The Leverage Externalities of Credit Default Swaps[1]

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Abstract

This paper provides the first empirical evidence of the externalities of credit default swaps (CDS). We find that a firm's leverage is lower when a larger proportion of its revenue derives from customers referenced by CDS. This finding is robust to alternative samples and measures, placebo tests, and the selection of customers by suppliers. Moreover, firms affected by customer CDS trading increase equity issuance and reduce investment, which is consistent with the view that CDS trading on customers improves the information environment for suppliers and provides information about customer default risk. Therefore, while many firms are not directly linked to CDS trading, CDS trading on their customers has spillover effects on these firms' financial policies.

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Abstract

This paper provides the first empirical evidence of the externalities of credit default swaps (CDS). We find that a firm's leverage is lower when a larger proportion of its revenue derives from customers referenced by CDS. This finding is robust to alternative samples and measures, placebo tests, and the selection of customers by suppliers. Moreover, firms affected by customer CDS trading increase equity issuance and reduce investment, which is consistent with the view that CDS trading on customers improves the information environment for suppliers and provides information about customer default risk. Therefore, while many firms are not directly linked to CDS trading, CDS trading on their customers has spillover effects on these firms' financial policies.

1. Introduction

Credit default swaps (CDS) are among the most influential and controversial financial innovations in recent decades.[1] They provide opportunities for credit risk transfer, facilitating both risk-sharing and risk-taking. A burgeoning strand of literature shows that CDS have a pervasive impact on the reference firms, including their borrowing costs, capital structure, and bankruptcy risk. A large part of the Dodd-Frank Act provides new regulations of CDS, such as central clearing and measures aimed to improve market functioning and transparency. However, CDS exist only for a handful of large firms. In the peak year of 2005, only 8.6% of U.S. firms in Compustat were referenced by CDS. For most firms, CDS seem to constitute a remote issue that is not directly relevant to them. Is the influence of CDS only limited to those CDS-referenced firms? In this paper, we empirically examine potential spillover effects or externalities of CDS trading.

We focus on one key stakeholder of the CDS-referenced firms: their suppliers. Suppliers in the upstream of the supply chain are usually smaller firms without CDS trading, yet their direct economic interests in their customers provide an ideal setting for our analysis of CDS externalities. Suppliers should be concerned with their major customers regarding relationship-specific exposures such as trade credit and product market stability (Titman (1984) and Stulz (1996)). CDS signal changes in the creditworthiness of debtors much faster than ratings do (International Organization of Securities Commissions (IOSCO), 2012). CDS spreads can help Chief Financial Officers and treasurers differentiate relative credit quality across a collection of entities, especially for nonfinancial companies. For many CFOs, CDS have become a standard tool for assessing the credit quality of customers.[2]

If the CDS market provides information about customers, then suppliers face a better information environment and can adjust their corporate policies accordingly. Because equity issuance is sensitive to information asymmetry, improved information

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[1] CDS are similar to insurance contracts. The buyer pays a periodic fee to the seller for a contingent payment linked to a reference entity's credit event. As of December 2012, there was a total of $25 trillion in CDS notional value outstanding, as reported by the Bank for International Settlements. Stulz (2010) discusses the role of CDS in the credit crisis. Regulators in the U.S. and E.U. are currently implementing new rules for CDS.

[2] See, e.g., "Wrong price signals sent by CDS", *CFO Insight*, June 12, 2012 (retrieved from http://www.cfo-insight.com/risk-management-it/hedging/wrong-price-signals-sent-by-cds/), and "Do CDS spreads tell the truth?" *CFO Magazine*, May 19, 2011 (http://ww2.cfo.com/banking-capital-markets/2011/05/do-cds-spreads-tell-the-truth-2/).

quality can facilitate equity issuance, resulting in lower firm leverage. Moreover, as a new facility for price discovery, CDS trading can reflect information about a customer's bankruptcy risk that is otherwise not accessible to a supplier. Indeed, Bolton and Oehmke (2011) and Subrahmanyam, Tang, and Wang (2014) show that the advent of CDS trading can increase the bankruptcy risk of the reference firm. Therefore, a supplier may perceive customer CDS as signaling higher revenue risk going forward. As such, the supplier has an incentive to maintain lower leverage. However, there are also plausible scenarios under which firms can have higher leverage after CDS trading on their customers. For example, customer CDS can be used as a proxy hedging tool by lenders to manage supplier credit risk, especially when there are no CDS on the supplier itself. Because hedged lenders are more willing to increase the credit supply, supplier leverage may increase. Therefore, the effect of customer CDS trading on supplier leverage is ultimately an empirical question.

Using linked data on both the supply chain relationship and CDS trading,[3] we find that, all else equal, the leverage of suppliers is significantly lower if a larger proportion of the suppliers' revenue is derived from CDS-referenced customers. The effect is also economically significant: a one-standard-deviation increase in sales to CDS-referenced customers is associated with a 0.6-1.0 percentage point lower market leverage ratio, while the median market leverage ratio is 7% for our sample suppliers (which are relatively small firms). Saretto and Tookes (2013) find that firm leverage is approximately two percentage points higher after its own CDS trading. Therefore, the externalities of customer CDS on supplier leverage are fairly large. Our finding is robust to changes in the model specification, sample selection and variable measurement. For example, the customer CDS effect is above and beyond the critical customer effect documented by Banerjee, Dasgupta, and Kim (2008). The CDS effect also prevails after controlling for common industry shocks to customers and suppliers. Moreover, the effect of customer CDS on supplier leverage is not merely the suppliers' response to customer distress or changes in customer leverage. Overall, our baseline results reveal a robust, negative relationship between customer CDS trading and supplier leverage.

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[3] In our linked final sample, only a small number of supplier firms are referenced by CDS, but many firms have significant business (usually more than 10% of total revenue) with customers that are referenced by CDS trading. For example, in 2005, only 8.9% of the supplier firms (200 out of 2,240) in our sample had CDS trading. For the supplier firms that do not have CDS on themselves, 30.7% of them (625 out of 2,035) derive significant amounts of revenue from customers with CDS trading.

In a first attempt to establish a causal relationship, we conduct a difference-in-differences analysis by matching treated and control groups of suppliers from the same industry, of similar size, and that are linked to customers with similar credit quality. The treated and control suppliers differ by their customer CDS status. In this matched sample, the customer CDS-treated firms have significantly larger leverage decreases than the control firms. Furthermore, we run placebo tests by randomizing the CDS introduction time on customers, and there is no significant effect from the placebo samples.

CDS trading on customers is arguably an exogenous event to the suppliers, which usually do not trade CDS.[4] However, one potential selection issue hindering the causal interpretation of our findings is that suppliers may choose customers with or without CDS trading. The amount of sales derived from CDS customers therefore may be jointly determined with supplier leverage. To infer causality, we use the instrumental variable approach to identify the CDS effect. We construct two instrumental variables for our key independent variable: the proportion of a supplier's sales to customers with CDS trading. The first instrument, the foreign exchange (FX) hedging position of customer firms' lenders and bond underwriters, follows Saretto and Tookes (2013). The use of FX hedging is related to lenders' general hedging strategy, including CDS trading, but the aggregate FX hedging interests of a bank are unlikely to be related to the credit quality of a particular borrower of the bank and the borrower's suppliers. The second instrument is based on lenders' loan portfolio concentration. Lenders typically have thousands of loans in their portfolio, and the concentration with respect to industry or location is largely determined by their business model. Therefore, loan portfolio concentration is exogenous to the leverage of the borrowing firms' suppliers. Moreover, lenders with more concentrated loan portfolios have stronger incentives to use CDS to diversify (Minton, Stulz, and Williamson (2009)). Both instruments seem valid, and our findings after the instrumentation remain significant.

The negative relationship between supplier leverage and customer CDS trading seems to be channeled through the information environment for suppliers.[5] First, we

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[4] Financial firms such as banks, insurance companies, and hedge funds, not the suppliers, decide whether to trade the CDS of a particular entity. CDS traders usually must be members of the International Swaps and Derivatives Association (ISDA) to be protected by ISDA CDS Master Agreements. To date, only financial firms are ISDA members.

[5] Prior studies such as Acharya and Johnson (2007) show that CDS trading reveals insider information. Moreover, CDS trading can pressure firms to reveal more information. Kim, Shroff, Vyas, and Wittenberg-

find a stronger effect on supplier leverage when there is a larger amount of CDS trading and when the customer-supplier relationship is long-term, and information is arguably more accurate in those situations. Second, incremental information from CDS matters more when the supplier is more opaque. We find stronger effects for suppliers with less analyst coverage. Additionally, we use the customer stock reaction around CDS introduction to gauge the information shock, and we find a stronger CDS effect on supplier leverage when the reaction is larger. Third, if customer CDS trading improves the supplier's information environment, we expect more equity issuance rather than debt reduction as the source of leverage decreases, which is exactly what we find.

In addition to the above "information improvement" channel, the specific information content about customer bankruptcy risk also seems to drive the relationship between customer CDS trading and supplier leverage. The relationship is stronger when CDS-referenced customers are closer to financial distress. Moreover, only when the suppliers produce differentiated goods or when the downstream demand is more concentrated, i.e., when potential customer defaults are particularly costly, is supplier leverage significantly related to customer CDS trading. Furthermore, suppliers reduce capital expenditures when their customers have CDS trading. Since we find no direct evidence of a credit crunch for the supplier, such a conservative investment policy is likely an indication of suppliers' concern regarding customer credit risk. Taken together, the evidence is consistent with suppliers perceiving customer CDS as a signal of heightened revenue risk in the future. Suppliers with fewer cushions against customer default will take more preemptive actions and lower their leverage more than other firms.

This paper improves our understanding of the implications of CDS trading. To the best of our knowledge, this is the first paper to show that CDS trading affects non-CDS industrial firms. Subrahmanyam, Tang, and Wang (2014) show that firm credit risk increases after CDS trading. Our study extends their work, as the potential of CDS to increase customer credit risk engenders externalities to suppliers and hence suppliers' incentive to decrease leverage as a precaution. Our findings support the informational role of CDS. Information production from CDS trading alleviates suppliers' information asymmetry, inducing more equity usage. Our study is closely related to that of Saretto

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Moerman (2014) find that managers are more likely to issue earnings forecasts when firms have actively traded CDS. We provide a more detailed discussion in Section 2.

and Tookes (2013), who show that a firm's leverage is higher after its own CDS trading. We find that the impact of CDS spills over to upstream non-CDS firms. However, this spillover works at least partly through the perception of customer CDS as associated with heightened risk, rather than as a facility for proxy hedging. Therefore, in contrast to the positive effect on the referenced customers themselves, CDS have a negative effect on supplier leverage. More importantly, such externalities affect a much larger population of firms and have a considerable economic magnitude, indicating that the concerns over CDS are by no means confined to reference firms only. By highlighting the informational role of CDS, our findings support regulations of the CDS market that are aimed at enhancing the market's transparency and efficiency.

Customer CDS trading points to a new dimension of factors in firms' capital structure decisions. Such external determinants of leverage are consistent with Titman's (1984) stakeholder theory of capital structure as well as recent studies on "peer effects" by Leary and Roberts (2014). In our study, financial contracts written on customers can influence suppliers' leverage decisions. This study also adds to the burgeoning literature on supply chain effects in corporate finance, such as Kale and Shahrur (2007) and Banerjee, Dasgupta, and Kim (2008). We show that firm leverage is affected by both the product market relationship and financial market innovations.

The remainder of this paper is organized as follows. We discuss the existing literature and develop predictions for the empirical tests in Section 2. Section 3 describes the data and summary statistics. Our baseline empirical results are presented in Section 4. Section 5 discusses the underlying mechanisms for our main findings. Section 6 concludes.

2. Related Literature and Empirical Predictions

Recent studies have examined various effects of CDS trading on corporate finance. Bolton and Oehmke (2011) model the "empty creditor" problem and predict that firms are more likely to receive debt financing but will face tougher creditors after CDS trading. Saretto and Tookes (2013) find that firm leverage is higher if the firm's debt is referenced by CDS. Subrahmanyam, Tang, and Wang (2014) show that firm bankruptcy risk increases after CDS trading. To date, existing studies have largely focused on the impact of CDS trading on the reference firms themselves. Little attention has been paid

to CDS trading externalities, that is, the spillover effects of one firm's CDS trading on the economic or financial activities of other firms. [6]

The externalities of CDS are potentially an even more important issue than the direct effects of CDS because only a handful of firms are referenced by CDS contracts, and many of them are large financial firms. Meanwhile, a far greater number of firms are connected to CDS-referenced firms through real economic links. Externalities can arise if the connected firms' information environment or economic interests are affected by CDS. One prominent linkage between firms is the supplier-customer relationship. This linkage is important because suppliers' trade credit and future revenue directly depend on their customers' activities. For example, Rajan and Zingales (1995) document that accounts receivable are 18% of total assets on average for U.S. firms in their sample.

In this study, we examine how a firm's leverage is affected by CDS trading on its customers even though there is no CDS trading on the firm itself. The customer-supplier setting is ideal for our study of CDS externalities because customer CDS trading is mostly exogenous to the suppliers. The CDS market consists of institutional investors and financial firms, so it is reasonable to assume that industrial suppliers do not trade their customers' CDS.[7] Why would CDS contracts on customers impact their suppliers' leverage? In the following, we discuss a number of potential mechanisms.

2.1 Informational Role of CDS

CDS trading and price discovery facilitate information production regarding the reference firm. Given the economic connection between a reference firm and its suppliers, such information can be important for the suppliers' financial policies. First, information produced through customer CDS can partly reflect supplier performance and alleviate information asymmetry for the supplier. We call this channel *a better information environment* or *information improvement*. CDS not only reveal information through price discovery in the market but also promote information

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[6] Several studies analyze the impact of CDS trading on stock and bond market quality and financial intermediaries. Das, Kalimipalli, and Nayak (2014) examine how CDS affect the efficiency, quality, and liquidity of bond markets. Boehmer, Chava, and Tookes (2013) analyze the impact of CDS trading on stock market liquidity and efficiency. Chava, Gunduri, and Ornthanala (2013) examine how CDS affect the relevance of credit ratings. Those studies reveal real effects of CDS trading on referenced firms.

[7] CDS traders usually abide by the ISDA Master Agreements. Members of ISDA are exclusively financial firms. Our conclusion, however, does not depend on this presumption. Given their information advantage, suppliers could potentially benefit if they can trade the CDS of their customers, but we find a negative effect of exposure to CDS-referenced customers on a supplier's financial aggressiveness.

production. For example, Kim, Shroff, Vyas, and Wittenberg-Moerman (2014) find that managers are more likely to issue earnings forecasts when firms have actively traded CDS. As the supplier's information environment improves, equity financing becomes less costly and can be used more in the supplier's capital structure. Bharath, Pasquariello, and Wu (2009) show that firms with better information quality issue more stock and have lower leverage.

The information improvement channel also suggests that opaque firms will benefit more than transparent firms from a better information environment. Thus, customer CDS will have a larger negative impact on supplier leverage among opaque suppliers. If customer CDS affect supplier leverage through information production, we also expect the effect to be stronger when more original information is revealed through CDS. One gauge of information originality is the customer's stock market reaction to its CDS introduction. Larger abnormal returns around a CDS introduction suggest that the CDS reveal information that was not known to investors, which will contribute more to the supplier's information improvement.

Thus, the information improvement channel predicts that *suppliers with a larger exposure to CDS-referenced customers have lower leverage. This effect is stronger among opaque suppliers. Suppliers decrease leverage mainly by issuing equity.*

CDS trading on customers may signal concerns regarding the customers' credit risk, inducing suppliers to use more conservative financial policies. We call this channel *negative customer information*, which is supported by prior theoretical and empirical studies. Bolton and Oehmke (2011) argue that CDS could give rise to a higher incidence of costly bankruptcies due to tougher creditors. Subrahmanyam, Tang, and Wang (2014) show empirically that a firm's default risk increases after CDS trading. Concerns about customers can be transmitted to the suppliers through the supply chain. Hertzel, Li, Officer, and Rodgers (2008) show that customer distress has a significant and negative impact on supplier performance. Cohen and Frazzini (2008) find that customer stock returns can predict supplier stock returns. Those studies also suggest that the information diffusion from customers may take time so that suppliers can adjust.

The suppliers of CDS-referenced customers may have an incentive to maintain lower leverage as a precaution for future revenue disruptions or a loss of trade credit. Customer CDS trading can signal that the supplier's receivables, which are the unsecured debt of the customer, and projected revenues are at higher risk. According to

structural models of corporate finance and investment (see, e.g., Garlappi and Yan (2011), Choi (2013), and Obreja (2013)), firms optimally choose lower financial leverage when facing higher asset risk or cash flow risk. Kale, Noe, and Ramirez (1991) show that for firms with low levels of debt, which is the case for the average supplier firm in our sample, an increase in business risk induces lower leverage. Relatedly, Garcia-Appendini and Montoriol-Garriga (2013) show that suppliers reserve debt capacity to support financially distressed customers. Moreover, the warning signal conveyed by CDS will be more imminent if the CDS-referenced customers are closer to financial distress. In such cases, the CDS externalities on supplier leverage will be stronger.

A supplier will be more vulnerable to customer failure if it is more difficult for the supplier to switch customers. This situation is likely applicable to suppliers producing differentiated goods as opposed to standardized goods. Because their outputs are unique and customized, it is difficult for such suppliers to search and adapt themselves to new customers when their current customers default. Thus, these suppliers will be particularly sensitive to customer credit risk. A similar situation also applies to suppliers facing concentrated as opposed to diversified demands from downstream firms. Thus, if customer CDS affect supplier leverage because they convey negative information about the customer, we expect this effect to be stronger among suppliers of differentiated goods and suppliers facing concentrated downstream demands.

The negative customer information channel thus also predicts that *suppliers with a larger exposure to CDS-referenced customers have lower leverage.* However, this prediction provides different implications than those provided by the information improvement channel. For example, this channel further predicts that *the CDS effect is stronger when the customers are closer to distress or when the suppliers produce differentiated goods or face concentrated downstream demands.* If customer CDS are perceived as a red flag of default risk, suppliers will likely adopt a conservative investment policy as well. We thus expect affected suppliers to cut capital expenditures as uncertainty increases. However, suppliers may maintain their R&D expenses in search of new growth opportunities.

The above analysis indicates that customer CDS have a negative impact on supplier leverage either due to an enhanced information environment and hence a lower cost of equity or as a result of precaution due to a potentially unfavorable customer

outlook.[8] Both mechanisms are related to the amount of information the CDS markets can produce. Conceivably, a larger number of CDS contracts outstanding is more likely to produce information. Therefore, we expect that *the amount of customer CDS outstanding has a negative impact on supplier leverage*. Additionally, customer information matters to a supplier only when the customer-supplier relationship is of a long-term nature. If a supplier's customers are transitory, information about a particular customer revealed by its CDS will be of little relevance. Thus, for the informational role of CDS to be valid, we predict that *customer CDS have a significant impact on supplier leverage only if the customer-supplier relationship is of a long-term nature*.

2.2 Pass-through Effects from More Credit Supply to Customers

Saretto and Tookes (2013) examine CDS-referenced firms and find that when lenders can hedge their exposure, they will extend more credit to borrowers. Customer CDS can also be used as a proxy hedge for supplier credit risk if the supplier's credit risk is highly correlated with the customer's credit risk. Such *CDS as a proxy-hedging tool* mechanism predicts that suppliers with a larger exposure to CDS-referenced customers have *higher* leverage. Accordingly, this effect is stronger when suppliers' cash flow is highly correlated with their customers' cash flow. The proxy-hedging role will be limited, however, if customer CDS spreads are imperfectly correlated with supplier credit risk. Moreover, Kapadia and Pu (2012) and Hilscher, Pollet, and Wilson (2014) find market segmentation and irrationality in the CDS market. Therefore, the effectiveness of CDS as a proxy-hedging tool remains an empirical question.

Banks may have constraints on the total credit provided to customers and suppliers. In this case, more customer credit may "crowd out" supplier credit.[9] Given Saretto and Tookes' (2013) finding that the credit supply to a firm increases when the firm has CDS, it is possible that supplier leverage can decrease. However, the recent rise of supply chain finance suggests that total credit may increase when lenders finance

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[8] We also note that according to the stakeholder theory of capital structure (Titman (1984)), new customer information produced by CDS will induce a supplier to adjust its leverage so that its liquidation policy is optimally positioned. The direction of this leverage adjustment, however, is unclear. For example, if CDS signal heightened customer default risk, the supplier may be less interested in using low leverage as a commitment device to retain customers. However, if supplier commitment enhances customers' survival probability, then the supplier may want to decrease its leverage.

[9] Graham, Leary, and Roberts (2014) show that government borrowing crowds out corporate borrowing.

both customers and suppliers.[10] Additionally, banks may prefer lending to the suppliers of its portfolio firms to lending to other new firms if the customer firms can provide references and information about the suppliers. A good setting to test the *crowd-out* effect is when a supplier and its CDS-referenced customers share the same lender, where the negative effect of customer CDS on supplier leverage will be particularly pronounced if the crowd-out effect is at work.

When customers with CDS can obtain more credit directly, they will not need as much trade credit from suppliers, especially when trade credit is expensive. Therefore, suppliers' need for short-term debt to fund receivables will decrease. This *trade credit support* mechanism predicts lower supplier leverage after customer CDS trading. However, whether suppliers fund receivables with debt or equity is unclear. As an indirect way to test this mechanism, we can examine whether customers use less trade credit after their own CDS introduction.

3. Data and Descriptive Statistics

3.1. Sample Construction

We first compile a dataset of CDS trading sourced from two major CDS interdealer brokers: CreditTrade and GFI. The data are based on actual transaction information such as committed quotes and trades rather than non-tradable quotes. We identify the starting date of each firm's CDS trading from these records.[11] Similar data are used by Subrahmanyam, Tang, and Wang (2014), among others. CreditTrade data cover the period from June 1997 to March 2006, and GFI data cover the period from January 2002 to April 2009. The overlapping period helps assure the data quality from each source.[12] We focus on North American, single-name corporate CDS (i.e., CDS referencing a corporation as opposed to a sovereign entity). We regard the underlying firm as a CDS-referenced firm since the first transaction date. Because our data begin in 1997, which is regarded by many market observers as the inception of the CDS market, there is minimal concern about the possible censoring of a firm's CDS trading status.

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[10] We note that customers and suppliers can be complements rather than competitors for credit. Credit-constrained suppliers are unlikely to satiate demands from credit-abundant customers. Therefore, cutting credit to suppliers may undo the effect of more credit to customers.

[11] CreditTrade merged with Creditex in 2007, and Creditex is now part of ICE (Intercontinental Exchange). CreditTrade was the biggest data source for CDS transactions during the earlier period of the CDS market. GFI Group is a major wholesale market brokerage in the derivatives markets, and it has also become a leading CDS data provider in recent years.

[12] We also validate the overall data quality by comparing Markit CDS quote data with ours.

Nevertheless, it is possible that some less actively traded CDS contracts are not captured by our dataset. Therefore, our estimated effect represents a lower bound of the actual effect because such misclassification will bias the estimate toward zero.

We collect data on supplier-customer relationships from Compustat Segments files. The same dataset was constructed and used by Fee and Thomas (2004), Shahrur (2005), Kale and Shahrur (2007), Banerjee, Dasgupta, and Kim (2008), Hertzel, Li, Officer, and Rodgers (2008), and Cohen and Frazzini (2008), among others. Regulation SFAS No. 131 requires firms to disclose in their interim financial reports the identity of and amount of sales to any customer accounting for more than 10% of total sales. Some firms also report customers that contribute less than 10% of sales but are considered important to their business.[13] We need the identity of critical customers to link them with companies covered by Compustat Fundamentals Annual, but customer names are often reported using abbreviations. Therefore, for each customer firm, we carefully look through Compustat companies to find names that have key components in common with the customer firm and select the firm that we determine is a definite match. On many occasions, where a match is ambiguous or there are multiple potential matches, we further manually determine the match (or the lack of it) by researching related websites such as stock exchanges, official company websites, and Google Finance. We collect financial and industry information about each supplier firm directly from Compustat Fundamentals Annual.

We link the CDS-referenced firms with those in the supplier-customer dataset. The above procedure produces a dataset with information about each firm covered by Compustat Segments files and its reported critical customers, as well as whether and when any of its critical customers (and the supplier firm itself) are referenced by CDS. We only include supplier firms that are incorporated in the U.S., have common stock covered by the Center for Research in Security Prices (CRSP), and are not in the financial or utility industries. We exclude those suppliers that are themselves referenced by CDS from our main analysis. This restriction ensures that our empirical results are not contaminated by the supplier's own CDS status. Nevertheless, our results are robust to a sample including these CDS-referenced suppliers, as we discuss later.

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[13] Prior to 1997, Regulation SFAS No. 14 governed segment disclosure. SFAS No. 131 was issued by the Financial Accounting Standards Board in June 1997 and is effective for fiscal years beginning after December 15, 1997.

Table 1 provides a year-by-year summary of the number of supplier firms, the average number of critical customers per supplier firm, the number of customers that are referenced by CDS, and the number of supplier firms with CDS-referenced customers. An average firm in our sample has two to three critical customers. The number of CDS-referenced customer firms exhibits an increasing trend over the sample years, while the number of suppliers that have CDS-referenced customers rises dramatically in the earlier half of the sample years and falls slightly in the latter half. We note that the number of suppliers linked to CDS-referenced customers is much greater than the number of CDS-referenced customers. For example, while the number of CDS-referenced firms is 219 in 2002, the number of firms that may be subject to CDS externalities through links with their critical customers is 694.

3.2. Descriptive Statistics

Table 2 shows the summary statistics of the variables used in our baseline analysis. We measure a firm's financial leverage using both the market and book leverage ratios:

$$Market\ Leverage = \frac{long\ term\ debt + debt\ in\ current\ liabilities}{market\ value\ of\ common\ equity + total\ assets - common\ equity - deferred\ taxes}$$

$$Book\ Leverage = \frac{long\ term\ debt + debt\ in\ current\ liabilities}{total\ assets}$$

The median market (book) leverage ratio is 7.0% (12.5%) for the supplier firms in our sample. Nearly 20% of the firms have a zero leverage ratio. As we discuss later, excluding such zero-leverage firms from the sample does not change our results.

If a firm's CDS status has an impact on its upstream firms' capital structure, then suppliers that derive a larger proportion of revenue from CDS-referenced customers are more likely to be affected by such externalities. We therefore use a supplier's sales to CDS-referenced critical customers divided by its total sales to measure the supplier's exposure to CDS-referenced customers and label this figure % *Sales to Customers with CDS*:

$$\%\ Sales\ to\ Customers\ with\ CDS = \frac{Sales\ to\ Customers\ with\ CDS\ in\ Current\ Year}{Total\ Sales\ of\ the\ Supplier} \tag{1}$$

This variable has a mean value of 0.06. We note that one-quarter of the suppliers have positive sales to CDS-referenced customers. Among these suppliers, the average % *Sales*

to Customers with CDS is 0.26, and the maximum is 0.73. Thus, a sizable set of firms is subject to potential CDS externalities from their critical customers, and this exposure shows large cross-sectional variations. As we discuss later, our results are robust to alternative measures of exposure to CDS-referenced customers as well as the exclusion of suppliers that have no CDS-referenced customers throughout the sample years.

We use a host of leverage determinants as control variables, following, among others, Frank and Goyal (2009), Saretto and Tookes (2013), and Leary and Roberts (2014): the median leverage ratio of the firm's three-digit SIC industry (*Industry Median Leverage*), market-to-book asset ratio (*Market-to-Book*), fixed assets as a proportion of total assets (*Fixed Assets*), operating income after depreciation (*Profitability*), firm size (*Total Assets*), standard deviation of operating income before depreciation (*Earnings Volatility*), other tax shield benefits (*Loss Carry-Forward*), unexpected earnings (*Change of EPS*), and whether the firm has a credit rating (*Rated*). We also use the firm's stock return in the concurrent year (*12-Month Stock Return*) to control for market conditions. The supplier firms in our sample are relatively small. Of the supplier firms, 11.6% of them are rated. The correlations between % *Sales to Customers with CDS* and other variables are generally low (see Internet Appendix Table A1), suggesting that a firm's exposure to CDS-referenced customers is a dimension that has little overlap with the standard leverage determinants.

4. Effect of Customer CDS on Supplier Leverage

This section presents our empirical findings on the relationship between supplier leverage and customer CDS trading. We first show our baseline results. Then, we examine a number of alternative explanations and conduct a host of robustness checks. Finally, we address potential endogeneity issues and show that our results are consistent with a causal interpretation.

4.1. Baseline Results

We use panel regressions to examine the impact of a supplier's exposure to CDS-referenced customers on its leverage. The fully specified baseline regression model is the following:

$$Leverage_{it} = \beta_1 \times \% \, Sales \, to \, Customers \, w/ \, CDS_{it-1} + \beta_2 \times Controls + \alpha_i \times D_i + \alpha_t \times D_t + \varepsilon_{it} \, (2)$$

The dependent variable is the market or book leverage ratio of firm *i* in a given year *t*. The explanatory variables include our key variable of interest, *% Sales to Customers with CDS*, and *Controls*, a set of leverage determinants that are well-recognized in the literature. Throughout our analysis, the explanatory variables are one-period-lagged to the dependent variable, except for *12-Month Stock Return*, the control for concurrent market conditions. D_i and D_t are vectors of firm and year dummy variables used to control for firm- and year-fixed effects, respectively. We report the *t*-statistics for our coefficient estimates using robust standard errors clustered at the firm level.

Table 3 reports the baseline regression results. The results show that % S*ales to Customers with CDS* has a statistically significant impact on both the market and book leverage of a firm. The coefficient estimate is -7.43 with a -5.57 *t*-statistic in the market leverage regression with firm-fixed effects in column 1 (the coefficient estimate is -4.03 with -3.15 *t*-statistics with both firm- and year-fixed effects in column 2). The coefficient estimates and *t*-statistics in the book leverage regressions in columns 3 and 4 are of similar magnitude. The economic magnitude of the estimated effect is also significant. A one-standard-deviation increase in % S*ales to Customers with CDS* is associated with a 0.6-1.0% (0.7-1.1%) decrease in the market (book) leverage ratio. This magnitude is 9-16% (5-9%) of the median market (book) leverage ratio. To further put these numbers into context, in the same analysis, a one-standard-deviation increase in a firm's profitability decreases the leverage ratios by 1.5-2.1%, and the decrease in leverage is approximately 3.7% if a rated firm loses its credit rating. Considering that a firm's leverage is approximately 2% higher after its own CDS trading, as reported by Saretto and Tookes (2013), the externalities of customer CDS on supplier leverage are fairly large. The coefficient estimates for the control variables in Table 3 are consistent with those documented in the literature. The above findings suggest that critical customers' CDS status has an impact on a supplier firm's capital structure that is above and beyond the effects of standard leverage determinants.

What is the plausible magnitude of a change in a supplier's leverage in response to a change in its exposure to CDS-referenced customers? We do not have a structural model to calculate an equilibrium target leverage, but we can use the tradeoff between tax benefits and financial distress costs to make a simple illustration. Suppose we hold tax benefits as fixed. If customer CDS trading implies heightened financial distress costs

for the supplier, the relevant question is the extent to which an increase in financial distress costs can be offset by a decrease in leverage. Using the simplified structural credit risk model as in the studies by Merton (1974) and Bharath and Shumway (2008), the probability of default (*PD*) is the normal transformation of distance-to-default (*DD*): *PD*=N(-*DD*). Distance-to-default is roughly the inverse of leverage divided by asset volatility. Holding volatility fixed, distance-to-default is proportional to the inverse of leverage. Assuming that the initial distance-to-default is 2 (roughly corresponding to a BB rating), if leverage decreases by 10% (e.g., from 0.070 to 0.063), then the distance-to-default increases by approximately 10% to 2.2, and the probability of default drops from 2.28% to 1.39%, a 38.9% change. The expected costs of default (or financial distress) are equal to the probability of default multiplied by the costs of default. Thus, a 38.9% decrease in the probability of default may offset a 28% increase in financial distress costs associated with customer CDS.[14] If the initial distance-to-default is 1, and it increases to 1.1 after a 10% leverage decrease, then the probability of default changes from 15.9% to 13.6%, or a 14.5% change, which can offset a 12.7% increase in financial distress costs. If the leverage decrease is 5% instead of 10%, then the corresponding changes are as follows: For the initial *DD* =1, *PD* changes from 15.9% to 14.7%, a 7.4% change, offsetting a 6.9% increase in financial distress costs. If the initial *DD* =2, *PD* changes from 2.28% to 1.79%, a 21.5% decrease, offsetting a 17.7% increase in financial distress costs.

The above back-of-the-envelope calculations demonstrate that the estimated leverage decrease (9-16%) seems reasonable to offset a sizable increment of financial distress costs due to a heightened exposure to CDS customers. If we take into account the loss of tax benefits when lowering leverage, then the financial distress costs due to customer CDS would have to be even larger to warrant the above-mentioned leverage decrease for the supplier firms.[15]

4.2. Alternative Explanations

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[14] Because 1/(1+38.9%)=72%=1-28%.

[15] We can also consider other economic effects. Suppose that the negative effect of customer CDS on supplier leverage comes from suppliers issuing more equity to take advantage of the enhanced information environment due to customer CDS trading. Given an average direct expenses ratio of 6.65% for seasoned equity offers (Corwin (2003)), a firm with median total assets ($123.8 million) and a median book leverage ratio (12.5%) should be able to save $0.7 million in information-related indirect costs if it decreases its leverage to 11.5% through an equity issue of $10.8 million.

Because CDS-referenced firms are usually large firms, it is possible that our measure of a supplier's exposure to CDS-referenced customers, *% Sales to Customers with CDS*, only captures the importance of large customers in a supplier's total sales. Banerjee, Dasgupta, and Kim (2008) show that the importance of sales to critical customers has a significant effect on a firm's leverage, consistent with the stakeholder theory of capital structure (Titman (1984) and Titman and Wessels (1988)). Therefore, to differentiate the CDS effect from the importance of critical customers in a supplier's total sales, we include in the regression the variable *% Sales to Critical Customers*, which is computed as the sum of sales to all critical customers reported by the supplier divided by the supplier's total sales.

Common shocks to both the upstream and downstream industries along the supply chain may also generate a negative relationship between sales to CDS-referenced customers and supplier leverage. Specifically, a negative industry shock that is contagious along the supply chain could result in more customers being referenced by CDS as well as the supplier decreasing its leverage. To guard against such spurious cross-industry contagious effects, we control for economic conditions in both the suppler firm's industry and the critical customers' industries. We measure industry conditions using the median annual stock return in a three-digit SIC industry. Because a supplier firm usually has a number of critical customers, we take the average of each critical customer's industry median stock return to measure the industry conditions of all critical customers as a group. We use the sales to each critical customer as the weight when computing the average. The supplier firm's industry median stock return is labeled *Industry Median Return*, and the average of its critical customers' industry median stock returns is labeled *Customer Industry Median Return*.

Credit contagion can also apply to individual customer-supplier relationships. For example, the poor performance or deteriorating credit quality of customers can lead to their CDS introduction as well as a decrease in the supplier's leverage. We therefore control for *Customer in Distress* in the regressions. This variable is the average of an indicator variable that equals 1 if the customer's annual stock return is below its industry (three-digit SIC) median, weighted by the supplier's sales to each critical customer.

According to the bargaining theory (e.g., Dasgupta and Sengupta (1993) and Chu (2012)) and the relation-specific investment theory (e.g., Kale and Shahrur (2007) and

Hennessy and Livdan (2009)), customers' leverage choices may also affect a supplier's capital structure. To the extent that a customer's leverage ratio is closely associated with its CDS status, our baseline results may not actually capture a CDS effect. We therefore include *Customer Leverage* in the regression, which is the average leverage ratio of a supplier's critical customers weighted by the supplier's sales to each customer. Furthermore, we also control for the average profitability and earnings volatility of the critical customers, *Customer Profitability* and *Customer Earnings Volatility*, to account for the possibility that that the supplier's leverage may be affected by its customers' operating conditions.[16]

The estimation results in Table 4 show that the effect of customer CDS trading on supplier leverage remains negative and statistically significant after controlling for the new variables suggested by the above alternative explanations. In the specifications with firm- and year-fixed effects (columns 2 and 4), the effect is even stronger than the baseline results, both statistically and economically. Note also that consistent with Banerjee, Dasgupta, and Kim (2008), *% Sales to Critical Customers* has a negative effect on a firm's leverage ratio, although the statistical significance varies across specifications. The coefficient estimate of *Customer Leverage* is positive and significant for column 3 but insignificant for other specifications. The weak effect of customer leverage on supplier leverage may reflect counteracting forces of the bargaining theory and the relation-specific investment theory. Importantly, the results indicate that customers' CDS status has a distinct impact on a supplier's leverage decision that is above and beyond the effect of industry and customer conditions *per se.*

4.3. Alternative Sample, Measure, and Specification

4.3.1. Alternative Samples

We show in the Internet Appendix Table A2 that our findings are robust to a number of sampling choices. First, including suppliers both with and without CDS in the sample and controlling for their differences produces qualitatively the same results (suppliers with CDS references are excluded in the baseline analysis to avoid potential contamination by their own CDS status). Second, we find similar results when we take

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[16] For suppliers whose customers have no CRSP-Compustat merged data, we replace the missing values with the annual sample median. Our results are robust to excluding suppliers with such customers throughout.

the 2007-2008 crisis period out of our sample and begin the sample period in 1998 to ensure that SFAS No. 131 was fully effective. Third, zero-leverage firms are a unique group that has received special attention recently (e.g., Strebulaev and Yang (2013)). We find that the effect of customer CDS status on supplier leverage is even stronger for the subsample that excludes zero-leverage firms. Fourth, suppliers that never have CDS-referenced customers may be fundamentally different from those with CDS customers. We thus exclude suppliers that never had CDS-referenced customers from the sample, and our findings remain the same. Fifth, we focus on a sample of suppliers that had CDS-referenced S&P 500 firms as customers. Because S&P 500 firms are large, representative firms in the economy and closely watched by market participants, the probability that their CDS introduction is related to information not observed by the public is relatively small. Therefore, the regression results will be less contaminated by unobserved variables. We find qualitatively the same results based on this more restrictive sample.

4.3.2.   Alternative Measure of the Impact of Customer CDS Trading

The measure of the influence of customer CDS in our baseline analysis captures the intensity of the customer-supplier connection via sales. To demonstrate suppliers' reaction to customer CDS trading, we replace *% Sales to Customers with CDS* with *Have Customer with CDS*, a dummy variable that equals 1 if the supplier has CDS-referenced customer(s). This measure is simpler but coarser. As shown in Panel A of Table 5, our results using this alternative measure are qualitatively the same as our baseline results. Our results are also robust to the other two alternative constructs of the key independent variable: (1) sales to CDS-referenced customers as a proportion of sales to all critical customers and (2) the proportion of critical customers that have CDS trading. Details can be found in the lower part of Internet Appendix Table A2. These results, combined with our baseline analysis, show that customer CDS trading has both quantitative and qualitative effects on supplier leverage.

4.3.3. Change Analysis

We conduct a change analysis to further understand the dynamic relationship between customer CDS trading and supplier leverage. We regress the first difference of

the dependent variable on the first differences of the independent variables. The results are reported in Panel B of Table 5. There is a negative and significant relationship between the change in *% Sales to Customers with CDS* and the change in *Book Leverage*. The effect on *Market Leverage* is just shy of the 10% significance level with firm- and year-fixed effects. Even if the specification only considers the effect associated with time-series changes, the economic magnitude is still approximately half of that in the level regressions.

The results suggest that the observed CDS externalities are not simply a cross-sectional phenomenon; time-series changes in a supplier's exposure to CDS-referenced customers are associated with changes in the supplier's leverage as well. In the next section, we present more evidence regarding the time-series effect of customer CDS in a difference-in-differences analysis.

4.4. Addressing Endogeneity

Although our results survive a number of alternative explanations and robustness checks, one additional concern is that a supplier's leverage and its exposure to CDS-referenced customers are jointly determined. In this section, we address potential endogeneity with a difference-in-differences analysis and an instrumental variable regression.

4.4.1. Difference-in-Differences

The change analysis in the previous subsection indicates that the CDS externalities work through time-series variations as well as cross-sectionally. In this section, we conduct a difference-in-differences analysis to further understand how suppliers experience CDS externalities as they begin to have CDS-referenced customers. Moreover, by matching treated suppliers with untreated suppliers, this analysis alleviates endogeneity concerns.

The difference-in-differences analysis is based on a matched sample with a four-year event window. Specifically, a treated supplier is defined as having CDS-referenced customer(s) in the third and fourth years (*t* and *t*+1) of a four-year window and having no CDS-referenced customer(s) in the first and second years (*t*-2 and *t*-1). A control supplier is defined as having no CDS-referenced customers throughout the four-year window. A control supplier is then matched with a treated supplier in year t-1 of the

four-year window if they are in the same two-digit SIC industry and their size and customer default risk are the closest to each other among all potential matches. We use *Total Assets* to measure firm size and use the *Customer Z-Score*, defined as the average Z-score of the customers weighted by the supplier's sales to each customer, to measure customer default risk.

This matching procedure ensures that the treated and control suppliers resemble each other closely in terms of industry, size, and customer financial conditions *ex ante* but differ in whether they receive the treatment, i.e., begin having CDS-referenced customers. As such, the leverage change in the matched window for control firms can be considered to approximate what the leverage change would have been in the event window had the treated firm not received the treatment. The difference between the change in leverage for treated firms and that for control firms thus reveals the causal effect of customer CDS on supplier leverage.

The comparison of the matched firms is reported in the Internet Appendix Table A3. The matched firms have almost the same size before treatment, but the treated firms tend to have customers with higher Z-scores than the control firms. Such matching would nevertheless work against finding a significant relationship between customer CDS and supplier leverage because treated firms are less likely to deleverage if they have safer customers on average.

We then implement the difference-in-differences analysis in a regression framework. We define two dummy variables. *Treated* equals 1 if the supplier received the treatment (started to have CDS-referenced customer(s)) in year t of the event window. This dummy variable distinguishes the treated and control suppliers. *After* equals 1 for year *t* and *t*+1 in the event window, and it equals 0 for year *t-2* and *t-*1. The variable distinguishes the years before and after the treatment for the treated supplier, and it distinguishes the years in the matched window for the control supplier.

As shown in Column 1 and Column 4 of Table 6, compared with the control firms, the treated firms decreased their leverage significantly after they began having customers with CDS. The coefficient for *Treated*After* is -2.80 (-2.64) for the market (book) leverage specification, and both are statistically significant. That is, on average, a treated firm's market (book) leverage decreases by 2.80 (2.64) percentage points after it begins having CDS-referenced customers. By contrast, the coefficient for *After* shows that a control firm's market (book) leverage increases by 1.92 (2.22) percentage points

on average in the post-treatment years. The evidence is clear that depending on their exposure to CDS-referenced customers, similar suppliers take significantly different paths in their leverage dynamics.[17]

4.4.2. Placebo Tests

There might be a concern that some unobserved factors could induce a supplier to decrease leverage in the future and also make its customers more likely to have CDS. In this case, such a leverage decrease after having CDS-referenced customers is the result of a predetermined trend rather than a demonstration of CDS externalities. If such a trend exists, then we should observe the comovement of supplier leverage and customer CDS trading regardless of the exact timing at which the firm changes leverage and having CDS-referenced customers.

We use placebo tests to address this concern regarding expected future changes.[18] If our results are driven by a predetermined trend, we should still observe a similar effect if we incorrectly assign the treatment one or two years before the actual event. On the other hand, if the supplier's leverage change is driven by customer CDS, then the effect will disappear if we incorrectly assign the treatment one or two years before the actual event. Columns 2 and 3 (5 and 6) in Table 6 show the difference-in-differences results for market (book) leverage when we incorrectly assign the treatment one year and two years before the actual event, respectively. The coefficient for the interaction term *Treated*After* is no longer significant, and it is unstable across market and book leverage regressions and across different placebo timing. These tests indicate that the observed CDS externalities are unlikely to be driven by a predetermined trend.

4.4.3. Instrumental Variable Regression

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[17] We provide an additional related analysis in the Internet Appendix Table A4 by focusing on a small sample of suppliers that have been serving a customer for at least two years before it becomes referenced by CDS ("long-term customer"). Under this setting, CDS trading is exogenous to the supplier's choice of customers. We match this sample of treated suppliers with control suppliers that have long-term customers without CDS but are in the same industry and have similar sizes and customer default risks. We find that customer CDS still have a negative effect on supplier leverage in this small matched sample, although it is statistically significant only on market leverage.

[18] We thank the referee for suggesting the placebo tests.

Suppliers plan ahead and take proactive actions. They may anticipate or plan to have lower leverage in the future due to some unobserved factors.[19] Based on this anticipation, suppliers might feel comfortable selling more to CDS-referenced customers at present. Another possibility is common negative productivity shocks that cause both suppliers and customers to become riskier, driving both the supplier to decrease leverage and CDS to start trading on the customer. Although the earlier placebo tests rule out a predetermined trend driving our results, we further address endogeneity concerns using instrument variable regression.

We identify two instruments that are related to the customers' CDS status but are arguably unrelated to the supplier's leverage. The first instrument, *FX Derivatives Use by Customers' Lenders*, measures the amount of foreign exchange (FX) derivatives used by the major banks of a supplier's customers. Minton, Stulz, and Williamson (2009) report that banks that use interest rate, foreign exchange, equity, and commodity derivatives are more likely to be users of CDS. That is, banks that actively hedge using derivatives tend to do so in a variety of markets. Thus, if a firm's major banks intensively use foreign exchange derivatives, they are also likely to use CDS to hedge credit risk as well. Moreover, the aggregate FX hedging interests of a bank are unlikely to be related to the credit quality of a particular borrower of the bank and its suppliers. Thus, we consider this instrumental variable to satisfy the exclusion condition as well.

To construct this instrument, we first follow Saretto and Tookes (2013) and obtain the FX derivatives usage of each customer's major banks, and we then aggregate this usage across all of the customers of a given supplier to obtain the supplier-level instrumental variable. Specifically, for each customer, we find the banks that served as its leading lenders or bond underwriters over the past five years using data from DealScan and Fixed Income Securities Database (FISD). Then, we compute the average amount of foreign exchange derivatives used for hedging (rather than trading) purposes relative to the total assets of the bank holding companies of these lenders/underwriters of a given customer. Data on the usage of foreign exchange derivatives by banks are collected from the Call Reports at the Federal Deposit Insurance Corporation (FDIC).

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[19] This anticipation is not reverse causality (supplier leverage changes causing customer CDS trading). Reverse causality is unlikely because the critical customers are generally much larger than the suppliers, a given customer typically has multiple suppliers, and industrial firms rarely trade any CDS.

Finally, we sum up the usage of foreign exchange derivatives by each customer's lenders/underwriters across all of the customers of a given supplier.[20]

The second instrument, *% Sales to Customers with Concentrated Lenders*, is computed as the supplier's sales to customers with concentrated lenders divided by the supplier's total sales. A customer is considered to have concentrated lenders if the average Herfindahl index of its lenders in terms of each lender's loan portfolio industry-state concentration is above the annual sample median.[21] Loan portfolio diversification is a major determinant of a bank's risk level and is therefore closely related to the bank's other risk policies, such as using derivatives on borrowers' credit risk. However, the loan portfolio's degree of diversification should have no direct bearing on a particular borrower's supplier's capital structure. Therefore, *% Sales to Customers with Concentrated Lenders* should also qualify as a valid instrument. We use loan data from DealScan to compute lenders' loan portfolio concentrations. We match customer firms with their lenders in DealScan using the Compustat-DealScan link file from Michael Roberts' website (see Chava and Roberts (2008)).

We then run 2SLS regressions with *% Sales to Customers with CDS* instrumented by the above two IVs, and the results are shown in Table 7. We find that a supplier's revenue from CDS-referenced customers still has a statistically significant impact on its capital structure, and the economic significance is even larger than that without IVs (Table 4). In the Internet Appendix Table A5, which reports the first-stage regression, we note that both instruments are significantly related to *% Sales to Customers with CDS*, and the *F*-test for weak instruments rejects the notion that the instruments are weak. Because the IV regression ensures that only exogenous changes in a supplier's revenue exposure to CDS-referenced customers are used for identification, these results corroborate the notion that customers' CDS status indeed *causes* decreases in upstream firms' leverage.[22]

5. Mechanisms

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[20] For suppliers whose customers cannot be matched to DealScan or FISD for lender or underwriter data, we replace the missing values with the sample median. Our results are similar if we exclude those observations.

[21] We follow Massa and Zhang (2013) and compute the Herfindahl index of a lender's loans in different two-digit SIC industry and state pairs. Then, for a given customer firm, we compute the average Herfindahl index of all of its current lenders.

[22] Our results are qualitatively unchanged if we use *% Sales to Customers with Concentrated Lenders* as the only instrument.

The robust evidence that customer CDS has a negative impact on supplier leverage is consistent with both the *better information environment* and *negative customer information* channels, but it is inconsistent with the *CDS as a proxy-hedging tool* effect. We provide further evidence to understand the mechanisms underlying the CDS externalities. We begin by examining whether the CDS externalities are related to the amount of information and the relevance of the information produced by customer CDS. Then, we examine the two channels with respect to the informational role of customer CDS, namely, the information improvement and negative customer information mechanisms. Finally, we discuss other possible channels for the CDS externalities.

5.1. Information Improvement

If suppliers adjust their leverage in response to customer information produced by CDS, why do they decrease leverage? One reason could be that the information conveyed by customer CDS enhances the information environment of the supplier. Alleviated information asymmetry helps to lower a supplier's cost of equity, making equity more desirable than debt as the marginal source of financing. We examine this information improvement mechanism from various angles.

5.1.1. CDS Outstanding

When there are more CDS traded on an underlying firm, price discovery and information revelation will be more effective. Thus, if the CDS externalities are driven by information conveyed by CDS, we expect supplier leverage to have a significant relationship with the amount of CDS outstanding on the supplier's customers.

We therefore construct a new variable, *Customer CDS Outstanding*, and examine its relationship with supplier leverage. *Customer CDS Outstanding* equals the average amount of customers' CDS outstanding weighted by the supplier's sales to each customer. As shown in Table 8, *Customer CDS Outstanding* has a negative and significant impact on a supplier's leverage. A one-standard-deviation increase in *Customer CDS Outstanding* is associated with a 0.32-0.71% (0.46-0.76%) decrease in market (book) leverage. This finding suggests that information conveyed by CDS trading likely plays an important role in mediating the CDS externalities.

5.1.2. Relevance of Information: Long-Term Relationship

Information transmission from a customer to a supplier is more effective when their relationship is more durable. Information about a customer matters only if the customer is likely to stay with the supplier in the future. A supplier would not care about information produced by customer CDS if its relationship with the customer is only short-term.

We divide the sample suppliers based on the average length of their relationship with their current customers and rerun the baseline regressions on the subsamples. If the effect of CDS indeed goes through the supply chain and carries information, we expect the effect to be concentrated among long-term customer-supplier pairs, which is exactly what we find in Table 9. *% Sales to Customers with CDS* has a significant impact on supplier leverage only for suppliers whose relationships with their customers are long-term ($\geq$ 3 years). For suppliers with short-term relationships with their customers, the effect is much smaller and statistically insignificant. The evidence suggests that customer CDS affect supplier leverage only when the customer information matters to the supplier. The result further implies that the information produced by customer CDS is likely a driver of the CDS externalities.

5.1.3. Analyst Coverage

Firms face very different information environments. Some firms are widely covered by multiple information intermediaries, while other firms do not have any analyst following at all. The additional information produced by customer CDS trading should matter most for relatively more opaque suppliers if the information improvement mechanism is at work. Therefore, we expect suppliers with less analyst coverage to experience more pronounced leverage decreases when their exposure to customers with CDS is higher.

We test this proposition by dividing the sample of suppliers based on their analyst following and rerun the baseline regressions on these subsamples. Panel A of Table 10 reports the estimation results. To the extent that analyst coverage is an important indicator of information asymmetry, suppliers that are scarcely followed by analysts suffer more from information asymmetry. Thus, information concerning their revenue sources produced by customer CDS should be particularly helpful to improve these suppliers' information environment. This result is exactly what we find; CDS

externalities on supplier leverage are much stronger among suppliers with low analyst following. For suppliers with ample analyst coverage, customer CDS trading has little or no effect on their leverage.[23]

5.1.4. *Market Reaction to Customer CDS Introduction*

To better understand how information produced by customer CDS drives the CDS externalities, we take advantage of a matched sample of treated and control suppliers with long-term customers. The treated supplier has been serving a customer for four consecutive years (i.e., a long-term customer), and this customer began to have CDS trading in the third year of the four-year window. The control supplier has also been serving a customer for four consecutive years, but this long-term customer had no CDS trading during the four-year window. We match the treated supplier with the control supplier in the second year of the four-year window such that they are in the same two-digit SIC industry and their size (total assets) and customer default risk (average customer Z-score) are the closest to each other among all of the potential matches.[24] Because the supplier's choice of long-term customer is made at least two years before its CDS reference, the treated supplier's exposure to customer CDS is exogenously initiated by the long-term customer, making it possible to link the supplier's leverage response with the informational impact of CDS introduction. Specifically, we compute the cumulative abnormal return of the long-term customer in the [-2, +2] trading day window around its CDS introduction, where the abnormal return is computed based on the Fama-French three-factor model estimated during the [-252, -22] trading days relative to the CDS introduction. If CDS convey new information about the customer, such information should be most useful when the customer's event abnormal return is either very high or very low. If the customer's event abnormal return is approximately average, then the information produced by CDS is unlikely to be particularly original. Thus, if customer CDS impacts supplier leverage by alleviating information asymmetry, we expect the effect to be stronger when the long-term customer's event abnormal return is more radical.

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[23] As an alternative measure of information asymmetry, we also divide the sample suppliers based on their idiosyncratic volatility. We find that the negative impact of customer CDS on supplier leverage is concentrated among suppliers whose idiosyncratic volatility is above the sample median (see the Internet Appendix Table A6 for details).

[24] This matched sample of suppliers with long-term customers is the same as that used to address endogeneity concerns in Internet Appendix Table A4.

We divide the treated suppliers into three groups based on terciles of the cumulative abnormal return (CAR) of the long-term customers around their CDS introduction. Control firms follow their matched treated firms into these three groups. As reported in Panel B of Table 10, the impact of customer CDS on supplier leverage is negative and much stronger when more original information is conveyed by customer CDS. The effect is especially significant among suppliers whose long-term customers experience a high event CAR. For suppliers whose long-term customer's event CAR is low, although the effect is not statistically significant, it is always far more negative than it is when the long-term customer's event CAR is average. These results are consistent with the idea that the CDS externalities on supplier leverage are driven by the original information conveyed by CDS.

5.1.5. Source of Leverage Reduction

To obtain more direct evidence on this information improvement mechanism, we further examine a supplier's financing behavior in response to heightened exposure to CDS-referenced customers. Specifically, we ask, does a supplier decrease its leverage by retiring debt or by issuing equity? If deleveraging is achieved through equity issuance, then this evidence supports the notion that equity becomes the preferred source of financing on the margin due to an improved information environment

We define *Debt Retirement* as debt reduction divided by last year's total assets, i.e., dltr(t)/at(t-1). *Equity Issuance* equals sale of equity divided by last year's total assets, i.e., sstk(t)/at(t-1). We then run linear regressions of the above variables on the first difference of *% Sales to Customers with CDS* and a set of control variables (also in first difference). Column 1 of Table 11 shows that *Debt Retirement* increases with *% Sales to Customers with CDS*, but the effect is not significant. However, Column 2 shows that when *% Sales to Customers with CDS* increases, *Equity Issuance* is significantly higher, both statistically and economically.

In sum, the decrease in leverage in response to customer CDS is most pronounced among opaque suppliers and when the information shock produced by customer CDS is large. Additionally, the decrease in leverage is largely achieved by equity issuance rather than debt retirement. Taken together, the better information environment produced by customer CDS appears to be an important channel for the CDS externalities on supplier leverage.

5.2. Negative Customer Information

Another possible reason that heightened exposure to customers with CDS leads to lower leverage usage by suppliers is that customer CDS contain information content related to customer risk. Given that CDS are associated with a higher probability of bankruptcy (Bolton and Oehmke (2011) and Subrahmanyam, Tang, and Wang (2014)) and also provide a way to profit from negative information, customer CDS may convey new information about customer credit risk. As a prudent reaction to a potentially unfavorable risk outlook, a supplier may decide to adopt a lower leverage ratio.

5.2.1. Customer Credit Risk

Our first test for the negative customer information mechanism is to examine the difference in the leverage response between suppliers whose customers are more susceptible to distress or credit risk and those whose customers are relatively safe. For the former, the trading of their customers' CDS is more likely to be motivated by a dimming risk outlook. Additionally, the potential effect of CDS to distort debtholders' incentives and aggravate distress should be strongest among these customer firms. Thus, we expect the leverage of these suppliers to have a higher sensitivity to their customers' CDS status.

In Table 12, we divide the sample of suppliers based on the average Z-score of their customers and rerun the regressions in Table 4 on the subsamples. The results show that the negative effect of customer CDS on supplier leverage is most pronounced among suppliers whose customers are close to financial distress (average Z-score below the sample median). For suppliers with high credit quality customers, the effect is statistically insignificant. The evidence suggests that suppliers are more cautious in their financial policies when customer CDS are more likely an indication of heightened risk going forward.[25]

5.2.2. Exposure to Supply Chain Rigidity

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[25] We also divide the sample suppliers based on the average Standard and Poor's credit rating of their customers. The results, reported in the Internet Appendix Table A7, show that the negative effect of customer CDS on supplier leverage is concentrated among suppliers whose customers' average credit rating is below investment grade.

We further examine the negative customer information channel by comparing the response to customer CDS of suppliers facing high vs. low costs of disruption if their customers fail. Specifically, we follow Giannetti, Burkart, and Ellingsen (2009) and classify suppliers' output as differentiated goods, services, or standardized goods according to their two-digit SIC code. Giannetti et al. argue that differentiated goods and services are more customer-specific than standardized goods. Suppliers producing the former face higher disruption costs if their customers fail and therefore will be more sensitive to the potential risks signaled by customer CDS.

Panel A of Table 13 reports the results of the subsamples of suppliers. Suppliers producing differentiated goods use significantly lower leverage when they have a larger sales exposure to customers referenced by CDS. Suppliers providing services also use less leverage, but the effect is not statistically significant. Suppliers producing standardized goods, however, have higher (although statistically insignificant) leverage if they sell more to CDS-referenced customers. The results are consistent with suppliers perceiving customer CDS as a risk flag and using more caution when customer defaults tend to be more costly to them.

As an alternative measure of disruption costs, we use the Herfindahl index of the supplier industry's output used by its downstream industries. If a supplier's output is used by only a few industries, then the supplier will face greater disruption costs if some of its customers become distressed. Based on the 2002 Use and Make tables of U.S. industries from the Bureau of Economic Analysis, we divide the suppliers into subsamples in which the Herfindal index of their industry output usage by customer industries is above vs. below the sample median. As shown in Panel B of Table 13, customer CDS have a significantly negative impact on supplier leverage if the suppliers have concentrated customers. However, the impact is statistically insignificant if the supplier's output usage is diversified. Again, the evidence is consistent with customer CDS containing customer risk information because more risk-sensitive suppliers are more responsive.[26]

5.2.3. Supplier Investment Policy

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[26] We also find that the effect of customer CDS trading on supplier leverage is stronger for more financially constrained suppliers (Internet Appendix Table A8) and for suppliers with fewer investment opportunities (Internet Appendix Table A9).

If a leverage decrease is a precaution due to a potentially unfavorable risk outlook signaled by customer CDS, it is likely that suppliers will adjust their investment as a risk management measure as well. We thus examine the impact of the exposure to customers with CDS on a supplier's capital expenditures and R&D expenses in Columns 1 and 2 of Table 14, respectively. We find *% Sales to Customers with CDS* has a negative and significant effect on a supplier's capital expenditures. A one-standard deviation increase in *% Sales to Customers with CDS* results in a 5% (3%) decrease from the median (mean) capital expenditures of the supplier. We find no significant impact on the supplier's R&D expenses. Because there is no evidence that the average supplier faces a credit crunch (Table 11), the investment cut is likely a precautionary move.[27] Because suppliers show caution in both financial and real policies as their exposure to CDS-referenced customers increases, the adjustments are likely motivated by the warning conveyed by customer CDS.[28]

5.3. Discussion of Other Mechanisms

We consider other possible channels that may lead to a negative relationship between the exposure to CDS-referenced customers and supplier leverage (see Section 2 as well). For example, in addition to the quantity or amount of leverage, maturity is another important dimension of credit. As detailed in the Internet Appendix Table A11, we find that debt maturity is somewhat shorter when a supplier's exposure to CDS-referenced customers is larger. This effect is statistically significant with firm-fixed effects but insignificant once year-fixed effects are included. Therefore, a supplier's debt maturity does not increase (to counteract the decrease in the quantity of debt) after customer CDS trading.

One potential mechanism discussed in Section 2 is customer credit crowding out supplier credit. The evidence on suppliers' external financing behavior shown in Table 11 reveals that debt reduction is insignificant after customers' CDS trading, which is inconsistent with a credit crowding-out story. We also perform an analysis on a subsample where both the supplier and its customers can be linked to DealScan. There

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[27] The maintenance of R&D expenses is also consistent with suppliers' search for growth opportunities in case current customers fail.

[28] We also examine how the exposure to CDS-referenced customers affects a supplier's operating performance, such as sales growth and profitability. As reported in the Internet Appendix Table A10, we find no significant impact of customer CDS on suppliers' sales growth and profitability.

is no evidence that the CDS externalities on supplier leverage are more pronounced when a supplier shares the same lenders (either the lead bank or syndicate members) with its CDS-referenced customers (see the Internet Appendix Table A12 for details). Hence, we do not find evidence of the *crowd-out* mechanism.

Another possible mechanism works through trade credit. Because customers with CDS can obtain more credit on their own, suppliers may not need to provide as much trade credit when more sales are to customers with CDS. If some of the trade credit is financed by a supplier's debt, then the supplier will be able to reduce the debt level. Our finding in Table 11 that suppliers do not experience significant reductions in debt levels is not supportive of this mechanism. We also examine whether a customer's accounts payable, i.e., the trade credit provided by suppliers, decreases after its CDS begin trading. We find that customers with CDS actually tend to have larger amounts of accounts payable, although this effect is not statistically significant (see the Internet Appendix Table A13 for details). Again, it seems that trade credit is not a significant mechanism for the CDS externalities.

Overall, the evidence presented in this section is not supportive of other potential channels but is consistent with the informational role of customer CDS in suppliers' financial decisions. Customer CDS trading helps improve suppliers' information environment, making equity the preferred financing choice on the margin. Meanwhile, customer CDS convey information about potential revenue risks going forward for the supplier, inducing suppliers to be more conservative in leveraging.

6. Conclusion

Although only a small proportion of firms are directly linked to CDS, we show that CDS affect many firms through their economic links with the referenced firms. When a firm generates a larger proportion of revenue from CDS-referenced customers, it tends to use less leverage. This result is robust to controlling for the importance of critical customers, industry shocks, and customer conditions. It also persists in a difference-in-differences analysis. Moreover, we address potential endogeneity using instrumental variables. Our result remains statistically and economically significant.

We further show that the information produced by customer CDS is likely the main driver of the observed CDS externalities. On the one hand, customer CDS help to improve the information environment of the supplier, making equity more attractive

than debt as the marginal source of financing. On the other hand, customer CDS signal potential risks from the customer going forward, inducing the supplier to decrease leverage as a precaution.

To the best of our knowledge, this is the first study to document that CDS referencing one firm can generate externalities on the financial policies of another related firm without CDS. Our findings can be useful for policymakers and regulators. CDS are a major concern for regulators all over the world. For example, the Dodd-Frank Act in the U.S. aims to improve the disclosure, settlement, clearing, and risk management of CDS trading. The E.U. has partially banned buying CDS without holding reference bonds. On the other hand, China and India recently took initiatives to set up onshore CDS trading. An important implication of our research is that the informational role of CDS on other related firms should be taken into consideration for objective and balanced policy debates. Finally, this paper highlights the interaction between financial innovations and product market relations in shaping corporate financial policies, which broadens our view of the external determinants of firms' capital structure.

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Table 1: Sample Firms Over Time

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. CDS trading data are from GFI Group, CreditTrade, and Markit.

Fiscal Year	Total Number of Supplier Firms	Average Number of Customers per Supplier Firm	Number of Customer Firms w/ Active CDS	Number of Supplier Firms Having CDS-Referenced Customers
1997	3,256	2.01	11	84
1998	2,960	2.03	27	253
1999	2,113	2.31	66	362
2000	2,557	2.32	115	505
2001	2,334	2.39	175	598
2002	2,236	2.44	219	694
2003	2,044	2.45	230	683
2004	2,072	2.48	235	640
2005	2,035	2.49	243	625
2006	2,032	2.54	237	619
2007	2,021	2.65	245	638
2008	1,735	2.65	230	507

Table 2: Summary Statistics

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. *Market Leverage* is the sum of long-term debt and debt in current liabilities as a percentage of the market value of assets, i.e., (dltt+dlc)/(prcc_f*csho+at-ceq-txdb)*100. *Book Leverage* is the sum of long-term debt and debt in current liabilities as a percentage of total assets, i.e., (dltt+dlc)/at*100. *% Sales to Customers w/ CDS* is sales to customers that have CDS trading as a proportion of the supplier's total sales. *Industry Median Market (Book) Leverage* is the median *Market (Book) Leverage* of the supplier's industry classified by the three-digit SIC code. *Market-to-Book* is the ratio of market assets to book assets, i.e., (prcc_f*csho+at-ceq-txdb)/at. *Fixed Assets* is fixed assets as a proportion of total assets, i.e., ppent/at. *Profitability* is EBIT scaled by total assets, i.e., oiadp/at. *Total Assets* is the natural log of total assets, i.e., ln(at). *Earnings Volatility* is the standard deviation of EBIT in the last five years scaled by total assets, i.e., std(oiadp)/at. *Loss Carry-Forward* is the total loss carry-forward scaled by total assets, i.e., tlcf/at. *Change of EPS* is the change in earnings per share from last year scaled by stock price, i.e., [epspx(t)-epspx(t-1)]/prcc_f(t). *Rated* equals 1 if the supplier has an S&P long-term issuer credit rating and 0 otherwise. *12-Month Stock Return* is the cumulative stock return of the supplier in the last 12 months.

Variable	# Obs	Mean	Std. Dev.	Min	Median	Max
Market Leverage	26,508	14.59	17.89	0.000	7.04	71.4
Book Leverage	27,312	19.82	22.36	0.000	12.51	101.89
% Sales to Customers w/ CDS	26,846	0.055	0.138	0.000	0.000	0.728
Industry Median Market Leverage	27,394	10.92	10.50	0.000	8.40	74.05
Industry Median Book Leverage	27,394	14.75	11.71	0.000	13.85	156.32
Market-to-Book	26,585	2.273	2.195	0.525	1.527	14.032
Fixed Assets	27,062	0.233	0.224	0.005	0.151	0.900
Profitability	27,383	-0.045	0.282	-1.385	0.043	0.343
Total Assets	27,392	4.871	1.715	1.268	4.819	9.846
Earnings Volatility	23,045	0.102	0.145	0.005	0.053	0.914
Loss Carry-Forward	17,322	0.621	1.546	0.000	0.037	9.684
Change of EPS	25,242	-0.030	0.502	-2.720	0.003	2.117
Rated	27,395	0.116	0.321	0.000	0.000	1.000
12-Month Stock Return	26,953	1.105	0.821	0.083	0.948	5.169

Table 3: Effect of Customer CDS on Supplier Leverage

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. The dependent variable is *Market Leverage* in columns (1) and (2) and *Book Leverage* in columns (3) and (4). *Market Leverage* is the sum of long-term debt and debt in current liabilities as a percentage of the market value of assets, i.e., (dltt+dlc)/(prcc_f*csho+at-ceq-txdb)*100. *Book Leverage* is the sum of long-term debt and debt in current liabilities as a percentage of total assets, i.e., (dltt+dlc)/at*100. *% Sales to Customers w/ CDS* is sales to customers that have CDS trading as a proportion of the supplier's total sales. *Industry Median Market (Book) Leverage* is the annual median *Market (Book) Leverage* of the supplier's industry classified by the three-digit SIC code. *Market-to-Book* is the ratio of market assets to book assets, i.e., (prcc_f*csho+at-ceq-txdb)/at. *Fixed Assets* is fixed assets as a proportion of total assets, i.e., ppent/at. *Profitability* is EBIT scaled by total assets, i.e., oiadp/at. *Total Assets* is the natural log of total assets, i.e., ln(at). *Earnings Volatility* is the standard deviation of EBIT in the last five years scaled by total assets, i.e., std(oiadp)/at. *Loss Carry-Forward* is the total loss carry-forward scaled by total assets, i.e., tlcf/at. *Change of EPS* is change in earnings per share from last year scaled by stock price, i.e., [epspx(t)-epspx(t-1)]/prcc_f(t). *Rated* equals 1 if the supplier has an S&P long-term issuer credit rating and 0 otherwise. *12-Month Stock Return* is the cumulative stock return of the supplier in the last 12 months. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

	Market Leverage		Book Leverage	
	(1)	(2)	(3)	(4)
% Sales to Customers w/ CDS	-7.429***	-4.025***	-8.129***	-4.785***
	(-5.573)	(-3.148)	(-4.401)	(-2.586)
Industry Median Leverage	0.284***	0.187***	0.196***	0.130***
	(10.30)	(6.954)	(6.093)	(3.998)
Market-to-Book	-1.003***	-1.073***	-0.654***	-0.713***
	(-11.06)	(-11.85)	(-4.449)	(-4.880)
Fixed Assets	12.63***	9.264***	12.34***	9.799***
	(5.451)	(4.019)	(4.187)	(3.322)
Profitability	-5.234***	-5.576***	-6.816***	-7.539***
	(-4.970)	(-5.131)	(-3.807)	(-4.202)
Total Assets	2.294***	4.004***	2.243***	4.084***
	(5.698)	(8.838)	(4.289)	(7.033)
Earnings Volatility	-0.644	0.867	4.183	5.668
	(-0.301)	(0.404)	(1.107)	(1.496)
Loss Carry-Forward	0.621***	1.153***	0.827**	1.387***
	(2.926)	(5.094)	(2.161)	(3.516)
Change of EPS	-0.545*	-0.453	-0.218	-0.0919
	(-1.848)	(-1.536)	(-0.487)	(-0.201)
Rated	3.678***	3.757***	3.677***	3.717***
	(3.830)	(4.124)	(2.755)	(2.847)
12-Month Stock Return	-3.586***	-3.268***	-1.595***	-1.471***
	(-22.15)	(-20.65)	(-8.892)	(-7.841)
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	No	Yes	No	Yes
# Obs.	10,134	10,134	10,240	10,240
R-sqr Within	0.167	0.207	0.057	0.076

Table 4: Effect of Customer CDS Status on Supplier Leverage: Alternative Explanations

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. The dependent variable is *Market Leverage* in columns (1) and (2) and *Book Leverage* in columns (3) and (4). *Market Leverage* is the sum of long-term debt and debt in current liabilities as a percentage of the market value of assets, i.e., (dltt+dlc)/(prcc_f*csho+at-ceq-txdb)*100. *Book Leverage* is the sum of long-term debt and debt in current liabilities as a percentage of total assets, i.e., (dltt+dlc)/at*100. *Sales to Customers w/ CDS* is sales to customers that have CDS trading as a proportion of the supplier's total sales. *Industry Median Market (Book) Leverage* is the annual median *Market (Book) Leverage* of the supplier's industry classified by the three-digit SIC code. *Market-to-Book* is the ratio of market assets to book assets, i.e., (prcc_f*csho+at-ceq-txdb)/at. *Fixed Assets* is fixed assets as a proportion of total assets, i.e., ppent/at. *Profitability* is EBIT scaled by total assets, i.e., oiadp/at. *Total Assets* is the natural log of total assets, i.e., ln(at). *Earnings Volatility* is the standard deviation of EBIT in the last five years scaled by total assets, i.e., std(oiadp)/at. *Loss Carry-Forward* is the total loss carry-forward scaled by total assets, i.e., tlcf/at. *Change of EPS* is change in earnings per share from last year scaled by stock price, i.e., [epspx(t)-epspx(t-1)]/prcc_f(t). *Rated* equals 1 if the supplier has an S&P long-term issuer credit rating and 0 otherwise. *12-Month Stock Return* is the cumulative stock return of the supplier in the last 12 months. *% Sales to Critical Customers* is sales to all identified critical customers as a proportion of the supplier's total sales. *Customer in Distress* is the average of an indicator of each customer's annual stock return below the industry (three-digit SIC) median, weighted by sales to the customer. *Industry Median Return* is the annual median stock return of the supplier's three-digit SIC industry. *Customer Industry Median Return* is the average of each customer's three-digit SIC industry's median stock return, weighted by sales to the customer. *Customer Leverage* is the average of each customer's market or book leverage (depending on whether the dependent variable is market or book leverage) weighted by sales to the customer. *Customer Earnings Volatility* is the average of each customer's earnings volatility weighted by sales to the customer. Customer average variables are extrapolated as equal to the annual sample median when the supplier's customers have no CRSP-Compustat merged data. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

	Market Leverage		Book Leverage	
	(1)	(2)	(3)	(4)
% Sales to Customers w/ CDS	-7.079***	-4.516***	-8.941***	-6.388***
	(-4.910)	(-3.211)	(-4.297)	(-3.058)
Industry Median Leverage	25.11***	17.89***	17.89***	12.95***
	(8.831)	(6.519)	(5.470)	(3.925)
Market-to-Book	-0.969***	-1.065***	-0.601***	-0.685***
	(-10.65)	(-11.50)	(-4.052)	(-4.601)
Fixed Assets	12.32***	9.347***	11.93***	9.882***
	(5.288)	(4.020)	(3.999)	(3.320)
Profitability	-5.051***	-5.398***	-6.829***	-7.531***
	(-4.631)	(-4.803)	(-3.764)	(-4.115)
Total Assets	2.250***	3.923***	2.405***	4.108***
	(5.456)	(8.421)	(4.459)	(6.832)
Earnings Volatility	-0.185	0.896	4.703	5.637
	(-0.0855)	(0.408)	(1.229)	(1.460)
Loss Carry-Forward	0.647***	1.168***	0.889**	1.408***
	(2.939)	(4.976)	(2.230)	(3.427)
Change of EPS	-0.406	-0.390	-0.0598	-0.0136
	(-1.346)	(-1.279)	(-0.131)	(-0.0292)
Rated	4.020***	3.937***	3.695***	3.641***
	(4.207)	(4.249)	(2.725)	(2.730)
12-Month Stock Return	-3.656***	-3.296***	-1.600***	-1.475***
	(-22.27)	(-20.49)	(-8.751)	(-7.737)
% Sales to Critical Customers	-1.915*	-1.245	-1.441	-0.611
	(-1.891)	(-1.235)	(-1.039)	(-0.440)
Customer in Distress	-1.574***	-0.312	-1.695***	-0.424
	(-5.322)	(-0.886)	(-4.574)	(-0.977)
Industry Median Return	-0.520	-0.427	-0.424	0.0759
	(-1.163)	(-0.887)	(-0.745)	(0.125)
Customer Industry Med. Return	-2.131***	-0.171	-0.904	-0.570
	(-3.476)	(-0.178)	(-1.115)	(-0.441)
Customer Leverage	3.999	-0.728	6.220**	2.235
	(1.632)	(-0.294)	(2.467)	(0.829)
Customer Profitability	-3.740	-2.513	-3.440	-4.420
	(-0.924)	(-0.600)	(-0.683)	(-0.865)
Customer Earnings Volatility	0.673	-9.370	8.668	0.365
	(0.0710)	(-0.989)	(0.627)	(0.0259)
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	No	Yes	No	Yes
# Obs.	9,937	9,937	10,043	10,043
R-sqr Within	0.180	0.208	0.065	0.077

Table 5: Effect of Customer CDS Status on Supplier Leverage:
Alternative Measure of Customer CDS Exposure and Change Analysis

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. In Panel A, the dependent variable is *Market Leverage* in columns (1) and (2) and *Book Leverage* in columns (3) and (4). *Have Customer w/ CDS* equals 1 if the supplier has at least one CDS-referenced customer and 0 otherwise. In Panel B, the dependent variable is change from t to t+1 *Market Leverage* in columns (1) and (2) and change from t to t+1 of *Book Leverage* in columns (3) and (4). The independent variables are changes from t-1 to t. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Panel A: Alternative Measure

	Market Leverage		Book Leverage	
	(1)	(2)	(3)	(4)
Have Customer w/ CDS	-2.653***	-1.676***	-3.305***	-2.281***
	(-4.996)	(-3.192)	(-5.035)	(-3.422)
Industry Median Leverage	25.61***	17.97***	17.62***	12.45***
	(8.724)	(6.318)	(5.463)	(3.814)
Market-to-Book	-0.971***	-1.065***	-0.602***	-0.682***
	(-10.72)	(-11.60)	(-4.074)	(-4.621)
Fixed Assets	12.23***	9.183***	12.02***	9.906***
	(5.373)	(4.056)	(4.095)	(3.385)
Profitability	-5.233***	-5.545***	-6.939***	-7.606***
	(-4.759)	(-4.900)	(-3.831)	(-4.161)
Total Assets	2.282***	3.968***	2.392***	4.107***
	(5.647)	(8.578)	(4.535)	(6.916)
Earnings Volatility	-0.120	0.959	4.483	5.398
	(-0.0552)	(0.437)	(1.178)	(1.407)
Loss Carry-Forward	0.659***	1.177***	0.902**	1.415***
	(3.048)	(5.083)	(2.307)	(3.517)
Change of EPS	-0.482	-0.470	-0.174	-0.130
	(-1.526)	(-1.464)	(-0.365)	(-0.269)
Rated	4.090***	4.019***	3.775***	3.729***
	(4.356)	(4.388)	(2.840)	(2.839)
12-Month Stock Return	-3.642***	-3.286***	-1.583***	-1.462***
	(-22.45)	(-20.65)	(-8.768)	(-7.768)
% Sales to Critical Customers	-2.496**	-1.588	-2.190	-1.167
	(-2.520)	(-1.620)	(-1.640)	(-0.873)
Customer in Distress	-1.559***	-0.294	-1.653***	-0.413
	(-5.242)	(-0.839)	(-4.473)	(-0.952)
Industry Median Return	-0.405	-0.315	-0.310	0.188
	(-0.902)	(-0.660)	(-0.547)	(0.311)
Customer Industry Med. Return	-2.272***	-0.238	-1.083	-0.586
	(-3.713)	(-0.249)	(-1.352)	(-0.461)
Customer Leverage	3.366	-1.411	5.853**	1.603
	(1.395)	(-0.578)	(2.362)	(0.605)
Customer Profitability	-3.806	-2.483	-3.371	-4.190
	(-0.938)	(-0.594)	(-0.676)	(-0.827)
Customer Earnings Volatility	-0.562	-10.22	5.679	-2.133
	(-0.0599)	(-1.083)	(0.420)	(-0.154)
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	No	Yes	No	Yes
# Obs.	10,089	10,089	10,197	10,197
R-sqr Within	0.180	0.209	0.065	0.078

Panel B: Change Analysis

Δ	Market Leverage		Book Leverage	
	(1)	(2)	(3)	(4)
% Sales to Customers w/ CDS	-1.810*	-1.738	-3.615**	-3.522**
	(-1.678)	(-1.612)	(-2.173)	(-2.109)
Industry Median Leverage	3.605*	-0.224	-1.190	-2.104
	(1.825)	(-0.112)	(-0.472)	(-0.817)
Market-to-Book	-0.794***	-0.783***	-0.544***	-0.558***
	(-9.879)	(-9.767)	(-3.872)	(-3.960)
Fixed Assets	5.873*	4.636	3.171	2.997
	(1.935)	(1.538)	(0.964)	(0.903)
Profitability	-2.226**	-1.532	-0.425	-0.221
	(-2.278)	(-1.593)	(-0.273)	(-0.142)
Total Assets	0.541	0.485	0.236	0.0693
	(1.175)	(1.059)	(0.397)	(0.115)
Earnings Volatility	0.446	1.016	3.090	3.302
	(0.186)	(0.429)	(0.973)	(1.035)
Loss Carry-Forward	0.256	0.273	-0.205	-0.217
	(1.016)	(1.083)	(-0.525)	(-0.552)
Change of EPS	-0.196	-0.254	-0.200	-0.209
	(-0.698)	(-0.909)	(-0.585)	(-0.610)
Rated	1.139	1.085	-0.228	-0.234
	(1.488)	(1.461)	(-0.271)	(-0.278)
12-Month Stock Return	-3.175***	-2.936***	-1.087***	-1.066***
	(-21.64)	(-20.42)	(-7.330)	(-6.967)
% Sales to Critical Customers	-0.197	-0.195	-0.608	-0.543
	(-0.230)	(-0.228)	(-0.579)	(-0.514)
Customer in Distress	-0.412*	-0.205	-0.797***	-0.437
	(-1.801)	(-0.823)	(-2.669)	(-1.359)
Industry Median Return	-0.333	-0.426	-0.484	-0.330
	(-0.989)	(-1.181)	(-1.109)	(-0.705)
Customer Industry Med. Return	-2.308***	-0.492	-0.651	-0.0277
	(-4.851)	(-0.746)	(-1.058)	(-0.0302)
Customer Leverage	1.876	0.534	5.102**	5.472**
	(0.969)	(0.275)	(2.235)	(2.283)
Customer Profitability	-3.788	-1.688	-1.281	-1.890
	(-1.195)	(-0.517)	(-0.313)	(-0.450)
Customer Earnings Volatility	1.790	-1.104	7.965	8.852
	(0.241)	(-0.151)	(0.660)	(0.746)
Firm-Fixed Effects	No	No	No	No
Year-Fixed Effects	No	Yes	No	Yes
# Obs.	6,824	6,824	6,895	6,895
R-sqr Within	0.132	0.155	0.017	0.021

Table 6: Effect of Customer CDS Status on Supplier Leverage:
Difference-in-Differences Analysis and Placebo Tests

The original sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. From the original sample, we construct a matched sample of treated and control suppliers as follows: (1) A treated supplier is defined as having CDS-referenced customer(s) in the third and fourth years (t and t+1) of a four-year window and having no CDS-referenced customer(s) in the first and second years (t-2 and t-1). (2) A control supplier is defined as having no CDS-referenced customers throughout a four-year window. (3) A control supplier is matched with a treated supplier in year t-1 of the four-year window if they are in the same two-digit SIC industry and their *Total Assets* and *Customer Z-Score* are the closest to each other among all potential matches. The placebo treatment is defined as having CDS-referenced customers one year (or two years) before the actual year of treatment. The dependent variable is *Market Leverage* in columns (1)-(3) and *Book Leverage* in columns (4)-(6). The treatment year is the actual event year in columns (1) and (4), is one year before the actual event year in columns (2) and (5), and is two years before the actual event year in columns (3) and (6). *Treated* equals 1 if the supplier has CDS-referenced customer(s) during the sample period and 0 otherwise. *After* equals 1 if the year is after the year when the control supplier is matched with the treated supplier (one year before the treatment) and 0 otherwise. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

	Market Leverage			Book Leverage		
	Actual t	t-1	t-2	Actual t	t-1	t-2
	(1)	(2)	(3)	(4)	(5)	(6)
Treated*After	-2.800***	-0.132	0.217	-2.642**	0.436	-1.141
	(-2.718)	(-0.106)	(0.115)	(-1.987)	(0.283)	(-0.459)
Treated	1.015	1.452	2.477**	1.267	1.337	4.154**
	(1.006)	(0.836)	(2.174)	(0.921)	(0.684)	(2.110)
After	1.920***	1.295	0.530	2.221***	2.695**	3.252*
	(3.155)	(1.419)	(0.393)	(2.656)	(2.102)	(1.813)
Industry Median Leverage	-4.632	-16.18	-11.31	-5.109	-23.21**	-7.584
	(-0.748)	(-1.242)	(-0.758)	(-0.706)	(-2.220)	(-0.546)
Market-to-Book	-0.566***	-0.987***	-0.862***	-0.507	-0.284	-0.170
	(-2.880)	(-3.897)	(-3.149)	(-1.505)	(-0.661)	(-0.323)
Fixed Assets	14.38**	33.49***	26.15*	13.11*	32.73***	25.37*
	(2.335)	(3.387)	(1.927)	(1.759)	(3.061)	(1.672)
Profitability	-0.872	-5.382	-4.072	2.621	-8.168	-9.825*
	(-0.343)	(-1.550)	(-1.056)	(0.795)	(-1.609)	(-1.691)
Total Assets	2.146*	6.517**	5.810*	1.915	5.034	6.888
	(1.737)	(2.250)	(1.762)	(1.262)	(1.322)	(1.383)
Earnings Volatility	3.198	19.32**	25.26**	9.423	24.74***	26.96*
	(0.637)	(2.233)	(2.563)	(1.461)	(2.845)	(1.909)
Loss Carry-Forward	-0.420	-0.829	-1.460**	-0.871	-2.882***	-2.947**
	(-0.568)	(-1.153)	(-1.995)	(-0.867)	(-2.907)	(-2.497)
Change of EPS	-1.479*	-3.943***	-2.767**	-3.329**	-3.706***	-3.278***
	(-1.699)	(-3.157)	(-2.197)	(-2.571)	(-3.635)	(-3.017)
Rated	0.269	-10.21***	-8.864**	0.994	-5.175	-3.844
	(0.140)	(-2.924)	(-2.619)	(0.349)	(-1.528)	(-0.905)
12-Month Stock Return	-2.515***	-2.957***	-2.983***	-1.383***	-1.232*	-1.098
	(-6.450)	(-5.521)	(-4.497)	(-3.351)	(-1.888)	(-1.429)
% Sales to Critical Customers	-0.539	6.503	-4.268	3.417	11.66	4.076
	(-0.223)	(1.049)	(-0.836)	(0.577)	(1.619)	(0.594)
Customer in Distress	1.833***	1.911**	0.446	2.189***	2.597***	0.409
	(2.896)	(2.318)	(0.305)	(2.766)	(2.725)	(0.262)
Industry Median Return	-2.598**	-3.615	-1.193	-1.791	-3.870*	0.773
	(-2.283)	(-1.601)	(-0.456)	(-1.267)	(-1.749)	(0.295)
Cust. Industry Med. Return	-0.817	3.797	3.693	2.560	6.031	8.962
	(-0.376)	(1.191)	(0.903)	(0.927)	(1.387)	(1.470)
Customer Leverage	-0.327	-6.076	3.339	5.817	-3.076	-1.433
	(-0.0758)	(-0.935)	(0.495)	(1.440)	(-0.589)	(-0.227)
Customer Profitability	2.787	-18.92*	-15.36	11.89	-11.01	-8.800
	(0.410)	(-1.929)	(-1.345)	(1.374)	(-1.148)	(-0.855)
Cust. Earnings Volatility	-6.397	-12.73	-5.227	2.019	-21.52	0.325
	(-0.593)	(-0.703)	(-0.244)	(0.131)	(-1.084)	(0.0141)
Firm-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
# Obs.	1,539	454	355	1,555	455	356
R-sqr Within	0.259	0.447	0.360	0.109	0.357	0.305

Table 7: Effect of Customer CDS Status on Supplier Leverage:
Instrumental Variable Regression

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. The dependent variable is *Market Leverage* in columns (1) and (2) and *Book Leverage* in columns (3) and (4). The variable of interest, *% Sales to Customers with CDS*, is instrumented by *FX Derivatives Use by Customers' Lenders* and *% Sales to Customers with Concentrated Lenders*. *FX Derivatives Use by Customers' Lenders* is constructed as follows. For each customer firm, we compute the average amount of foreign exchange derivatives used for hedging purposes relative to the total assets of the bank holding companies of the banks serving as the customer firm's lead lenders or bond underwriters in the past five years. Then, we sum this value across all of the customer firms of a given supplier. *% Sales to Customers with Concentrated Lenders* is defined as sales to customers with concentrated lenders as a proportion of the supplier's total sales. A customer is considered to have concentrated lenders if the average Herfindahl index of its lenders' loan portfolio industry-state concentration is above its annual sample median. Please refer to the other variable definitions in Table 4. Standard errors are robust, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

	Market Leverage		Book Leverage	
	(1)	(2)	(3)	(4)
% Sales to Customers w/ CDS	-20.01***	-10.70**	-23.37***	-18.03***
	(-4.077)	(-2.107)	(-3.907)	(-2.822)
Industry Median Leverage	24.66***	17.88***	16.95***	12.81***
	(11.15)	(7.995)	(5.847)	(4.285)
Market-to-Book	-0.981***	-1.065***	-0.612***	-0.684***
	(-12.11)	(-13.34)	(-4.447)	(-4.928)
Fixed Assets	11.94***	9.331***	11.47***	9.802***
	(5.815)	(4.602)	(4.443)	(3.806)
Profitability	-4.901***	-5.261***	-6.665***	-7.283***
	(-5.002)	(-5.354)	(-4.108)	(-4.423)
Total Assets	2.614***	3.955***	2.819***	4.170***
	(7.015)	(10.11)	(5.982)	(8.329)
Earnings Volatility	0.256	0.981	5.192*	5.785*
	(0.140)	(0.544)	(1.695)	(1.886)
Loss Carry-Forward	0.693***	1.150***	0.948***	1.381***
	(3.836)	(6.074)	(2.920)	(4.112)
Change of EPS	-0.453	-0.414	-0.110	-0.0573
	(-1.354)	(-1.239)	(-0.220)	(-0.112)
Rated	3.828***	3.852***	3.489***	3.482***
	(4.277)	(4.388)	(2.856)	(2.872)
12-Month Stock Return	-3.615***	-3.294***	-1.550***	-1.473***
	(-23.60)	(-21.68)	(-8.360)	(-7.700)
% Sales to Critical Customers	-0.404	-0.608	0.221	0.565
	(-0.415)	(-0.639)	(0.174)	(0.447)
Customer in Distress	-1.494***	-0.426	-1.604***	-0.631
	(-5.275)	(-1.177)	(-4.470)	(-1.362)
Industry Median Return	-0.408	-0.407	-0.298	0.109
	(-0.903)	(-0.846)	(-0.527)	(0.180)
Customer Industry Med. Return	-2.047***	-0.0725	-0.898	-0.434
	(-3.040)	(-0.0738)	(-1.076)	(-0.344)
Customer Leverage	5.906***	0.343	7.963***	4.126
	(2.591)	(0.148)	(3.272)	(1.581)
Customer Profitability	-2.573	-1.710	-2.694	-3.421
	(-0.685)	(-0.453)	(-0.574)	(-0.721)
Customer Earnings Volatility	-3.607	-11.13	3.370	-3.062
	(-0.390)	(-1.219)	(0.265)	(-0.240)
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	No	Yes	No	Yes
# Obs.	9,137	9,137	9,235	9,235
R-sqr Within	0.165	0.205	0.052	0.069

Table 8: Effect of Customer CDS Status on Supplier Leverage: CDS Outstanding

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. The dependent variable is *Market Leverage* in columns (1) and (2) and *Book Leverage* in columns (3) and (4). *Customer CDS Outstanding* is the average amount of each customer's CDS outstanding in the most recent year, weighted by sales to the customer. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively

	Market Leverage		Book Leverage	
	(1)	(2)	(3)	(4)
Customer CDS Outstanding	-0.745***	-0.337**	-0.807***	-0.487**
	(-4.641)	(-2.100)	(-3.583)	(-2.104)
Industry Median Leverage	25.67***	18.03***	17.95***	12.59***
	(8.630)	(6.300)	(5.499)	(3.827)
Market-to-Book	-0.966***	-1.061***	-0.596***	-0.677***
	(-10.73)	(-11.60)	(-4.078)	(-4.620)
Fixed Assets	12.16***	9.137***	12.00***	9.838***
	(5.331)	(4.028)	(4.083)	(3.357)
Profitability	-5.200***	-5.565***	-6.905***	-7.638***
	(-4.725)	(-4.912)	(-3.809)	(-4.177)
Total Assets	2.183***	3.959***	2.250***	4.098***
	(5.385)	(8.532)	(4.252)	(6.884)
Earnings Volatility	-0.107	0.973	4.476	5.419
	(-0.0497)	(0.444)	(1.174)	(1.412)
Loss Carry-Forward	0.615***	1.168***	0.844**	1.402***
	(2.832)	(5.026)	(2.151)	(3.470)
Change of EPS	-0.437	-0.439	-0.121	-0.0913
	(-1.385)	(-1.373)	(-0.255)	(-0.189)
Rated	4.110***	4.044***	3.814***	3.760***
	(4.377)	(4.414)	(2.865)	(2.860)
12-Month Stock Return	-3.631***	-3.284***	-1.574***	-1.458***
	(-22.30)	(-20.60)	(-8.708)	(-7.731)
% Sales to Critical Customers	-2.789***	-1.738*	-2.548*	-1.367
	(-2.790)	(-1.765)	(-1.900)	(-1.021)
Customer in Distress	-1.575***	-0.277	-1.670***	-0.397
	(-5.326)	(-0.784)	(-4.543)	(-0.894)
Industry Median Return	-0.453	-0.352	-0.369	0.138
	(-1.015)	(-0.738)	(-0.653)	(0.229)
Customer Industry Med. Return	-2.126***	-0.340	-0.919	-0.725
	(-3.490)	(-0.356)	(-1.148)	(-0.572)
Customer Leverage	3.213	-1.648	5.237**	1.030
	(1.325)	(-0.675)	(2.090)	(0.384)
Customer Profitability	-4.728	-3.093	-4.528	-5.067
	(-1.167)	(-0.741)	(-0.905)	(-0.996)
Customer Earnings Volatility	2.416	-8.092	9.632	0.494
	(0.255)	(-0.856)	(0.706)	(0.0355)
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	No	Yes	No	Yes
# Obs.	10,089	10,089	10,197	10,197
R-sqr Within	0.179	0.208	0.062	0.076

Table 9: Effect of Customer CDS Status on Supplier Leverage: Length of Relationship

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. The column labeled Long Relationship (Short Relationship) reports regression results on the subsample of suppliers whose average length of relationships with their customers is no less than (less than) three years. The dependent variable is *Market Leverage* in columns (1) and (2) and *Book Leverage* in columns (3) and (4). The control variables (not reported) are the same as in Table 4. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

	Market Leverage		Book Leverage	
	Long Relationship (1)	Short Relationship (2)	Long Relationship (3)	Short Relationship (4)
% Sales to Customers w/ CDS	-6.260***	-1.235	-6.324*	-2.834
	(-2.620)	(-0.741)	(-1.935)	(-1.082)
Other Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	Yes	Yes	Yes	Yes
# Obs.	3,033	6,904	3,069	6,974
R-sqr Within	0.248	0.174	0.063	0.059

Table 10: Effect of Customer CDS Status on Supplier Leverage: Information Improvement

The original sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. In Panel A, the column labeled Large Coverage (Small Coverage) reports regression results on the subsample of suppliers whose analyst following is above (below) the annual sample median. The dependent variable is *Market Leverage* in columns (1) and (2) and *Book Leverage* in columns (3) and (4). In Panel B, we use the matched sample with long-term customers used in Table A4. We compute the cumulative abnormal return (CAR) of the long-term customers in the [-2,+2] window around their CDS introduction using coefficients of the Fama-French three-factor model estimated in the [-252,-22] window relative to the CDS introduction. We then divide the treated suppliers into three subsamples based on their long-term customers' event CAR. The control suppliers follow their matched treated suppliers into the three subsamples. The column labeled High (Avg., Low) CAR reports regression results on the subsample of matched suppliers where the treated supplier's customer event CAR is in the top (middle, bottom) tercile. The dependent variable is *Market Leverage* in columns (1)-(3) and *Book Leverage* in columns (4)-(6). The control variables (not reported) are the same as those in Table 4. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Panel A. Number of Analysts Following the Supplier: Large vs. Small

	Market Leverage		Book Leverage	
	Large Coverage	Small Coverage	Large Coverage	Small Coverage
	(1)	(2)	(3)	(4)
% Sales to Customers w/ CDS	-3.620*	-4.953**	-3.718	-8.304***
	(-1.932)	(-2.296)	(-1.324)	(-2.656)
Other Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	Yes	Yes	Yes	Yes
# Obs.	4,320	5,617	4,382	5,661
R-sqr Within	0.229	0.202	0.084	0.083

Panel B. Customer Cumulative Abnormal Return around CDS Introduction: High, Average, or Low

	Market Leverage			Book Leverage		
	High CAR	Avg. CAR	Low CAR	High CAR	Avg. CAR	Low CAR
	(1)	(2)	(3)	(4)	(5)	(6)
% Sales to Customers w/ CDS	-27.95**	-2.035	-13.58	-18.29**	3.570	-3.502
	(-2.693)	(-0.281)	(-1.457)	(-2.286)	(0.453)	(-0.261)
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
# Obs.	82	81	80	82	81	80
R-sqr Within	0.805	0.793	0.789	0.741	0.758	0.657

Table 11: Effect of Customer CDS Status on Supplier Leverage:
Debt Retirement and Equity Issuance

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. The dependent variables are *Debt Retirement* and *Equity Issuance* from year t to t+1 in columns (1) and (2), respectively. *Debt Retirement* is debt reduction divided by last year's total assets, i.e., dltr(t)/at(t-1). *Equity Issuance* is sale of equity divided by last year's total assets, i.e., sstk(t)/at(t-1). *Industry Median Debt Retirement* is the annual median *Debt Retirement* of the supplier's three-digit SIC industry. *Industry Median Equity Issuance* is the annual median *Equity Issuance* of the supplier's three-digit SIC industry. The independent variables are the changes from year t-1 to t. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

	Debt Retirement	Equity Issuance
Δ	(1)	(2)
% Sales to Customers w/ CDS	2.156	7.059**
	(0.839)	(2.073)
Industry Median Debt Retirement	67.76***	
	(7.725)	
Industry Median Equity Issuance		26.35***
		(3.022)
Market-to-Book	0.482***	1.865***
	(3.780)	(4.298)
Fixed Assets	2.362	4.832
	(0.753)	(0.875)
Profitability	-1.791	3.421
	(-1.310)	(0.944)
Total Assets	0.942	7.159***
	(0.919)	(5.195)
Earnings Volatility	2.427	9.963
	(0.686)	(1.226)
Loss Carry-Forward	0.142	5.914***
	(0.388)	(5.874)
Change of EPS	0.166	-0.390
	(0.421)	(-0.637)
Rated	-0.184	-2.155**
	(-0.108)	(-2.025)
12-Month Stock Return	0.530**	1.642***
	(2.293)	(4.127)
% Sales to Critical Customers	-0.0937	-0.407
	(-0.0961)	(-0.215)
Customer in Distress	0.405	-0.415
	(1.027)	(-0.785)
Industry Median Return	-0.155	1.107
	(-0.238)	(1.566)
Cust. Industry Med. Return	-0.291	-1.140
	(-0.238)	(-0.599)
Customer Leverage	-0.165	-3.107
	(-0.0540)	(-0.610)
Customer Profitability	4.912	1.899
	(0.835)	(0.181)
Customer Earnings Volatility	-0.699	13.00
	(-0.0482)	(0.561)
Firm-Fixed Effects	No	No
Year-Fixed Effects	Yes	Yes
# Obs.	6,779	6,836
R-sqr	0.047	0.063

Table 12: Effect of Customer CDS Status on Supplier Leverage: Customer Risk Outlook

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. The column labeled High Z (Low Z) reports regression results on the subsample of suppliers whose average customer Z-score is above or equal to (below) the annual sample median. The dependent variable is *Market Leverage* in columns (1) and (2) and *Book Leverage* in columns (3) and (4). The control variables (not reported) are the same as those in Table 4. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

	Market Leverage		Book Leverage	
	High Z	Low Z	High Z	Low Z
	(1)	(2)	(3)	(4)
% Sales to Customers w/ CDS	0.926	-7.618**	2.857	-11.75**
	(0.388)	(-2.157)	(0.685)	(-2.293)
Other Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	Yes	Yes	Yes	Yes
# Obs.	1,698	1,548	1,713	1,570
R-sqr Within	0.271	0.285	0.136	0.183

Table 13: Effect of Customer CDS Status on Supplier Leverage: Supply Chain Rigidity

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. In Panel A, the column labeled Dif. (Ser., Std.) reports regression results on the subsample of suppliers whose two-digit SIC industry is categorized as producing differentiated goods (services, standardized goods). The dependent variable is *Market Leverage* in columns (1)-(3) and *Book Leverage* in columns (4)-(6). In Panel B, the column labeled Concentrated (Diversified) reports regression results on the subsample of suppliers whose customers are concentrated (diversified) in terms of the Herfindahl index of their output usage by downstream industries. The dependent variable is *Market Leverage* in columns (1) and (2) and *Book Leverage* in columns (3) and (4). The control variables (not reported) are the same as in Table 4. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Panel A. Supplier Output Specificity: Differentiated Goods, Services, and Standardized Goods

	Market Leverage			Book Leverage		
	Dif.	Ser.	Std.	Dif.	Ser.	Std.
	(1)	(2)	(3)	(4)	(5)	(6)
% Sales to Customers	-5.849***	-4.561	0.559	-6.574***	-5.019	1.646
w/ CDS	(-2.753)	(-1.561)	(0.196)	(-2.651)	(-1.590)	(0.319)
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
# Obs.	3,605	2,409	1,963	3,653	2,440	1,975
R-sqr Within	0.234	0.222	0.253	0.123	0.080	0.121

Panel B. Concentration of Customer Industries: Concentrated vs. Diversified

	Market Leverage		Book Leverage	
	Concentrated	Diversified	Concentrated	Diversified
	(1)	(2)	(3)	(4)
% Sales to Customers w/ CDS	-5.218***	-1.653	-5.626**	-5.777
	(-2.968)	(-0.579)	(-2.133)	(-1.442)
Other Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	Yes	Yes	Yes	Yes
# Obs.	5,072	4,719	5,116	4,779
R-sqr Within	0.235	0.190	0.089	0.077

Table 14: Effect of Customer CDS Status on Supplier Investment

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. The dependent variable is *Capital Expenditures* and *R&D Expenses* in columns (1) and (2), respectively. *Capital Expenditures* is capital expenditures divided by lagged total assets, i.e., capx(t)/at(t-1). *R&D Expenses* is research and development expenses (missing values replaced by 0) divided by lagged total assets, i.e., xrd(t)/at(t-1). *Industry Median Capital Expenditures* is the annual median *Capital Expenditures* of the supplier's three-digit SIC industry. *Industry Median R&D Expenses* is the annual median *R&D Expenses* of the supplier's three-digit SIC industry. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

	Capital Expenditures	R&D Expenses
	(1)	(2)
% Sales to Customers w/ CDS	-1.395**	-0.0474
	(-2.335)	(-0.0671)
Industry Median Capital Expenditures	20.12***	
	(4.523)	
Industry Median R&D Expenses		2.848
		(0.689)
Market-to-Book	0.691***	0.666***
	(11.42)	(7.991)
Fixed Assets	-3.224**	4.211***
	(-2.350)	(3.915)
Profitability	2.675***	-6.615***
	(4.655)	(-8.192)
Total Assets	-1.683***	-3.092***
	(-7.980)	(-13.90)
Earnings Volatility	-0.673	1.564
	(-0.618)	(1.129)
12-Month Stock Return	0.508***	0.290***
	(6.467)	(3.687)
% Sales to Critical Customers	0.336	1.427***
	(0.794)	(3.096)
Customer in Distress	0.0852	-0.0711
	(0.531)	(-0.419)
Industry Median Return	1.211***	0.174
	(4.731)	(0.918)
Customer Industry Med. Return	0.651	-0.0860
	(1.361)	(-0.182)
Customer Leverage	-1.292	-0.496
	(-1.382)	(-0.543)
Customer Profitability	3.467**	4.638**
	(2.028)	(2.224)
Customer Earnings Volatility	3.235	0.889
	(0.783)	(0.171)
Firm-Fixed Effects	Yes	Yes
Year-Fixed Effects	Yes	Yes
# Obs.	15,958	16,063
R-sqr Within	0.101	0.188

Appendix: Variable Definitions

Variable	Definition
Book Leverage	The sum of long-term debt and debt in current liabilities as a percentage of total assets, i.e., (dltt+dlc)/at*100
Market Leverage	The sum of long-term debt and debt in current liabilities as a percentage of the market value of assets, i.e., (dltt+dlc)/(prcc_f*csho+at-ceq-txdb)*100
% Sales to Customers w/ CDS	Sales to customers that have CDS trading as a proportion of the supplier's total sales
Industry Median Leverage	Median book/market leverage of the supplier's industry classified by the three-digit SIC code
Market-to-Book	Ratio of market assets to book assets, i.e., (prcc_f*csho+at-ceq-txdb)/at
Fixed Assets	Fixed assets as a proportion of total assets, i.e., ppent/at
Profitability	EBIT scaled by total assets, i.e., oiadp/at
Total Assets	Natural log of total assets, i.e., ln(at)
Earnings Volatility	Standard deviation of EBIT in the last five years scaled by total assets, i.e., std(oiadp)/at
Loss Carry-Forward	Total loss carry-forward scaled by total assets, i.e., tlcf/at
Change of EPS	Change in earnings per share from last year scaled by stock price, i.e., [epspx(t)-epspx(t-1)]/prcc_f(t)
Rated	Equals 1 if the supplier has an S&P long-term issuer credit rating and 0 otherwise
12-Month Stock Return	Cumulative stock return of the supplier in the last 12 months
% Sales to Critical Customers	Sales to all identified critical customers as a proportion of the supplier's total sales
Customer in Distress	Average of an indicator of each customer's annual stock return below the industry (three-digit SIC) median, weighted by sales to the customer. This value is replaced by the annual sample median when none of the supplier's customers has CRSP-Compustat merged data. A similar extrapolation is used for other customer-related variables when needed.
Industry Median Return	The annual median stock return of the supplier's three-digit SIC industry
Customer Industry Med. Return	Average of each customer's three-digit SIC industry's annual median stock return, weighted by sales to the customer
Customer Leverage	Average of each customer's market/book leverage, weighted by sales to the customer
Customer Profitability	Average of each customer's profitability, weighted by sales to the customer
Customer Earnings Volatility	Average of each customer's earnings volatility, weighted by sales to the customer
Have Customer w/ CDS	Equals 1 if the supplier has at least one CDS-referenced customer and 0 otherwise
% Sales to Critical Customers w/ CDS	Sales to customers that have CDS trading as a proportion of the supplier's sales to all identified critical customers
% Customers w/ CDS	Number of customers w/ CDS as a proportion of the supplier's total number of customers
CDS Trading	Equals 1 if CDS have been introduced to the firm by the year concerned and 0 otherwise
Customer Z-score	Average Z-score of each customer weighted by sales to the customer
Treated	Equals 1 if the supplier has CDS-referenced customer(s) during the sample period and 0 otherwise
After	Equals 1 if the year is after the year when the control supplier is matched with the treated supplier (one year before the treatment) and 0 otherwise
FX Derivatives Use by Customers' Lenders	For each customer firm, compute the average amount of foreign exchange derivatives used for hedging purposes relative to the total assets of the bank holding companies of the banks serving as the customer firm's lead lenders or bond underwriters in the past five years. Then, sum this value across all of the customer firms of a given supplier.

(*continued*)

Appendix: Variable Definitions - *continued*

% Sales to Customers w/ Concentrated Lenders	Sales to customers with concentrated lenders as a proportion of the supplier's total sales. A customer is considered to have concentrated lenders if the average Herfindahl index of its lenders' loan portfolio industry-state concentration is above its annual sample median.
Debt Maturity	Weighted average debt maturity, i.e., [6*(dltt-dd2-dd3-dd4-dd5)+5*dd5+4*dd4+3*dd3+2*dd2+1*dlc]/(dltt+dlc)
Customer CDS Outstanding	Average amount of each customer's CDS outstanding in the recent year, weighted by sales to the customer
Length of Relationship	The average number of years the supplier has serviced each customer, weighted by the current sales to the customer
Supplier Analysts Following	Number of analysts following the supplier
Supplier Idiosyncratic Volatility	The supplier's idiosyncratic volatility, estimated using the Fama-French three-factor model and return data in the most recent 60 months (24 months minimum).
Customer Event CAR	The cumulative abnormal return of a customer in the [-2,+2] window around its CDS introduction, using coefficients of the Fama-French three-factor model estimated in the [-252,-22] window relative to CDS introduction
Debt Retirement	Debt reduction divided by last year's total assets, i.e., dltr(t)/at(t-1)
Equity Issuance	Sale of equity divided by last year's total assets, i.e., sstk(t)/at(t-1)
Customer Credit Rating	Average S&P credit rating of each customer, weighted by sales to the customer, where AAA is coded as 1, AA+ as 2, and so on
Supplier Output Specificity	Whether the supplier's industry produces services, differentiated goods, or standardized goods (Giannetti, Burkart, and Ellingsen (2009)
Concentration of Customer Industries	Herfindahl index of the supplier industry's output to downstream industries using the 2002 input-output tables from the Bureau of Economic Analysis
Capital Expenditures	Capital expenditures divided by lagged total assets, i.e., capx(t)/at(t-1)
R&D Expenses	Research and development expenses (missing values replaced with 0) divided by lagged total assets, i.e., xrd(t)/at(t-1)
Sales Growth	The annual growth rate of sales, i.e., [sale(t)-sale(t-1)]/sale(t-1)
Common Lead	If the supplier has CDS-referenced customers, the dummy variable equals 1 if the supplier and any of the CDS-referenced customers have any syndicate lead lenders in common and 0 otherwise. If the supplier has no CDS-referenced customers, the dummy variable equals 1 if the supplier and any of its customers have any syndicate lead lenders in common and 0 otherwise.
Common Lender	If the supplier has CDS-referenced customers, the dummy variable equals 1 if the supplier and any of the CDS-referenced customers have any syndicate lenders (either lead or member banks) in common and 0 otherwise. If the supplier has no CDS-referenced customers, the dummy variable equals 1 if the supplier and any of its customers have any syndicate lenders (either lead or member banks) in common and 0 otherwise.
Customer Accounts Payable	A customer firm's accounts payable as a percentage of total assets, i.e., ap/at*100

Internet Appendix (to be posted online)

Table A1: Correlations

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. Detailed variable definitions are listed in Table A1.

		1 Market Leverage	2	3	4	5	6	7	8	9	10	11
2	% Sales to Customers w/ CDS	-0.058										
3	Industry Median Market Leverage	0.459	-0.079									
4	Market-to-Book	-0.405	0.046	-0.280								
5	Fixed Assets	0.246	-0.169	0.338	-0.113							
6	Profitability	-0.018	0.025	0.150	0.024	0.018						
7	Total Assets	0.106	-0.027	0.130	-0.044	0.147	0.296					
8	Earnings Volatility	-0.125	0.050	-0.191	0.192	-0.070	-0.564	-0.348				
9	Loss Carry-Forward	-0.113	0.047	-0.202	0.232	-0.076	-0.657	-0.319	0.517			
10	Change of EPS	-0.148	0.003	-0.084	0.077	-0.046	0.099	-0.031	-0.005	0.061		
11	Rated	0.332	-0.006	0.205	-0.082	0.151	0.139	0.542	-0.152	-0.132	-0.036	
12	12-Month Stock Return	-0.209	0.015	-0.095	0.432	-0.010	0.201	0.003	-0.064	-0.054	0.153	0.010

Table A2: Effect of Customer CDS Status on Supplier Leverage: Robustness Checks

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS (unless specified otherwise). The sample period is between 1997 and 2008 (unless specified otherwise). Under the panel "Alternative Sample", we apply different restrictions to the original sample as specified. Under the panel "Alternative Variable of Interest", we use *% Sales to Critical Customers w/ CDS* and *% Customers w/ CDS* to measure the suppliers' exposure to CDS-referenced customers. *% Sales to Critical Customers w/ CDS* is sales to customers that have CDS trading as a proportion of the supplier's sales to all identified critical customers. *% Customers w/ CDS* is the number of customers with CDS as a proportion of the supplier's total number of customers. The dependent variable is *Market Leverage* in columns (1) and (2) and *Book Leverage* in columns (3) and (4). The control variables (not reported) are the same as those in Table 4. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

	Market Leverage		Book Leverage	
	(1)	(2)	(3)	(4)
Alternative Sample:				
Include Suppliers w/ CDS	-6.635***	-4.093***	-8.268***	-5.748***
	(-4.828)	(-3.065)	(-4.135)	(-2.879)
1998-2006	-6.404***	-3.959***	-8.146***	-6.026***
	(-4.075)	(-2.599)	(-3.584)	(-2.670)
Exclude Zero-Leverage Firms	-7.099***	-4.317***	-9.316***	-6.526***
	(-4.574)	(-2.852)	(-4.138)	(-2.877)
Exclude Firms w/ No CDS Customers	-6.534***	-3.372**	-8.282***	-4.853**
	(-4.336)	(-2.261)	(-3.849)	(-2.208)
Suppliers Serving S&P 500 Customers with CDS	-5.734***	-3.006**	-6.553***	-3.395*
	(-4.028)	(-2.179)	(-3.264)	(-1.652)
Alternative Variable of Interest:				
% Sales to Critical Customers w/ CDS	-2.730***	-1.460**	-3.233***	-1.855**
	(-4.210)	(-2.260)	(-3.668)	(-2.046)
% Customers w/ CDS	-3.132***	-1.652**	-3.280***	-1.677*
	(-4.530)	(-2.438)	(-3.440)	(-1.722)
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	No	Yes	No	Yes

Table A3: Matched Firm Comparison: Difference-in-Differences Sample

The original sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. From the original sample, we construct a matched sample of treated and control suppliers as follows: (1) A treated supplier is defined as having CDS-referenced customer(s) in the third and fourth years (t and t+1) of a four-year window and having no CDS-referenced customer(s) in the first and second years (t-2 and t-1). (2) A control supplier is defined as having no CDS-referenced customers throughout a four-year window. (3) A control supplier is matched with a treated supplier in year t-1 of the four-year window if they are in the same two-digit SIC industry and their *Total Assets* and *Customer Z-Score* are the closest to each other among all potential matches. The table reports the mean *Total Assets*, *Customer Z-Score*, *Market Leverage*, and *Book Leverage* of the treated and control groups before (t-1) and after (t+1) the treatment year (t), respectively, as well as the *t*-statistics that test the differences in means. *Total Assets* is the natural log of total assets, i.e., ln(at). *Customer Z-Score* is the average Z-score of each customer weighted by sales to the customer. *Market Leverage* is the sum of long-term debt and debt in current liabilities as a percentage of the market value of assets, i.e., (dltt+dlc)/(prcc_f*csho+at-ceq-txdb)*100. *Book Leverage* is the sum of long-term debt and debt in current liabilities as a percentage of total assets, i.e., (dltt+dlc)/at*100.

		Before (t-1)	After (t+1)	t-statistic
Total Assets	Treated	4.839	5.007	-1.766
	Control	4.794	4.889	-1.126
	t-statistic	0.513	1.271	
Customer Z-Score	Treated	6.622	4.558	5.814
	Control	5.203	4.343	3.776
	t-statistic	3.516	1.056	
Market Leverage	Treated	0.135	0.139	-0.316
	Control	0.130	0.161	-2.648
	t-statistic	0.507	-1.837	
Book Leverage	Treated	0.185	0.190	-0.302
	Control	0.174	0.204	-2.221
	t-statistic	0.908	-0.974	

Table A4: Effect of Customer CDS Status on Supplier Leverage:
Matched Sample with Long-Term Customers

The original sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. From the original sample, we select a matched sample of treated and control suppliers where a control supplier is matched to a treated supplier if they are in the same two-digit SIC industry and their *Total Assets* and *Customer Z-Score* are closest to each other among all potential matches, while a treated (control) supplier has (does not have) a customer that has CDS introduced in the third year (any year) during a four-year window of relationship with the supplier. Panel A reports the mean *Total Assets*, *Customer Z-Score*, *Market Leverage*, and *Book Leverage* of the treated and control groups before (t-1) and after (t+1) the treatment year (t), respectively, as well as the *t*-statistics that test the differences in means. *Total Assets* is the natural log of total assets, i.e., ln(at). *Customer Z-Score* is the average Z-score of each customer weighted by sales to the customer. *Market Leverage* is the sum of long-term debt and debt in current liabilities as a percentage of the market value of assets, i.e., (dltt+dlc)/(prcc_f*csho+at-ceq-txdb)*100. *Book Leverage* is the sum of long-term debt and debt in current liabilities as a percentage of total assets, i.e., (dltt+dlc)/at*100. Panel B reports the regression results on the matched sample with long-term customers. The dependent variable is *Market Leverage* in columns (1) and (2) and *Book Leverage* in columns (3) and (4). Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Panel A

		Before (t-1)	After (t+1)	t-statistic
Total Assets	Treated	4.632	4.817	-0.776
	Control	4.519	4.723	-0.924
	t-statistic	0.514	0.393	
Customer Z-Score	Treated	6.568	5.790	1.182
	Control	6.414	5.834	0.870
	t-statistic	0.216	-0.073	
Market Leverage	Treated	0.157	0.123	1.114
	Control	0.079	0.106	-1.170
	t-statistic	2.757	0.624	
Book Leverage	Treated	0.188	0.176	0.304
	Control	0.116	0.156	-1.456
	t-statistic	2.116	0.579	

Panel B

	Market Leverage		Book Leverage	
	(1)	(2)	(3)	(4)
% Sales to Customers w/ CDS	-12.40***	-8.517**	-5.868	-1.870
	(-3.198)	(-2.189)	(-1.297)	(-0.456)
Industry Median Leverage	12.00	13.56	-2.314	2.489
	(0.578)	(0.753)	(-0.171)	(0.214)
Market-to-Book	-0.772*	-0.924**	-1.015**	-1.116**
	(-1.733)	(-2.201)	(-2.002)	(-2.153)
Fixed Assets	7.329	11.97	-13.76	-10.23
	(0.567)	(0.937)	(-0.742)	(-0.541)
Profitability	-2.305	-1.587	3.036	2.057
	(-0.406)	(-0.281)	(0.505)	(0.349)
Total Assets	10.57***	11.91***	8.895***	10.86***
	(3.409)	(4.830)	(3.160)	(4.404)
Earnings Volatility	0.174	4.758	3.285	8.532
	(0.0176)	(0.479)	(0.372)	(0.851)
Loss Carry-Forward	3.513***	4.245***	3.337***	3.960***
	(3.925)	(3.662)	(3.414)	(3.613)
Change of EPS	-3.013	-3.579**	-3.666*	-3.037*
	(-1.585)	(-2.085)	(-1.927)	(-1.688)
Rated	0.759	-1.110	19.07	16.10
	(0.0602)	(-0.101)	(1.047)	(1.010)
12-Month Stock Return	-1.897***	-2.006***	-0.823	-1.079
	(-3.119)	(-3.177)	(-0.960)	(-1.196)
% Sales to Critical Customers	-8.136	-7.676	-9.065*	-5.423
	(-1.469)	(-1.502)	(-1.740)	(-1.072)
Customer in Distress	1.699	1.892	0.462	0.932
	(1.255)	(1.288)	(0.382)	(0.799)
Industry Median Return	1.435	1.784	1.693	3.669
	(0.835)	(0.838)	(0.827)	(1.575)
Customer Industry Med. Return	-1.487	-4.242	0.0723	-2.278
	(-0.576)	(-0.930)	(0.0243)	(-0.529)
Customer Leverage	-18.31	-13.30	-9.047	-11.16
	(-1.264)	(-0.814)	(-1.021)	(-1.231)
Customer Profitability	-19.76*	-25.07**	-19.40	-29.88**
	(-1.695)	(-2.334)	(-1.287)	(-2.002)
Customer Earnings Volatility	29.91	60.51	21.48	73.00
	(0.737)	(1.286)	(0.413)	(1.338)
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	No	Yes	No	Yes
# Obs.	267	267	267	267
R-sqr Within	0.350	0.410	0.250	0.338

Table A5: First Stage of the Instrumental Variable Regression

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. The dependent variable is *% Sales to Customers with CDS*. *Industry Median Leverage* refers to market leverage and book leverage in columns (1) and (2), respectively. The excluded instruments are *FX Derivatives Use by Customers' Lenders* and *% Sales to Customers w/ Concentrated Lenders*. *FX Derivatives Use by Customers' Lenders* is constructed as follows. For each customer firm, we compute the average amount of foreign exchange derivatives used for hedging purposes relative to the total assets of the bank holding companies of the banks serving as the customer firm's lead lenders or bond underwriters in the past five years. Then, we sum this value across all of the customer firms of a given supplier. *% Sales to Customers with Concentrated Lenders* is defined as sales to customers with concentrated lenders as a proportion of the supplier's total sales. A customer is considered to have concentrated lenders if the average Herfindahl index of its lenders' loan portfolio industry-state concentration is above its annual sample median. Please refer to the other variable definitions in Table 4. Standard errors are robust, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

	Market Leverage	Book Leverage
	(1)	(2)
% Sales to Customers w/ Concentrated Lenders	0.2384***	0.2375***
	(8.88)	(8.90)
FX Derivatives Use by Customers' Lenders	1.1490***	1.1462***
	(4.69)	(4.69)
Industry Median Leverage	-0.0105	-0.0146
	(-0.46)	(-0.70)
Market-to-Book	-0.0002	-0.0001
	(-0.13)	(-0.06)
Fixed Assets	0.0082	0.0044
	(0.37)	(0.20)
Profitability	0.0261**	0.0256**
	(2.09)	(2.06)
Total Assets	0.0042	0.0044
	(1.07)	(1.15)
Earnings Volatility	0.0106	0.0101
	(0.44)	(0.42)
Loss Carry-Forward	-0.0013	-0.0009
	(-0.56)	(-0.41)
Change of EPS	-0.0032	-0.0031
	(-0.98)	(-0.96)
Rated	-0.0124	-0.0124
	(-1.63)	(-1.64)
12-Month Stock Return	0.0004	0.0003
	(0.21)	(0.18)
% Sales to Critical Customers	0.0893***	0.0873***
	(10.14)	(9.98)
Customer in Distress	-0.0193***	-0.0191***
	(-3.98)	(-3.97)
Industry Median Return	0.0042	0.0042
	(0.87)	(0.89)
Customer Industry Med. Return	0.0066	0.0040
	(0.43)	(0.27)
Customer Leverage	0.1255***	0.1212***
	(4.02)	(4.52)
Customer Profitability	0.1367**	0.1033*
	(2.43)	(1.88)
Customer Earnings Volatility	-0.3575**	-0.3693***
	(-2.54)	(-2.63)
Firm-Fixed Effects	Yes	Yes
Year-Fixed Effects	Yes	Yes
# Obs.	9,137	9,235
R-sqr	0.28	0.29

Table A6: Effect of Customer CDS Status on Supplier Leverage:
Supplier Idiosyncratic Volatility

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. The column labeled High (Low) Volatility reports regression results on the subsample of suppliers whose idiosyncratic volatility is above (below) the annual sample median. Idiosyncratic volatility is estimated by fitting stock returns in the previous 60 months to the Fama-French three-factor model. The dependent variable is *Market Leverage* in columns (1) and (2) and *Book Leverage* in columns (3) and (4). The control variables (not reported) are the same as those in Table 4. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

	Market Leverage		Book Leverage	
	High Volatility	Low Volatility	High Volatility	Low Volatility
	(1)	(2)	(3)	(4)
% Sales to Customers w/ CDS	-5.806***	-3.203	-7.117**	-3.985
	(-2.777)	(-1.574)	(-2.247)	(-1.521)
Other Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	Yes	Yes	Yes	Yes
# Obs.	4,872	4,844	4,929	4,892
R-sqr Within	0.187	0.238	0.071	0.082

Table A7: Effect of Customer CDS Status on Supplier Leverage:
Customer Credit Rating

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. The column labeled IG (Non-IG) reports regression results on the subsample of suppliers whose average customer S&P credit rating is above or equal to BBB- (below BBB- or unrated). The dependent variable is *Market Leverage* in columns (1) and (2) and *Book Leverage* in columns (3) and (4). The control variables (not reported) are the same as those in Table 4. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

	Market Leverage		Book Leverage	
	IG	Non-IG	IG	Non-IG
	(1)	(2)	(3)	(4)
% Sales to Customers w/ CDS	-0.978	-5.089**	4.323	-8.142***
	(-0.367)	(-2.359)	(1.386)	(-2.768)
Other Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	Yes	Yes	Yes	Yes
# Obs.	992	8,945	1,000	9,043
R-sqr Within	0.322	0.203	0.175	0.075

Table A8: Effect of Customer CDS Status on Supplier Leverage:
Supplier Financial Flexibility

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. In Panel A, the column labeled Non-Payer (Payer) reports regression results on the subsample of suppliers that do not pay (do pay) dividends. In Panel B, the column labeled High SA (Low SA) reports regression results on the subsample of suppliers whose SA index (Hadlock and Pierce (2010)) is above or equal to (below) the sample median. The dependent variable is *Market Leverage* in columns (1) and (2) and *Book Leverage* in columns (3) and (4). The control variables (not reported) are the same as those in Table 4. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Panel A. Supplier Paying Dividends: No vs. Yes

	Market Leverage		Book Leverage	
	Non-Payer	Payer	Non-Payer	Payer
	(1)	(2)	(3)	(4)
% Sales to Customers w/ CDS	-5.018***	-2.550	-7.950***	-0.931
	(-2.791)	(-1.212)	(-2.946)	(-0.333)
Other Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	Yes	Yes	Yes	Yes
# Obs.	6,972	2,951	7,046	2,983
R-sqr Within	0.209	0.229	0.087	0.070

Panel B. Supplier SA Index: High vs. Low

	Market Leverage		Book Leverage	
	High SA	Low SA	High SA	Low SA
	(1)	(2)	(3)	(4)
% Sales to Customers w/ CDS	-5.557***	-1.541	-7.000**	-1.201
	(-2.675)	(-0.778)	(-2.170)	(-0.461)
Other Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	Yes	Yes	Yes	Yes
# Obs.	4,631	5,306	4,664	5,379
R-sqr Within	0.175	0.236	0.075	0.103

Table A9: Effect of Customer CDS Status on Supplier Leverage:
Supplier Growth Opportunities

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. In Panel A, the column labeled High Growth (Low Growth) reports regression results on the subsample of suppliers whose sales growth is above or equal to (below) the sample median. In Panel B, the column labeled High Q (Low Q) reports regression results on the subsample of suppliers whose Tobin's Q is above or equal to (below) the sample median. The dependent variable is *Market Leverage* in columns (1) and (2) and *Book Leverage* in columns (3) and (4). The control variables (not reported) are the same as those in Table 4. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Panel A. Supplier Sales Growth: High vs. Low

	Market Leverage		Book Leverage	
	High Growth	Low Growth	High Growth	Low Growth
	(1)	(2)	(3)	(4)
% Sales to Customers w/ CDS	-1.026	-7.264***	-2.669	-8.852***
	(-0.503)	(-3.368)	(-0.982)	(-2.885)
Other Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	Yes	Yes	Yes	Yes
# Obs.	4,796	5,129	4,851	5,180
R-sqr Within	0.203	0.212	0.074	0.086

Panel B. Supplier Tobin's Q: High vs. Low

	Market Leverage		Book Leverage	
	High Q	Low Q	High Q	Low Q
	(1)	(2)	(3)	(4)
% Sales to Customers w/ CDS	-2.148	-6.153**	-3.051	-7.015***
	(-1.336)	(-2.531)	(-0.948)	(-2.665)
Other Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	Yes	Yes	Yes	Yes
# Obs.	4,798	5,139	4,847	5,196
R-sqr Within	0.155	0.277	0.057	0.107

Table A10: Effect of Customer CDS Status on Supplier Operating Performance

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. The dependent variable is *Sales Growth* and *Profitability* in columns (1) and (2), respectively. *Sales Growth* is the annual growth rate of sales, i.e., [sale(t)-sale(t-1)]/sale(t-1). *Profitability* is EBIT scaled by total assets, i.e., oiadp/at. *Industry Median* is the annual median *Sales Growth* and *Profitability* of the supplier's three-digit SIC industry in columns (1) and (2), respectively. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

	Sales Growth	Profitability
	(1)	(2)
% Sales to Customers w/ CDS	-0.0612	0.0267
	(-0.891)	(1.208)
Industry Median	0.00460	0.0430
	(0.616)	(1.333)
Sales Growth	-0.0956***	-0.00232
	(-6.658)	(-0.545)
Market-to-Book	0.0673***	0.0157***
	(12.05)	(8.495)
Fixed Assets	-0.250***	0.0171
	(-2.705)	(0.597)
Profitability	-0.427***	0.307***
	(-7.870)	(12.49)
Total Assets	-0.0654***	0.00824
	(-4.143)	(1.614)
Earnings Volatility	-0.472***	0.164***
	(-4.743)	(4.324)
12-Month Stock Return	0.0949***	0.0483***
	(13.46)	(20.23)
% Sales to Critical Customers	0.0573	-0.0262**
	(1.365)	(-2.128)
Customer in Distress	-0.0327**	0.00267
	(-2.518)	(0.626)
Industry Median Return	0.0887***	0.0104
	(4.490)	(1.563)
Customer Industry Med. Return	0.162***	0.0379***
	(3.791)	(2.713)
Customer Leverage	0.0288	-0.0241
	(0.369)	(-0.929)
Customer Profitability	0.154	0.0441
	(0.925)	(0.827)
Customer Earnings Volatility	0.188	-0.0850
	(0.442)	(-0.701)
Firm-Fixed Effects	Yes	Yes
Year-Fixed Effects	Yes	Yes
# Obs.	16,012	16,059
R-sqr Within	0.112	0.152

Table A11: Effect of Customer CDS Status on Supplier Debt Maturity

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. The dependent variable is *Debt Maturity*, which is the weighted average debt maturity, i.e., [6*(dltt-dd2-dd3-dd4-dd5) + 5*dd5 + 4*dd4 + 3*dd3 + 2*dd2 + 1*dlc]/(dltt+dlc). *Industry Median Maturity* is the annual median *Debt Maturity* of the supplier's three-digit SIC industry. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

	Debt Maturity	
	(1)	(2)
% Sales to Customers w/ CDS	-0.540**	-0.378
	(-2.428)	(-1.619)
Industry Median Maturity	0.0933***	0.0955***
	(2.657)	(2.610)
Book Leverage	0.0847	0.0252
	(0.472)	(0.142)
Market-to-Book	0.0323	0.0331
	(1.501)	(1.513)
Fixed Assets	0.708**	0.563*
	(2.160)	(1.720)
Profitability	0.0981	0.00669
	(0.558)	(0.0385)
Total Assets	0.226***	0.369***
	(3.844)	(5.423)
Earnings Volatility	-0.169	-0.113
	(-0.425)	(-0.271)
Loss Carry-Forward	0.0171	0.0568
	(0.432)	(1.386)
Change of EPS	0.0191	0.0207
	(0.461)	(0.501)
Rated	0.221	0.220
	(1.403)	(1.416)
12-Month Stock Return	0.0219	0.0109
	(1.017)	(0.481)
% Sales to Critical Customers	-0.224	-0.181
	(-1.545)	(-1.263)
Customer in Distress	-0.0866**	-0.0814
	(-2.053)	(-1.568)
Industry Median Return	0.00309	0.0369
	(0.0439)	(0.496)
Customer Industry Med. Return	0.167*	-0.0709
	(1.676)	(-0.472)
Customer Leverage	0.249	0.225
	(0.677)	(0.588)
Customer Profitability	-0.102	-0.494
	(-0.166)	(-0.778)
Customer Earnings Volatility	-1.792	-1.553
	(-1.103)	(-0.974)
Firm-Fixed Effects	Yes	Yes
Year-Fixed Effects	No	Yes
# Obs.	6,278	6,278
R-sqr Within	0.024	0.037

Table A12: Effect of Customer CDS Status on Supplier Leverage: Credit Crowd-Out

The sample comprises firms in the Compustat Segments files that report critical customers, are incorporated in the U.S., have common stock covered by the CRSP, are not in the financial or utility industries, and are not themselves referenced by CDS. The sample period is between 1997 and 2008. The dependent variable is *Market Leverage* in columns (1) and (2) and *Book Leverage* in columns (3) and (4). In Panel A, *Common Lead* is defined as follows. If the supplier has CDS-referenced customers, the dummy variable equals 1 if the supplier and any of the CDS-referenced customers have any syndicate lead lenders in common and 0 otherwise. If the supplier has no CDS-referenced customers, the dummy variable equals 1 if the supplier and any of its customers have any syndicate lead lenders in common and 0 otherwise. In Panel B, *Common Lender* is defined as follows. If the supplier has CDS-referenced customers, the dummy variable equals 1 if the supplier and any of the CDS-referenced customers have any syndicate lenders (either lead or member banks) in common and 0 otherwise. If the supplier has no CDS-referenced customers, the dummy variable equals 1 if the supplier and any of its customers have any syndicate lenders (either lead or member banks) in common and 0 otherwise. The control variables (not reported) are the same as those in Table 4. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Panel A. Interaction with *Common Lead*

	Market Leverage		Book Leverage	
	(1)	(2)	(3)	(4)
% Sales to Customers w/ CDS	-10.74***	-3.792	-12.44***	-4.834
	(-3.517)	(-1.317)	(-3.351)	(-1.335)
Common Lead	1.082	1.632	0.768	1.352
	(0.622)	(1.006)	(0.424)	(0.764)
% Sales to Customers w/ CDS	4.795	3.258	8.418	6.624
* Common Lead	(0.900)	(0.655)	(1.627)	(1.297)
Other Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	No	Yes	No	Yes
# Obs.	1,944	1,944	1,969	1,969
R-sqr Within	0.264	0.339	0.143	0.191

Panel B. Interaction with *Common Lender*

	Market Leverage		Book Leverage	
	(1)	(2)	(3)	(4)
% Sales to Customers w/ CDS	-8.714***	-2.134	-7.581*	-0.870
	(-2.588)	(-0.660)	(-1.920)	(-0.221)
Common Lender	-0.289	0.279	0.871	1.217
	(-0.218)	(0.229)	(0.598)	(0.869)
% Sales to Customers w/ CDS	-0.0851	-0.856	-3.788	-3.596
* Common Lender	(-0.0215)	(-0.239)	(-0.909)	(-0.915)
Other Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	Yes
Year-Fixed Effects	No	Yes	No	Yes
# Obs.	1,963	1,963	1,989	1,989
R-sqr Within	0.258	0.332	0.133	0.182

Table A13: Effect of Customer CDS Status on Customer Accounts Payable

The sample comprises customers reported in the Compustat Segments files that are also covered by the Compustat Fundamental Annual, are incorporated in the U.S., have common stock covered by the CRSP, and are not in the financial or utility industries. The sample period is between 1997 and 2008. The dependent variable is *Customer Accounts Payable*, which is accounts payable divided by total assets, i.e., ap/at. *CDS Trading* equals 1 if CDS has been introduced to the (customer) firm by the year concerned and 0 otherwise. *Industry Median Accounts Payable* is the annual median *Customer Accounts Payable* of the (customer) firm's three-digit SIC industry. Independent variables are one-year lagged than the dependent variable. Please refer to the other variable definitions in Table 4. Standard errors are robust and clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

| | Customer Accounts Payable | |
	(1)	(2)
CDS Trading	0.232	0.314
	(1.163)	(1.417)
Industry Median Accounts Payable	0.594	0.587
	(0.711)	(0.757)
Market-to-Book	0.0920	0.0461
	(1.186)	(0.595)
Fixed Assets	0.402	0.534
	(0.353)	(0.480)
Profitability	-4.386***	-4.478***
	(-3.338)	(-3.381)
Total Assets	-0.926***	-0.890***
	(-5.768)	(-4.571)
Earnings Volatility	-2.312	-1.591
	(-0.857)	(-0.604)
Book Leverage	-0.457	-0.409
	(-0.609)	(-0.546)
Rated	0.431	0.454
	(1.207)	(1.261)
Firm-Fixed Effects	Yes	Yes
Year-Fixed Effects	No	Yes
# Obs.	11,580	11,580
R-sqr Within	0.028	0.035