vs. Private (Bank) Debt: Debt Specialization & CDS Trading

This table tests the effect of the onset of CDS trading and traditional determinants of capital structure on debt specialization. The dependent variable is *HHI1* (Herfindahl-Hirschman Index), which is defined differently than previously. I sum senior bonds and notes, subordinated bonds and notes, commercial paper, and capital leases and calculate the total as a percentage of total debt (excluding other). I do the same for drawn credit and term loans. I then recalculate *HHI* with only these two debt types – public and private debt. All right-hand side variables are lagged except for *CDS_Firm*. *CDS_Active* is the main variable of interest and is equal to one (zero otherwise) when a CDS contract begins trading on a firm's debt and thereafter. *CDS_Firm* is a dummy variable equal to one if a firm has a traded CDS contract at any point in the dataset and zero otherwise. *lnSize* is the log of total assets deflated to millions of 2002 dollars. *MktBk* is market capitalization plus total debt plus preferred stock liquidating value minus deferred taxes and investment tax credit scaled by total assets. *Profitability* is operating income before depreciation divided by total assets. *DivPayer* is a dummy variable equal to one if common stock dividends are positive and zero otherwise. *Tangibility* is total net property, plant, and equipment scaled by total assets. *CFvol* is the standard deviation of quarterly *Profitability* using the prior twelve quarters and averaged per year. *RDexp* is research and development expenses divided by total assets. *Unrated* is a dummy variable equal to one if the firm is not rated by S&P and zero otherwise. *BookLev* is total debt scaled by total assets. All continuous control variables are winsorized at the 1% and 99% levels. All models include Fama-French 48 industry and year fixed effects. Robust standard errors are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) HHI1	(2) HHI1	(3) HHI1	(4) HHI1	(5) HHI1	(6) HHI1
L.CDS_Active	0.1217***	0.1542***	0.1534***	0.1434***	0.1456***	0.2104***
	(0.0115)	(0.0186)	(0.0186)	(0.0184)	(0.0181)	(0.0250)
CDS_Firm		0.1103***	0.1090***	0.1509***	0.1219***	0.1220***
		(0.0178)	(0.0178)	(0.0177)	(0.0175)	(0.0175)
L.lnSize		-0.0506***	-0.0482***	-0.0213***	-0.0184***	-0.0184***
		(0.0032)	(0.0033)	(0.0038)	(0.0037)	(0.0037)
L.MktBk		0.0379***	0.0310***	0.0291***	0.0281***	0.0281***
		(0.0044)	(0.0044)	(0.0043)	(0.0042)	(0.0042)
L.Profitability		0.0854***	0.2285***	0.1970***	0.1582***	0.1579***
		(0.0249)	(0.0405)	(0.0392)	(0.0379)	(0.0379)
L.DivPayer		0.0150	0.0142	0.0074	-0.0188*	-0.0197**
		(0.0100)	(0.0100)	(0.0099)	(0.0097)	(0.0097)
L.Tangibility		-0.2555***	-0.2520***	-0.2464***	-0.1295***	-0.1112***
		(0.0251)	(0.0250)	(0.0247)	(0.0247)	(0.0254)
L.CFvol			0.6813***	0.7254***	0.6598***	0.6575***
			(0.1736)	(0.1719)	(0.1720)	(0.1717)
L.RDexp			0.3014***	0.2815***	0.2146***	0.2185***
			(0.0747)	(0.0729)	(0.0705)	(0.0706)
L.Unrated				0.1695***	0.0921***	0.0928***
				(0.0124)	(0.0126)	(0.0126)
L.BookLev					-0.6016***	-0.6008***
					(0.0249)	(0.0249)
L.CDS_Active X L.Tangibility						-0.1989***
						(0.0503)
_cons	1.0304***	1.3243***	1.2944***	1.0149***	1.1978***	1.1902***
	(0.0654)	(0.0623)	(0.0646)	(0.0659)	(0.0653)	(0.0655)
N	10025	10025	10025	10025	10025	10025
Model	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit
pseudo R^2	0.056	0.095	0.098	0.112	0.156	0.157
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes