Credit Default Swaps and the Cost of Capital

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Abstract

This study examines the impact of credit default swap (CDS) trading on a firm's cost of capital during the period 2001-2018. The initiation of CDS trading significantly reduces a firm's weighted average cost of capital (WACC). Highly levered firms reduce their debt, while firms with low leverage increase their debt. CDS-referenced firms adjust their debt placement by using more arm's length debt, while they simultaneously reduce the usage of revolving credits and term loans from banks. These changes in financing choices reflect the fact that CDS trading increases rollover risk and debt renegotiation costs while simultaneously reducing capital supply-side frictions.

JEL Classification: *G23, G30, G32*

Key Words: *Credit Default Swaps; Weighted Average Cost of Capital; Empty Creditors; Capital Structure; Public Debt; Bank Debt*

Credit Default Swaps and the Cost of Capital

1. Introduction

A credit default swap (CDS)[1] is a credit derivative whose primary purpose is to hedge and trade credit risks. During the 2008-2009 recession, the CDS market was a major factor contributing to bank frailty. In the aftermath of the crisis, several research articles questioned the validity of the CDS contract as a sensible financial innovation. In particular, this literature examined the way in which CDS contracts affect creditors' incentives, governance mechanisms, and stakeholder relations.

In this paper, we shed new light on the impact of CDS trading on the cost of financing of the referenced firm (hereafter "CDS firm"). Prior literature has investigated both the costs and benefits of CDS trading. The costs include reduced creditor monitoring and increased renegotiation frictions (e.g., Ashcraft and Santos, 2009, Subrahmanyam et al., 2014, Danis, 2016, Narayanan and Uzmanoglu, 2018). The benefits include stronger borrower commitment, fewer frictions in credit supply and enhanced price discovery (e.g., Bolton and Oehmke, 2011, Saretto and Tookes, 2013, Shan et al., 2019). The relative importance of these costs and benefits remains an unresolved issue in need of empirical investigation. We fill this gap by studying the effect of CDS inception on the underlying firm's weighted average cost of capital (WACC) and on the cost of capital components. Thus, we provide a clearer perspective on how credit default swaps influence the costs of debt and equity as well as the firm's overall cost of financing.

A firm's WACC plays a critical role in business decisions, such as mergers and acquisitions. To maximize shareholder wealth, the executives of the focal firm strive to increase the spread between the WACC and the expected returns of investment opportunities, either by reducing the WACC or by increasing expected returns on investments. An investment is typically only undertaken if the expected return exceeds the minimum cost of capital a firm can secure in the capital markets. As such, the WACC reflects the beliefs of market participants (i.e., capital suppliers) regarding the risk of the focal firm. Arguably, if the benefits of CDSs outweigh their costs, market participants will lower their required return following CDS inception, which would result in a lower WACC for the company.

[1] Credit default swaps are credit derivatives that compensate CDS buyers via lump-sum contractual payments in case of pre-specified credit events (e.g., restructuring, payment default, or bankruptcy) occurring over a predetermined period. In exchange for the insurance reimbursement, the buyers need to make periodic payments to the seller.

Conversely, an increase in the WACC would imply that the costs of CDSs outweigh their benefits, thereby yielding an increase in risk, and accordingly, an increase in the investors' required rate of return. In this regard, the changes in a firm's WACC following the introduction of CDSs provide useful information about the effects of CDS trading on a given firm.

Our study is founded on the theoretical contributions of Hu and Black (2008) and Bolton and Oehmke (2011). These theorists point out that CDS trading can lead to empty creditor issues,[2] which can have both positive and negative consequences for CDS firms. In terms of the negative effects, the authors hypothesize that CDSs grant insured lenders[3] greater bargaining power over ex-post debt renegotiations. Thus, these lenders become less accommodating in out-of-court debt workouts. Furthermore, overly insured lenders may have less or even no interest in the continued existence of distressed companies. The underlying explanation is that, if the CDS firm goes bankrupt, lenders can obtain compensation from CDS sellers, provided that the overall payoff from the bankruptcy (i.e., the payoffs generated by the CDSs plus the recovery value of debt) exceeds that from a compromise in debt renegotiations. Consequently, CDS trading may increase the likelihood of bankruptcy and may cause inefficient liquidation for distressed corporations.

On the other hand, Bolton and Oehmke (2011) also theorize that CDSs can serve as a commitment device for borrowers, deterring them from strategically defaulting on their debt. Therefore, CDS trading can help solve the limited-commitment problems of debt contracts when borrower commitment is not verifiable and hence unenforceable. Furthermore, the availability of CDSs offers a new channel through which banks can efficiently move their credit risk to CDS sellers and free up more capital originally tied to borrowers with high credit risk[4] (Shan et al., 2016). Such commitment and risk hedging benefits of CDSs result in a situation where insured lenders are more willing to extend their credits, reduce the charged interest rate, and use fewer covenants and collaterals (Shan et al., 2019), therefore reducing frictions on the credit supply side.

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[2] Empty creditors are buyers who have partially or fully decoupled their debt-related cash flows and debt control rights by holding a disproportionate number of CDSs.

[3] We use the terms CDS-protected lenders, insured lenders, lenders, and CDS buyers interchangeably. All of these terms refer to corporate debt holders who purchase CDS contracts to protect their risk exposure, rather than speculators whose main interest is to profit from fluctuations in the credit risk of referenced firms.

[4] A bank can replace the credit risk of borrowers (which is usually high) with the credit risk of the CDS seller (usually low). By doing so, the bank can shift assets from high-risk categories to low-risk ones and still comply with regulatory capital requirements. Therefore, the bank can have more available capital that was released from risky borrowers.

To explore the effects of CDS trading, we construct a panel sample using the universe of US companies from Compustat in the period from 2001 to 2018. We collect CDS data from Markit and then link CDS firms with Compustat firms according to the Markit Reference Entity Database (RED). We obtain debt compositions from Capital IQ and cost of capital data from Bloomberg. Our final sample contains 41,519 firm-year observations arising from 5,406 firms. Using this dataset, we conduct a series of analyses in which the cost of capital measure (either WACC, cost of equity, or cost of debt) is regressed on a binary variable representing the initiation of CDS trading (*CDSINIT*). In addition, we include a dummy variable that takes on the value of 1 for investment grade firms and zero otherwise (*INVTGRADE*), as well as the interaction between CDS initiation and the investment grade dummy. These regression analyses are referred to herein as the baseline model.

We find robust evidence that CDS trading causes disparate effects on investment and non-investment grade firms. Shareholders of non-investment grade firms view CDS trading negatively and thus require a higher return on their investments following the introduction of CDSs. In contrast, equity holders of investment grade firms view CDS trading in a neutral or positive light and thus lower their rate of return. The cost of debt declines in both types of firm, although the effect is more pronounced in the case of investment grade firms. In terms of the net effect on the cost of financing, CDS inception results in a significant reduction in WACC, in the range of 42 to 52 basis points (bps), for non-investment grade firms, while the WACC of investment grade firms drops more modestly (in the range of 0 to 17 bps)[5] following CDS trading[6]. We obtain similar results using quantile regressions.

We conduct robustness tests to address potential sample selection bias and endogeneity concerns. First, we construct propensity score matched (PSM) samples using various selection criteria. The results from this analysis are in line with the results obtained from the main sample. Second, we apply the instrumental variable approach to our main variable of interest, CDS trading availability, to investigate potential endogeneity. The regression estimates of the instrumented variable are consistent with those observed for the main variable of interest in the baseline model, thus eliminating potential endogeneity concerns. Third, we re-run the baseline model using CDS firms only to further exclude the possibility of sample selection bias. The regression estimates are consistent with those obtained using the full sample.

[5] We assign a value of zero to any estimated coefficients that are nonsignificant at the 10% level.
[6] In monetary terms, these decreases are economically meaningful. For example, with respect to non-investment grade firms, a 42 bps drop in WACC is equivalent to a drop of 0.0042*4.0165 = $168.69 million in capital spending, while a 17 bps drop (for investment grade firms) is equal to a drop of 0.0017 *13.0197 = $221.33 million in capital cost, where $4.0165 billion and $13.0197 billion are the mean capital amount for non-investment and investment grade firms, respectively.

To further validate our conclusions, we re-estimate our baseline model with an extra dummy variable that indicates the termination of CDS trading. If the initiation of CDS trading results in a decrease in the WACC, we should observe an increase in the WACC due to the cessation of CDS trading. We obtain a positive estimate for the CDS cessation variable, validating our earlier conclusions. We also use CDS trading liquidity variables to replace the CDS initiation indicator variable. Estimates obtained using the CDS daily notional volume and the number of clearing dealers further corroborate our findings. Lastly, we re-estimate our models using samples that omit observations from 2001 and from the period of the 2008-2009 financial crisis, and we reach consistent conclusions.

Next, we study the channels through which CDSs affect the WACC. In the first of these investigations, we examine the effect of CDS initiation on the weights of the two capital components (debt and equity) for firms with low and high leverage ratios. Because the cost of debt (mean after-tax of 2.70%) is significantly less than that of equity (10.58%), firms are likely to adjust their WACC by using more debt to retire equity financing. We test this conjecture by assessing changes in the market weight of debt and equity following CDS trading. For non-investment grade firms, we find that estimates from regressing debt weight on CDS initiation are positive, while the corresponding estimates for equity weight are negative. The increase in the usage of debt capital is especially marked for non-investment grade firms with low leverage ratios. Therefore, post CDS trading, non-investment grade firms adjust their capital mix by increasing the relative amount of debt capital. This finding is consistent with Bolton and Oehmke's (2011) hypothesis that CDSs serve as a commitment device and thus reduce friction on the supply side and increase credit supply to borrowers. For investment grade firms, we find that medium and highly levered investment grade firms employ more equity capital and less arm's length debt following CDS initiation – the opposite trend to that seen for non-investment grade firms. This finding is in line with Bolton and Oehmke's (2011) hypothesis that protected CDS lenders with improved bargaining power become less accommodating in ex-post debt workouts. This threatening effect of CDSs forces firms to reduce their usage of debt financing after CDS trading. Therefore, it appears that post CDS trading, firms either seek to reap the benefits of CDSs or they attempt to avoid threatening behavior on the part of tough lenders. They adjust their capital mix accordingly, which results in the observed changes in WACC.

In a further analysis to examine the channels through which CDSs affect the total cost of capital, we assume that WACC is a linear combination of its *debt* component (defined as the product of cost of debt and weight of debt) and its *equity* component (defined as the product of cost of equity and weight of equity), and we evaluate the effects of CDS trading on each of these components. For non-investment grade firms, the equity component decreases from 30.2 bps to 44.1 bps, on average, following the initiation of CDS trading, while there is only a marginal decrease in the debt component. Thus, it is mainly the equity component that causes a reduction in WACC for non-investment grade firms. With respect to investment grade firms, there is no significant change in the equity component following CDS initiation, although we note that the interaction term (the product of CDS initiation and a dummy variable that takes on the value of 1 for investment grade firms) is positive and significant. The debt component, on the other hand, shows a significant decrease in investment grade firms, which indicates that the overall decrease in WACC for these firms is mainly due to a decline in the proportional cost of debt.

Apart from adjusting the capital mix, managers may also choose decrease the overall cost of capital by lowering the cost of debt. Public companies generally use multiple types of debt (Colla et al., 2013; Lin et al., 2013). For instance, syndicated facilities, loans, revolving credits, private placement, and senior or junior bonds and notes are common types of debt instrument used in capital markets. Since distinct types of debt have different required returns, the cost of capital depends on the overall borrowing costs associated with each of the financing sources. For example, it could be the case that CDS firms substitute bonds for term loans because the initiation of CDS trading confers an informational advantage on referenced firms. Such a substitution could alter the capital structure of a firm, and its overall cost of debt, hence resulting in a change in WACC. To examine this channel, we first provide evidence that CDS trading improves the informational environment of a firm by showing an increased number of analysts following the CDS firms' stocks. Due to the reduced risk of information asymmetry, bank debt becomes less attractive to such firms relative to the pre-CDS period. Therefore, we conjecture that firms may substitute public debt for bank debt. We use the definitions of Lin et al. (2013) for this analysis, where public debt is the sum of various bonds, notes and commercial papers, and bank debt is the sum of bank loans and revolving credits. We perform a series of regressions in which the independent variable is CDS initiation and the dependent variables are, respectively, the ratios of each debt category to the total debt. We find that non-investment grade firms employ between 4.2% and 5.2%[7] more arm's length debt after CDS initiation, while they reduce the

[7] In monetary terms, an increase of 4.2% is equivalent to an increase of 0.042 *0.6738*1.9392 =$548.78 million in bonds and notes, while an increase of 5.2% is equivalent to an increase of 0.052 *0.6738*1.9392 =$679.45 million, where 0.6738 and $1.9392 are, respectively, the mean ratio of arm's length debt to total debt and the mean total debt of non-investment grade CDS firms.

ratio of revolving credit by between 3.2% and 3.8%[8]. Thus, to facilitate short-term liquidity, non-investment grade firms keep a portion of the proceeds from issuing bonds/notes. This finding is consistent with Subrahmanyam et al. (2017) who document a cash increase within firms following CDS initiation. With regard to investment grade firms, we find that these firms employ more revolving credit post CDS trading. A likely explanation is that since investment grade firms are more highly rated and less likely to incur a rollover risk, these firms use more short-term financing to achieve cost savings. In addition to using more revolving credit, investment grade firms reduce their reliance on public sources of financing, mainly by reducing the use of commercial papers. Further, investment grade firms increase their use of other sources of capital (besides bank and arm's length debt), such as private placement. Indeed, the effect of CDS initiation on "other borrowings" (i.e., debt capital that can not be classified as "bank" or "bonds and notes") is substantial: an increase of 10.5% ($p < 0.001$) in the industry-year model and an increase of 3.4% ($p < 0.05$) in the firm-year model[9]. Lastly, in common with non-investment grade firms, investment grade firms do not adjust the weight of bank loans in their capital structure. A possible explanation is that most CDS contracts were written on bonds or notes, not on bank loans (Saretto and Tookes, 2013); hence bank loans are less affected by CDS initiation.

Some findings in our study seem to contradict previous studies. For example, Ashcraft and Santos (2009) and Hirtle (2009) find that larger and more transparent firms may benefit from CDS trading, while riskier and more opaque firms are likely to incur costs, due to a loss of monitoring benefits. The present study, on the other hand, finds that CDSs significantly reduce the cost of capital of non-investment grade firms. Nevertheless, it should be noted that the previous studies focused on the impact of CDS trading on one or two types of debt (i.e., bank loans and/or bonds and notes), while the current study focuses on the overall effect of CDS trading in terms of WACC.

In an attempt to reconcile our results with those of the aforementioned studies, we gather data on unsecured bonds and notes, identified by SecuredTypeId=3 from the Capital IQ database, and compute their mean interest cost, maximum interest cost, and sum of interest costs. We use the mean interest cost as the dependent variable in our baseline model and present the results in Online Appendix 5. The

[8] In monetary terms, a reduction of 3.2% is equivalent to a reduction of 0.032 *0.1227*1.9392 =$76.14 million in revolving credit, while a reduction of 3.8% is equivalent to a reduction of 0.038 *0.1227*1.9392 =$90.42 million, where 0.1227 and $1.9392 are, respectively, the mean ratio of revolving credit to total debt and the mean total debt of non-investment grade CDS firms.

[9] In monetary terms, an increase of 3.4% is equivalent to an increase of 0.034 *0.1591*4.2701 =$230.98 million from other sources of borrowing, while an increase of 10.5% is equivalent to an increase of 0.105 *0.1591*4.2701 =$713.34 million, where 0.1591 and $4.2701 are, respectively, the mean ratio of other borrowings to total debt and the mean total debt of investment grade CDS firms.

coefficient on CDS initiation is positive (0.445) and significant at the 1% level, indicating that, for non-investment grade firms, the cost on unsecured bonds and notes increases by 44.5 bps due to CDS trading. The effect of CDS initiation on investment grade firms, on the other hand, is negative (-0.308) and significant at the 5% level. These results are consistent with previous findings in showing that low rated (i.e., risky and opaque) firms experience increased costs due to CDS trading, while high rated (i.e., large and transparent) firms realize benefits of CDS trading.

Our results also seem, upon initial reflection, to contradict those of Narayanan and Uzmanoglu (2018b), who use Tobin's Q as a proxy for firm value and find that this parameter decreases as a result of CDS trading. However, a reduction in WACC does not automatically lead to an increase in firm value, and vice versa. It could be the case that future cash flows and the cost of capital both decrease post CDS trading, but to different degrees. To investigate this possibility further, we compute Tobin's Q and use it as the dependent variable in our baseline model (see Online Appendix A6). The estimated coefficients on CDS initiation are negative and significant at the 1% level, indicating a decrease in Tobin's Q due to CDS trading for non-investment grade firms. The marginal effects for investment grade firms (relative to non-investment grade firms) are also negative, implying that CDS trading yields an even greater decrease in Tobin's Q for high rated firms.

To further support our hypothesis that CDS trading reduces future cash flows, we analyze the firms' investment activities post CDS trading. The results are presented in Online Appendix A7. We observe that non-investment grade firms significantly reduce their investment in capital assets (Compustat data item CAPX) and in acquisitions (Compustat data item AQC). These results are validated by the negative coefficients obtained when regressing financing activity (FINIF) on the CDS initiation variable. Therefore, it appears that non-investment grade firms adopt a conservative strategy to counteract the impact of CDS trading. Investment grade firms also adopt a conservative policy, but to a lesser degree. They likewise reduce their level of financing (FINIF) and their firm acquisition activities (AQC), but there is no significant change in their investment in capital assets (CAPX). To obtain further evidence, we analyze the relationship between CDS trading and net operating cash flows (OANCF). We observe negative and significant coefficients on CDS initiation, suggesting a decrease of future cash flows induced by CDSs for non-investment grade firms. Investment grade firms also suffer decreased cash flows, but to a lesser degree. These results indicate that post CDS trading, both types of firm reduce their investment activities, resulting in lower cash flows, and ultimately, a reduction in firm value.

Our study contributes to the growing literature on the effects of CDS trading. In contrast to prior studies that examine one type of financing cost (e.g., Ashcraft and Santos, 2009; Hirtle, 2009; Shim and Zhu, 2014; Kim, 2016; Amiram et al., 2017; Narayanan and Uzmanoglu, 2018c), we consider the overall costs and benefits of CDS trading . We obtain robust evidence to show that the cost of capital decreases substantially post CDS trading for non-investment grade firms, while there is a more moderate decrease for investment grade firms. Furthermore, we show that CDS trading has a differential effect on firms with high and low credit quality. Equity holders demand lower required returns (relative to before CDS trading) from firms with higher credit quality, while shareholders in firms with lower credit quality require higher returns to compensate for their increased risk associated with CDS trading. Our study also contributes to the capital structure literature. We show that after CDS trading, non-investment grade firms prefer more arm's length debt to bank debt. In addition, to offset the increased rollover risk induced by CDS trading, these firms tend to use arm's length debt to replace revolving credits for liquidity, while investment grade firms use more revolving credit to achieve cost savings. The empirical findings in this study show that financial market innovations, and specifically credit default swaps in this case, can affect companies' financing decisions.

The rest of the paper is organized as follows. Section 2 outlines the literature relevant to this study. In Section 3, we describe our data sample and summary statistics. We present the methodology and baseline results in Section 4 and provide robustness tests in Section 5. We analyze the impact of CDS trading on debt placement and on the cost of capital in Section 6. Section 7 concludes.

2 Literature Review

A large body of literature examines the ways in which CDSs affect the behavior and/or policies of referenced firms (e.g., Fung et al., 2012; Subrahmanyam et al., 2014, 2017; Martin and Roychowdhury, 2015; Batta et al., 2016; Danis, 2016; Danis and Gamb, 2018; Narayanan and Uzmanoglu, 2018a; Fuller at al., 2018; Kim et al., 2018; Batta and Yu, 2019; and Chang et al., 2019). Another stream of literature examines the impact of CDS trading on loan and/or bond spreads (e.g., Ashcraft and Santos, 2009; Hirtle, 2009; Shim and Zhu, 2014; Kim, 2016; Amiram et al., 2017; Narayanan and Uzmanoglu, 2018c). In the following two subsections, we review studies on the consequences of CDS trading in terms of its costs and its benefits respectively.

2.1 Costs of CDS trading

CDS trading gives rise to a variety of costs for CDS firms by introducing additional frictions into debt renegotiations. For example, Subrahmanyam et al. (2014) find a substantial increase in the likelihood of both bankruptcy and rating downgrading after the emergence of CDS markets. Facing a heightened default risk after CDS trading, capital suppliers usually demand a higher return on their investment. Consistent with this finding regarding the increased risk, Narayanan and Uzmanoglu (2018b) provide evidence that CDS initiation is accompanied by an increase in the cost of equity. Subrahmanyam et al. (2017) find that, post-CDS trading, CDS firms significantly increase cash holdings. They conclude that this conservative liquidity policy results from the threatening effects of exacting lenders. An increase in cash holdings could lead to extra agency costs (Jensen, 1986) and suboptimal investment, which could eventually destroy shareholders' wealth (Faulkender and Wang, 2006). Furthermore, Danis (2016) finds a significantly lower participation rate in distressed exchange offers among CDS firms in contrast to the rate among non-CDS firms. Narayanan and Uzmanoglu (2018a) find that CDS firms face a holdout problem caused by CDS-protected bondholders in distressed exchanges. The latter two phenomena (lower participation rates and holdout problems) are detrimental to the debt workout process. Ultimately, shareholders would bear the costs incurred by CDS-protected bondholders.

The risk hedging role of CDSs could also incur costs for referenced firms because CDS-protected lenders have less incentive to actively monitor borrowers (Morrison, 2005; Ashcraft and Santos, 2009; Parlour and Winton, 2013; Shan et al., 2016; Amiram et al., 2017; Kim et al., 2018). By using CDSs, lenders are able to transfer the credit risks of referenced entities to CDS sellers. If they opt for transferring their entire position, lenders no longer have the incentive to monitor the credit relationship, and borrowers lose the certification value of debt.

Empirical studies find that lower monitoring efforts on the part of lenders would, eventually, increase the operating costs of CDS firms. For example, the bond spreads of riskier firms increase after CDS trading (Ashcraft and Santo, 2009). The underlying cause is the lost benefits from banking monitoring, such as mitigating adverse selection and avoiding moral hazards. Such losses exceed the potential gains (e.g., increased capital supply) for these riskier firms. Lee et al. (2017) argue that reduced monitoring intensifies the conflict of interests between managers and shareholders and produces agency costs in the form of additional managerial perquisites. Amiram et al. (2017) provide direct evidence of an increase in syndicated loan spreads after CDS trading. They argue that because CDSs reduce the effectiveness of lead arrangers' shares in syndicated loans, which originally served as the device to mitigate information asymmetry between the lead arranger and syndicate members, lead arrangers must retain larger shares in such loans than prior to CDS trading to justify their continued efforts in monitoring borrowers. This, in turn, increases the loan spread. Furthermore, Martin and Roychowdhury (2015) show that CDS trade initiation results in a decline in a firm's reporting conservatism. This can increase business risks and thus lead to additional business costs.

2.2 Benefits of CDS trading

Researchers have also found evidence of positive effects of CDS trading. For instance, Ashcraft and Santos (2009) show that the spreads of bonds and bank loans decrease following CDS initiation for high-credit and informationally-transparent firms. Shim and Zhu (2014) arrive at a similar conclusion based on Asian bond data. Kim (2016) finds that bond spreads are significantly reduced post-CDS trading, particularly for firms with a higher likelihood of strategic default. Saretto and Tookes (2013) provide evidence that CDS firms exhibit higher leverage ratios and longer debt maturities relative to non-CDS firms.

While the above studies focus on the impact of CDS trading from the borrowers' perspective, other studies have examined the impact from the lenders' perspective. For example, Hirtle (2009) finds that banks that manage credit risk with CDSs expand their lending. But this evidence of increased credit supply is limited to newly negotiated term loans for large corporate borrowers. By contrast, Norden et al. (2014) find consistent evidence that banks actively hedging credit risk with CDSs not only supply more loans but also pass benefits from risk management to the entire portfolio of borrowers by lowering interest rate spreads. The increased supply of credit to a firm can enhance the firm's financial flexibility and reduce its financial constraints, ultimately promoting economic growth.

CDS firms also stand to benefit from an improved informational environment (Stulz, 2010; Berndt and Ostrovnaya, 2014). The major participants in CDS markets are financial institutions that usually offer loans to borrowers, and thus gather the borrowers' private information (Acharya and Johnson, 2007; Flannery et al., 2010; Norden et al., 2014; Ivanon et al., 2016; Norden, 2017). Acharya and Johnson (2007) document an information flow from CDS to equity markets that is indicative of lenders' privileged knowledge of borrowers' creditworthiness. Consistent with the CDS market being a venue for informed trading, Batta et al. (2016) find that the accuracy of analysts' forecasts significantly improves after CDS trading. They conclude that CDS trading encourages informed traders to reveal privileged information to equity markets, which results in increased forecasting accuracy on the part of stock analysts. Liu et al. (2022) show that CDS trading reduces the probability of stock price crashes for referenced firms due to the fact that CDS traders incorporate into spreads the bad news that executives of the referenced firms would like to withhold. With an enhanced informational environment, the role of banks in producing information becomes less critical for CDS companies. Therefore, CDS firms may change their financing choices and debt types.

While we have identified both positive and negative effects of CDS trading on firms, in any given case, it is difficult to predict what the overall influence will be. For instance, it was noted that reduced monitoring efforts can result in increased costs; yet a decrease in monitoring may also have a positive effect on the referenced firm. Chang et al. (2019) find that CDSs promote technological innovations because of an increase in risk-taking activities on the part of CDS firms, which in turn stems from reduced lender monitoring. Shan et al. (2019) find that lenders apply less stringent covenants and collateral requirements to new loans if there has been CDS trading in the borrowers' debts. The authors suggest that lenders use CDSs as a substitute for debt covenants and collaterals because active supervision of covenants and collaterals is costly. Accordingly, the use of CDSs to supplant covenants and/or collaterals can improve loan contract efficiency for both lenders and borrowers, and can have a positive effect on CDS firms.

In summary, CDS trading involves both costs and benefits for the referenced companies. The costs arise from greater friction in the renegotiation process (as a result of the exacting effects of CDSs) and from insufficient monitoring (due to risk hedging), both of which can cause capital suppliers to demand higher required returns, thus escalating business costs. At the same time, the benefits arising from reduced friction on the credit supply side (due to the risk shifting and commitment effects of CDSs), as well as those arising from the improved informational environment (due to the price discovery role of CDSs) can drive down the required returns of capital suppliers and thus enhance shareholders' wealth. Therefore, the overall effect of CDS trading on the WACC is difficult to predict and must be investigated empirically.

3. Sample data, variables, and summary statistics

3.1 Data sources and sample construction

To construct our research sample, we merge data from several sources, including Compustat, the Center for Research in Security Prices (CRSP), Markit Group, Bloomberg, Capital IQ, the Depository

Trust and Clearing Corporation (DTCC), Thomson Reuters Institutional Holdings (13f), I/B/E/S, and Execucomp.

We begin by considering all US public firms covered by Compustat from 2001 to 2018. Following prior studies (e.g., Saretto and Tookes, 2013), we exclude financial firms whose standard industrial classification (SIC) codes are within the range 6000-6999. We then merge the Compustat data with data from CRSP, and require firm-year observations to have non-missing total assets and debt on Compustat. We also exclude observations with missing book and market values of equity. These procedures result in a sample of 87,124 firm-year observations arising from 8,984 firms. We obtain WACC, cost of debt, and cost of equity information from Bloomberg and merge these data with the Compustat accounting data through the International Securities Identification Number (ISIN).

We begin our sample period in the year 2001 to coincide with the availability of Markit's CDS trading quotes. Following Subrahmanyam et al. (2014) and Amiram et al. (2017), we refer to the CDS initiation date as the first trading date of a CDS contract with five-year maturity denominated in US dollars on the referenced company. We manually match each CDS firm identified in Markit with the corresponding firm in Compustat using the Bloomberg RED tracking events database[10]. We further validate the identities of the CDS firms by examining company events listed in LexisNexis[11]. Following Narayanan and Uzmanoglu (2018b), in the case where a subsidiary is referenced by CDSs, we trace it back to its parent company[12]. We are consistent with previous studies (see Amiram et al., 2017 and Kim et al., 2018) in eliminating all CDS firms whose initial trading dates occur in January 2001, as there are ambiguities regarding these initiation dates. This process yields 873 non-financial US public firms that have been referenced by CDSs from 2001 to 2017. We further verify all CDS firms whose trading dates fall in 2001 using Bloomberg and do not find any that are invalid (i.e., firms with trading dates starting before 2001).

[10] The Bloomberg RED tracking events database records the major events of CDS firms (such as a merger, spin off, or renaming) that may interfere with CDS trading. For example, Science Applications International Corporation (SACI) was split into Leidos Inc. and a new independent company that retained the SACI name in September 2013. Bloomberg RED indicates that Leidos Inc. is the primary successor of the original SACI, and that Leidos Inc.'s debts are first referenced by CDS contracts on March 5th, 2007. Thus, we consider March 5th, 2007 as the initial trading date for Leidos Inc. and we link Leidos Inc. to Compustat data rather than SACI.

[11] For instance, 21st Century Fox Inc. was spun off from the News Corporation on June 23rd, 2013. The News American Inc., a subsidiary of the original News Corporation, was referenced by CDSs on February 28th, 2001. We assign the initial CDS trading date of February 28th, 2001 to 21st Century Fox Inc. and eliminate both the original and the new News Corporation from the CDS sample, despite the fact that the new firm was also referenced by CDSs after the split. Accordingly, we focus only on the impact of the initial CDS trading on the firm.

[12] For example, Express Script Inc. was referenced on November 25th, 2005, according to Markit. We trace it to its parent company, Express Scripts Holding Company, in order to extract accounting fundamentals from Compustat.

Next, we obtain debt structure variables from the Capital IQ database. Capital IQ classifies corporate debt structures according to seven categories: commercial paper, revolving credit, bank and term loans, bonds and notes, capital leases, trust preferred, and other borrowings. The source of debt information originates from SEC filings (e.g., 10-K or 10-Q form), corporate financial reports, and press releases. Capital IQ collects these debt data several times a year (i.e., quarterly or semi-annually), thus generating multiple inputs for identical issues. To clean our data, we first select data items with a last filing or only filing report (i.e., *FILINGFLAG_COMPANY* = 2 or 3). We also restrict reports to those that are the latest report for the filing date and financial period in question (i.e., *LATESTFILINGFORINSTANCEFLAG* =1 and *LATESTFORFINANCIALPERIODFLAG* =1). We remove duplicates, as per Choi et al. (2018). Specifically, we require that firm-year observations do not have duplicates for the following data items: debt issuing identifier (*COMPONENTID*), debt description (*DESCRIPTIONTEXT*), principal amount (*DATAITEMVALUE*), maturity (*MATURITYHIGH* and *MATURITYLOW*), and interest payment (*INTERESTRATEHIGHVALUE*). We use two further approaches to mitigate concerns about duplicated reports[13]. First, for all firm-year observations with the same data item identifier (*COMPONENTID*), we select the maximum and mean of the reported items, respectively. Second, we make use of the fact that Capital IQ records both the maximum amount of revolving credit (debt type 2 in Capital IQ) committed by banks and the actual amount drawn by firms. We follow the method of Lou and Otto (2020) and remove all observations containing the string 'Facility' in the *DESCRIPTIONTEXT* field because this indicates the maximum credit available to a firm, not the actual drawn amount. Lastly, we aggregate all fine-grained debt components based on their type at an annual frequency. We then merge Capital IQ and Compustat/CRSP data based on the ISIN.

We extract stock analyst data from Bloomberg and I/B/E/S. Because Bloomberg has more extensive coverage than I/B/E/S over our sample period, we use data from the former for our main analyses and data from the latter for robustness tests. We acquire top executives' (e.g., CEO, CFO) stock ownership from Execucomp, institutional ownership from Thomson Reuters Institutional Holdings (13f), CDS average daily trading notional and total number of clearing dealers from DTCC, and long-term issuer rating data from Moody's Investors Service. We integrate these data based on the ISIN and keep only

[13] Although we remove duplicated reports using the abovementioned approaches, duplicated reports in terms of unique debt issuance still exist because we combine quarterly items into annual data for debt structure analysis. For example, during the 2013 fiscal year, Capital IQ collected debt data for Andeavor Inc. in March, June, September, and December, respectively. In these reports, the term loan identified by the unique debt issue identifier, *COMPONENTID* = 914786139, had a value of \$0m, \$499m, \$498m, and \$398m, respectively. It is clear that the company initiated the loan in the second quarter and amortized it in the last quarter.

the observations that have no missing control variables, as discussed in Section 3.2. Consistent with prior studies (e.g., Fuller et al., 2018; Colonnello et al., 2019), we exclude firms with total assets of less than $10 million. Our final sample contains 41,519 firm-year observations from 5,406 US public firms, of which 8,113 firm-year observations belong to 659 CDS firms and 33,406 firm-year observations come from 4,747 non-CDS firms[14]. In line with prior studies on the topic of capital structure, we winsorize all accounting variables at the bottom and top one percentiles to reduce the influence of potential outliers.

3.2 Variables

3.2.1 Dependent variables

We draw WACC data directly from Bloomberg for two reasons: Bloomberg specialists evaluate the cost of debt for companies using fair market values, and numerous institutional investors use the Bloomberg platform to reference the fair values of corporate debt. The widespread global use of Bloomberg's trading platform gives us the confidence to suggest that the Bloomberg WACC reflects the real cost of capital for companies. We extract the following data as our dependent variables: *WACC*, *cost of debt*, *cost of equity*, *weight of debt*, and *weight of equity*[15]. The detailed definitions and computation of these variables can be found in Appendix 1.

In addition, to examine the influence of CDS trading on corporate debt structure, we construct other explained variables from Capital IQ. In particular, following Lin et al. (2013), we use the ratios of bank debt and public debt to total debt as two measures of the preference for debt financing. Bank debt is the sum of revolving credits and loans from banks, whereas public debt is the sum of commercial papers and bonds and notes. Total debt refers to the sum of all seven types of financing mechanism mentioned above. In addition, we follow Colla et al. (2013) in computing the ratios of each of these types of debt to the total debt and evaluate whether firms prefer a special category of debt funding after CDS trading.

3.2.2 Independent variables

[14] The actual number of observations may vary in different regressions, depending on the availability of control variables. For example, when we control for the marginal tax rate in the baseline regressions, the sample size reduces to 39,300 firm-years because Compustat provides tax rates only until the fiscal year 2016.

[15] We examine both weight of debt and weight of equity because 12.6 percent of observations in our sample have non-zero preferred shares. This implies that an increase in the weight of debt is not necessarily equivalent to the same amount of decrease in the weight of equity.

Following the approach of prior studies on CDS trading (e.g., Ashcraft and Santos, 2009; Martin and Roychowdhury, 2015; Chang et al., 2019), we construct an indicator variable *CDSINIT* to capture the influence of CDS trading on companies. For CDS firms, *CDSINIT* has a value of one in and after the year of CDS trade initiation, and zero before that. For non-CDS firms, its value is set to zero through the whole sample period. Therefore, a significant negative (positive) estimated coefficient for *CDSINIT* would reveal that CDS trading is associated with a material reduction (increase) in the dependent variable in question, i.e., *WACC*, *cost of equity* or *cost of debt*. We also build another dummy variable, *CDSFIRM*, to differentiate between CDS and non-CDS firms. *CDSFIRM* has a value of one for CDS firms (with CDS-referenced debt over the sample period), and zero for non-CDS firms (firms that do not, at any point in the sample period, trade CDSs on their debts). Thus, this dummy variable captures the time-invariant differences in unobservable firm characteristics between CDS and non-CDS companies.

Aside from the dummy variable *CDSINIT*, we employ two explanatory variables that measure the liquidity of CDS trading: the notional average daily traded CDS amount (its scaled value using the natural log) and the total number of clearing dealers in a year. Shan et al. (2019) argues that most of the benefits of CDS trading can be ascribed to the hedging capability of CDSs. A more liquid CDS market would allow lenders to locate sellers more easily and thereby reduce the cost of hedging. Furthermore, a liquid market can incorporate relevant information into quotes and can disseminate information to other markets (e.g., bonds and equities), resulting in an improvement in the firm’s informational environment. We conjecture a negative relation between the degree of liquidity in the CDS market and the referenced firm's cost of capital, We follow Narayanan and Uzmanoglu (2018c) in assigning zeros to these two alternative measures of CDS trading activity if DTCC does not report the trading data[16].

3.2.3 Control variables

A multitude of internal and external factors can affect a firm’s capital financing decisions, and hence influence its capital structure and cost of capital. Furthermore, firms that undergo CDS trading do not constitute a randomly selected sample; factors that contribute to the cost of capital may also influence the decision to initiate CDS trading. We use prior studies on the cost of capital and capital structure

[16] DTCC reports single-name CDS trading data for the most actively traded 1000 CDSs, and these data cover over 95% of CDS trading activity in the world (Narayanan and Uzmanoglu, 2018c). Therefore, assigning zeros to missing values should not cause biased estimates.

(e.g., Titman and Wessels, 1988; Davydenko and Strebulaev, 2007; Colla et al., 2013; Saretto and Tookes, 2013; Narayanan and Uzmanoglu, 2018b) to select a set of firm-level control variables. These control variables include firm size, leverage, profitability, business risk, institutional ownership, dividend policy, etc. An exhaustive list of these variables along with the definitions is reported in Appendix 2.

3.3 Sample characteristics

Panel A of Table 1 reports the distribution of CDS firms by the initiation year. We observe that 89.85% of CDS inceptions take place in the period from 2001 to 2007. Subsequently, there is a significant decrease in CDS initiation. Our sample shows a similar pattern to that of Kim et al. (2018). To illustrate, Kim et al. (2018) document that the percentages of CDS trade initiations over the five-year period from 2001 to 2005 are 23.2, 16.2, 17.8, 15.8, and 7.9%, respectively. Over the same period, the CDS initiations in our sample are distributed as follows: 21.5, 14.7, 17.8, 14.2, and 6.1%. In Panel B, we show the distribution of CDS firms according to their one-digit SIC code. We observe firms in the manufacturing industry (of goods and services, such as food, petroleum, paper, printing, rubber, stone, and computers) are more prone to trade CDSs, constituting 46.36% of the sample.

<Insert Table 1 about here>

Panel A of Table 2 presents the means and medians of CDS and non-CDS firms across firm-level characteristics, as well as the mean differences between the two groups. We observe that the costs of debt and equity are significantly greater for CDS firms than for non-CDS firms, but the overall cost of capital is lower for CDS firms because they use more debt financing (whereas non-CDS firms use more equity financing).

<Insert Table 2 about here>

Debt placement is another source of discrepancy between CDS and non-CDS firms. CDS firms prefer public debt while non-CDS firms employ more bank debt. For example, the percentage of public debt (relative to total debt) is 76% for CDS firms and 58.4% for non-CDS firms. Furthermore, 61.7% of the total debt arises from banks for non-CDS firms, while this percentage is only 20.4% for CDS firms. A possible explanation is difference in informationenvironment between the two types of firms (see Diamond, 1991 and Rajan, 1992). Indeed, this is borne out by the larger number of stock analysts following CDS firms (mean of 14) compared to non-CDS firms (mean of 6).

The descriptive statistics of firm-level control variables are shown in the lower part of Panel A. CDS firms show substantial differences from non-CDS firms. CDS firms are larger, more profitable, and rated by credit rating agencies. They also employ more financial leverage than non-CDS firms. These findings are consistent with literature that identifies the properties of CDS firms (Subrahmanyam et al., 2014, 2017; Martin and Roychowdhury, 2015; Chang et al., 2019). We also observe that CDS firms pay higher dividends and have higher stock trading liquidity than non-CDS firms. Regarding institutional ownership (IO), institutional investors hold 73% of the common shares of CDS firms, compared to about 51% of non-CDS firms' common shares. However, the concentration of IO (measured by the Herfindahl-Hirschmann index or HHI) indicates that CDS firms exhibit more dispersed ownership (HHI of 0.059) than non-CDS firms (HHI of 0.171). In addition, CDS firms are more mature than their non-CDS counterparts, with average firm ages of 32.20 and 18.50 years, respectively.

We present CDS trading activity in Panel B of Table 2. The mean of *CDSINIT* is 0.162, indicating that 16.2% of firm-year observations involve CDS trading over the sample period. Lastly, we present the Pearson correlation matrix of the main variables of interest in Table 3.

<Insert Table 3 about here>

The correlation between *CDSFIRM* and *CDSINIT* is 0.90[17] and significant at the 1% level. This is the result of the variable construction methodology, since both variables have a value of one after CDS trading initiation. The remaining correlations are reasonably low (e.g., the maximum correlation is 0.63, between Moody's rating and *CDSFIRM*), implying that our tests do not suffer from multi-collinearity problems.

4. Methodology and mainresults

4.1. Baseline specification

We explore the effect of the initiation of CDS trading on the cost of capital. Following prior studies, such as Saretto and Tookes (2013) and Chang et al. (2019), we estimate the following multivariate model with either industry-year or firm-year fixed effects:

[17] To counter this high correlation, we present estimated results based on both industry-year and firm-year fixed models.

$$Cost\ of\ capital_{i,t} = \alpha + \beta CDSFIRM_i + \omega CDSINIT_{i,t-1} + \pi INVTGRADE_{i,t-1} + \lambda CDSINIT_{i,t-1} * INVTGRADE_{i,t-1} + \gamma \mathrm{X}_{i,t-1} + \rho \mathrm{Industry}_j \text{or } \mathrm{Firm}_i + \phi \mathrm{Year}_t + \varepsilon_{i,t} \quad (1)$$

where $Cost\ of\ capital_{i,t}$ is one of the explained variables (i.e., WACC, cost of debt or cost of equity) for firm i at year . Our main variable of interest is *CDSINIT*, which is an indicator variable that takes on a value of one in and after the CDS initiation year, and zero before that. The variable $INVTGRADE_{i,t-1}$ is an indicator variable that takes on the value of 1 if the firm's rating is greater than Baa. We include this variable, as well the interaction term between CDS initiation and the investment grade variable, since prior literature has shown the influence of CDS initiation on debt financing differs for investment and non-investment grade firms. The coefficient ω captures, for non-investment grade firms, the differential effect of CDS trading on the cost of capital for treated (CDS) firms relative to control (non-CDS) firms. The coefficient of the interaction term, λ, captures the marginal effect of CDS trading on investment grade firms relative to non-investment grade firms. A positive (negative) value of λ would indicate that the effect of CDS trading on cost of capital is more (less) positive for investment grade firms than for non-investment grade firms. $X_{i,t-1}$ is the vector of firm-level control variables (see Section 3.2) observed at the end of fiscal year $t-1$. We lag all explanatory and control variables by one year because the initiation of CDS trading may not affect the cost of capital immediately. Furthermore, using lagged variables attenuates potential endogeneity issues. $\mathrm{Industry}_j$ or Firm_i denotes either firm or industry fixed effects. This term allows us to control for the effects on the cost of capital of time-invariant unobservable factors that operate at either the firm or the industry level. In addition, we incorporate year fixed effects to capture aggregate time trends in the firms' cost of capital. Following the suggestion of Petersen (2009), we cluster standard errors at the firm level, given that observations of a given firm are autocorrelated across time.

4.2. Baseline results

Table 4 reports the estimates of the baseline model represented by Equation (1). For each dependent variable (WACC, cost of debt, and cost of equity), Columns (1) and (2) represent the results under industry-year and firm-year fixed effects, respectively. The overall cost of capital (WACC) significantly declines after the inception of CDSs for non-investment grade firms. The reductions in WACC of 51.9 bps (Column 1) and 42.2 bps (Column 2) are both significant at the 1% level. They are also economically meaningful: using the average capital ($4.016 billion) of non-investment grade CDS firms, the corresponding decreases in monetary terms are $168.69 million and $221.33 million, respectively. With respect to the interaction term, we observe a positive and significant (at the 1% level) coefficient for both WACC models. By summing the coefficients ω and λ (see Equation (1)), we observe that CDS trading generates a decrease in cost of capital[18] of up to 17 bps[19] for investment grade firms, meaning that the negative effect of CDS trading on cost of capital is less pronounced than that observed for non-investment grade firms. To examine whether our results are driven by outliers, we repeat the analyses using quantile regressions over quantiles of 0.25, 0.5, and 0.75, the results of which are reported in Online Appendix A1. The estimated coefficients for CDS initiation and for the interaction term are in line with our results in Table 4.

Turning to the cost of debt regression models, we find consistent evidence of a decline in the cost of debt following CDS initiation for non-investment grade firms, significant at least at the 5% level across models. The coefficient of the interaction term in the industry-year model is negative and significant at the 1% level, suggesting a more pronounced negative effect of CDS trading on cost of debt for investment grade firms than for their non-investment grade peers. However, the coefficient of the interaction term is not significant for the firm-year model. In both models, the sum of the coefficients ω and λ is negative and significant: -0.603 with $p < 0.001$ in the industry-year model and -0.140 with $p = 0.08$ in the firm-year model, corresponding to declines of 60.3 bps and 14 bps, respectively, in the cost of debt following CDS trading for investment grade firms.

<Insert Table 4 about here>

The last two columns of Table 4 show estimated coefficients for the cost of equity model. We observe that the effect of CDS trading on the cost of equity is different for investment and non-investment grade firms. CDS trading increases cost of equity by at least 31.6 bps for non-investment grade firms, implying that shareholders of non-investment grade firms take a negative view of the effect of CDS trading on their firms. We observe negative and significant coefficients for the interaction term in both models, showing that the positive effect of CDS trading on the cost of equity is lower for investment grade firms than for non-investment grade firms.

Overall, the results in Table 4 reveal that CDSs confer benefits on high-credit firms through two channels – a decrease in cost of equity and a decrease in cost of debt – while it confers benefits on low-credit firms only through lowering their cost of debt. The coefficients on the control variables in Table

[18]

[19] Using the mean capital of investment grade firms, $13.019 billion, a 17 bps drop in WACC is equivalent to a $221.33 million cut in capital spending.

4 are in line with those reported in previous literature. For example, all estimates on business riskiness (proxied by stock volatility) are positive and significant at the 1% level, indicating that both lenders and equity holders require higher returns when facing higher risk.

In summary, the results presented in Table 4 and Online Appendix A1 suggest that equity investors of different types of firm hold disparate views regarding CDS trading. Shareholders in low- and non-rated firms view CDS trading negatively and therefore require a higher return to compensate for the increased risk. Such an increase in the cost of equity is consistent with Bolton and Oehmke's (2011) arguments of threatening effects of CDSs. In contrast, shareholders in high-rated firms reduce their required returns after CDS trading. This phenomenon is consistent with Bolton and Oehmke's (2011) commitment effects of CDSs. With regard to the cost of debt, we find that this metric decreases for both high- and low-rated firms post CDS trading. Finally, we observe that, for non-investment grade firms, the overall effect of CDS trading is a substantial decrease in WACC. Our conclusion is that non-investment grade firms reap the benefits of CDS trading either through a lower cost of debt, or because they increase the debt weight in their capital structure, or both. Relative to non-investment grade firms, investment grade firms show a more modest decrease in WACC following CDS initiation. We investigate the channels through which firms reduce WACC in Section 6. In the next section, we validate our results by means of several robustness tests.

5. Robustness tests

Prior studies (e.g., Subrahmanyam et al., 2014, 2017; Martin and Roychowdhury, 2015; Chang et al. 2019) find that, in general, CDS-referenced companies are larger, more likely to have an investment grade rating, and less prone to information opacity than their non-referenced counterparts. These findings are in agreement with the theory of adverse selection; i.e., CDS sellers wish to sell protection totrustworthy companies that have a low risk of information asymmetry and are highly rated, as this allows sellers to reduce their information disadvantage relative to CDS buyers, who usually draft the loans and thus have access to private information regarding the borrowers. Such adverse selection may cause sample selection bias. Furthermore, it could be the case that unobservable factors drive CDS selection and simultaneously influence the firms' cost of capital. To address these sample selection and endogeneity concerns, we use various robustness tests previously employed in the literature (Ashcraft and Santos, 2009; Subrahmanyam et al., 2014; Martin and Roychowdhury, 2015; Kim et al., 2018; Narayanan and Uzmanoglu 2018b; Chang et al. 2019): propensity score matched samples, instrumental variables, a CDS reversal test, CDS liquidity tests, a sample that is restricted to CDS firms, and samples that exclude the year 2001 and the financial crisis periods.

5.1 Propensity score matched (PSM) samples

While, in the above analyses, we explicitly managed the systematic differences between CDS and non-CDS firms by employing the variable *CDSFIRM* or by using firm-fixed effects along with a set of firm-level controls, these two types of firm may differ in terms of unobserved time-variant variables. We address this issue by constructing matched samples. We use the following probit model to assess the probability of CDS trading initiation, which then enables us to match firms according to their likelihood of CDS trading initiation:

$$\text{Prob}\left(CDSINIT_{i,t} = 1\right) = \Phi\left(\alpha + \theta X_{i,t-1} + \varphi \text{Industry}_k + \omega \text{Year}_t\right), \quad (2)$$

where Φ is the cumulative distribution function of the standard normal distribution and X is an array of firm-level characteristics that are used to predict the inception of CDS trading. Following Chang et al. (2019), we incorporate all controls used in the baseline model into vector X, thereby mitigating concerns that the factors affecting the cost of capital may also drive CDS trading initiation. In addition, following Subrahmanyam et al. (2014), we include working capital ratio, turnover ratio, cash ratio, and PPE ratio[20]. In the last two terms of the regression, we use the first three digits of the SIC code as an industry classification to isolate industry effects and we include the year to account for aggregate time-trend effects on the cost of capital.

Following Ashcraft and Santos (2009) and Subrahmanyam et al. (2014), we build a probit sample by using all firm-year observations of non-CDS firms (i.e., firms whose debts are never referenced in CDS markets) as well as the firm-year observations of CDS firms prior to the initiation of CDS trading. In other words, we eliminate firm-year observations of CDS firms for the post-CDS trading periods. We present the probit estimation results in Table 5. The model specified in Equation (2) predicts the onset of CDS trading reasonably well, as indicated by the high concordant percentage (97.2%) and pseudo-R^2 (48.52%). These statistics are comparable to those generated in previous studies (see, e.g., Subrahmanyam et al., 2017 and Martin and Roychowdhury, 2015). In addition, the coefficients of the predictors are in line with those reported in prior studies (Martin and Roychowdhury, 2015; Subrahmanyam et al., 2014, 2017; Chang et al., 2019). For instance, larger firms, firms with higher

[20] We also attempted to include return on assets (*ROA*), as recommended by Subrahmanyam et al. (2014). However, there was a high correlation between *ROA* and *Profitability* for our data, thus causing a multicollinearity problem. Therefore, we use *Profitability* only, as it is a control variable in our baseline regression.

leverage, firms with lower risk, firms that are more profitable, and firms that are more highly rated all generate greater interest among CDS market participants. In addition, the coefficient on firm age is positive and significant at the 1% level, implying that firms that are more mature are more likely to exhibit CDS trading initiation in the sample period. Lastly, the significant coefficient on liquidation indicates that lenders pay attention to the recovery values of CDS firms, consistent with the CDS structural model.

To prepare the matched samples, we compare the predicted likelihood of CDS initiation of non-CDS firms with that of CDS firms in the year prior to CDS trading. Following Subrahmanyam et al. (2014), we produce three control samples using different matching criteria, in order to mitigate the limitations of propensity score matching[21]. Specifically, our control samples are created using: (1) nearest matching without replacement; (2) nearest matching within the same FF17 industry classification as the CDS firm, with multiple replacement; (3) nearest two matching with multiple replacement. In constructing samples (2) and (3), we require that a given non-CDS firm is only entered into the control sample once per year. This ensures that the control samples consist of unique firm-year observations, even though a non-CDS firm may serve as a control for several CDS firms. Finally, for all three control samples, we require that the differences in the mean logit of the propensity scores between CDS and non-CDS samples are not statistically significant at the 10% level[22].

<Insert Table 5 about here>

We present the firm characteristics of the CDS firms prior to CDS initiation and the matched non-CDS firms in Table 6. For brevity, we only present the statistics based on the first matching criterion (nearest without replacement), which yields matches for 265 of the 659 CDS firms[23]. We observe that CDS firms and non-CDS firms are not significantly different in terms of *leverage, profitability, riskiness, age, CAPEX, growth, IO concentration, liquidation, stock liquidity, R&D,* and *Moody rated*. Therefore, these firm-level characteristics are unlikely to be the source of the difference in cost of capital between CDS and non-CDS firms. As is the case in prior studies (e.g., Martin and Roychowdhury, 2015; Subrahmanyam et al., 2014, 2017; Chang et al., 2019), in spite of careful

[21] For example, one limitation of propensity score matching is that unobservable confounders cannot be balanced in the treatment-control samples, thus resulting in biased results (Austin, 2011a).

[22] We use the SAS procedure PSMATCH to match non-CDS observations to their CDS counterparts. We adjust the parameter of PSMATCH, 'CALIPER', so as to maximize the size of the sample while simultaneously ensuring that the mean difference in propensity scores between CDS and non-CDS samples is not significant at the 10% level. Following Austin (2011b), the maximum allowable caliper width is 0.2 of the standard deviation of the logit of the propensity scores.

[23] We require the percentage difference between the predicted probabilities of CDS and non-CDS firms to be less than 1%.

matching, we find that CDS firms remain different from non-CDS firms in terms of *assets* (firm size) and *dividends*. However, the non-significant difference between the propensity scores of the two groups indicates that, overall, they have a similar propensity to trade CDSs. Finally, with the exception of *cost of debt*, the cost of capital variables (*WACC, cost of equity, debt weight,* and *equity weight*) are not significantly different between the two groups prior to CDS trading. Therefore, there are no trends in these firm characteristics that may cause variances between CDS and non-CDS samples post-CDS trading.

<Insert Table 6 about here>

We re-estimate the baseline model in Equation (1) using our three PSM samples. We present the results in Table 7. For brevity, we only report the estimated coefficients for *WACC*. Consistent with the results from the whole sample, we find that all estimated coefficients on CDS initiation are negative and significant at least at the 10% level across all three PSM samples. In addition, we observe positive and significant marginal effects for investment grade firms relative to non-investment grade firms. The magnitudes of the estimates are similar to those obtained using the whole sample. Overall, the evidence supports our conclusion that the availability of CDSs significantly reduces the cost of capital for non-investment grade firms

<Insert Table 7 about here>

5.2 Instrumental variable regression

Our baseline model relies on the exogenous assumption of the introduction of CDSs. This leads to the concern that reverse causality may be at play, i.e., that the reduction in WACC may initiate CDS trading. An effective means of addressing this concern is to use instrumental variables (IVs) that are exogenous to a firm's cost of capital decisions but have close relations with the initiation of CDS trading. We follow Chang et al. (2019) in constructing an IV, *CDS_percentage*, which, for a given CDS firm, is the percentage of CDS firms, among all firms whose head offices are within a 200-mile radius of the firm, whose 2-digit SIC industry code does not correspond to that of the firm[24]. Our rationale for this IV is based on the empirical evidence of Massa et al. (2013), who document that bond investors are locally biased (i.e., they make investment decisions based on their proximity to firms). Such a herding effect on the part of bond investors would cause bond trading to be locally correlated.

[24] Our results are robust to alternative definitions of a "neighboring firm" (i.e., based on 300-mile or 400-mile radii). Furthermore, similar results are obtained if we use one or three digits of the SIC to segment the firms.

Therefore, the initiation of CDS trading on a firm could be affected by the extent of CDS trading on neighboring firms. However, the extent of CDS trading on neighboring firms should not have a direct effect on a firm's cost of capital decisions because these neighboring firms are not in the same industry as the focal firm. Thus, the variable *CDS_percentage* satisfies both conditions (relevance and exclusion restriction) required for an instrumental variable[25].

We follow previous studies (such as Saretto and Tookes, 2013; Subrahmanyam et al., 2014, 2017) in adopting a two-stage least squares procedure for our analysis. Specially, we first estimate a probit model that uses *CDS_percentage* (i.e., the IV) as a predictor of CDS trading initiation. The first-stage estimation results are reported in Online Appendix A2. The coefficient of *CDS_percentage* is positive and significant at the 1% level, indicating that the percentage of neighboring CDS firms from a different industry is an effective predictor of CDS initiation. We then use the fitted probability from the first-stage probit regression as the instrumented variable to replace *CDSINIT* in the second stage of regression. The results are reported in Table 8. As shown, the estimated coefficients[26] are in line with those of the main analysis across different model specifications and different measures of cost of capital. Thus, our main finding – that the initiation of CDS trading reduces the cost of capital – has not been challenged.

<Insert Table 8 about here>

5.3 Termination of CDS trading

Following Narayanan and Uzmanoglu (2018b), we introduce a dummy variable, *CDSREVERSAL*, which has a value of one for CDS firms in the years following the termination of CDS trading, and zero otherwise. The rationale is that if the initiation of CDS trading can lower the WACC, because of various benefits induced by the activity, then the termination of CDS trading should cause an increase in the WACC, due to the fact that these benefits no longer apply. Consequently, the cessation of CDS trading may deliver a negative signal to the capital markets, meaning that lenders may be unwilling to increase their credit supply to those firms or may begin to charge a higher interest rate. To test this hypothesis, we include *CDSREVERSAL* as another independent variable in the baseline equation (1). We report the results in Online Appendix A3. The coefficients of *CDSINIT* and *CDSREVERSAL* are -

[25] We follow Chang et al. (2019) in computing the shortest distance between two coordinates (i.e., the latitude and longitude of the firms' headquarters) on a sphere using the formula 3963*arccos(sin(lat1) *sin(lat2) + cos(lat1)*cos(lat2)*cos(long2 - long1)), where 3963 (miles) is the radius of the earth.

[26] The estimated coefficients cannot be interpreted as the percentage change in cost of capital due to CDS initiation, because the instrumented CDS is the likelihood of CDS initiation.

0.674 (*t*-value of -6.09) and 0.232 (*t*-value of 1.88), respectively. This indicates that the termination of CDSs is indeed associated with an increase in the WACC.

5.4 The effect of CDS trading liquidity on cost of capital

Prior studies have shown that the degree of CDS trading liquidity is related to the capital structure of the referenced firm. For example, Saretto and Tookes (2013) use the number of CDS quotes and the CDS bid-ask spreads as proxies for liquidity and find that companies can maintain a higher leverage ratio and longer debt maturity if CDSs written on their debt are traded more actively Likewise, Narayanan and Uzmanoglu (2018a, b) show that the activity of CDS trading is positively associated with a firm's value and its cost of capital. We follow the approach of these studies by using variables of CDS trading liquidity as a replacement for the indicator variable *CDSINIT*. We obtain CDS trading activity data from the DTCC over the period 2009 to 2018. Specifically, we use the natural log of the average daily trading notional volume and the total number of clearing dealers in a given fiscal year as proxies for the liquidity of CDS trading. We scale the notional volume by the natural log because the distribution of the raw values is significantly right skewed[27].

<Insert Table 9 about here>

We present the estimated coefficients in Table 9. Starting with the regressions of the WACC, the coefficients of both liquidity variables are negative and significant at the 5% level, while there is no significant interaction between the liquidity variables and *INVTGRADE*. This indicates that a higher liquidity of CDS trading is associated with a lower cost of capital for both investment grade and non-investment grade firms. With respect to the cost of debt and the cost of equity, the coefficients of the liquidity variables are not significant, but we observe negative coefficients for the interaction term, significant at least at the 5% level across models. A possible explanation is that the DTCC only gathers trading data pertaining to the top 1000 referenced firms, such that most observations in our liquidity test sample are investment grade firms. In general, these results support our main findings.

5.5 Restriction of sample to CDS firms

The baseline analysis using the whole sample compares outcomes for CDS and non-CDS firms by controlling a set of covariates. However, some latent factors (i.e., not included in our model) may drive CDS firms to behave differently from non-CDS firms. Apart from using the PSM procedure, another

[27] Over the period 2009 to 2017, we have 3,986 firm-year observations from 547 CDS firms, of which 1,631 observations have trading data, arising from 227 CDS firms.

method for mitigating sample selection concerns is to use CDS firms only. This is because a CDS firm may be more comparable to another CDS firm than to a non-CDS firm, meaning that the former is a more suitable benchmark. Table 10 presents the results of applying model (1) to the CDS firms only. The estimates from the CDS sample are largely in line with our estimates from the whole sample. [28]. The strong negative relation between the WACC and CDS initiation is confirmed but the coefficients in Table 10 (compared with those in Table 4) indicate a smaller magnitude in the effect. Likewise, that negative relation is shown to be weaker for investment grade CDS firms (as it was the case for the whole sample). Similar observations hold for the negative relation between the cost of debt and CDS initiation: The effect is still documented for CDS firms only but with a smaller magnitude. Finally, as far as the relation between the cost of equity and CDS initiation is concerned, the positive relation is confirmed in the sample of CDS firms only.

<Insert Table 10 about here>

5.6 Samples excluding the year 2001 or the 2008-2009 financial crisis

Our estimation hinges on pinpointing the initiation dates of five-year CDS contracts. As mentioned, for this reason, we deleted all CDS firms whose quotes were in January 2001, in case they commenced CDS trading before this date. In this subsection, to eliminate all concerns that some of our CDS firms may have commenced CDS trading before 2001, we re-estimate our baseline model without the CDS firms that have quotes in 2001. The regression coefficients are shown in Panel A of Online Appendix A4 and are broadly similar to those obtained using the whole sample. In a second robustness test, we eliminate concerns that our results may have been driven by observations from the 2008-2009 financial crisis period, by removing all firm-year observations for the years in question (the sample still runs from 2001 to 2018). The regression results obtained using this reduced sample (see Panel B of Online Appendix A4) are again consistent with those observed using the full sample.

6. Debt financing and CDS trading

The evidence reported thus far indicates that the overall cost of capital is reduced for both non-investment and investment grade firms following CDS trading. Further, we find that the effect of CDS trading is larger for non-investment grade firms. Specifically, firms with low credit quality exhibit a

[28] In creating the CDS sample, we remove 50 observations whose leverage is zero, which results in a final sample of 7,963 observations.

decrease in cost of debt financing, while investment grade firms benefit from a reduction in both cost of equity and cost of debt. This section investigates how firmsadjust their debt financing policy following CDS initiation.

The total cost of debt could change either via the risk premium charged by creditors or the quantity of debt taken on by the firm. Regarding the former, CDS-protected lenders may pass on some of the benefits of CDS trading (such as reduced monitoring costs, lower contracting expenses, or easier hedging) to borrowers, therefore lowering the required interest rate. Ivanon et al. (2016) state that the cost of a bank loan is lowered post-CDS trading due to decreased bank monitoring costs. As far as the amount of debt is concerned, managers can substitute debt for equity, or vice versa. Since the cost of debt is usually lower than the cost of equity, a firm can, to some extent, reduce the overall cost of capital by using a greater proportion of debt. Managers can also adjust the debt type, for example, favoring short-term debts over long-term ones, retiring bank loans by issuing a new bond, or using subordinated debts instead of secured ones. Since different types of debt incur different interest rates and entail different covenants, managers can alter their debt financing mix, and alter the overall cost of capital.

6.1 Substituting debt for equity

As stated, we find consistent evidence that both types of CDS firm experience a decline in the WACC after CDS initiation, with the effect being less pronounced for investment grade firms. The decline is in particular due to a decrease in the cost of debt. It is possible that managers respond to CDS trading by altering the firm's financial leverage ratio that causes a decline in the WACC. To investigate this channel, we regress the market weight of debt on CDS initiation plus a set of control variables, where the market weight of debtis obtained from Bloomberg (see Appendix 1 for details).

Table 11 presents the results under industry- and firm-fixed effects in Columns (1) and (2), respectively. In Columns (3) and (4), we report estimates based on quantile regression for quantiles of 0.25 and 0.75, respectively.

<Insert Table 11 about here>

For non-investment grade firms, we note that all coefficients on *CDSINIT* in Columns (1) and (2) are significant at least at the 5% level. The debt weight increases in the range of 2.43 to 3.31 percentage points . Further, CDSs are associated with a greater increase in debt weight for low leverage firms than for high leverage firms, as evidenced by the decrease in debt weight from 5.46 to 3.24 percentage points when the leverage ratio changes from 0.25 to 0.75. Therefore, we conclude that the decrease in WACC of non-investment grade firms is partly due to the increase in the debt weight of their capital structure.

The effects of CDS trading on debt and equity weight appear to be different for investment grade companies. The coefficients on the interaction terms in the debt regression models are negative and significant at least at the 5% level, showing that the positive effect of CDS trading on debt weight is lower for investment grade (relative to non-investment grade) firms. By assessing the overall effect of CDS initiation, we find that it has no significant effect on debt weight for investment grade firms with low leverage ratio[29], but a significant negative effect for highly levered investment grade firms. The disparate effects of CDS trading on the two types of firms (low and high leverage) can be explained by the fact that CDSs have both commitment and exacting effects. Firms with higher leverage are exposed to higher bankruptcy risk, and if their creditors can get insurance from CDS trading, then these firms are more likely to face threats from empty creditors. To counter the negative effects of CDSs, highly levered firms may aim at reducing their leverage and the risk of bankruptcy.

The estimates of Table 11 suggest that for non-investment grade (investment grade) firms, CDS initiation is associated with an increase (decrease) in the proportion of debt financing. To further validate this finding, we regress the book leverage ratio on CDS initiation and report the estimates in Table 12.

<Insert Table 12 about here>

Table 12 shows that the estimates on CDS initiation are positive and significant (at the 5% level), indicating that CDS trading is associated with an increase in the weight of debt in the capital compositions of non-investment grade firms. Prior studies (e.g., Saretto and Tookes, 2013) have documented an overall increase in leverage following CDS initiation. Our results further show that this effect is in fact concentrated on non-investment grade firms. Inspecting the interaction terms between CDS initiation and investment grade status (which are negative and significant at the 1% level), we see

[29] The overall effect on investment grade firms in any given model is evaluated by the sum of the coefficients on *CDSINIT* and its interaction with *INVTGRADE*. In the case of the 0.25 quantile of the weight of debt, the sum of these coefficients is 5.466+(-6.454) = -0.988 with a p value of 0.75 (non significant). However, for the 0.75 quantile, the sum of the coefficients is 3.240 +(-8.357) =-5.137 with a p value of <0.001.

that the leverage ratios of investment grade firms actually *decrease* after CDS initiation, by up to 5.8% [30].

To summarize our conclusions on capital structure changes following CDS initiation, we find evidence that the weight of equity (debt) significantly decreases (increases) in non-investment grade firms, which is accompanied by a significant decrease in the total cost of capital (WACC). It therefore appears that, in the case of non-investment grade firms, the commitment effects of CDS trading clearly dominate its threatening effects. The decrease in WACC for investment grade firms is mainly due to a decrease in the debt component of WACC, where this decrease is either due to a decrease in the weight of debt, a decrease in the cost of debt, or both. For medium and highly levered investment grade firms, it seems that the threatening effects of CDS trading outweigh the commitment effects.

6.2 Debt placement and rollover risk

Given the important role played by the debt component, to further identify the channels responsible for causing a reduction in WACC, we determine whether firms change their debt placement after CDS trading in such a way so as to cause a decrease in the cost of debt.

We follow Saretto and Tookes (2013) in analyzing the relationship between CDS initiation and various debt composition variables. Since different types of debt have distinct interest costs and covenants, a firm can replace an instrument that has a high cost of debt with other instruments that have lower costs. Furthermore, the increase in information transparency between firms and capital markets after CDS initiation may afford CDS firms greater access to public debt markets, and as a result, these firms may use more bonds or notes, rather than bank loans[31]. Such a change in strategy may reduce the overall cost of debt financing. We follow Colla et al. (2013) and classify debts into six categories: term loans, revolving credits, bonds and notes (senior and subordinated), commercial papers, capital leases, and other borrowings, (including trust-preferred stock). Furthermore, we follow Lin et al. (2013) in

[30] In column (1), for example, the overall effect of CDS initiation for investment grade firms is 0.028 + (-0.086) = -0.058, which is a 5.8% decrease in leverage.

[31] CDS markets play a critical role in producing and disseminating information (Ashcraft and Santos, 2009; Stulz, 2010) because the participants in these markets are almost all institutions (such as banks or insurance companies) that usually possess private information regarding the borrower's business and financial status. Prior studies find that information flows into stock markets from CDS markets, implying an overall improvement in a firm's information transparency following CDS initiation (Acharya and Johnson, 2007). We use the number of analysts as the dependent variable (which we regress on CDS initiation) to measure the change in information quality for CDS firms. We find statistically significant evidence that CDS firms experience an improvement in their information environment (see Online Appendix A5).

constructing public and private debt categories. We scale the debt compositions by the total debt to create debt composition ratios.

<Insert Table 13 about here>

Table 13 presents the results of regressing each of the debt composition ratios on CDS initiation and a set of firm-specific control variables. We first examine the results for non-investment grade firms. Beginning with public debt, we observe positive coefficients on CDS initiation, significant at the 5% level in the industry-fixed effects model and at the 10% level in the firm-fixed effects model.[32] In terms of the subcategories of public debt, the estimates for bonds are positive and significant at the 1% level, while the estimates for commercial papers (CPs) are negative and significant at the 5% level. Given that public debt is comprised mostly of bonds and notes (96.1% in volume against 3.4% for commercial paper), the negative effect of CDS trading on CPs was absorbed by the positive effect of CDS trading on bonds and notes, resulting in an overall increase in the public debt to total debt ratio. These findings indicate that CDS trading strongly promotes the use of arm's length debt. The coefficients for the bond regression model are 0.042 and 0.052, implying that post-CDS trading, CDS firms increase financing from bonds and notes by an average of approximately 5%. In economic terms, the above coefficients are equivalent to an increase of between $814.46 and $1,008.38 million[33] in a firm's bond financing.

In sharp contrast to the increase in public debt, private sources of debt significantly decrease, as demonstrated by the negative coefficients -0.048 and -0.063 (both significant at the 1% level)[34]. In economic terms, these decreases in private debt are equivalent to decreases of $215.02 and $282.21 million, respectively[35]. As far as sources of private debt are concerned, we find that only estimates for the regression of revolving credits are significant (at the 5% level in both models).

In contrast to the studies of Saretto and Tookes (2013) and Chen et al. (2018), which do not separately examine the effects of CDSs on revolving credits and loans, we treat term loans and drawn revolving credits individually. We find a substantial reduction in the usage of revolving credits post-CDS trading but no statistically significant effect on the usage of term loans.

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[32] The estimates are close to those of Chen et al. (2018). For example, the estimated coefficient for public debt with firm-fixed effects is 0.048 and significant at the 1% level in their paper. Our estimate is 0.038 and significant at the 5% level.

[33] 4.2%*0.6738*1.9392= $548.78 million, and 5.2%*0.6738*1.9392= $679.45 million, where $1.9392 billion is the mean of the total debt of non-investment grade CDS firms and 67.38% is the mean ratio of bonds and notes to total debt for non-investment grade CDS firms.

[34] This estimate also aligns with Chen et al. (2018). Their corresponding estimate is negative (-0.05) and significant at the 5% level.

[35] 4.8%*0.231*1.9392 =$215.02 million, and 6.3%*0.231* 1.9392 =$282.21 million, where $1.9392 billion is the mean of the total debt of non-investment grade CDS firms and 23.1% is the mean ratio of bank loans to total debt for CDS firms.

The shift from private debt to public debt could be explained by the reduced risk of information asymmetry and/or the decreased monitoring benefits of bank debt after CDS trading. However, these reasons would not explain the reduction in revolving credits post-CDS trading. A possible motivation for reducing revolving credits would be to mitigate the threatening effects of CDS trading. Firms with non-investment grade credit generally have a higher rollover risk than firms with investment grade credit. If CDS trading aggravates banks' concerns about repayment for these firms, we would observe a reduction in the usage of revolving credits.

Turning to investment grade firms, we find markedly different results compared with those observed for non-investment grade firms. For public debt, the coefficients on the interaction terms are negative and significant at least at the 5% level. The overall effects of *CDSINIT* are -0.037 (p = 0.043) for the industry-year model and -0.016 (p = 0.311) for the firm-year model. Therefore, highly rated firms appear to reduce their public debt ratio post CDS trading. The interaction term for the regression of bonds is negative and significant (at the 5% level); however, the overall effect of CDS trading on the bond ratio for investment grade firms is not significant[36]. There are no marginal effects in the case of the commercial papers model, indicating no significant difference in usage of this debt instrument between high and low rated firms.

For bank debt, we find a strong, positive marginal effect for investment grade firms, as indicated by the positive and significant estimates on the interaction term. Regarding the overall effect, we find that, in contrast to non-investment grade firms, investment grade firms increase their usage of bank debt post-CDS trading. The increased private debt financing is due to greater usage of revolving credits and declining use of bonds and notes; CDS trading has no significant effect on term loans[37], as was also the case for non-investment grade firms.

In contrast with non-investment grade firms, CDS trading is related with an increase in the use of revolving credits when it comes to investment grade firms. A possible explanation is that since CDS initiation resultsin an informationally more transparent environment, lenders might lower their estimation of rollover risk for highly rated firms, which, in turn, makes that source of financing more attractive.

[36] The overall effects of CDS trading on bonds for the two models are, respectively, 0.052+(-0.076) = -0.024 (with p = 0.145) and 0.042+(-0.036) = 0.006 (with p = 0.710).
[37] The overall effects of CDS trading on bank loans for the two models are, respectively, -0.015+0.004 = -0.011 (with p = 0.568) and -0.031+0.042 = 0.011 (with p = 0.605).

In summary, non-investment grade firms adjust their debt placement by substituting private debt with arm's length debt. This adjustment reflects the commitment effects of CDS trading. These firms also reduce their revolving credit usage possibly because of an increased rollover risk, reflecting the threatening effects of CDSs. In contrast, investment grade firms use less public debt post CDS trading, but show a slight increase in the use of bank debt. These firms also use more revolving credits. However, we find CDS trading has no discernable effects on the usage of term loans, for investment and non-investment grade firms alike.

7. Conclusions

The CDS market has caused substantial controversy (Stulz, 2010). Some believe that CDSs are partly to blame for the subprime crisis in the United States that led to the subsequent 2008-2009 financial crisis. As a result, opponents of CDSs have called for a ban on CDS trading. Others have pointed out that CDS trading completes financial markets by providing simple and inexpensive hedging vehicles. Researchers have examined the various tangible effects of CDSs on both firms and the economy by studying how CDSs affect corporate policies and activities. Our study builds on these analyses and evaluates the overall costs and benefits associated with CDSs by evaluating their impact on a firm's cost of capital. We construct a panel dataset using US public companies listed in Compustat from 2001 to 2018 to examine whether CDS trading affects the weighted average cost of capital (WACC), the cost of debt, and the cost of equity.

Our findings show that CDS has disparate effects on investment and non-investment grade firms. CDSs significantly reduce the overall cost of capital for non-investment grade firms, while they bring about a more moderate decrease in the cost of capital for investment grade firms. Further, equity holders require a lower return post-CDS trading for investment grade firms, while shareholders in non-investment grade firms raise their required returns. Investment grade firms, compared to their non-investment grade peers, realize more benefits of CDSs by reducing their cost of debt.

We also explore the channels through which CDS firms reduce the cost of capital. Results of quantile regressions show that the effects of CDS trading varyrent firms with high and low leverage ratios. Firms with low leverage experience a significant increase in their debt weight, and correspondingly, a reduction in their equity weight, while firms with high and medium leverage show significant reduction in the weight of debt in their capital structure. Both findings are consistent with the empty creditor hypothesis, which posits that CDS trading simultaneously exerts two contrary effects on firms. On the one hand, it increases the credit supply for borrowers, while on the other hand, it introduces frictions into the debt renegotiation process.

Finally, we find robust evidence that CDS firms alter their debt structure. Post-CDS trading, non-investment grade CDS firms use more arm's length debt and less bank debt than they did previously. In particular, they reduce their usage of revolving credits. These findings reflect the exacting effects of CDS trading: to avoid rollover risk, firms choose arm's length debt in preference to short-term bank debt for liquidity. On the contrary, investment grade firms employ more revolving credits than they did prior to CDS trading, in order to realize cost-saving benefits. Both investment and non-investment grade firms increase their use of financing sources other than bank and arm's length debt, with the purpose being either to avoid the exacting effects of CDSs or to generate cost savings. Therefore, the adjustment of debt placement is another channel that can be used to reduce the cost of capital. Our findings suggest that financial market innovations, such as CDSs, affect a firm's financing decisions and consequently their capital structure.

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Table 1. Characteristics of the sample distribution

Panel A. Distribution of CDS firms based on the inception year

Year	Number of new CDS firms	Percentage	Cumulative percentage
2001	141	21.40	21.40
2002	97	14.72	36.12
2003	118	17.91	54.02
2004	94	14.26	68.29
2005	40	6.07	74.36
2006	44	6.68	81.03
2007	58	8.80	89.83
2008	11	1.67	91.50
2009	6	0.91	92.41
2010	5	0.76	93.17
2011	7	1.06	94.23
2012	10	1.52	95.75
2013	3	0.45	96.21
2014	4	0.61	96.81
2015	9	1.37	98.18
2016	2	0.30	98.48
2017	10	1.52	100
Total	659	100	

Panel B. Distribution of CDS firms based on the one-digit SIC industry code

SIC Industry	Number of CDS firms	Number of firm-year observations	Percentage of all CDS firms
Agriculture, forest and fishing (0)	1	17	0.15
Construction and mining (1)	59	726	8.95
Manufacturing (2,3)	305	3,897	46.28
Transportation (4)	115	1,411	17.45
Wholesale and retail (5)	74	901	11.23
Services (7,8,9)	105	1,161	15.93
Total	659	8,113	100

Table 2. Summary statistics

Panel A. Firm-level variables

This table presents sample statistics for both CDS and non-CDS firms. Variables are collected over the period from 2001 to 2017 and are summarized at the firm level. The number of firm-year observations, N, varies per variable, depending on the joint availability of controls when testing the baseline model. WACC, cost of debt, cost of equity, weight of debt, and weight of equity are expressed as percentages. Assets, long-term debts, and CDS notional are expressed in billions of dollars. STD refers to the standard deviation. Public debt, CPs, bonds/notes, bank debt, drawn revolving credits, bank loans, capital leases, trusted preferred, and other borrowings are all expressed as ratios (relative to the total debt). Variable definitions can be found in Appendix 2. All accounting variables are winsorized at the top and bottom 1%. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	CDS firms				Non-CDS firms				
Variable	N	Mean	Median	STD	N	Mean	Median	STD	Mean difference
Explained variables									
WACC	8,113	8.546	8.366	2.421	33,406	9.270	9.043	3.001	-0.725***
Cost of debt	8,113	3.124	3.178	1.832	33,406	2.604	2.590	2.081	0.519***
Cost of equity	8,113	10.890	10.407	2.850	33,406	10.505	10.234	3.057	0.384***
Weight of debt	8,113	29.804	25.237	21.110	33,406	18.039	9.358	22.010	11.766***
Weight of equity	8,113	69.796	74.582	21.533	33,406	81.166	90.050	22.787	-11.330***
Debt decompositions									
Public debt	7,436	0.760	0.839	0.264	14,757	0.584	0.620	0.367	0.170***
CPs	2,089	0.106	0.056	0.146	312	0.147	0.097	0.182	-0.040***
Bonds/Notes	7,415	0.715	0.793	0.265	14,730	0.571	0.617	0.365	0.143***
Bank debt	6,563	0.204	0.081	0.267	19,768	0.617	0.753	0.380	-0.408***
Drawn revolving credits	5,796	0.084	0.015	0.171	16,465	0.374	0.268	0.374	-0.293***
Bank loans	3,778	0.231	0.130	0.260	12,141	0.492	0.458	0.362	-0.260***
Capital leases	3,329	0.050	0.010	0.135	10,042	0.219	0.033	0.351	-0.169***
Trusted preferred	381	0.075	0.047	0.085	154	0.232	0.133	0.228	-0.156***
Other borrowings	4,449	0.130	0.027	0.216	5,965	0.185	0.032	0.300	-0.056***
Firm-level characteristics									
Assets	8,113	12.427	4.644	27.334	33,406	0.696	0.237	1.674	11.738***
Leverage	8,113	0.316	0.287	0.195	33,406	0.171	0.098	0.204	0.144***
Growth	8,113	3.039	2.230	4.906	33,406	2.830	1.963	4.542	0.208***
Profitability	8,113	0.081	0.083	0.111	33,406	-0.010	0.055	0.239	0.092***
IO concentration	8,113	0.059	0.041	0.069	33,406	0.171	0.089	0.193	-0.112***
IO ratio	8,113	0.730	0.773	0.222	33,406	0.510	0.513	0.326	0.219***
Age	8,113	32.205	29	18.794	33,406	18.507	15	13.096	13.697***
R&D	8,113	0.034	0	0.255	33,406	0.404	0.006	1.886	-0.369***
Liquidation	8,113	0.570	0.560	0.130	33,406	0.462	0.467	0.177	0.107***
Riskiness	8,113	0.392	0.333	0.222	33,406	0.601	0.515	0.322	-0.208***
CAPEX	8,113	0.098	0.042	0.180	33,406	0.118	0.032	0.296	-0.014***
Stock liquidity	8,113	7.617	7.614	0.695	33,406	7.084	7.189	1.041	0.532***
Tax rate	8,113	0.298	0.339	0.084	33,406	0.228	0.277	0.116	0.069***
Dividends	8,113	0.514	0.240	0.658	33,406	0.118	0	0.313	0.395***
Credit rating	8,113	0.759	1.000	0.427	33,406	0.094	0	0.292	0.665***
Analyst	8,113	13.650	12	8.812	33,406	5.468	4	5.959	8.182***
Long-term debt	8,113	3.053	1.160	6.737	33,406	0.151	0.008	0.490	2.902***
Capital	8,113	8.451	3.240	17.561	33,406	0.524	0.178	1.297	7.927***
Tobin's Q	8,113	1.400	1.098	1.316	33,375	1.524	1.089	1.377	-0.124***

Panel B. CDS trading activities

Variable	N	Mean	Median	STD
CDSINIT	41,519	0.162	0	0.368
CDSFIRM	41,519	0.195	0	0.396

Notional	1,631	0.019	0.012	0.019
Dealers	1,631	10.448	11.25	4.059

Table 3. Pearson correlations between selected variables

This table provides Pearson correlations between key firm-level variables. Variable definitions are provided in Appendix 2. All accounting variables are winsorized at the top and bottom 1%. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CDSFIRM (1)	1.00																		
CDSINIT (2)	0.89***	1.00																	
WACC (3)	-0.09***	-0.09***	1.00																
Public debt (4)	0.23***	0.22***	0.09***	1.00															
Bank debt (5)	-0.44***	-0.43***	0.01***	-0.89***	1.00														
Log (Assets) (6)	0.64***	0.62***	-0.02***	0.23***	-0.48***	1.00													
Leverage (7)	0.13***	0.13***	-0.18***	0.02***	-0.08***	0.15***	1.00												
Profitability (8)	0.16***	0.14***	-0.09***	-0.02***	-0.09***	0.34***	-0.03***	1.00											
CAPEX (9)	-0.02***	-0.02***	0.03***	0.04***	-0.04***	-0.01**	0.12***	-0.22***	1.00										
Growth (10)	0.02***	0.01**	0.12***	0.06***	-0.03***	0.01**	0.00	0.02***	0.02***	1.00									
Log (Age) (11)	0.29***	0.32***	-0.13***	0.12***	-0.24***	0.34***	0.06***	0.24***	-0.12**	-0.05***	1.00								
Riskiness (12)	-0.26***	-0.26***	0.14***	-0.10***	0.18***	-0.47***	-0.06***	-0.45***	0.09***	-0.05***	-0.38***	1.00							
Dividends (13)	0.36***	0.38***	-0.15**	0.17***	-0.27***	0.43***	0.11**	0.19***	-0.03***	0.03***	0.40***	-0.34***	1.00						
Tax rate (14)	0.24***	0.21***	-0.04***	0.02***	-0.13***	0.50***	-0.05***	0.58***	-0.13***	0.00	0.26***	-0.50***	0.31***	1.00					
IO concentration (15)	-0.24***	-0.21***	-0.21***	-0.18***	0.22***	-0.53***	-0.00	-0.22***	0.02***	-0.07***	-0.16**	0.39***	-0.18***	-0.35***	1.00				
Liquidation (16)	0.24***	0.22***	-0.24***	-0.11***	-0.08***	0.36***	0.09***	0.23***	-0.14**	-0.10***	0.18***	-0.19**	0.16***	0.27***	-0.07***	1.00			
R&D (17)	-0.08**	-0.07**	0.11***	0.05***	0.05***	-0.16***	0.06***	-0.42***	0.47***	0.06***	-0.14***	0.14***	-0.08***	-0.27***	0.06***	-0.28***	1.00		
Moody (18)	0.63***	0.60***	-0.12***	0.23***	-0.44***	0.59***	0.15***	0.16***	0.02***	0.00	0.29***	-0.25***	0.31***	0.23***	-0.24***	0.26***	-0.09**	1.00	
Stock liquidity (19)	0.21***	0.20***	0.37***	0.20***	-0.22***	0.38***	-0.01***	0.02**	0.06***	0.11***	-0.02**	0.00	0.01***	0.12***	-0.46***	-0.05***	0.06***	0.18***	1.00

Table 4. The relation between CDS trading and the cost of capital

This table reports regression results of various cost of capital measures on the initiation of CDS trading and a set of firm-level control variables. CDS activity and firm-level controls are measured over the period from 2001 to 2016, and the cost of capital metrics correspond to the period from 2002 to 2017. Constants are computed but not reported. Variable definitions are provided in Appendix 2. All accounting variables are winsorized at the top and bottom 1%. We present estimates obtained from industry- and firm-year fixed effects models in Columns (1) and (2), respectively. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level, and the number in parentheses denotes the *t* statistic. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	WACC		Cost of debt		Cost of equity	
	(1)	(2)	(1)	(2)	(1)	(2)
CDSFIRM	-0.333** (-3.95)		0.248*** (2.97)		-0.371*** (-4.20)	
CDSINIT	-0.519*** (-5.08)	-0.422*** (-4.08)	-0.165* (-1.88)	-0.233*** (-2.81)	0.308*** (2.84)	0.454*** (3.97)
INVTGRADE	-0.143* (-1.64)	-0.385** (-4.07)	-0.084 (-0.95)	0.051 (0.49)	-0.471*** (-5.13)	-0.231** (-2.37)
CDSINIT x INVTGRADE (1,1)	0.348*** (2.91)	0.339*** (3.15)	-0.424*** (-4.02)	0.093 (0.92)	-0.663*** (-5.34)	-0.377*** (-3.08)
Controls						
Tax rate	1.236*** (4.89)	1.601*** (6.12)	-3.459*** (-18.28)	-1.770*** (-9.59)	-1.412*** (-6.20)	-0.535* (-1.96)
Log (Assets)	0.092*** (4.09)	0.095** (2.23)	0.245*** (14.56)	0.303*** (9.77)	0.445*** (21.58)	0.547*** (12.46)
Leverage	-0.868*** (-5.60)	-0.609*** (-4.18)	0.349*** (3.69)	0.238** (2.55)	-0.466*** (-3.23)	-0.285** (-2.00)
Profitability	-0.181** (-2.54)	0.038 (0.87)	-0.073** (-2.01)	-0.113** (-1.99)	-0.142** (-2.36)	-0.055 (-1.32)
CAPEX	-0.295** (-2.14)	-0.220** (-2.55)	0.217*** (4.18)	0.063 (0.79)	-0.418*** (-3.50)	-0.327*** (-4.45)
Growth	0.041*** (11.11)	0.023*** (8.10)	-0.003 (-1.38)	-0.002 (-0.95)	0.013*** (3.94)	0.012*** (4.21)
Log (Age)	-0.073** (-2.16)	-0.537*** (-5.17)	0 .010 (0.41)	-0.011 (-0.15)	-0.058* (-1.85)	-0.238** (-2.29)
Riskiness	1.342*** (13.38)	1.607*** (15.95)	0.572*** (9.23)	0.255*** (4.32)	2.995*** (29.91)	2.797*** (26.78)
Dividends	-0.091 (-1.63)	-0.046 (-0.66)	-0.134*** (-3.10)	0.102** (2.25)	-0.255*** (-5.12)	-0.261*** (-4.13)
IO concentration	-2.092*** (-14.73)	-1.124*** (-7.06)	0.472*** (5.29)	0.244*** (2.67)	-1.759*** (-12.82)	-0.882*** (-5.36)
Liquidation	-2.373*** (-17.01)	-1.464*** (-8.01)	2.308*** (21.06)	1.167*** (8.71)	-0.643*** (-5.07)	-0.780*** (-4.31)
R&D	0.083*** (5.36)	0.006 (0.35)	-0.010 (-0.95)	-0.002 (-0.02)	0.047*** (3.79)	-0.003 (-0.17)
Stock liquidity	0.730*** (26.88)	0.526*** (18.55)	0.015 (0.82)	0.030* (1.66)	0.764*** (29.68)	0.653*** (22.47)
Industry-fixed effects	Yes		Yes		Yes	
Firm-fixed effects		Yes		Yes		Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
#Observations	41,519	41,519	41,519	41,519	41,519	41,519
#Firms	5,406	5,406	5,406	5,406	5,406	5,406
Adjusted R^2	0.382	0.657	0.358	0.668	0.425	0.635

Table 5. Probit regression to predict the probability of CDS trading initiation

This table presents the coefficient estimates of the probit model specified by Equation (2), which is used to predict the inception of CDS trading. The sample includes all firm-year observations for non-CDS companies and the firm-year observations prior to CDS trading initiation for CDS companies (i.e., we eliminate all observations in the post-CDS period). The sample period is from 2001 to 2017. The variable *CDSINIT* equals one in and after the CDS trading initiation year for CDS firms, and zero otherwise. All control variables are winsorized at the top and bottom 1% and are lagged by one year. The definitions of control variables are provided in Appendix 2. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level, and *t* statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable = Prob (CDSINIT=1)	
Variable	Coefficient
Constant	-13.89** (-2.52)
Log (Assets)	0.413*** (16.13)
Growth	-0.001 (-0.26)
Risk	-0.334** (-2.00)
Profitability	0.572** (2.03)
PPE ratio	0.545* (1.94)
CAPEX	0.001 (0.97)
Dividends	0.010* (1.87)
IO concentration	1.011*** (3.02)
Leverage	1.060*** (8.676)
Log (Age)	0.241*** (6.44)
Cash	0.897** (2.12)
Turnover	0.128** (2.54)
Liquidation	1.576*** (3.54)
R&D	-0.013 (-0.33)
WCAP	0.382 (1.39)
Moody rated	0.877*** (14.84)
Stock liquidity	0.301*** (7.50)
Likelihood Ratio	2,778.29***
Industry-fixed effects	Yes
Year-fixed effects	Yes
Pseudo R^2	48.55%
Percent Concordant /C	97.1%
C	0.971
Somer’s D	0.941
Tau-a	0.022
#Observations	45,995

Table 6. Comparison of firm characteristics for treated (CDS) and control (non-CDS) firms

This table compares CDS and matched non-CDS firms' characteristics in the year prior to the initiation of CDS trading (for the CDS firm). The control observations are selected based on the nearest likelihood of CDS trading initiation, by year and without multiple matching. Variable definitions are provided in Appendix 2. All control variables are winsorized at the top and bottom 1%. The number in parentheses is the *t* statistic. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Mean of CDS firms	Mean of non-CDS firms	Difference
WACC	8.531	8.821	-0.290 (-1.40)
Cost of debt	4.373	3.977	0.396 (2.40) **
Cost of equity	10.363	10.630	-0.266 (-1.13)
Debt weight	31.575	31.294	0.280 (0.14)
Equity weight	68.212	67.809	0.403 (0.19)
Tax rate	0.288	0.284	0.004 (0.49)
Log (Assets)	14.669	14.456	0.212 (2.54) **
Leverage	0.242	0.237	0.005 (0.51)
Profitability	0.120	0.115	0.005 (0.35)
CAPEX	0.119	0.162	-0.043 (-1.34)
Growth	2.054	1.930	0.124 (0.12)
Log (Age)	2.813	2.799	0.014 (0.21)
Riskiness	0.463	0.473	-0.010 (-0.47)
Dividends	0.334	0.177	0.156 (2.92) ***
IO concentration	0.061	0.068	-0.007 (-1.26)
Liquidation	0.567	0.574	-0.007 (-0.63)
R&D	0.054	0.037	0.017 (1.27)
S&P rated	0.905	0.898	0.007 (0.36)
Stock liquidity	7.503	7.551	-0.048 (-0.71)
Logit of Propensity of initiation	-2.312	-2.521	0.209 (1.59)
#Observations	265	265	

Table 7. The impact of CDS trading on the cost of capital using PSM samples

This table presents regression results based on propensity score matched samples constructed as per the three criteria listed in Section 4.3. The probit sample includes 36,776 observations corresponding to the period from 2001 to 2017. For brevity, we only report estimated coefficients for WACC. The estimated coefficients for the cost of debt and cost of equity models can be found in Online Appendix XXX. We report industry- and firm-year fixed effects in Columns (1) and (2), respectively. All regressions include year-fixed effects to control for time trends on the cost of capital. All control variables are winsorized at the top and bottom 1% and are lagged by one year compared to the cost of capital. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level, and *t* statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	WACC					
	Nearest-one matching without replacement		Nearest-one with exact FF17 industry classification		Nearest-two matching with multiple replacement	
	(1)	(2)	(1)	(2)	(1)	(2)
CDSFIRM	0.078		-0.005		0.081	
	(0.52)		(-0.04)		(-0.51)	
CDSINIT	-0.338*	-0.373**	-0.384***	-0.426**	-0.293*	-0.341*
	(-1.94)	(-2.17)	(-2.65)	(-2.51)	(-1.65	(-1.91)
INVTGRADE	0.048	-0.516**	-0.148	-0.399**	0.020	-0.404***
	(0.41)	(-3.76)	(-1.09)	(-2.44)	(0.15)	(-2.77)
CDSINIT x INVTGRADE	0.376*	0.375**	0.338**	0.300*	0.365*	0.297*
	(1.87)	(2.23)	(1.99)	(1.77)	(1.76)	(1.72)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes		Yes		Yes	
Firm-fixed effects		Yes		Yes		Yes
Adjusted R^2	0.383	0.624	0.415	0.632	0.476	0.599
#Observations	6156	6,156	5,048	5,048	5,276	5,276
#Firms	526	526	425	425	445	445

Table 8. The relation between instrumented *CDSINIT* and the cost of capital

This table reports results of the regression of the cost of capital on the instrumented CDS initiation variable and a set of firm-level control variables. CDS activity and firm-level controls correspond to the period from 2001 to 2016, while the cost of capital variables cover the period from 2002 to 2017. Constants are computed but not reported. Variable definitions are provided in Appendix 2. All accounting variables are winsorized at the top and bottom 1%. We present estimates for industry- and firm-year fixed effects models in Columns (1) and (2), respectively. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level, and the number in parentheses is the *t* statistic. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	WACC		Cost of debt		Cost of equity	
	(1)	(2)	(1)	(2)	(1)	(2)
CDSFIRM	-0.319*** (-3.81)		0.244*** (3.42)		-0.108 (-1.21)	
Instrumented CDSINIT	-1.567*** (-9.73)	-1.138*** (-6.63)	-0.464*** (-3.68)	-0.188 (-1.38)	0.476*** (2.87)	0.509*** (2.77)
INVTGRADE	-0.154 (-1.32)	-0.558*** (-4.30)	0.067 (0.64)	0.079 (0.66)	-0.344*** (-2.88)	-0.170 (-1.35)
Instrumented CDSINIT x INVTGRADE (1,1)	0.806*** (4.47)	0.887*** (4.96)	-0.570*** (-3.89)	0.101 (0.70)	-0.731*** (-3.97)	-0.550*** (-2.93)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes		Yes		Yes	
Firm-fixed effects		Yes		Yes		Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
#Observations	37,392	37,392	37,392	37,392	37,392	37,392
#Firms	4,848	4,848	4,848	4,848	4,848	4,848
Adjusted R^2	0.401	0.657	0.421	0.668	0.444	0.635

Table 9. The impact of CDS trading liquidity on the cost of capital

This table presents results of the regression of various cost of capital measures on the following independent variables: *CDS daily trading notional volume* (first three models) and *total number of clearing dealers in a fiscal year* (last three models). Both of these independent variables are set to zero for non-CDS firms and for firms whose CDSs are not covered by the DTCC. We used the log of the notional volume to reduce the skewness of the distribution. All controls are included but have been omitted from the table for brevity. We report industry-fixed effects for all models, as well as year-fixed effects to control for time trends on the cost of capital. All control variables are winsorized at the top and bottom 1% and are lagged by one year relative to the cost of capital. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level, and *t* statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	WACC	Cost of debt	Cost of equity	WACC	Cost of debt	Cost of equity
CDSFIRM	-0.534***	0.041	-0.143	-0.543***	0.024	-0.186*
	(-4.62)	(0.60)	(-1.32)	(-4.77)	(0.36)	(-1.73)
Notional	-0.029**	-0.004	-0.005			
	(-2.41)	(-0.47)	(-0.50)			
Notional x INVTGRADE	0.006	-0.025***	-0.037***			
	(0.49)	(-2.63)	(-2.79)			
Dealer				-0.039**	-0.001	0.007
				(-2.29)	(-0.12)	(0.47)
Dealer x INVTGRADE				0.004	-0.030**	-0.058***
				(0.26)	(-2.34)	(-3.25)
INVTGRADE	-0.042	-0.078	-0.875	-0.030	-0.104	-0.871***
	(-0.39)	(-1.05)	(-7.80)	(-0.30)	(-1.42)	(-7.87)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.376	0.258	0.453	0.377	0.257	0.452
#Observations	16,774	16,774	16,774	16,774	16,774	16,774
#Firms	3,371	3,371	3,371	3,371	3,371	3,371

Table 10. The impact of CDS trading on the cost of capital using a subsample of CDS firms only

This table presents regression results based on CDS (treatment) firms only. We report industry- and firm-year fixed effects in Columns (1) and (2), respectively. All regressions include year-fixed effects to control for time trends in the various cost of capital measures. All control variables are winsorized at the top and bottom 1% and are lagged by one year compared to the dependent variable. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level, and *t* statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	WACC		Cost of debt		Cost of equity	
	(1)	(2)	(1)	(2)	(1)	(2)
CDSINIT	-0.258**	-0.246**	-0.139*	-0.185**	0.371***	0.362***
	(-2.05)	(-2.02)	(-1.64)	(-2.13)	(2.95)	(2.72)
INVTGRADE	0.215*	-0.218	-0.198**	-0.095	0.273**	0.091
	(1.79)	(-1.49)	(-2.03)	(-0.92)	(2.28)	(0.66)
CDSINIT x INVTGRADE	0.140	0.231*	0.064	0.142	-0.685***	-0.475***
(1,1)	(1.05)	(1.69)	(0.66)	(1.48)	(-5.29)	(-3.51)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes		Yes		Yes	
Firm-fixed effects		Yes		Yes		Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
#Observations	7,963	7,963	7,963	7,963	7,963	7,963
#Firms	656	656	656	656	656	656
Adjusted R^2	0.460	0.681	0.492	0.689	0.617	0.723

Table 11. The relationship between CDS trading and the market weight of debt

This table reports results of regressions of the market weight of debt on the CDS initiation variable and a set of firm-level control variables (excluding leverage ratio). CDS activity and firm-level control variables correspond to the period from 2001 to 2016, and the weight of debt, which is expressed as percentages, correspond to the period from 2002 to 2017. Constants have been computed but are omitted for brevity. Variable definitions are provided in Appendix 2. All accounting variables are winsorized at the top and bottom 1%. We present parameter estimates under industry- and firm-year fixed effects in Columns (1) and (2), respectively. In Columns (3) and (4), we report estimates based on quantile regression for quantiles of 0.25 and 0.75, respectively. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level for Column (1), and the numbers in parentheses are the *t* statistics. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Market weight of debt							
	(1)	(2)	(3)	(4)				
CDSFIRM	1.857**		3.125***	1.579**				
	(1.99)		(7.98)	(2.10)				
CDSINIT	3.310***	2.434**	5.466***	3.240***				
	(3.22)	(2.52)	(11.63)	(3.62)				
INVTGRADE	-5.347***	-0.604	0.290	-5.023***				
	(-6.08)	(-0.72)	(0.63)	(-5.78)				
CDSINITxINV	-6.556***	-1.775**	-6.454***	-8.357***				
TGRADE 1,1)	(-5.73)	(-1.96)	(-11.13)	(-7.58)				
Controls								
Tax	-39.537***	-24.991***	-10.625***	-42.850***	(18.89)	(13.72)	(24.62)	(11.88)
	(-18.21)	(-13.26)	(-11.22)	(-23.78)				
Log (Assets)	4.235***	5.747***	1.400***	4.764***	-4.364***	-5.882***	-4.794***	-1.515***
	(20.70)	(18.05)	(18.51)	(33.11)	(-21.25)	(-17.93)	(-31.17)	(-19.11)
Leverage	10.665***	6.350***	3.249***	11.135***	-10.632***	-6.855***	-10.893***	-3.633***
	(9.77)	(6.77)	(4.23)	(7.61)	(-9.42)	(-6.68)	(-6.97)	(-4.51)
Profitability	1066	-1.402*	-0.021	0.806	0.173	1.602*	0.666	0.394
	(1.34)	(-1.92)	(-0.05)	(0.96)	(0.21)	(1.93)	(0.75)	(0.86)
CAPEX	-0.518	-0.837***	0.001	-0.066	0.001	0.658***	0.230	-0.001
	(-0.37)	(-3.06)	(0.91)	(-0.03)	(0.52)	(2.67)	(0.08)	(0.86)
Growth	-0.398***	-0.145***	-0.128***	-0.363***	0.425***	0.187***	0.404***	0.147***
	(-14.92)	(-8.18)	(-7.91)	(-11.77)	(15.38)	(9.68)	(12.27)	(8.65)
Log (Age)	-0.090	5.349***	-0.039	-0.287	-0.003	-4.018***	0.089	0.015
	(-0.30)	(6.91)	(-0.34)	(-1.28)	(-0.01)	(-7.71)	(0.37)	(0.13)
Riskiness	14.204***	5.922***	2.210***	18.901***	-15.976***	-7.770***	-21.492***	-2.713***
	(18.49)	(9.42)	(5.96)	(26.78)	(-20.16)	(-11.56)	(-28.48)	(-6.98)
Dividends	-2.329***	-0.556	-0.584**	-2.108***	2.300***	0.633	2.032***	0.595**
	(-4.13)	(-1.03)	(-2.54)	(-4.82)	(4.04)	(1.16)	(4.35)	(2.47)
IO	13.399***	6.122***	3.938***	22.658***	-14.236***	-6.082***	-24.287***	-4.337***
Concentration	(10.62)	(5.74)	(7.42)	(22.44)	(-10.91)	(-5.41)	(-22.50)	(-7.79)
Liquidation	28.357***	12.661***	9.762***	34.376***	-29.968***	-14.069***	-36.373***	-10.625***
	(24.38)	(10.43)	(19.43)	(35.98)	(-24.90)	(-11.29)	(-35.60)	(-20.18)
R&D	-0.214**	-0.014	-0.026	-0.161	0.247***	0.059	0.074	0.042
	(-2.10)	(-0.12)	(-0.45)	(-1.47)	(2.65)	(0.61)	(0.34)	(0.69)
Stock liquidity	-1.980***	-0.646***	-0.385***	-2.427***	2.167***	0.867***	2.559***	0.423***
	(-8.94)	(-3.50)	(-4.04)	(-13.38)	(9.67)	(4.51)	(13.19)	(4.24)
Industry-effects	Yes		Yes	Yes	Yes		Yes	Yes
Firm-effects		Yes				Yes		
Year-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
#Observations	41,519	41,519	41,519	41,519	41,519	41,519	41,519	41,519
Firms	5,406	5,406	5,406	5,406	5,406	5,406	5,406	5,406
Adjusted R^2	0.431	0.803	0.194	0.329	0.434	0.801	0.332	0.193

Table 12. The relation between CDS trading and book leverage

This table reports results of the regression of book leverage on the CDS initiation variable and a set of firm-level control variables. CDS activity and firm-level controls cover the period from 2001 to 2017, while the leverage variable covers the period from 2002 to 2018. Constants are omitted for brevity. Variable definitions are provided in Appendix 2. All accounting variables are winsorized at the top and bottom 1%. We present parameter estimates under industry- and firm-year fixed effects in Columns 1 & 2, respectively. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level for Column (1), and the numbers in parentheses denote the *t* statistics. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Book Leverage	
	(1)	(2)
CDSFIRM	0.039^{***} (3.67)	
CDSINIT	0.028^{**} (2.36)	0.019^{**} (2.16)
INVTGRADE	-0.022^{**} (-2.30)	0.017^{*} (1.91)
CDSINIT x INVTGRADE (1,1)	-0.086^{***} (-6.49)	-0.027^{***} (-2.91)
Controls		
Tax	-0.517^{***} (-17.79)	-0.301^{***} (-14.37)
Log (Assets)	0.034^{***}(14.75)	0.038^{***} (10.31)
Profitability	0.006 (1.36)	-0.010^{*} (-1.67)
CAPEX	0.051^{**} (2.49)	-0.020^{***} (-7.49)
Growth	-0.001^{**} (-2.19)	-0.001^{**} (-2.22)
Log (Age)	-0.013^{***} (-4.20)	0.036^{***} (4.27)
Riskiness	0.024^{***} (3.03)	0.025^{***} (3.93)
Dividends	0.002 (0.37)	0.022^{***} (4.02)
IO Concentration	0.049^{***} (3.78)	0.044^{***} (3.02)
Liquidation	0.288^{***} (20.33)	0.106^{***} (7.08)
R&D	0.001 (0.15)	-0.001 (-0.49)
Stock liquidity	0.001 (0.52)	0.002 (1.00)
Industry-fixed effects	Yes	
Firm-fixed effects		Yes
Year-fixed effects	Yes	Yes
#Observations	41,519	41,519
Firms	5,406	5,406
Adjusted R^2	0.356	0.738

This table reports the regression of each of the WACC components on the CDS initiation variable and a set of firm-level control variables. The WACC components are the product of market weight of debt and cost of debt (examined in the first two models) and the product of market weight of equity and cost of equity (second two models). CDS activity and firm-level controls correspond to the period from 2001 to 2017, while WACC components span the period from 2002 to 2018. Constants are omitted for brevity. Variable definitions are provided in Appendix 2. All accounting variables are winsorized at the top and bottom 1%. We present parameter estimates under industry-year and firm-year fixed effects in Columns (1) and (2), respectively. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level for Column (1), and the numbers in parentheses are the *t* statistics. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Market weight of debt*Cost of debt		Market weight of equity*Cost of equity	
	(1)	(2)	(1)	(2)
CDSFIRM	0.180***		-0.536***	
	(3.46)		(-4.74)	
CDSINIT	-0.044	-0.112**	-0.445***	-0.306**
	(-0.81)	(-2.01)	(-3.38)	(-2.25)
INVTGRADE	-0.286***	-0.106**	0.150	-0.259**
	(-6.18)	(-2.44)	(1.38)	(-2.19)
CDSINIT x INVTGRADE	-0.270***	0.046	0.618***	0.302**
[1*1]	(-4.54)	(0.88)	(4.24)	(2.27)
Controls				
Tax	-2.075***	-1.172***	3.612***	3.001***
	(-21.10)	(12.67)	(11.83)	(9.99)
Log (Assets)	0.180***	0.280***	-0.096***	-0.180***
	(20.02)	(18.42)	(-3.51)	(-3.65)
Leverage	0.537***	0.312***	-1.330***	-0.928***
	(11.51)	(7.16)	(-7.86)	(-5.62)
Profitability	0.037***	-0.074*	-0.159***	0.148
	(2.65)	(-1.88)	(-2.67)	(1.64)
CAPEX	0.000	0.018	-0.279*	-0.213***
	(0.28)	(0.52)	(-1.85)	(-4.26)
Growth	-0.014***	-0.007**	0.054***	0.033***
	(-12.64)	(-8.22)	(13.06)	(10.16)
Log (Age)	0.003	0.233***	-0.084**	-0.782***
	(0.22)	(5.93)	(-2.05)	(-6.60)
Riskiness	0.561***	0.274***	0.516***	1.185***
	(15.53)	(8.57)	(4.48)	(10.66)
Dividends	-0.095***	0.063**	-0.003	-0.096
	(-3.71)	(2.22)	(-0.06)	(-1.26)
IO Concentration	0.446***	0.228***	-2.651***	-1.349***
	(8.58)	(4.65)	(-16.08)	(-7.58)
Liquidation	1.101***	0.503***	-3.682***	-2.078***
	(21.95)	(9.87)	(-21.17)	(-10.31)
R&D	-0.004	0.001	0.064***	0.001
	(-1.29)	(0.11)	(4.57)	(0.05)
Stock liquidity	-0.075***	-0.041***	0.808***	0.568***
	(-7.65)	(-4.58)	(25.22)	(17.83)
Industry-fixed effects	Yes		Yes	
Firm-fixed effects		Yes		Yes
Year-fixed effects	Yes	Yes	Yes	Yes
#Observations	41,519	41,519	41,519	41,519
Firms	5,406	5,406	5,406	5,406
Adjusted R^2	0.318	0.720	0.355	0.691

Table 13. The impact of CDS trading on debt placement

This table reports results of the regression of various debt composition variables on CDS initiation and a set of firm-level control variables. The dependent variables are the ratios of each type of debt to total debt, corresponding to the period from 2001 to 2017. Constants are estimated but not reported, and all controls lag the dependent variable by one year. Variable definitions are provided in Appendix 2. All accounting variables are winsorized at the top and bottom 1%. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level, and the numbers in parentheses are the *t* statistics. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Total public debt		Bonds and notes		Commercial paper		Other borrowings	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
CDSFIRM	0.027*		0.011		0.089***		-0.065***	
	(1.71)		(0.74)		(3.02)		(-3.76)	
CDSINIT	0.038**	0.028*	0.052***	0.042***	-0.082**	-0.093***	0.033**	0.014
	(2.33)	(1.73)	(3.19)	(2.57)	(-2.53)	(-3.03)	(2.907)	(0.91)
INVTGRADE	0.145***	0.086***	0.132***	0.071***	-0.043	-0.036	-0.029*	0.002
	(9.98)	(4.73)	(8.79)	(3.89)	(-1.38)	(-0.92)	(-1.77)	(0.14)
CDSINIT x INVTGRADE (1,1)	-0.075***	-0.044**	-0.076***	-0.036**	0.014	0.038	0.072***	0.020
	(-4.14)	(-2.43)	(-4.16)	(1.94)	(0.45)	(1.06)	(3.75)	(0.96)
Controls								
Tax	-0.364***	-0.223***	-0.358***	-0.214***	0.004	-0.031	0.094*	0.010
	(-7.71)	(-5.00)	(-7.62)	(-4.77)	(0.05)	(-0.42)	(1.69)	(0.22)
Log (Assets)	0.023***	0.024***	0.019***	0.022***	-0.022***	-0.022	-0.004	-0.014
	(5.10)	(2.99)	(4.35)	(2.73)	(-2.72)	(-1.06)	(-0.77)	(-1.38)
Leverage	0.020	-0.002	0.030	0.009	-0.072	-0.074	-0.136***	-0.107***
	(0.77)	(-0.06)	(1.11)	(0.36)	(-1.45)	(-1.51)	(-3.91)	(-3.05)
Profitability	-0.066***	-0.009	-0.065***	-0.012	0.009	0.076	-0.018	-0.007
	(-4.12)	(-0.69)	(-4.08)	(-0.89)	(0.14)	(1.10)	(-0.73)	(-0.32)
CAPEX	-0.011	-0.010**	-0.010	-0.010**	0.007	0.021	-0.001	0.001
	(-0.83)	(-2.31)	(-0.80)	(-2.39)	(0.33)	(1.11)	(-0.61)	(0.93)
Growth	0.001*	0.000	0.001	0.001	0.001	-0.001	0.000	-0.000
	(1.90)	(0.53)	(1.06)	(0.36)	(1.25)	(-1.30)	(0.37)	(-0.39)
Log (Age)	0.001	-0.022	-0.003	-0.026	0.007	-0.058*	0.012*	0.010
	(0.17)	(-1.09)	(-0.40)	(-1.28)	(0.61)	(-1.90)	(1.75)	(0.47)
Riskiness	-0.078***	0.006	-0.079***	-0.008	-0.001	0.049	-0.003*	-0.032*
	(-4.71)	(-0.45)	(-4.74)	(-0.59)	(-0.01)	(0.70)	(-1.76)	(-1.72)
Dividends	0.053***	0.037***	0.040***	0.037***	0.008	0.000	-0.002	-0.039***
	(5.25)	(2.94)	(4.06)	(2.71)	(0.85)	(0.03)	(-0.02)	(-2.78)
IO concentration	-0.036	0.050*	-0.040**	0.059**	0.048	-0.078	0.026	-0.005
	(-1.29)	(1.88)	(-1.42)	(2.18)	(0.23)	(-0.29)	(0.72)	(-0.15)
Liquidation	-0.314***	-0.202***	-0.310***	-0.203***	-0.154**	-0.013	-0.308***	-0.155***
	(-10.39)	(-5.66)	(-10.26)	(-5.65)	(-2.11)	(-0.17)	(-7.71)	(-3.17)
R&D	0.000	-0.001	-0.000	-0.001	-0.212	-0.164	0.015**	0.016**
	(0.01)	(-0.55)	(-0.04)	(-0.58)	(-1.03)	(-0.91)	(2.51)	(2.21)
Stock liquidity	0.053***	0.019***	0.056***	0.022***	-0.018	-0.024	-0.007	0.005
	(10.14)	(3.90)	(10.64)	(4.38)	(-1.35)	(-1.72)	(-1.24)	(0.86)
Industry-fixed effects	Yes		Yes		Yes		Yes	
Firm-fixed effects		Yes		Yes		Yes		Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
#Observations	22,210	22,210	22,162	22,162	2,413	2,413	10,431	10,431
#Firms	3,327	3,327	3,324	3,324	289	289	2052	2052
Adjusted R^2	0.270	0.637	0.250	0.671	0.234	0.538	0.132	0.626

Table 12. Continued

	Total private debt		Term loans		Revolving credits		Capital leases	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
CDSFIRM	-0.064***		-0.031		-0.095***		-0.031	
	(-3.35)		(-1.41)		(-5.75)		(-1.42)	
CDSINIT	-0.063***	-0.048***	-0.015	-0.031	-0.038**	-0.032**	0.000	0.016
	(-3.04)	(-2.74)	(-0.68)	(-1.61)	(-2.35)	(-2.22)	(0.01)	(0.74)
INVTGRADE	-0.215***	-0.141***	-0.144***	-0.141***	-0.107***	-0.063***	-0.056***	-0.032
	(-12.66)	(-7.18)	(-7.31)	(-5.84)	(-7.60)	(-3.96)	(-3.21)	(-1.55)
CDSINIT x INVTGRADE (1,1)	0.091***	0.057***	0.004	0.042*	0.098***	0.051***	0.057***	0.002
	(4.44)	(2.94)	(0.17)	(1.76)	(6.35)	(3.30)	(2.88)	(0.12)
Controls								
Tax	0.546***	0.277***	0.348***	0.103*	0.391***	0.218***	0.137**	0.064
	(12.19)	(6.29)	(6.38)	(1.92)	(8.40)	(5.03)	(2.54)	(1.25)
Log(assets)	-0.074***	-0.069***	-0.039***	-0.029***	-0.061***	-0.061***	-0.029***	-0.017*
	(-17.80)	(-8.27)	(-8.56)	(-2.98)	(-14.50)	(-7.31)	(-6.24)	(-1.72)
Leverage	0.012	0.006	0.005	-0.030	-0.027	-0.014	-0.021	-0.026***
	(0.49)	(0.27)	(0.19)	(-1.04)	(-1.00)	(-0.57)	(-0.66)	(-0.85)
Profitability	-0.002	0.002	0.003	0.005	-0.012	-0.001	0.004	0.003
	(-0.01)	(0.49)	(0.36)	(0.79)	(-1.63)	(-0.28)	(0.77)	(0.76)
CAPEX	-0.040***	-0.012***	-0.049***	0.000	0.023	-0.001	0.510	0.573**
	(-4.07)	(-3.20)	(-4.09)	(0.01)	(0.77)	(-0.14)	(0.57)	(2.14)
Growth	-0.001	0.001	0.000	0.001	-0.001	0.000	0.001	-0.000
	(-0.72)	(0.68)	(0.41)	(0.68)	(-1.34)	(0.66)	(0.14)	(-0.27)
Log (Age)	-0.028 ***	0.003	-0.050***	0.001	0.016***	-0.012	-0.012*	-0.058**
	(-4.54)	(0.15)	(-7.11)	(0.06)	(2.66)	(-0.57)	(-1.84)	(-2.44)
Riskiness	0.004	-0.018	-0.037**	-0.018	0.009	-0.033**	-0.018	-0.012
	(0.31)	(-1.33)	(-2.01)	(-1.07)	(0.58)	(-2.29)	(-1.01)	(-0.76)
Dividends	-0.033***	0.005	-0.038***	-0.028**	0.006	0.027**	0.011	-0.002
	(-3.31)	(0.38)	(-3.37)	(-2.07)	(0.75)	(2.52)	(1.05)	(-0.17)
IO concentration	-0.022	-0.049**	0.035	0.001	-0.098***	-0.037	-0.110***	-0.078***
	(-0.98)	(-2.16)	(1.32)	(0.05	(-3.64)	(-1.41)	(-3.85)	(-2.89)
Liquidation	0.094***	0.201***	-0.140***	-0.111***	-0.023	0.205***	-0.650***	-0.414***
	(3.05)	(5.25)	(-4.06)	(-2.60)	(-0.68)	(5.04)	(-17.79)	(-7.89)
R&D	0.005*	-0.001	0.007***	-0.003	0.003	0.010	0.003	-0.012***
	(1.84)	(-0.40)	(2.70)	(-0.78)	(0.41)	(1.02)	(0.79)	(-3.54)
Stock liquidity	-0.028***	-0.009**	-0.005***	-0.003	-0.014***	-0.003	0.008	-0.003
	(-6.28)	(-2.19)	(-1.02)	(-0.54)	(-2.83)	(-0.67)	(1.54)	(-0.53)
Industry-fixed effects	Yes		Yes		Yes		Yes	
Firm-fixed effects		Yes		Yes		Yes		Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
#Observations	26,346	26,346	15,920	15,920	22,276	22,276	13,386	13,386
#Firms	3,999	3,999	3,132	3,132	3,482	3,482	2,641	2,641
Adjusted R^2	0.318	0.701	0.203	0.680	0.250	0.676	0.123	0.652

Appendix 1. Bloomberg methodology for computing WACC, cost of debt, and cost of equity

1.WACC cost of debt (after tax)

The after-tax weighted average cost of debt for the security is calculated using government bond rates, a debt adjustment factor, the proportions of short- and long-term debt to total debt, and the stock's effective tax rate. The debt adjustment factor represents the average yield above government bonds for a given rating class. The lower the rating, the higher the adjustment factor. The debt adjustment factor (AF) is only used when a company does not have a fair market curve (FMC). When a company does not have a credit rating, an assumed rating of 1.38 (the equivalent rating of a BBB + Standard & Poor's long-term currency issuer rating) is used. The exact calculation of the debt adjustment factor is a Bloomberg proprietary calculation.

Cost of Debt = [[(SD/TD) * (CS*AF)] + [(LD/TD) * (CL*AF)]] * [1-TR],

where SD = Short Term Debt, TD = Total Debt, CS = Pre-Tax Cost of Short-Term Debt, AF = Debt Adjustment Factor, LD = Long-Term Debt, CL = Pre-Tax Cost of Long-Term Debt, TR = Effective Tax Rate.

2. WACC Cost of Equity

The cost of equity is derived from the Capital Asset Pricing Model (CAPM).

The cost of equity = Risk-free rate + [beta * Country risk Premium].

The default value for the risk-free rate is the country's long-term bond rate (10-year).

3. WACC (Weighted Average cost of Capital)

The cost of capital is computed as:

WACC = [KD * (TD/V)] + [KP * (P/V)] + [KE * (E/V)],

where KD = Cost of Debt, TD = Total Debt, V = Total Capital, KP = Cost of Preferred, P = Preferred Equity, KE = Cost of Equity, E = Equity Capital.

Total Capital = Total Debt + Preferred Equity + Equity Capital. Figures are drawn from the company's most recent report, annual or interim.

3. WACC Weight of Equity

The ratio of market capital to total capital, calculated as:

Historical Market Cap/ (Historical Cap + ST Borrowings + LT Borrowings + Preferred Equity).

4. WACC Weight of Debt

The ratio of total debt to total capital, calculated as:

(ST Borrowings + LT Borrowings) / (Historical Market Cap + ST Borrowings + LT Borrowings + Preferred Equity).

Appendix 2. Variable definitions

Variable Name	Definition	Source
WACC	The weighted average of cost of debt (after tax) and cost of capital; see Appendix 1 for details.	Bloomberg
Cost of debt	The overall cost of debt, including all sources of debt financing; see Appendix 1 for details.	Bloomberg
Cost of equity	The required rate of return of investors, computed from the capital asset pricing model (CAPM); see Appendix 1 for details.	Bloomberg
Weight of debt	The weight of debt evaluated on market values; see Appendix 1 for details.	Bloomberg
Weight of equity	The weight of equity evaluated on market values; see Appendix 1 for details.	Bloomberg
Default	The five-year predicted default probability.	Bloomberg
Public debt	The ratio of the sum of bank loans, term loans, and revolving credit to total debt.	Capital IQ
Bond	The ratio of the sum of senior bonds and notes and subordinated bonds and notes to total debt.	Capital IQ
Commercial	The ratio of commercial papers to total debt.	Capital IQ
Bank debt	The ratio of the sum of senior bonds and notes, subordinated bonds and notes, and commercial papers to total debt.	Capital IQ
Bank loan	The ratio of the sum of bank loans and term loans to total debt.	Capital IQ
Revolving credit	The ratio of revolving credit to total debt.	Capital IQ
Lease	The ratio of capital lease to total debt.	Capital IQ
Other	The ratio of other borrowings to total debt.	Capital IQ
CDSFIRM	A dummy variable that has a value of one for CDS firms and zero for non-CDS firms (for which CDSs have never been referenced on their debts in CDS markets over the sample period).	Constructed
CDSINIT	A dummy variable that has a value of one for the CDS firm in and after the CDS initiation year and zero before that.	Constructed
CDSREVERSAL	A dummy variable that has a value of one for the CDS firm in the years immediately following the termination of CDS trading, and zero otherwise.	Constructed
CDSLAG	The variable *CDSINIT* lagged by one year.	Constructed
Dealer	The total number of clearing dealers in the fiscal year scaled using the natural log	DTCC
Notional	The average daily trading notional volume scaled by the long-term debt in the fiscal year.	DTCC
Log (Assets):	Total assets (AT) on the natural log scale.	Compustat
Profitability	Earnings before interest and taxes (EBIT) divided by total assets (AT).	Compustat
Liquidation	1-Tangibility (see next definition).	Compustat
Tangibility	The ratio of (0.715 × Receivables + 0.547 × Inventory + 0.535 × Capital + 1 × Cash Holdings) to the total assets (AT).	Compustat
CAPEX	The ratio of capital expenditures (CAPX) to total sales (SALE).	Compustat
Cash	Cash and equivalent (CHE) divided by total assets (AT).	Compustat
PPE ratio	The property, plant, and equipment (in net terms) (PPENT) divided by assets (AT).	Compustat

Appendix 2. Continued

Variable Name	Definition	Source
MTBV	The ratio of equity market value to equity book value.	Compustat
EWACC	Empirical WACC computed by regressing net operating profit after taxes on total capital.	Compustat
NOPAT	Net operating profit after taxes.	Compustat
Total_Capital	The average of the book value and market value of a firm.	Compustat
Log (Age):	A firm's age is computed by selecting its earliest initial public offering (IPO) date and the first date when the firm was included in COMPUSTAT. The number of years elapsed since the earliest date is used to approximate a firm's age.	Compustat/CRSP
Riskiness	The stock volatility over the previous five fiscal years.	CRSP
Stock liquidity	The yearly stock turnover by volume divided by outstanding common shares.	Compustat
R&D	The ratio of R&D expenditure to total sales.	Compustat
Md rated	An indicator variable that has a value of one if a firm is rated by Moody, and zero otherwise.	Moody
INVTGRADE	An indicator variable that has a value of one if a firm's rating is greater or equal to Baa3 and zero otherwise.	Moody
Leverage	The ratio of total debt (DT) to total assets (AT).	Compustat
Res	The residual of regressing leverage on *CDSINIT* in a firm-year fixed effects model.	Computed
IO concentration	Herfindahl-Hirschman Index of institutional ownership, which is defined as: $HHI_{i,t} = \sum_{i,j,t}^{N_{i,t}} S_{i,j,t}^2$, where $N_{i,t}$ is firm i's total number of owners at time t and $S_{i,j,t}^2$ is the square of the percentage ownership in company i at time t of owner j.	Thomson 13f
Dividends	Cash dividend payments divided by total assets.	Compustat
ROA	Net income (NI) divided by total assets (AT).	Compustat
FF48	Fama-French 48 industry classification.	Compustat
FF17	Fama-French 17 industry classification.	
WCAP	The ratio of working capital (WCAP) to total assets (AT).	Compustat
Net equity issuance	Sale of common and preferred stock (SSTK) minus the purchase of common and preferred stock (PRSTKC) scaled by start-of-period assets (AT).	Compustat
Net debt issuance	Debt issuance (DLTIS) less debt repayments (DLTR) plus the change in short-term debt (DLCCH), scaled by assets (AT).	Compustat
High_liquidation	An indicator variable that has a value of one if the liquidation cost is above the sample median, and zero otherwise.	Compustat
High_Leverage	An indicator variable that has a value of one if the leverage ratio is above the sample median, and zero otherwise.	Compustat
High_IO_Concentration	An indicator variable that has a value of one if the HHI of institutional ownership is above the sample median, and zero otherwise.	Thomson 13f
CDS percentage	For a given firm, this is the percentage of CDS firms, among all firms whose head offices are within a 200-mile radius of the given firm, whose 2-digit SIC industry code differs from that of the given	Constructed

firm.

Online Appendix A1. The quantile regressions of WACC on CDS trading

This table reports estimates obtained from the regression of WACC on the CDS initiation variable and a set of firm-level control variables. CDS activity and firm-level controls span the period from 2001 to 2017, and WACC spans the period from 2002 to 2018. Constants are omitted for brevity. Variable definitions are provided in Appendix 2. All accounting variables are winsorized at the top and bottom 1%. Columns (1), (2), and (3) report estimates from industry-year fixed effects models for the 0.25, 0.50, and 0.75 quantiles, respectively. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are computed, and the number in parentheses is the *t* statistic. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	WACC		
	(1)	(2)	(3)
CDSFIRM	-0.375*** (-4.61)	-0.348*** (-4.66)	-0.266*** (-3.19)
CDSINIT	-0.438*** (-4.48)	-0.601*** (-6.71)	-0.753*** (-7.50)
INVTGRADE	0.024 (0.26)	-0.163*** (-1.88)	-0.223** (-2.30)
CDSINIT x INVTGRADE (1,1)	0.216* (1.80)	0.455*** (4.13)	0.478*** (3.87)
Controls			
Tax	2.006*** (10.17)	1.408*** (7.80)	1.275*** (6.30)
Log (Assets)	0.098*** (6.42)	0.090*** (6.45)	0.075*** (4.75)
Leverage	-1.886*** (-13.53)	-1.670*** (-13.09)	-1.431*** (-10.02)
Profitability	-0.167* (-1.82)	-0.387*** (-4.59)	-0.633*** (-6.70)
CAPEX	-0.337** (-2.16)	-0.323*** (-4.83)	-0.284*** (-3.79)
Growth	0.043*** (-4.62)	0.047*** (15.36)	0.048*** (13.80)
Log (Age)	0.038 (1.60)	-0.015 (0.68)	-0.056 (0.03)
Riskiness	0.600*** (7.73)	1.709*** (24.06)	1.521** (-2.28)
Dividends	-0.112** (-2.41)	-0.124*** (-2.92)	-0.177*** (-3.72)
IO concentration	-2.427*** (-21.88)	-2.707*** (-26.67)	-2.493*** (-21.93)
Liquidation	-2.184 (-21.43)	-2.454*** (-26.31)	-2.451*** (-23.46)
R&D	0.110*** (8.12)	0.108*** (8.68)	0.106*** (7.62)
Stock liquidity	0.663*** (33.71)	0.699*** (38.82)	0.704 (34.92) ***
Industry effects	Yes	Yes	Yes
Year effects	Yes	Yes	Yes
Pseudo R-square	0.200	0.236	0.266
# Observations	41,430	41,430	41,430

Online Appendix A2. Probit regression estimates for the fitted probability of CDS trading initiation

This table presents the coefficient estimates of the probit model specified by Equation (2), which is used to predict the inception of CDS trading. The sample includes all firm-year observations for non-CDS firms and CDS firms. The sample period is from 2001 to 2018. The dependent variable, *CDSINIT*, equals one in and after the CDS trading initiation year for CDS firms, and zero otherwise. All control variables are lagged by one year. CDS percentage is an instrumental variable that represents the percentage of CDS firms, among all firms whose headquarters are within a 200-mile radius of the given firm, whose 2-digit SIC industry code does not correspond to the firm's industry code. The definitions of the control variables are provided in Appendix 2. All control variables are winsorized at the top and bottom 1%. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level, and *t* statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable = Prob (CDSINIT=1)	
Variable	Coefficient
Constant	-17.327 (-8.62) ***
Log (Assets)	0.880 (55.025) ***
Growth	-0.011 (-3.89) ***
Risk	0.294 (3.29) ***
Profitability	-0.015 (-0.126)
PPE ratio	-0.041 (-0.304)
CAPEX	-0.438 (-5.19) ***
Dividends	0.163 (6.02) ***
IO concentration	1.277 (8.14) ***
Leverage	0.732 (6.90) ***
Log (Age)	0.351 (16.27) ***
Cash	-0.455 (-2.21) **
Turnover	0.075 (2.50) ***
Liquidation	-0.801 (-3.41) ***
R&D	-0.022 (-0.38)
WCAP	-0.440 (-3.32) ***
Moody rated	0.667 (20.59) ***
INVTGRADE	0.376 (9.34) ***
Stock liquidity	0.235 (10.16) ***
CDS percentage	**2.207 (10.68) *****
Likelihood Ratio	23,456.273***
Industry- and year-fixed effects	Yes
Pseudo R^2	74.51%
Percent Concordant /C	97.3%
C	0.973
#Observations	46,495

Online Appendix A3. The effect of the termination of CDS trading on WACC

This table reports results of regressing WACC on the CDS initiation variable, *CDSINIT*, and a variable that represents the cessation of CDS trading, *CDSREVERSAL*, as well as a set of firm-level control variables. CDS activity and firm-level controls correspond to the period from 2001 to 2016, while the cost of capital measure corresponds to the period from 2002 to 2017. Constants are computed but not reported. Variable definitions are provided in Appendix 2. All accounting variables are winsorized at the top and bottom 1%. We present estimates with industry- and firm-year fixed effects in Columns (1) and (2), respectively. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level, and the number in parentheses is the *t* statistic. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	WACC	
	(1)	(2)
CDSFIRM	-0.372*** (-4.19)	
CDSINIT	-0.674*** (-6.09)	-0.476*** (-4.58)
INVTGRADE	-0.105 (-1.23)	-0.398*** (-4.21)
CDSINIT x INVTGRADE	0.498*** (4.03)	0.358*** (3.34)
CDSREVERSAL	0.232* (1.88)	0.193* (1.86)
Controls		
Tax	1.573*** (5.96)	1.467*** (5.61)
Log(assets)	0.054** (2.39)	0.090** (2.10)
Leverage	-2.078*** (-12.34)	-0.670*** (-4.40)
Profitability	-0.585*** (-5.20)	0.036 (-0.85)
CAPEX	-0.265** (-2.09)	-0.214** (-2.33)
Growth	0.048*** (12.38)	0.026*** (8.43)
Log (Age)	-0.066* (-1.89)	-0.523*** (-5.08)
Riskiness	1.137*** (13.38)	1.620*** (16.24)
Dividends	-0.150*** (-2.63)	-0.052 (-0.75)
IO concentration	-2.336*** (-15.96)	-1.149*** (-7.18)
Liquidation	-2.533*** (-18.43)	-1.451*** (-8.01)
R&D	0.080*** (5.21)	0.008 (0.36)
Stock liquidity	0.751*** (21.74)	0.526*** (18.60)
Industry-fixed effects	Yes	
Firm-fixed effects		Yes
#Observations	41,519	41,519
#Firms	5,406	5,406
Adjusted R^2	0.3148	0.649

Online Appendix A4. The impact of CDS trading on the cost of capital using a sample that excludes the financial crisis and a sample that only includes observations between 2002 and 2017

Panel A presents regression results based on sample firms from the period between 2002 and 2017, while Panel B excludes observations from the financial crisis period (2008-2009). We report industry-fixed and firm-fixed effects in Columns (1) and (2), respectively. All regressions include year-fixed effects to control for time trends on the cost of capital. All control variables are winsorized at the top and bottom 1% and are lagged by one year compared to the dependent variables. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level, and *t* statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. CDS trading effects based on a sample restricted to the period between 2002 and 2017

	WACC		Cost of debt		Cost of equity	
	(1)	(2)	(1)	(2)	(1)	(2)
CDSINIT	-0.381***		0.335***		-0.396***	
	(-4.15)		(3.81)		(-4.00)	
CDSLAG	-0.456***	-0.361***	-0.237**	-0.264**	0.288**	0.441***
	(-4.27)	(-3.34)	(-2.53)	(-3.05)	(2.48)	(3.65)
INVTGRADE	-0.157*	-0.408***	0.028	0.089	-0.498***	-0.253**
	(-1.65)	(-4.15)	(0.31)	(0.81)	(-4.93)	(-2.60)
CDSINIT x	0.354***	0.349***	-0.551***	0.042	-0.627***	-0.291**
INVTGRADE	(2.81)	(3.07)	(-4.90)	(0.38)	(-4.75)	(-2.31)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes		Yes		Yes	
Firm-fixed effects		Yes		Yes		Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.351	0.651	0.330	0.663	0.408	0.637
#Observations	38,499	38,499	38,499	38,499	38,499	38,499
#Firms	5,151	5,151	5,151	5,151	5,151	5,151

Panel B. CDS trading effects based on a sample excluding the financial crisis periods of 2008 and 2009

	WACC		Cost of debt		Cost of equity	
	(1)	(2)	(1)	(2)	(1)	(2)
CDSINIT	-0.362***		0.248***		-0.378***	
	(-4.41)		(2.96)		(-4.43)	
CDSLAG	-0.474***	-0.393***	-0.202**	-0.259***	0.234**	0.398***
	(-4.70)	(-3.79)	(-2.30)	(-3.11)	(2.23)	(3.56)
INVTGRADE	-0.182**	-0.375***	-0.120	0.069	-0.517***	-0.254***
	(-2.11)	(-3.91)	(-1.39)	(0.64)	(-5.78)	(-2.62)
CDSINIT x	0.283**	0.293***	-0.361***	0.113	-0.598***	-0.351***
INVTGRADE	(2.35)	(2.62)	(-3.53)	(1.08)	(-4.86)	(-2.87)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes		Yes		Yes	
Firm-fixed effects		Yes		Yes		Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.374	0.666	0.353	0.680	0.412	0.644
#Observations	36,626	36,626	36,626	36,626	36,626	36,626
#Firms	5,351	5,351	5,351	5,351	5,351	5,351

This table reports results of the regression of the interest rate of three types of debt on the CDS initiation variable and a set of firm-level control variables. The dependent variables correspond to the period from 2002 to 2017. All control variables lag the dependent variable by one year, and constants are estimated but not reported. Variable definitions are provided in Appendix 2. All accounting variables are winsorized at the top and bottom 1%. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level, and the numbers in parentheses are the *t* statistics. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Average interest rate of arm's length debt		Average interest rate of bank loans		Average interest rate of revolving credits	
	(1)	(2)	(1)	(2)	(1)	(2)
CDSFIRM	0.481*** (3.09)		-0.233 (-1.28)		0.010 (0.07)	
CDSINIT	0.445*** (2.70)	-0.038 (-0.27)	0.044 (0.21)	0.201 (0.86)	0.162 (0.91)	-0.103 (-0.53)
INVTGRADE	-0.102 (-0.72)	-0.532*** (-3.48)	-0.141 (-0.60)	0.077 (0.32)	-0.021 (-0.12)	-0.277 (-1.37)
CDSINIT x INVTGRADE (1,1)	-0.753*** (-4.40)	0.167 (1.15)	-0.216 (-0.88)	0.137 (0.51)	0.311 (1.31)	0.138 (0.62)
Controls						
Tax	-1.658*** (-3.12)	-0.847** (-2.40)	-0.256*** (-7.91)	-0.271*** (-2.95)	-0.175*** (-5.25)	-0.038 (-0.52)
Log (Assets)	-0.126* (-2.36)	-0.193** (-2.45)	-0.256*** (-7.91)	-0.271*** (-2.95)	-0.175*** (-5.25)	-0.038 (-0.52)
Leverage	0.112 (0.82)	0.141* (1.78)	0.853*** (4.22)	0.671** (2.57)	0.878*** (4.71)	0.748*** (3.54)
Profitability	-0.083 (-0.29)	-0.094 (-0.73)	-2.280*** (-6.42)	-0.469* (-1.75)	-1.922*** (-7.22)	-0.454* (-1.91)
CAPEX	-0.458*** (-2.87)	-0.046 (-1.38)	-0.082 (-0.79)	-0.000 (-0.00)	-0.058 (-0.63)	-0.048 (-0.49)
Growth	0.000 (0.01)	0.001 (1.44)	0.002 (0.38)	0.003 (0.09)	-0.006 (-1.21)	-0.001 (-0.35)
Log (Age)	-0.048 (-0.73)	0.387* (1.72)	-0.030 (-0.53)	-0.158 (-0.82)	-0.212*** (-4.43)	-0.125 (-0.68)
Riskiness	1.232*** (5.37)	0.261** (2.10)	1.077*** (6.15)	0.412*** (2.93)	1.250*** (8.88)	0.620*** (4.90)
Dividends	-0.001 (-0.23)	0.019*** (8.15)	-0.079 (-1.00)	-0.145*) (-1.86)	-0.006 (-0.08)	-0.078 (-0.97)
IO concentration	0.574 (1.47)	0.516* (1.86)	0.482* (1.91)	0.406* (1.82)	0.531** (2.51)	0.183 (0.95)
Liquidation	2.489*** (7.22)	1.134*** (3.87)	-0.136*** (-0.50)	-0.496 (-1.33)	0.517* (1.88)	-0.161 (-0.42)
R&D	0.001* (1.71)	-0.001*** (-2.86)	0.285*** (2.82)	-0.073 (-0.85)	0.083 (0.42)	-0.231* (-1.65)
Stock liquidity	-0.407*** (-6.45)	-0.089* (-1.65)	0.008 (0.20)	0.086** (2.05)	0.008 (0.22)	0.004 (0.12)
Industry-fixed effects	Yes		Yes		Yes	
Firm-fixed effects		Yes		Yes		Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
#Observations	10,690	10,690	15,698	15,698	11,526	11,526
#Firms	1,737	1,737	3,186	3,186	2,449	2,449
Adjusted R^2	0.288	0.806	0.209	0.701	0.212	0.684

	Tobin's Q			
	(1)	(2)	(3)	(4)
CDSFIRM	0.279^{***}		0.271^{***}	
	(4.59)		(4.45)	
CDSINIT	-0.214^{***}	-0.135^{***}	-0.200^{***}	-0.073
	(-4.04)	(-3.39)	(-3.10)	(-1.58)
INVTGRADE	0.204^{***}	0.053	0.223^{***}	0.127^{**}
	(5.48)	(1.25)	(4.58)	(2.14)
CDSINIT x			-0.033	-0.139^{**}
INVTGRADE (1,1)			(-0.53)	(-2.32)
Controls				
Tax	0.032	0.602^{***}	0.033	0.614^{***}
	(0.23)	(4.58)	(0.24)	(4.67)
Log (Assets)	-0.130^{***}	-0.370^{***}	-0.130^{***}	-0.317^{***}
	(-9.43)	(-14.93)	(-9.42)	(-14.95)
Leverage	0.357^{***}	0.057	0.357^{***}	0.055
	(3.97)	(0.71)	(3.97)	(0.68)
Profitability	0.057	0.090^{**}	0.057	0.090^{**}
	(1.43)	(2.07)	(1.43)	(2.07)
CAPEX	-0.039	-0.321^{***}	-0.038	-0.318^{***}
	(-1.16)	(-4.35)	(-1.15)	(-4.12)
Growth	0.081^{***}	0.044^{***}	0.083^{***}	0.044^{***}
	(19.81)	(14.08)	(19.82)	(14.08)
Log (Age)	-0.127^{***}	-0.265^{***}	-0.127^{***}	-0.270^{***}
	(-7.17)	(-4.87)	(-7.16)	(-4.95)
Riskiness	-0.441^{***}	-0.180^{***}	-0.440^{***}	-0.179^{***}
	(-10.05)	(-4.41)	(-10.03)	(-4.38)
Dividends	0.123^{***}	0.119^{***}	0.124^{***}	0.122^{***}
	(3.91)	(3.84)	(3.89)	(3.98)
IO Concentration	-0.543^{***}	-0.388^{***}	-0.543^{***}	-0.388^{***}
	(-8.09)	(-5.73)	(-8.09)	(-5.75)
Liquidation	-0.554^{***}	-0.412^{***}	-0.554^{***}	-0.411^{***}
	(-6.31)	(-4.00)	(-6.31)	(-3.99)
R&D	0.024^{**}	0.001	0.024^{**}	0.001
	(2.30)	(0.04)	(2.30)	(0.04)
Stock liquidity	0.160^{***}	0.080^{***}	0.160^{***}	0.079^{***}
	(12.19)	(6.27)	(12.15)	(6.23)
Industry-fixed effects	Yes		Yes	
Firm-fixed effects		Yes		Yes
Year-fixed effects	Yes	Yes	Yes	Yes
#Observations	41,505	41,505	41,505	41,505
Firms	5,401	5,401	5,401	5,401
Adjusted R^2	0.254	0.659	0.255	0.660

	Financing activity (FINCF)		Net operating cash flow (OANCF)		Invested Capital (ICAPT)		Acquisition (AQC)		Capital expenditure (CAPX)	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
CDSFIRM	0.063*** (8.15)		-0.014** (-2.55)		0.073*** (4.89)		0.028*** (4.39)		0.004 (1.22)	
CDSINIT	-0.051*** (-6.64)	-0.018** (-2.13)	-0.016*** (-2.92)	-0.009* (-1.73)	-0.096*** (-6.53)	-0.057*** (-3.74)	-0.034*** (-5.47)	-0.029*** (-4.56)	-0.009*** (-2.58)	-0.007* (-1.93)
INVTGRADE	0.012* (1.92)	0.045*** (5.11)	-0.008* (-1.84)	-0.001 (-0.33)	-0.027** (-2.00)	0.024 (1.47)	0.001 (0.2)	0.014** (2.05)	-0.001 (-0.45)	0.002 (0.67)
CDSINIT x INVTGRADE	0.026*** (3.37)	0.003 (0.34)	0.004 (0.69)	0.007 (1.56)	0.056*** (3.44)	0.031* (1.81)	0.006 (1.10)	0.003 (0.46)	0.006** (2.07)	0.009*** (2.66)
Overall effect INVTGRADE	(p=0.000, f=11.32)	(p=0.063, f=3.45)	(p=0.006, F=7.44)	(p=0.720, F=0.13)	(p=0.004, f=8.14)	(p=0.066, f=3.37)	(p=0.000, f=23.51)	(p=0.000, f=19.94)	-0.00273 (p=0.3364, f=0.92)	0.002 (p=0.3279, f=0.96)
Controls										
Industry-fixed effects	Yes		Yes		Yes		Yes		Yes	
Firm-fixed effects		Yes		Yes		Yes		Yes		Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.177	0.414	0.421	0.665	0.103	0.426	0.131	0.206	0.278	0.633
#Observations	39,236	39,236	39,029	39,029	39,074	39,074	37,922	37,922	38,972	38,972
#Firms	5,110	5,110	5,078	5,078	5,101	5,101	5,061	5,061	5,086	5,086

The relationship between cost of debt and various debt composition ratios

This table reports results of the regression of the cost of debt on various debt composition ratios, which are the ratios of the debt instrument in question to the total debt. The dependent variables correspond to the period from 2001 to 2017, while the independent variables lag the dependent variable by one year. Columns (1) and (2) report estimated coefficients with industry- and firm-fixed effects, respectively. Variable definitions are provided in Appendix 2. All accounting variables are winsorized at the top and bottom 1%. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level, and the numbers in parentheses are the *t* statistics. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Cost of debt							
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Revolving credit	-0.429***	-0.265***						
	(-10.30)	(-5.85)						
Bank loan			-0.061	-0.024				
			(-1.37)	(-0.49)				
Bond					0.297***	0.192***		
					(7.14)	(4.26)		
Other borrowings							-0.727***	-0.319***
							(-8.34)	(-4.31)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes		Yes		Yes		Yes	
Firm-fixed effects		Yes		Yes		Yes		Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.493	0.620	0.514	0.692	0.301	0.591	0.322	0.643
#Observations	22,261	22,261	15,919	15,919	22,145	22,145	10,414	10,414
#Firms	3,481	3,481	3,131	3,131	3,323	3,323	2,051	2,051

. The channels of changing of cost of capital,

This table reports results of the regression of various debt composition ratios on the CDS initiation variable and a set of firm-level control variables. The dependent variables correspond to the period from 2001 to 2017 and are expressed as the ratio of the given type of debt to the total debt. Constants are estimated but not reported, and all controls lag the dependent variable by one year. Variable definitions are provided in Appendix 2. All accounting variables are winsorized at the top and bottom 1%. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level, and the numbers in parentheses are the *t* statistics. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Governance		Riskiness		IO Concentration (HHI)		IO Ratio	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
CDSFIRM	0.062** (2.33)		-0.006 (-1.38)		0.010** (2.23)		-0.029*** (-2.69)	
CDSINIT	0.042 (1.58)	0.006 (0.20)	0.013** (2.47)	0.015* (1.70)	0.050*** (9.73)	0.048*** (10.11)	-0.041*** (-3.18)	-0.031*** (-2.88)
INVTGRADE	0.077*** (3.49)	0.029 (1.36)	-0.015*** (-3.73)	-0.020** (-2.95)	0.021*** (5.10)	0.004 (1.28)	-0.038*** (-3.15)	-0.017* (-1.88)
CDSINIT x INVTGRADE (1,1)	-0.062** (-2.42)	-0.023 (-0.86)	0.014** (2.62)	0.016** (2.01)	-0.001 (-0.21)	-0.003 (-0.75)	-0.033** (-2.05)	-0.011 (-1.16)
Controls								
Tax	-0.130 (-1.29)	-0.021 (-0.27)	-0.313*** (-13.45)	-0.220*** (-9.56)				
Log (Assets)	0.057*** (7.71)	-0.009 (-0.73)	-0.011*** (-9.77)	-0.007*** (-2.38)				
Leverage	0.027 (0.76)	0.027 (1.16)	0.016 (1.55)	0.019* (1.70)				
Profitability	0.006 (0.15)	-0.006 (-0.25)	-0.249*** (-19.47)	-0.236*** (-14.35)				
CAPEX	0.059*** (2.76)	0.068*** (4.43)	0.012*** (3.19)	0.010* (1.85)				
Growth	0.001* (1.73)	-0.000 (-0.40)	-0.001*** (-4.41)	-0.001** (-2.18)				
Log (Age)	0.070*** (6.20)	0.153*** (3.34)	-0.022*** (-14.01)	-0.030*** (-5.15)				
Riskiness	-0.284*** (-5.30)	-0.090** (-2.36)		0.390*** (35.75)				
Dividends	-0.001 (-0.08)	-0.008 (-0.74)	-0.010*** (-6.30)	0.001 (0.58)				
IO concentration	-0.540*** (-4.30)	-0.172*** (-2.58)	0.088*** (9.22)	0.014 (1.05)				
Liquidation	-0.071 (-1.41)	-0.007 (-0.14)	0.037*** (5.19)	0.072*** (5.29)				
R&D	-0.001 (0.24)	0.009* (1.97)	-0.013*** (-4.88)	-0.016*** (-3.60)				
Stock liquidity	0.102*** (6.41)	0.019 (1.54)	-0.010*** (-7.12)	-0.019*** (-8.63)				
Industry-fixed effects	Yes		Yes		Yes		Yes	
Firm-fixed effects		Yes		Yes		Yes		Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
#Observations	9,436	9,436	41,475	41,475	41,017	41,017	41,213	41,213
#Firms	1,648	1,648	5,405	5,405	5,348	5,348	5,374	5,374
Adjusted R^2	0.324	0.771	0.640	0.739				

Online Appendix A5. The relationship between CDS trading and the number of stock analysts

This table reports regressions of the number of analysts who recommend buying stocks on the CDS initiation variable. Variable definitions are provided in Appendix 2. The analyst data correspond to the period from 2002 to 2018, while the control and CDS variables span from 2001 to 2017. We include industry-year and firm-year fixed effects in Columns (1) and (2), respectively. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level for Column (1), and the numbers in parentheses are the *t* statistics. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Number of analysts	
	(1)	(2)
CDSFIRM	3.768 (9.35) ***	
CDSINIT	1.268 (3.43) ***	0.912 (3.95) ***
Controls		
Log (Assets)	1.766 (20.79) ***	2.479 (28.16) ***
Leverage	-2.094 (-7.52) ***	-0.917 (-4.11) ***
Profitability	1.013 (5.85) ***	0.5088 (4.08)
CAPEX	0.705 (4.54) ***	0.168 (1.61)
Growth	0.154 (15.61) ***	0.049 (9.97) ***
Log (Age)	-0.658 (-6.99) ***	-1.031 (-5.12) ***
Riskiness	-2.368 (-11.71) ***	-0.657 (-3.69) ***
Dividends	-0.799 (-3.99) ***	0.784 (6.33) ***
IO concentration	-0.889 (-3.02) ***	-0.836 (-4.81) ***
Liquidation	-2.132 (-5.05) ***	-2.017 (-6.66) ***
R&D	-0.039 (-1.58)	-0.009 (-0.51)
S&P rated	-0.379 (-1.79) *	0.306 (2.26) **
Stock liquidity	0.882 (19.95) ***	0.263 (12.61) ***
Industry-fixed effects	Yes	
Firm-fixed effects		Yes
Year-fixed effects	Yes	Yes
#Observations	45,311	45,311
#Firms	5,475	5,475
Adjusted R^2	0.507	0.879

. The relationship between CDS trading and capital generation

This table reports results of the regression of various methods of raising capital on the CDS initiation variable and a set of firm-level control variables. CDS activity and firm-level controls correspond to the period from 2001 to 2017, while the leverage variables cover the period from 2002 to 2018. Constants are omitted for brevity. Variable definitions are provided in Appendix 2. All accounting variables are winsorized at the top and bottom 1%. We present parameter estimates under industry-year and firm-year fixed effects in Columns (1) and (2), respectively. The heteroskedasticity consistent errors (Wooldridge, 2002, p. 152) are clustered at the firm level, and the numbers in parentheses are the *t* statistics. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Equity issuance		Debt issuance		Long-term debt issuance		Short-debt issuance	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
CDSFIRM	0.019***		0.015***		0.038***		-0.003*	
	(5.39)		(3.38)		(6.92)		(-1.81)	
CDSINIT	-0.010***	0.004	-0.028***	-0.017***	-0.044***	-0.037***	0.001	0.001
	(-2.74)	(1.15)	(-5.54)	(-2.60)	(-7.21)	(-5.36)	(0.29)	(0.70)
INVTGRADE	0.001	0.013***	0.004	0.025***	0.006	0.028***	-0.003*	-0.002
	(0.55)	(3.24)	(1.08)	(3.47)	(1.32)	(4.20)	(-1.73)	(-1.14)
CDSINIT x INVTGRADE	0.009**	-0.003	0.010**	-0.004	0.006	0.001	0.005**	0.006**
	(2.22)	(-0.74)	(2.01)	(-0.59)	(1.05)	(0.10)	(2.42)	(2.09)
Controls								
Industry-fixed effects	Yes		Yes		Yes		Yes	
Firm-fixed effects		Yes		Yes		Yes		Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.226	0.512	0.031	0.271	0.020	0.261	0.012	0.255
#Observations	35,446	35,446	19,240	19,240	19,240	19,240	19,240	19,240
#Firms	4,855	4,855	3,609	3,609	3,609	3,609	3,609	3,609