Corporate Leverage, Debt Maturity and Credit Supply: The Role of Credit Default Swaps*

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Abstract

Does the ability of suppliers of corporate debt capital to hedge risk through credit default swap (CDS) contracts impact firms' capital structures? We find that firms with traded CDS contracts on their debt are able to maintain higher leverage ratios and longer debt maturities. This is especially true during periods in which credit constraints become binding, as would be expected if the ability to hedge helps alleviate frictions on the supply side of credit markets.

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1. Introduction

The recent credit crisis has brought an intense policy debate regarding the impact of financial innovation and derivatives, particularly credit default swaps (CDS).[1] Given the sheer size of the credit default swap market,[2] it is crucial to identify and quantify as many as possible of the potential effects that these markets might have on the economy. This paper asks whether and how firms' capital structures are affected by the ability of suppliers of debt capital to hedge credit risk through CDS contracts. We examine the capital structures of non-financial firms in the S&P 500 index during 2002-2010 and find that, even after controlling for factors that are known to impact demand for leverage and debt maturity, firms with CDS contracts trading on their debt are able to maintain substantially higher leverage ratios and longer debt maturities.

Why would CDS markets impact firms' financing? The ability of capital suppliers to hedge can reduce frictions on the supply side. This can occur in several ways. First, if treasuries are in short supply, the existence of CDS markets can make holding corporate debt more attractive to a broad group of potential investors. Second, financial institutions such as banks and insurance companies are frequent providers of corporate debt capital. Holding single-name CDSs can provide these buyers the opportunity to reduce regulatory capital requirements.[3] This can increase the supply of credit to firms if there is a separation between those willing to hold credit risk and those with capital that they would like to lend. Anecdotal evidence of the existence of binding regulatory capital constraints is consistent

[1] A credit default swap is essentially an insurance contract on a firm's debt, in which, in the event of default, the seller gives the buyer a payment corresponding to the difference between the nominal and the market value of the debt. The buyer pays the seller a periodic premium for this protection. These can be useful for hedging or to speculate on credit risk.

[2] The amount of CDSs outstanding has declined from a peak of $62.2 trillion notional in the second half of 2007, but the market has far from disappeared. The International Swaps and Derivatives Association (ISDA) reports that the notional amount of outstanding CDSs during the first half of 2010 was $26.3 trillion, similar to the size of the market in 2006, and far greater than the $5.4 trillion and $12.4 trillion in the first half of 2004 and 2005, respectively. See: http://www.isda.org/statistics/pdf/ISDA-Market-Survey-results1987-present.xls

[3] "Guarantees issued by or protection provided by entities with a lower risk weight than the counterparty exposure is assigned the risk weight of the guarantor or protection provider." (Basel II, page 49, Article 141)

with this market segmentation. For example, AIG states in its Annual Report that at the end of 2009 it had $150 billion in notional CDSs outstanding (written), which it wrote to provide regulatory capital relief to financial institutions for their corporate loans. Third, CDSs enable banks to provide loans for the purpose of maintaining client relationships, while mitigating portfolio risk. In one of the most comprehensive surveys of CDS market participants to date, the British Bankers' Association estimates that in 2006, 20% of purchasers of credit protection were banks making these purchases to hedge their loan portfolios (British Bankers' Association, *Credit Derivatives Report* (2006)).[4] Finally, we expect CDS markets to impact firms' capital structures because, even if suppliers of capital do not immediately purchase CDSs, the existence of CDS markets provide a resale option and may make holding credit risk more attractive. These potential channels, along with the growing empirical evidence that supply frictions are generally important (e.g., Faulkender & Petersen (2006); Lemmon & Roberts (2010); Massa, Yasuda & Zhang (2009); Sufi (2009); Leary (2009); Duchin, Ozbas & Sensoy (2010); Choi, Getmansky, Henderson & Tookes (2010)), suggest that CDSs could have economically significant effects on firms' capital structures.

Although there are several reasons why we might expect CDSs to relax firms' capital supply constraints, the empirical evidence thus far has been rather weak. In particular, in their study of credit spreads, Ashcraft & Santos (2009) find that the onset of CDS trading does not lower the cost of capital for the average firm, and leads to a small reduction in bond and loan spreads of firms that are safer and more transparent. S&P 500 firms that we study (presumably, the most important firms in the economy) are likely to be part of this group of safer firms experiencing reductions in spreads, the small magnitude of the reductions is still somewhat surprising. If the inability of suppliers of capital to hedge is an important supply friction then why should we observe such an economically small effect of the introduction of

[4]Loan sales are another way for relationship lenders to manage portfolio risk; however, as Minton, Stulz & Williamson (2009) argue, CDSs may be attractive alternatives to loan sales for three reasons. This is because: the lender may want to protect the relationship with the borrower; the borrower may not want the loan to be sold since it would be more difficult to negotiate with a lender who has no experience with the borrower; and relationship-based lending can involve implicit commitments on both parties that would become worthless if the loan is sold.

CDS on spreads? One explanation is that the demand curve for credit is relatively flat, so an outward shift in supply has a greater impact on quantities than on prices. A second, perhaps more plausible, explanation is that non-price terms are also impacted by the introduction of CDS. If suppliers of credit become more willing to relax non-price contract terms (such as debt maturity and collateral requirements), then this may dampen any observed impact on prices. Ashcraft & Santos (2009) focus on the impact of the introduction of CDS on a single dimension (i.e., price) of debt financing. Our analysis of both leverage (quantity) and debt maturity (a non-price contract term) helps complete the picture.

Our focus on debt maturity, in addition to leverage, allows us to take a potentially important step towards capturing variation in the firms' financial contracts as a result of shifts in the ability of suppliers of debt capital to hedge. There is widespread acceptance in the banking literature that maturity is an important non-price contract term. For example, Strahan (1999) reports evidence that banks use price and non-price terms such as maturity and collateral requirements as complements in loan contracting. This complementarity is also reported in Dennis, Nandy & Sharpe (2000). Melnik & Plaut (1986) explicitly model the tradeoff between price and other contract terms, including debt maturity, loan commitment fees and collateral requirements. All else equal, shortening maturity allows suppliers of capital to mitigate risk, keeping borrowers under close control; lengthening maturities without requiring higher rates is therefore interpreted as a relaxation of supply.

There are two main findings from the analysis. First, the introduction of CDS markets increases firm leverage and extends debt maturity. These increases are both statistically and economically significant. Depending on the definition of leverage (i.e., market or book leverage) and on whether the empirical specification provides between- or within-firm estimates, the estimated increase in debt ratios due to CDSs is between 0.009 and 0.055 (i.e., between 6 and 22 percent of mean leverage). The estimated increase in debt maturity is between 0.68 and 1.79 years (i.e., between 8 and 21 percent of mean debt maturity). Second, we find that the impact of CDSs on leverage and maturity is greatest in the periods in which

credit supply constraints are most binding. An ideal test of the hypothesis that the ability of suppliers to hedge becomes more important when credit constraints bind would identify a supply shock that impacts some firms in our sample but not others. We use defaults by other firms headquartered in the same state (but different industry) as the sample firm as a proxy for a local credit supply shock. This analysis uses previous findings in the literature that institutional investors exhibit local biases in their portfolio allocations (e.g., Coval & Moskowitz (1999), Bharath, Dahiya, Saunders & Srinivasan (2007), and Massa, Yasuda & Zhang (2009)) and are therefore likely to be affected by a default of a local firm. Consistent with the supply-side interpretation of the impact of CDSs, we observe a greater effect of CDSs on firms' ability to maintain greater leverage and longer maturities when local supply shocks occur.

A potential concern with any study of the impact of CDS markets on financing choice is the possibility that CDS firms are different from non-CDS firms based on unobservable variables that are systematically related to leverage and maturity choice. To mitigate this concern, our empirical approach exploits variation in the timing of the introduction of CDS markets. We follow Ashcraft & Santos (2009) and include two CDS variables in the benchmark regressions: *CDS Traded*, an indicator equal to one if there is a CDS market for the firm's debt at any time during the 2002-2010 sample period; and *CDS Trading*, an indicator variable equal to one if there is a traded CDS on its debt during year t. *CDS Traded* controls for unobservable differences between CDS and non-CDS firms. *CDS Trading* is the main variable of interest and captures the impact of CDSs on leverage and maturity in the years following CDS introduction. Alternatively, we replace the *CDS Traded* variable with firm fixed effects to account for time-invariant differences between firms, whether or not they have CDS contracts trading on their debt. In robustness analysis, we avoid concerns about selection altogether by looking *within* the sample of CDS firms to test whether the effects that we observe are stronger for firms whose CDS contracts are easier and cheaper to trade. In this way, rather than focusing on the availability of CDS (a binary variable), we focus on

how liquid the contracts are. We identify two very coarse measures of liquidity: the number of daily CDS quotes and the average CDS bid-ask spread. Despite the expected noise in these measures, we find that our results are robust to this alternative specification.

The benchmark empirical approach is useful in that it allows us to measure the effect of the onset of CDS trading; however, it also assumes that the timing of CDS introduction is exogenous. To address the potential concern that the emergence of CDS markets is simultaneously determined with the firm's leverage and maturity decisions, we take a second approach to the analysis and allow for the endogeneity of the existence of a CDS market. We look to recent empirical findings in Minton, Stulz & Williamson (2009) to identify variables that explain the hedging needs of firms' suppliers of capital that are not directly related to firm-level leverage or debt maturity. We use Dealscan data to identify firms' lenders (we examine the banks that are lead syndicate members).[5] We then introduce two instrumental variables by linking this information to the Federal Reserve's Call Report (bank-level) data on banks' loan portfolio composition and derivatives use. The first instrument, *Lender Foreign Exchange Derivatives* is defined as the amount of foreign exchange derivatives that lead banks use for hedging (not trading) purposes relative to their total loans. The idea behind this variable is that banks that hedge a given aspect of their portfolios are likely to be active risk managers more generally. We choose banks' foreign exchange hedging since any macro (and global) risk-management activity of banks is very unlikely to drive the leverage or debt maturity decisions of our sample of U.S. firms. The second instrumental variable, *Lender Agricultural Loans*, is the total amount of agricultural loans relative to the total loans of lead banks. The idea behind this measure is that, banks with more agricultural loans would be expected to be less likely to hold CDSs since, as Minton, Stulz & Williamson (2009) argue, these are likely to be relationship loans which banks are reluctant to sell or hedge. Both of these variables capture hedging demand of firms' suppliers of capital and are expected to be related to the existence of CDS markets for firms' debt. At the same time, we

[5] We thank Sudheer Chava and Michael Roberts for providing a file with links between the Dealscan and Compustat data.

do not expect lead syndicate banks' other hedging activities or loan portfolio compositions to drive individual firms' leverage or maturity decisions directly. We find that our results are robust, even after accounting for the potential endogeneity of CDS markets.

Finally, because the benchmark analysis uses the entire post-CDS introduction period to estimate the impact of CDS markets, we introduce a third approach in which we isolate the CDS introduction event. We employ a difference in differences approach and examine the changes in leverage and maturity from the end of year *t-1* to the end of years *t* and *t+1* relative to CDS introduction, compared with the changes in a matched sample of non-CDS firms. Matched firms are identified based on the propensity score method in Rosenbaum & Rubin (1983). We find substantial increases in both leverage and debt maturity near CDS introduction.

In interpreting the main results it is useful to ask whether greater leverage and debt maturity are "good" for firms. Recent evidence from the 2007-2009 financial crisis suggests that this is indeed the case. For example, Almeida, Campello, Laranjeira & Weisbenner (2009) find that firms with long-term debt coming due during the 2007-2008 period cut back on investment. Ivashina & Scharfstein (2010) find that firms with expired lines of credit cut down on investment activity relative to firms whose lines were not expiring. Duchin, Ozbas & Sensoy (2010) report declines in non-financial firms' investment as a result of the credit crisis, with the greatest declines for financially constrained firms and those dependent on external finance. Survey evidence is consistent with these studies. Campello, Graham & Harvey (2010) report that 86 percent of CFOs in financially constrained firms curtailed investment in attractive projects during the financial crisis. Overall, the evidence suggests that relaxing credit constraints and extending debt maturities would improve real investment. Even in non-crisis times, longer debt maturities allow firms to mitigate the potential rollover risk associated with short maturity debt as in Diamond (1991).

The remainder of the paper is organized as follows. Section 2 describes the literature

on capital supply constraints, debt maturity and credit default swaps. Section 3 describes the data and presents the benchmark empirical specification. Section 4 presents results of the analysis of the impact of suppliers' ability to hedge on leverage and maturity. Section 5 concludes.

2. Supply Constraints, Capital Structure and Debt Maturity

This paper contributes to three main strands of literature: recent papers that measure the role of capital supply constraints in firms' financing and investment decisions; research that focuses on debt maturity choice and the recent work on the implications of CDS contracts for firms.

2.1. The Role of Capital Supply Constraints in Firms' Financing Decisions

The idea that supply frictions can impact capital structure and investment patterns has been the subject of a number of recent papers. Faulkender & Petersen (2006) find that firms with access to public debt markets (i.e., a credit rating) have substantially more debt in their capital structures. Sufi (2009) shows that firms with a loan rating use more debt after the introduction of syndicated bank loan ratings. Lemmon & Roberts (2010) and Leary (2009) use events to show how shocks to the supply of credit impact financing and investment. Massa, Yasuda & Zhang (2009) find that capital supply uncertainty has a negative impact on leverage and also affects firms' maturity choices. Choi et al. (2010) find strong links between convertible bond issuance and a variety of measures of supply of capital from convertible bond arbitrage hedge funds. Erel, Julio, Kim & Weisbach (2011) provide time series evidence on the relationship between macroeconomic condition and firms' capital raising. They report that the supply of capital has a more important impact on capital raising than demand during downturns. On the theoretical side, Morellec (2010)

models dynamic corporate investment and financing decisions when firms have uncertain access to credit and finds that credit supply is crucial to the determination of equilibrium capital structure. All of these papers link capital supply to firms' capital structures or to investment decisions. They make obvious the need for an improved understanding of the precise role of supply. Our focus on the impact of CDS markets provides an initial step, as it allows us to understand one mechanism by which these constraints can become more or less binding: variation in the ease with which suppliers of capital can hedge their positions.

2.2. Corporate Debt Maturity

Despite a vast empirical literature on the debt versus equity choice (see e.g., Parsons & Titman (2009) for a recent survey), there are only a handful of empirical studies on the determinants of firms' debt maturity decisions and none of these address the potential impact of suppliers' ability to hedge. Barclay & Smith (1995) find that low growth options firms and large firms choose more long-term debt. Stohs & Mauer (1996) find that: (1) large, less risky firms with long asset maturity have longer term debt; (2) firms with more earnings surprises have more short-term debt; (3) a non-monotonic relationship between debt rating and maturity, with very high and low rated firms having short-term debt. Johnson (2003) is the first to explicitly account for the potential simultaneity between leverage and maturity. We follow Johnson (2003) and the subsequent debt maturity literature (e.g., Datta, Iskandar-Datta & Raman (2005); Aivazian, Ge & Qiu (2005) and Billett, King & Mauer (2007)) and estimate leverage and maturity jointly.

Guedes & Opler (1996) study new bond issues and focus on incremental debt maturity. One benefit of analyzing bond issues is that the authors do not have to rely on Compustat, which aggregates all debt with maturities greater than five years, to calculate maturities. The limitation is that the analysis is limited to bonds, leaving out other potentially important sources of debt.[6] Our debt maturity data capture the actual maturities of all components

[6] In our sample the total issuance of publicly traded bonds represents, on average, 18 percent of the total issuance of all types of debt.

of firms' capital structures (in years). This allows us to provide economically meaningful interpretations of our estimates and to capture more cross sectional variation in the maturity structure of debt than the Compustat categories allow.

2.3. Credit Default Swaps

The recent credit crisis has brought an intense policy debate regarding the impact of financial innovation and derivatives, particularly CDSs. For example, Stout (2009) identifies Congress's passage of the Commodity Futures Modernization Act in 2000, which made derivatives contracts legally enforceable, as the root of the recent financial crisis. On the other hand, Stulz (2010) argues that despite the popular claim that CDS markets facilitated the crisis, much of the crisis stemmed from the declines in the housing market, not from CDSs. It is clear that there are both costs and benefits; however, despite being crucial to informed policy-making, their magnitudes are generally unknown. Our analysis provides evidence of the impact of one potential channel through which CDSs might matter: primary markets for firms' debt.

CDSs allow suppliers of capital to reduce credit risk exposure, potentially increasing their willingness to supply capital to firms. The two most closely related empirical papers on the implications of CDS contracts for firms are Ashcraft & Santos (2009) and Hirtle (2009). In their study of credit spreads, Ashcraft & Santos (2009) find that the onset of CDS trading does not lower the cost of capital for the average firm, and leads to a small reduction in bond and loan spreads of firms that are safer and more transparent. It is possible that, holding spreads constant, benefits from CDSs are manifested in non-price terms such as debt maturities or quantities. For example, Petersen & Rajan (1994) find that relaxation of small business loan supply constraints result in increased quantities of credit, rather than a price outcome. They argue that this can occur if the market for credit supply is not perfectly competitive. We take as given the findings in Ashcraft & Santos (2009) that the cost of corporate debt is unaltered by the existence of CDSs and test whether CDS contracts have

economically meaningful effects on firms' leverage and debt maturities.

Hirtle (2009) uses proprietary bank data to examine derivatives use by banks and credit provision, at the bank portfolio level. She finds some evidence that greater use of derivatives leads banks to increase credit provision. Like our paper, she examines both price and non-price dimensions of credit provision; however, there are three important differences between our work and hers. First, Hirtle (2009) focuses on bank derivatives use and bank credit supply while we look at the entire capital structures of firms (i.e., not just bank loans). Examining the entire capital structure provides a useful complement to the bank loan analysis in Hirtle (2009) because it involves additional financial instruments and larger set of potential suppliers of capital. [7] Second, because we map individual CDS contracts to individual firms, we can examine whether the existence of CDS makes lenders more willing to extend credit to firms for which CDS are trading (since they can hedge firm-specific risk). This is distinct from an alternative channel, in which a lender is more willing to lend to all borrowers after freeing up capital by unloading the credit risk of another firm. Finally, unlike Hirtle (2009), we also exploit time series variation in the role of CDSs, based on the idea that they may become more important when credit constraints bind.

[7] As discussed in the introduction, we might expect agents other than banks to benefit from the ability to hedge. The fact that we look across all components of firms' capital structures also helps us reconcile some of the differences between our results and those in Hirtle (2009) (i.e., she finds only limited evidence that CDSs improve credit supply and it shows up mainly in maturities, as opposed to quantities of loans while we find a relatively large effect of CDSs on levels of corporate debt). One possibility is that by isolating the firms with traded CDSs, we are able to identify where the capital is being directed. Examining bank loan portfolio level data is useful given the main research question Hirtle (2009), but may introduce noise from the perspective of our main research goal, which is to identify the impact of single name CDSs on the capital structures of individual firms.

3. Data and Empirical Specification

3.1. Data

There are three main data sources: Compustat, Bloomberg and Capital IQ. We begin with all non-financial firms in the S&P 500 index during the years 2002-2010, as reported by Compustat.[8] We use Compustat for all firm-level financial information and require all firms to have non-missing data for all variables of interest. We obtain CDS quotes from Bloomberg.[9] The Bloomberg quote data allow us to identify firms for which there exist CDS contracts with substantial trading activity and about which there is sufficiently broad dissemination of information that a supplier of debt capital can easily find a counterparty to hedge his credit exposure. Moreover, the supplier of debt capital has a benchmark quote regarding the cost of insurance.[10]

We are interested in the impact of CDSs on both leverage and debt maturity; however precise maturity information is not available in standard datasets. We use the Capital IQ capital structure detail data to calculate debt maturities. For each firm and year, we use the Capital IQ lookup tool to locate the firm, based on ticker. We then confirm that the company name in Capital IQ matches the company name in Compustat. If there is no ticker match, we perform the search based on company name. Wherever there is uncertainty, which can occur especially in firms undergoing restructuring (for example, the historical source documents under the name "Sears Holding Company" are Kmart 10Ks; "Sears Roebuck" historical documents are Sears 10Ks), we examine the underlying source document to confirm that the maturity data being extracted are for the correct firm.

[8] We focus on large-capitalization firms (presumably the most important firms in the economy); however, we acknowledge that small firms are underweighted in the analysis. On the other hand, many previous studies of debt maturity use cross-sectional Compustat data and overweight smaller firms.

[9] The sample begins in 2002 because that is the first year for which we have CDS quote data from Bloomberg. We match Bloomberg data with Compustat data using the six-digit CUSIP number of the CDS reference bond.

[10] Of course, market participants may be able to hedge risk through bilateral contracts that are not traded, but in such cases, it is difficult to locate prices and potential counterparties.

Capital IQ lists each component of debt in the firms' capital structures, including principal, maturity and type of debt (i.e., bonds and bank notes, commercial paper, term loans, revolvers, leases, trust preferred and other). Occasionally, maturity information is missing. When this is the case, we assume that the maturity of the debt component is the same as the average maturity of the firm's other debt of the same type. Given the importance of debt heterogeneity documented in Rauh & Sufi (2010), we expect that using information from decomposed debt will allow us to capture meaningful cross-sectional variation. There are also occasions in which maturity ranges are given in the data (e.g., debt of a given type maturing in years t through $t + k$ are aggregated). In these cases, as long as the stated range is less than 10 years, we take the midpoint of the stated range.[11] An example of a Capital IQ screen from which we extracted data is included in the Appendix. [12] Outside of Stohs & Mauer (1996), ours is the only paper to our knowledge to analyze actual maturities of firm debt in a large sample. As in Stohs & Mauer (1996), we define *Debt Maturity* as the principal weighted maturity of all components of the firm's capital structure.[13]

We require non-missing information on debt maturity for inclusion in the final sample. The impact of initial filtering on the sample is as follows: approximately 84 percent of the sample of S&P 500 firms are industrial and 85 percent of those firms have debt information available on Capital IQ. Because maturity is undefined for firms with zero debt, we exclude zero debt firms (approximately 31 observations per year). If we included these firms by

[11] If the stated range for a given component of the firm's debt is greater than 10 years, the observation is treated as missing order to reduce noise in the debt maturity measure. We have also run the analysis without pre-filtering the data on wide maturity ranges and the main results hold.

[12] When month and year maturity information is given, we assume that the debt matures at the end of the stated month. When only year is given, we assume that the debt matures on June 30 of the stated year.

[13] In addition to the maturity of debt, we are able to observe the type of debt, including commercial paper. In the case of commercial paper, several firms report the maturity of their commercial paper programs (typically one year), rather than the maturity of the paper itself. For example, the GE 10K states, "We rely on the availability of the commercial paper markets to refinance maturing short-term commercial paper debt throughout the year," but GE's commercial paper is reported in Capital IQ as maturing at the end of year $t+1$. The program maturity is relevant because rollover risk is reduced during the life of the program, however, the actual maturity of the commercial paper may also be relevant. The main analysis uses reported commercial paper maturities. In an un-tabulated robustness test, we set all commercial paper maturities to 30 days, regardless of the maturity reported in Capital IQ (30 days is the average maturity of commercial paper according the Federal Reserve). Our results are robust to this alternative definition of commercial paper maturity.

coding both leverage and maturity as zero, the estimated impact of CDSs would become even larger. The final sample contains 3,168 firm-year observations and 1,578 firm-years in which CDS contracts are trading.

Table 1 presents summary statistics for the full sample of non-financial firms in the S&P 500 index, as well as separate summary statistics for firm/year observations with and without CDS contracts trading.[14] There are several important observations from the table. First, average leverage is substantial, with mean book leverage of 0.25 and market leverage of 0.16. The leverage variables also exhibit substantial cross-sectional variation, with standard deviations of 0.14 and 0.12, respectively. Second, debt maturity is quite long, with mean (median) debt maturity of 8.7 (7.1) years. This is substantially longer than the average maturity of 3.4 years reported in Stohs & Mauer (1996) for 323 manufacturing firms over the 1980-1989 period and suggests that debt maturities of large firms have increased significantly over the past two decades. Datta, Iskandar-Datta & Raman (2005) also report evidence that firms have increased their debt maturities in recent years: they report that 61 percent of the debt for their sample of firms matures in greater than 3 years, in contrast to 46 percent in the earlier sample of Johnson (2003). This trend implies that Compustat data, which only provides information on debt maturing over 1, 2, 3, 4 and 5+ year horizons, may restrict the ability of researchers to capture important variation in debt maturity. Third, the debt decomposition shows that bonds and notes make up the vast majority of debt for firms in the sample, with a mean ratio of bonds and notes to total debt of 0.74. Term loans and revolving lines of credit comprise 0.12 and commercial paper 0.06 of total debt respectively, and all other components are less than 0.05 of total debt.

Comparing the CDS and non-CDS samples provides useful insights. CDS firms have substantially higher average leverage and longer debt maturities relative to non-CDS firms. Importantly, CDS and non-CDS firms have similar credit ratings, with a mean S&P rating of

[14] The fraction of sample firms with CDSs climbs over the sample period, from 23.4 percent in 2002 to 64.7 percent in 2010.

A- for CDS firms and A for non-CDS firms. The median rating for both CDS and non-CDS firms corresponds to an S&P rating of A-, suggesting that CDS trading is not a proxy for credit risk. At the same time, CDS firms are larger, with lower market-to-book ratios and have slightly more bond and note debt and less debt from term loans and revolvers. When CDS firms obtain bond and note debt, the average maturity on this debt is more than two years longer than that of non-CDS firms. Regression analysis will shed more concrete light on these patterns.

3.2. Empirical Specification

There are two main goals of the analysis. The first is to examine the impact of CDSs on leverage and maturity decisions. We use the CDS market as a proxy for suppliers' ability to hedge, which is expected to relax credit supply constraints. The second goal is to exploit the time series dimensions of the data to see whether the impact of CDSs on leverage and maturity choice varies as supply conditions change.

The dependent variables of interest are leverage and debt maturity. Leverage is defined as either book leverage (*Book Leverage*) or market leverage (*Market Leverage*). *Book Leverage* is defined as total debt (long-term debt plus debt in current liabilities), divided by the book value of assets. *Market Leverage* is defined as total debt divided by firm value, where firm value is defined as the book value of assets, minus the book value of common equity, plus the market value of equity and deferred taxes. We include both of these leverage variables in all of the empirical analyses, for robustness. We have also repeated the analysis using net debt (debt minus cash holdings) to define leverage ratios. [15] *Debt Maturity* is defined as the principal-weighted maturity of all debt, as reported in Capital IQ. We estimate the (*Leverage*) and (*Maturity*) equations separately and, because the choice of leverage and debt maturity may occur jointly (see e.g., Barclay, Marx & Smith (2003)), we follow Johnson (2003) and also estimate the two equations simultaneously by two-stage least squares. The

[15] Although doing so reduces the sample size due to the requirement that firms have positive leverage, the main results hold. We thank Ben Esty for suggesting this robustness check.

single equation estimates are referenced "One Equation" and the simultaneous equation estimates are referenced as "Two Equations" in all tables.

Table 2 provides a summary of all variables in the leverage and maturity equation specifications, along with their predicted signs. Definitions of all variables are in Table 1. As in Ashcraft & Santos (2009), we include two credit default swap variables in the empirical specifications. *CDS Trading* is an indicator variable equal to one if the firm has quoted CDS contracts on its debt during year t. *CDS Traded* is an indicator variable equal to one if the firm has a traded CDS contract on its debt at any time during the 2002-2010 sample period. *CDS Traded* captures unobservable differences between CDS and non-CDS firms. The main goal of this paper is to determine the impact of the ability of suppliers of capital to hedge risk on leverage and maturity. By including both the *CDS Trading* and *CDS Traded* indicator variables, we are able to exploit differences in timing of CDS introduction across CDS firms to estimate the impact of having a CDS contract on leverage and debt maturity. The main coefficient of interest in both the leverage and maturity equations is that on *CDS Trading*, which captures the change in leverage and maturity in all years following CDS introduction.

The other explanatory variables shown in Table 2 are primarily from Johnson (2003) and reflect general findings from the capital structure literature. In particular, in the leverage equation, we include *Debt Maturity* based on the idea that, if firms face liquidity/rollover risk, firms with shorter maturity debt are expected to choose less leverage (see for example, the findings in Massa, Yasuda & Zhang (2009)). We also include *Industry Leverage*, *Market to Book*, *Fixed Assets, Profitability*, *Size*, *Volatility*, *Tax Credit*, *Loss Carry Forward*, *Abnormal Earnings*, *Rated*, *CP Program* and *Investment Grade*. Some of these variables are not in Johnson (2003): *Industry Leverage* is included given findings in Leary & Roberts (2010) that industry leverage is an important determinant of firms' capital structures. *Rated* and *CP Program* are included due to findings in Faulkender & Petersen (2006) that having a bond or commercial paper rating, as proxies for access to public debt markets, is associated with increases in firms' leverage ratios. We include *Investment Grade* given the findings in the

British Bankers' Association survey that the majority of single name CDSs are on firms with investment grade debt, and therefore we want to be sure that any observed impact of CDS is not due to a difference in credit quality.

In the *Debt Maturity* equation, *Leverage* is included due to the potential rollover risk. We also include *Market-to-Book*, *Fixed Asset*, *Profitability*, *Size*, *CP Program* (an indicator equal to one if the firm has a commercial paper program at the beginning of year t), *Tax Credit* and *Loss Carry Forward*, *Volatility*, *Abnormal Earnings*, *Asset Maturity*, *Rated* and *Investment Grade*. With the exception of *Fixed Asset*, *Profitability*, *CP Program* and *Investment Grade*, all of these variables are from Johnson (2003). *Fixed Assets* and *Profitability* are included in the *Debt Maturity* equation due to recent findings in Graham, Li & Qiu (2008) that both of these variables explain loan maturity [16] Barclay & Smith (1995) and Barclay, Marx & Smith (2003) also use *CP Program* and, consistent with Diamond (1991), they find that firms with commercial paper programs have shorter maturity debt, on average.[17] As in the *Leverage* regression, *Investment Grade* is included as a control variable to ensure that inference about the impact of CDS is not due to differences in credit quality.[18] We also choose to use *Industry Asset Maturity* rather than the asset maturity of the individual firm, as in previous studies. We do this in order to reduce noise associated with asset maturity calculations and to tighten the identification of the simultaneous equations model, as we discuss below.

For the simultaneous equations model to be identified, the exclusion restriction must be satisfied. From Table 2, notice that *Industry Leverage* is in the *Leverage* equation but excluded from the *Debt Maturity* equation. Also notice that *Industry Asset Maturity* is in the *Debt Maturity* equation but is excluded from the *Leverage* equation. *Industry Leverage* is excluded from the *Debt Maturity* equation because the theoretical link between leverage and

[16] We thank an anonymous referee for suggesting the inclusion of these variables.

[17] Johnson (2003) uses size-squared to capture this non-monotonic relationship; however, this variable does not have explanatory power in our sample. Results are not sensitive to including it.

[18] Johnson (2003) also includes a Regulated dummy variable for firms in SIC codes 4900 to 4939. We include industry fixed effects in all regressions, based on the Fama-French 17 industry groupings. Regulated maps to the utility industry fixed effect.

maturity comes from rollover risk. Highly levered firms might be expected to choose longer debt maturities to limit problems rolling over maturing debt. By contrast, if competitors are highly levered, modifying a firm's own debt maturity decision would do nothing to limit rollover risk. In other words, the potential simultaneity of debt maturity and leverage occurs at the firm level. *Industry Leverage* satisfies the exclusion restriction because the leverage of industry peers should not impact an individual firm's debt maturity choice. Similarly, after controlling for asset tangibility, *Industry Asset Maturity* should not be related to an individual firm's debt capacity. These variables are excluded from the leverage equation. The specifications for the the two equations are similar to the those in Johnson (2003); however, we rely on industry variables for identification.[19]

In the empirical implementation, most regressions are estimated with year and industry (based on the Fama-French 17 groupings) fixed effects and also allow for clustering of standard errors at the firm level.[20] For robustness, we also replace the industry fixed effects and the *CDS Traded* dummy variable with firm fixed effects. [21]

[19]There are several differences between our identification and that in Johnson (2003). First, *Rated* is an additional identifying variable in the *Debt Maturity* equation in Johnson (2003). However, we also include it in the leverage equation due to Faulkender & Petersen (2006), who examine the impact of credit supply frictions on leverage. They use having a bond or commercial paper rating as a proxy for access to public debt markets and find support for the hypothesis that this variable impacts debt ratios. Because Faulkender & Petersen (2006) find these ratings to be important, we include both *Rated* and *CP Program* in the leverage equation. Second, both *Fixed Assets* and *Profitability* are included in the *Debt Maturity* equation due to recent findings in Graham, Li & Qiu (2008) that both of these variables explain loan maturity. Third, *Industry Leverage* is an additional identifying variable in the *Leverage* equation (see Leary & Roberts (2010)). Finally, we replace the firm-specific asset maturity in Johnson (2003) with *Industry Asset Maturity* to mitigate any potential concern that firm-level asset maturity captures an unobservable determinant of firm-level leverage.

[20]Results are not affected by using a larger industry classification, as for example 3-digit SIC codes. We use the 17 Fama-French classification to maintain industry groups well populated and to avoid the incidental parameter problem that would arise when estimating probit models with fixed effects (see Lancaster (2000) for a review).

[21]The firm fixed effects analyses are useful in that they control for time-invariant unobservables at firm level and are independent of industry grouping; however, this specification also absorbs potentially interesting cross-sectional heterogeneity.

4. Results

4.1. Benchmark Results

Table 3 reports the estimated coefficients of the leverage and maturity equations. The single equation estimates are obtained by ordinary least squares (OLS) and are referenced as "One Equation" in the table; the simultaneous equation estimates are obtained by obtained by and two-stage least squares (2SLS) and are referenced as "Two Equations" in the table. We show both sets of results throughout and only report the second stage estimates in the case of 2SLS (for brevity). *Leverage* is the dependent variable in the results shown in Panel A and *Debt Maturity* is the dependent variable in Panel B. In both panels, Columns (1) through (4) measure debt using book leverage and Columns (5) through (8) measure debt using market leverage. The benchmark specification is given in Columns (1), (3), (5), and (7). As described in the previous section, the regression specifications are based on Johnson (2003). In Columns (2), (4), (6) and (8), we replace *CDS Traded* and industry fixed effects with firm fixed effects to rule out the possibility that any observed CDS effect is due to unobserved (time-invariant) heterogeneity between firms.

The most important observation from the *Leverage* equation results in Table 3 is the positive and statistically significant coefficients on *CDS Trading* in all four of the benchmark regressions (Columns (1), (3), (5), and (7)). The magnitudes of the coefficients are economically significant. With all variables at their mean levels, the 2SLS coefficients in the benchmark specification (Columns 3 and 7) imply that the introduction of CDS trading implies an increase in book leverage of 20 percent (increase of 0.050 from a mean of 0.25) and an increase in market leverage of 19 percent (increase of 0.031 from a mean of 0.16).[22] One

[22]Separate from the direct hedging effects of CDSs, Bolton & Oehmke (2010) show that they can improve firms' debt capacities by providing ex ante commitment of creditors to be "tough" in debt renegotiations. Ex ante, CDS improves creditors' bargaining power and decreases strategic default of firms, which increases debt capacity. Our finding of greater leverage of CDS firms is consistent with this prediction. Campello & da Matta (2011) predict that CDSs are most beneficial for safer, more valuable firms. Our sample of S&P 500 firms are likely to be part of this group.

potential concern is that equity returns of CDS firms are lower than non-CDS firms; however, the consistency of results across both the book leverage and market leverage specifications shows that equity performance is not driving the results.

The firm fixed effects regressions (Columns 2, 4, 6 and 8) in Panel A show that CDS has a statistically significant effect on leverage in all specifications. Thus, our results are not due to unobservable firm-specific heterogeneity. In general, the standard errors are somewhat higher in the case of firm fixed effects than in the benchmark specification due to the decline in degrees of freedom (and decline in power to identify cross-sectional differences) that comes with introducing firm level effects (Roberts & Whited (2011)). The point estimates are also lower in the firm fixed effects specification; however, it is important to note that the identification is different from the Ashcraft & Santos (2009) specification given in Columns (1), (3), (5) and (7). The estimated coefficient on *CDS Trading* in the firm fixed effects specification should be interpreted as the average difference in pre-versus post-CDS leverage and maturity for the firms which introduce CDS contracts during the sample period. The identification comes from firm-specific changes in whether there is a CDS market for the firm's debt. If we do not observe a firm in our data before or after the CDS event (we condition our analysis on membership in the S&P 500), we lose that observation. The Ashcraft & Santos (2009) approach does not require observing the same firm before and after CDS introduction for identification. Moreover, the reduction of the magnitudes of the coefficients on CDS consistent with Lemmon, Roberts & Zender (2008), who report that firm fixed effects reduce coefficient magnitudes on other determinants of leverage.[23]

The *CDS Traded* coefficients in Table 3, Panel A, are statistically insignificant in the regressions. While this variable is used as a control so that the *CDS Trading* variable captures the effect of the introduction of a CDS contract, the coefficients are interesting in that they do not show an average difference in leverage across CDS and non-CDS firms after

[23]Lemmon, Roberts & Zender (2008), emphasize that, if much of the explanatory power of existing determinants comes from cross-sectional variation, as opposed to time-series variation, then the importance of these determinants will necessarily fall as the firm fixed effects remove all such variation (p. 1590).

controlling for other characteristics. The other variables that are consistently statistically significant in the leverage equation are *Industry Leverage*, *Market to Book*, *Fixed Asset*, *Profitability*, *Size* (in the book leverage regressions), *Rated* and *Investment Grade*. The signs of the estimated coefficients on these variables are largely consistent with the predictions described in Table 2. Interestingly, after we control for *CDS Trading*, we find that debt maturity is not an important determinant of leverage. We find this in both the OLS and 2SLS specifications.

The results from the *Debt Maturity* regression are presented in Table 3, Panel B. Similar to Panel A, we find strong evidence that the ability of suppliers of capital to hedge impacts firms' capital structures. We find positive and statistically significant coefficients on the *CDS Trading* coefficients in all of the benchmark regressions (Columns 1, 3, 5 and 7) specifications. As in the leverage regressions, the magnitudes of the estimated coefficients are economically significant. With all variables at their mean levels, the results of the benchmark specification suggest that the introduction of CDS contracts increase debt maturity by between 1.09 and 1.79 years. These maturities are further increased once CDSs are introduced. The *CDS Trading* are also statistically significant in two of the four firm fixed effects specifications (Columns 2 and 6) and marginally significant in a third specification (Column 8), suggesting that unobservable firm-specific heterogeneity is not driving the main findings. As in Panel B, the estimated coefficients are smaller in magnitude and have larger standard errors than in the other specifications, as one might expect.

The estimated coefficients on *Industry Asset Maturity* (the proxy for firm asset maturity) in Table 3, Panel B are consistent with maturity matching (Myers (1977)). Since both debt maturity and asset maturity are measured in years, the interpretation of the coefficients in the benchmark specification (Columns 1, 3, 5 and 7) is straightforward: a one-year increase in asset maturity increases debt maturity by between 0.24 and 0.31 years (3 to 4 months). After controlling for asset maturity and *CDS Trading*, *Tax Credit* and *CP Program* are the other estimated coefficients that show any statistical significance. With the exception of

Tax Credit, the signs on the estimated coefficients on these variables are consistent with the predictions given in Table 2. Similar to the leverage regression, we do not find evidence that leverage is a significant determinant of maturity. In the firm fixed effects regressions (Columns 2, 4, 6 and 8), all results are similar to the benchmark specification except that *CP Program* and *Tax Credit* become insignificant. This is because these variables do not vary much at the firm level, as firms with commercial paper programs and tax credits tend to have them for the entire sample period.

As noted earlier, we provide two-stage least squares results (Columns 3, 4, 7 and 8) in addition to the single equation, OLS results (Columns 1, 2, 5 and 6) for consistency with prior literature. In un-tabulated diagnostic analysis, we conducted a Hausman test under the assumption that we have identified at least one valid instrument. In all but the market leverage specification of the maturity equation (Column 2), we fail to reject the null hypothesis of exogeneity. This suggests that, for our sample of firms, instrumenting for leverage and maturity is generally unnecessary. More importantly, the main findings, that CDS markets allow firms to maintain greater leverage and longer debt maturities, are consistent across all eight specifications and are therefore not sensitive to the specification that we employ.

4.2. CDS Market Liquidity Proxies

The *CDS Traded* indicator variable used in the main analysis (Table 3) follows Ashcraft & Santos (2009) and is included to control for unobservable differences between CDS and non-CDS firms. An alternative approach, which completely overcomes selection concerns, is to look within the sample of CDS firms and relate the leverage and maturity decisions made by these firms to the ability to use CDS contracts as hedging instruments. Rather than focusing on the availability of CDS (a binary variable), we focus on how liquid the contracts are. The underlying assumption is that suppliers of capital find it easier to hedge using CDSs if they are cheaper to trade and easier to locate.

In this section, we study the sample of 1,578 firm/year observations for which *CDS Trading* equals one and focus on variation in CDS market liquidity, which captures variation in the ability of suppliers of debt capital to hedge using CDS contracts. By examining only CDS firms, we are able to completely avoid concerns about selection of CDS firms (relative to non-CDS firms). The drawback is that CDSs trade over-the-counter, which leads to substantial noise in the liquidity proxies. Ideally, we would observe daily trading activity for CDSs, as we do for equities that trade on exchanges. Because these data are largely unavailable for CDSs, we calculate two somewhat coarse proxies of market liquidity: (1) the natural log of the number of daily Bloomberg CDS quotes that we observe for the firm during year t and (2) the average bid-ask spreads for the firm's CDSs during year t. The Bloomberg bid and ask quotes are limited in that they are based only on information from contributing dealers, however, we do not expect potential noise from sampling a small group of dealers to be systematically related to leverage or maturity decisions.

Table 4 reports results from regressions in which we replace *CDS Trading* and *CDS Traded* with the liquidity proxies. We find evidence that firms with more liquid CDS markets (lower quoted spreads and greater number of CDS quotes) are able to maintain higher leverage ratios and longer debt maturities. In the leverage regressions (Panel A), the estimated signs on all of the coefficients are consistent with the benchmark findings in Table 3. All four estimated coefficients are statistically significant in the regressions using CDS quoted spreads and three of four are significant in the regressions using a count of the number of quotes (the fourth is marginal, with a t-statistic of 1.52). The estimated coefficients of the 2SLS leverage regression in Panel A of Table 4 suggest that, all else equal, a one standard deviation increase in the number of quotes increases book leverage by 0.011 and market leverage by 0.007. A one standard deviation decrease in bid-ask spreads increases book leverage by 0.021 and market leverage by 0.012 (these represent 7.8 percent of mean book leverage and 6.7 percent of mean market leverage for the sample of CDS firms). In the maturity results shown in Panel B, we find similar results, but with greater statistical

significance. All eight of the estimated coefficients are statistically significant (four in the regressions using quoted spreads and four using number of quotes). The maturity results in Panel B suggest an increase in maturity of approximately 8 months following a one standard deviation increase in the number of quotes. In the case of spreads, the coefficients imply an increase in maturity of between 10 and 13 months following a one standard deviation decrease in bid-ask spreads.

Another way to avoid selection concerns would be to condition the sample on firms that at some point have CDS trading on their debt (i. e., firms for which *CDS Traded* equals one). In the Appendix Table A.1, we repeat the main analysis for this subsample of firms and find that our results regarding the impact of *CDS Trading* are robust to this alternative approach.[24]

4.3. Potential Endogeneity of CDS Contracts: Instrumental Variables Approach

One potential concern with any study of the impact of CDS markets on financing choice is the possibility that CDS firms are different from non-CDS firms in ways that are systematically related to the leverage and maturity choice. The empirical approach that we have followed so far accounts for time-invariant differences between CDS and non CDS firms (by using the *CDS Traded* control) and for time-invariant differences between firms, whether or not they are CDS firms (via firm fixed effects). However, both of these approaches assume that the timing of CDS introduction is exogenous to firms' leverage and maturity decisions. One might be concerned that, anticipating firms' leverage and debt maturity decisions, creditors initiate hedging contracts and CDS markets emerge. To tackle this potential problem, we need to identify an important reason for the emergence of CDS markets that is exogenous to the leverage and maturity decisions of firms.

Our goal is to find a variable that explains the hedging needs of firm's suppliers of capital that is not directly related to firm-level leverage or debt maturity. To do this, we use

[24] We thank a referee for encouraging this robustness check.

the Dealscan database to identify firms lenders (we use the lead syndicate member), along with data from the Federal Reserve's Call Report data on commercial banks to track the lending banks derivatives usage and the compositions of their loan portfolios. Minton, Stulz & Williamson (2009) report that banks that use interest rate, foreign exchange, equity and commodity derivatives are more likely to be net buyers of CDSs. Thus, banks that hedge tend to hedge more than one component of their portfolios. Of these variables, foreign exchange derivatives use is the least likely to have a direct link to the leverage or debt maturities of a bank's individual borrower (i.e., satisfy the exclusion restriction). Not only is a foreign exchange derivatives position a macro (rather than firm-level) hedge, but the firms in our sample are U.S. firms, making a bank's decision to hedge foreign exchange exogenous to a firm's leverage or debt maturity decisions, while related to its general propensity to hedge. Therefore, we introduce *Lender Foreign Exchange Derivatives*, the amount of foreign exchange derivatives used for hedging (not trading) purposes relative to total loans of the lead syndicate banks that a firm has borrowed from during the past five years, as an instrument for *CDS Trading*. Minton, Stulz & Williamson (2009) also report that banks with greater commercial and industrial loans, fewer agricultural loans and greater foreign lending activity are more likely to be net buyers of CDSs. Of these loan portfolio variables, a bank's agricultural loan activity is very unlikely likely to impact leverage or maturity. Therefore, we introduce a second instrument for *CDS Trading*: *Lender Agricultural Loans*, defined as the total amount of agricultural loans relative to the total amount of loans of the lead syndicate banks that a firm has borrowed money from over the past five years. Banks with more agricultural loans would be expected to be less likely to hold CDSs since, as Minton, Stulz & Williamson (2009) argue, these are likely to be relationship loans which banks are reluctant to sell or hedge. Both variables are constructed for each firm in year t as the average across all banks that have served as a lead syndicate member over the past five years, and are lagged by one year when included in the instrumental variable estimator.

In order to address concerns about potential simultaneity between firms' capital struc-

tures and CDS markets, we re-estimate main regressions, using *Lender Agricultural Loans* and *Lender Foreign Exchange Derivatives* to instrument for *CDS Trading*.[25] Because not all firms are covered by Dealscan, the sample size is reduced to 2,502 firm-year observations.

As in the benchmark two-stage least squares analysis, the exclusion restriction must be satisfied for the full system to be identified. *Industry Leverage* and *Industry Debt Maturity* identify the *Leverage* and *Debt Maturity* equations, respectively. Neither of these industry-level variables are expected to have a direct impact on the demand for a CDS market for an individual firm's debt, other than through their impact on firm leverage and maturity, respectively. Changes in the leverage of a given firm's competitors is unlikely to impact investors' desires to trade that firm's credit risk. Similarly, *Industry Asset Maturity* measures how quickly firms in the industry consume their production technologies. Firms with competitors with shorter or longer asset maturities should not be more or less likely to have traded CDS contracts.

Table 5 presents estimation results of Instrumental Variables analysis. In Columns 1, 2, 5 and 6, we instrument *CDS Trading* in the leverage and maturity equations where those are assumed to be independent (as in Columns 1, 2, 5 and 6 of the main analysis in Table 3). In Columns 3 4, 7, and 8, we assume that leverage and maturity are jointly determined.

The leverage and debt maturity results in Panels A and B are largely consistent with the benchmark regression results reported in Table 3: the estimated effect of CDSs is substantial, even after controlling for potential endogeneity. From Panel A, the estimated coefficients on the instrumented *CDS Trading* (*CDS Trading IV*) in the two-stage benchmark regressions (Columns 3 and 7) suggest that a one standard deviation increase in *CDS Trading IV* would imply an increase in both book and market leverage of 0.030 (from means of 0.25 for book leverage and 0.16 for market leverage). The estimated coefficients on *CDS Trading IV* in

[25]The fitted variable from the probit model for *CDS Trading* is used as an instrumental variable, as described by Wooldrige (2001). This approach is similar to that in Bharath, Dahiya, Saunders & Srinivasan (2011). The probit model estimation results are given in the Appendix Table A.2.

Panel B suggest that a one standard deviation increase in this variable would increase debt maturity by approximately 2.3 years. The estimated coefficients of the other variables in Panels A and B of Table 5 are similar to the benchmark results given in Table 3.

4.4. The Introduction of CDS: Difference in Differences Analysis

The approach that we have adopted thus far captures the impact of CDSs over long horizons (i.e., estimates of the coefficients on *CDS Trading* capture the change in leverage and maturity in all of the years following CDS introduction). As an alternative, we can isolate firms near CDS introduction and measure changes in leverage and maturity from the year *t-1* through the end of year *t* and year *t+1* relative to CDS introduction. We begin by matching all CDS firms to non-CDS firms using the Compustat universe.

The matched sample of non-CDS firms is chosen based on propensity scores obtained by estimating a probit model of the likelihood of CDS trading similar to the one reported in the Appendix Table A.3 and augmented by including *Leverage* and *Debt Maturity*. In such model, to guarantee that no outcome variable is included as a regressor, all independent variables are lagged by 1 year. Further, to guarantee that firms are on parallel trends prior to the CDS introduction, one-year changes in leverage and debt maturity are also included as regressors. For each CDS firm, we choose one non-CDS firms that is in the S&P 500 sample and that is the closet match, based on its propensity score. We sample with replacement in identifying matches. We obtain matches for 145 firms in the sample with CDS market introductions during the sample period.[26] Identification comes from the assumption that, conditional on the matching based on the variables in Table 5, CDS outcomes are random.

In the analysis presented in this section, we choose the closest match for each treatment

[26]The number of possible CDS firms is reduced by the fact that we have to observe a CDS introduction after the start of the sample period and the firm must be in the S&P 500 index in the years before and after the introduction of CDS. The latter requirement eliminates the years 2002 and 2010. The total number of firms that have CDS trading in our sample is 282, of those 218 start trading between 2003 through 2009. 49 of those enter the S&P 500 sample in the same year that the CDS is introduced, and 9 exit the sample the year after the introduction, 15 are lost for lack of data fields (specifically the changes in debt maturity) leaving us with a sample of 145 firms.

firm. Given that we are able to find good matches based on the propensity score matching technique (the mean distance between the treatment and matching firms is approximately 0.01), we proceed with regression analysis in which we condition on changes in all of the right-hand-side variables given in Table 3, using data on only treated firms and their matched firms. Rather than examining levels, we transform all variables to differences, reflecting the change from year *t-1* to year *t* of the CDS introduction, as well as from year *t-1* through year *t+1*.

These results are presented in Table 6. As in the benchmark analysis, we observe a positive role for CDSs. The estimated coefficients of the leverage regression in Panel A of Table 6 suggest that, all else equal, the introduction of a CDS increases book leverage by 0.023 and market leverage by 0.018 by the end of the year following CDS introduction. The maturity results in Panel B suggest an increase in maturity of between 7 and 8 months by the end of the year following CDS introduction. While the change leverage appears to be increasing by the end of the year after CDS introduction, the change in maturity is relatively constant.

The difference in difference approach is useful since it sheds light on how capital structure evolves following CDS introduction when comparing firms for which a CDS market arises to firms that are ex-ante similar, but for which no CDS market is created. In this context the treatment is the CDS introduction, which captures an increase in the availability of hedging instruments to suppliers of capital.

4.5. Credit Supply Tightening

4.5.1. Aggregate Time Series Patterns

In interpreting the results in Table 3, it is useful to ask whether the CDS effect becomes more important during times in which credit constraints bind, as would be expected if the ability to hedge helps alleviate frictions on the supply side of credit markets. To shed light on this question, we exploit the time series properties of the data and re-estimate

the regressions in Table 3 except that instead of using year fixed effects, we estimate the regressions separately by year.[27] Of particular interest is the role of CDSs when credit constraints become more and less binding. Given the financial crisis of 2007-2009, we would expect the effects to be greatest during the recent crisis period, a significant negative shock to credit supply.

Figure 1 shows the time series patterns of the estimated impact of CDSs on leverage and maturity. The leverage regression results are shown in the top panel in Figure 1. The estimated coefficients are positive in all years. More interestingly, the magnitudes of the impact of CDSs on leverage exhibit a U-shaped pattern over the 2002-2008 period, with a decline during 2009-2010, precisely when the credit constraints brought by the crisis began to improve. The results of year-by-year estimation of the impact of CDSs on *Debt Maturity* are shown in the bottom panel of Figure 1 and, similar to the leverage regressions, show a striking U-shaped pattern during the 2002-2008 period, with a decline during 2009-2010.

To provide a tighter link between the patterns shown in Figure 1 and constraints in U.S. credit markets, we look to the Federal Reserve's Senior Loan Officer Opinion Survey, which provides indicators of credit supply tightening.[28] If CDSs matter more when credit constraints bind, then we would expect to observe variation in the survey data similar to that shown in Figure 1. Figure 2 shows the net percentage of respondents reporting commercial and industrial loan tightening to large and medium sized firms over the sample period. The data reflect a pattern that is remarkably similar to the observed coefficients on the *CDS*

[27] We estimate parameters of the 2SLS specifications reported in Columns (3) and (7) of Panel A of Table 3 for leverage and Panel (B) for maturity, obtaining therefore four time-series of coefficients and report the four time-series in Figure 1. We make one modification as we are only able to include *CDS Trading* since estimating coefficients on both *CDS Trading* and *CDS Traded* requires time series variation in the CDS status of firms.

[28] The Federal Reserve conducts quarterly survey interviews with senior loan officers of domestic and foreign large commercial banks. The purpose of the survey is to collect information on credit availability, credit demand, and loan practices. One of the data fields collected and reported by the Federal reserve is the net percentage of respondents tightening standards for commercial and industrial loans. Details about the survey can be found at http://www.federalreserve.gov/boarddocs/snloansurvey/about.htm. Recent empirical findings in the banking literature are also consistent with the Fed survey data: Cornett, McNutt, Strahan & Tehranian (2010) find that lines of credit and loans both declined during the 2001 recession, although the decline was not as steep as in 2008.

Trading dummy variable in Figure 1. Not surprisingly, given the patterns in Figures 1 and 2, the correlations between the Senior Loan Officer Opinion Survey data and all four of the series of estimated coefficients on the *CDS Trading* shown in Figure 1 are positive and are mainly statistically significant. The correlations between the survey data series and the *CDS Trading* coefficients in the book and market leverage regressions are 0.79 and 0.72, respectively (with t-statistics of 2.23 and 2.05). The correlation coefficients between the survey data and the estimated coefficients of *CDS Trading* in the maturity regressions are 0.73 and 0.76 (with t-statistics of 2.08 and 2.16).

Figures 1 and 2 provide suggestive time series evidence that CDS markets become more important when credit constraints begin to bind, however, the same credit cycles are hitting all firms in the sample simultaneously. The credit tightening early years of the sample followed the recession of 2001 as well as large corporate governance scandals of 2001-2002 such as those that took place at Enron, WorldCom and Tyco and had effects that rippled through the entire U.S. economy. The tightening in 2007-2008 and final loosening in 2009-2010 coincides with the recent credit crisis. To test formally the hypothesis that CDS markets become more important when credit constraints begin to bind, we would ideally exploit the panel nature of our data and identify an event in which we expect credit constraints to become more binding for some sample firms and not others. In the next section, we use defaults by other firms in the same geographic region as a proxy for regional supply shocks. This helps us isolate the importance of CDSs as local credit supply conditions tighten.

4.5.2. Regional Supply Shocks: Within State Debt Defaults

Under the assumption that local suppliers of credit are important sources of debt financing for firms, we test the hypothesis that a negative shock to local credit supply, defined as defaults of firms headquartered in the same state as the sample firm but not in the same industry, increases the importance of suppliers' ability to hedge. Our key assumption that local bond investors and banks exhibit local biases in their portfolios is consistent with the

literature. For example, in the case of equity investors, Coval & Moskowitz (1999) find a strong bias of investment managers for local firms, possibly driven by asymmetric information between local and non-local investors. Massa, Yasuda & Zhang (2009) find some evidence that local bias also exists among bond investors. Approximately 38 percent of bonds in their sample of firms are held by local investors, statistically different from the 15 percent that would be held if the investors were regionally diversified. Bharath et al. (2007) report that firms are more likely to choose lenders that are headquartered in the same state, suggesting that states are relevant for defining local credit supply.

To illustrate the intuition of the state default analysis presented in this section, imagine a bank with a portfolio consisting largely of local loans. When a large default occurs, the bank becomes less willing to lend to other local firms either because it is now closer to becoming constrained by regulatory capital requirements or because it is updating its credit screening abilities (as in Murfin (2010)). In both cases, these local investors are likely to find the ability to hedge credit exposure to be particularly appealing after experiencing negative portfolio shocks.

In the regression results shown in Table 7, we repeat the Table 3 analysis but we include *State Default*, defined as the dollar value of all defaulted debt by Compustat firms headquartered in the sample firm's state during year *t-1*, divided by the total book value of debt of all Compustat firms headquartered in the state at the beginning of year *t-1*. To mitigate the concerns that a local default might reflect a demand shock common to more than one local firm, the observation of *State Default* for each firm only measures the defaults of firms that are head-quartered in that firm's state but *outside* of that firm's industry. This allows us to remove the link between the variable, which is intended to measure the local supply shock, from potential direct shocks to the firm's demand for debt.

Since our focus is on the impact of defaulted debt on the suppliers' ability to hedge credit exposure to a particular issuer, we include in the regression an interaction term of *CDS*

Trading with *State Default*. The main hypothesis is that the coefficient on the interaction term is positive. That is, when local credit constraints begin to bind, CDS firms are able to maintain higher leverage and longer debt maturities than non-CDS firms.

We compile a list of default events by combining information available on Bloomberg of firms that are either in default on one of their publicly traded bonds (missed interest or principal payment) or filed for Chapter 11 (bankruptcy reorganization) or Chapter 7 (liquidation). Some information on bank debt is available from Moody's research papers and is also included in the analysis. There are a total of 628 default events during our sample period, which we can match to publicly traded firms, representing a total of $390.1 billion of debt in default. While there is substantial variation, the defaults can be important local events. Recall that *State Default* measures the ratio of defaulted debt to total Compustat debt outstanding in a given state. The time-series of the cross-sectional average of *State Default* behaves similarly to other measures of default intensity: it is high in 2002 and 2009 (around 2 percent) and it is low in 2004 throughout 2007 (around 0.4 percent).

Consistent with our hypothesis, Table 7, shows positive and statistically significant coefficients on the *CDS Trading* $\times$ *State Default* interaction variable in all specifications. Panel A shows that the benchmark 2SLS estimated coefficients are 0.158 and 0.115 in the book and market leverage regressions, respectively. These imply that, in addition to the main CDS effect, a one standard deviation increase in the amount of defaulted debt by same-state firms (i.e., increase in the intensity of the supply shock) allows CDS firms to maintain book leverage ratios that are 0.47 percent higher and market leverage ratios that are 0.35 percent higher (i.e., 1.8 percent and 2.2 percent higher than the respective sample means of 25 and 16 percent, respectively) than the non-CDS firms that are subject to the same shock. Similarly, in Panel B, the 2SLS coefficients are 20.056 and 19.820 in the *Debt Maturity* regressions using market and book leverage, respectively. These imply that a one standard deviation increase in the amount of defaulted debt by same state firms allows CDS firms to maintain debt maturities that are about 7 months months longer than non-CDS firms. The effect of

State Default, taken by itself, is negative (as one would expect), but statistically insignificant in the regressions. The other estimated coefficients are similar to those in Table 3.

One potential concern in interpreting the results of the state default analysis (and the *CDS Trading* results more generally) is that CDS contracts may be initiated by market participants who expect a future change in firm performance given the observed defaults. As mentioned above, we choose different industry firms in the Table 7 regressions to mitigate this concern. We also examined the relationship between the onset of CDS trading and future firm performance for the full sample of firms. In Appendix table A.3, we present results of analyses in which various measures of firm performance are regressed on the CDS variables, as well as lagged performance measures and other controls. We find no significant impact of *CDS Trading*.

The state default analysis allows us to use both the time series and cross-sectional properties of the data to compare differences between CDS and non-CDS firms over a common time period, following a supply shock that is relevant to some firms and not others. We interpret the results in Table 7 and in Figures 1 and 2 as evidence that the ability of suppliers of capital to hedge credit risk has a significant impact on leverage and maturity, especially during times in which credit constraints bind.

Taken together, all of the results from Tables 3 through 4 suggest an important role for the availability of insurance contracts (CDSs) on a firm's debt in both leverage and debt maturity.

5. Conclusions

Consistent with the idea that borrowers benefit from a relaxation of credit constraints due to the ability of suppliers of debt capital to hedge their risk, we find a strong role for CDSs in both leverage and debt maturity. We take three approaches in the empirical analysis. The

first exploits variation in whether firms have traded CDS contracts and in the timing of the adoption of CDS trading. In the second approach, we allow for the potential endogeneity of the existence of a CDS market for a firm's debt by introducing an instrumental variable for CDS trading. Finally, we focus on the CDS adoption event and use a matched sample of firms with no CDS but that have similar characteristics, based on a propensity score research design. We measure changes in leverage and maturity near CDS introduction.

All three empirical approaches lead to similar conclusions: CDS markets allow firms to maintain higher leverage and longer debt maturities (both in the time series and the cross section). Moreover, we exploit the time series properties of the data and find that the role for CDS becomes stronger as credit constraints bind, suggesting important time series variation in the impact of capital supply on firm capital structure.

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Figure 1: Impact of CDS Trading, by Year

This figure shows the time series of estimated coefficients on the CDS Trading dummy variable in the Book Leverage, Market Leverage and Debt Maturity regressions. We estimate parameters of the 2SLS specifications reported in Columns (3) and (7) of Panel A of Table 3 for leverage and of Panel (B) of Table 3 for maturity, obtaining therefore 4 time-series of coefficients. The "Book Leverage" lines show the time series of estimated coefficients from the regressions using book leverage. The "Market Leverage" lines show the coefficients from the regressions using market leverage.

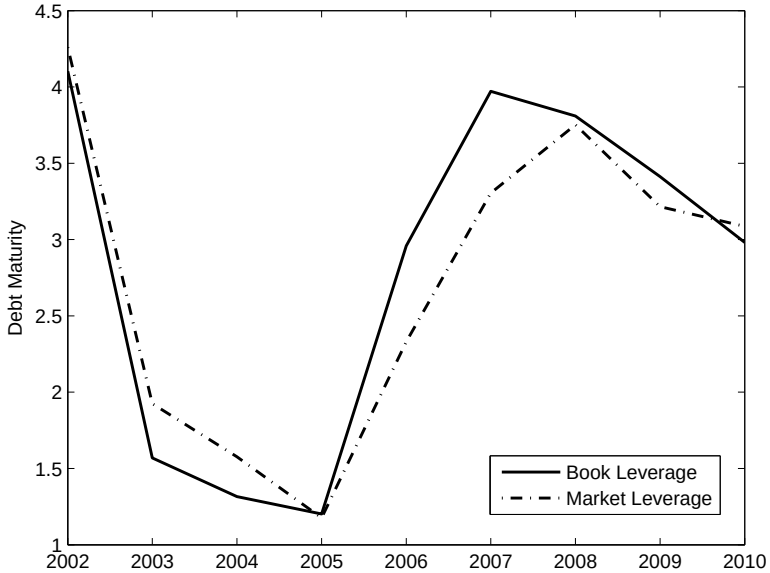

Figure 2: Net Tightening of Credit Supply, by Year

This figure shows the net percentage of senior loan officers reporting commercial and industrial loan tightening to large and medium sized firms over the 2002-2010 sample period. Higher values indicate tightening of credit supply. Data are from the Federal Reserve's Senior Loan Officer Opinion Survey.

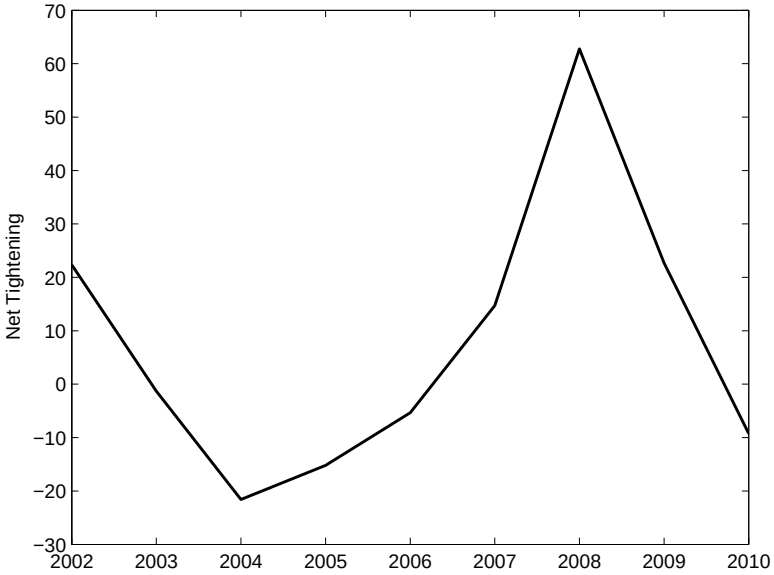

Table 1: Summary Statistics

This table presents summary statistics for the sample of non-financial firms in the S&P 500 index during the 2002-2010 period. Panel A presents summary statistics for firm-level variables used in the main analyses. Panel B presents summary statistics of the debt decomposition variables. Book Leverage is book leverage, defined as total debt (long-term debt plus debt in current liabilities), divided by the book value of assets. Market Leverage is market leverage, defined as total debt, divided by firm value, where firm value is defined as the book value of assets, minus the book value of common equity, plus the market value of equity, plus the book value of deferred taxes. Debt Maturity is debt maturity in years, defined as the principal-weighted maturity of all debt, as reported in Capital IQ. Asset Maturity is the weighted maturity of the firm's assets, defined as: (gross PPE divided by depreciation expense, times gross PPE divided by total assets) plus (current assets divided by cost of goods sold, times current asses divided by total assets). Market to Book is the firm's market-to-book ratio, defined as the market value of assets (equity market capitalization plus the book value of other liabilities), divided by the book value of assets. Fixed Assets is defined as net PPE, dived by the book value of total assets. Profitability is defined as earnings before interest and taxes, divided by the book value of assets. Size is the natural logarithm of total sales, in $millions. CP Program is a dummy equal to one if the firm has a commercial paper program at the beginning of year t. Volatility is defined as the standard deviation of annual changes in earnings over years t through t-5, divided by the book value of assets as the end of year t. Abnormal Earnings is defined as the change in earnings per share from year t–1 to year t, divided by the share price as the end of year t. Tax Credit is defined as the investment tax credit, divided by the book value of assets. Loss Carry Forward is defined as the net operating loss carry forwards, divided by the book value of assets. Rating is the S&P credit rating of the firm, where the value 1 corresponds to an S&P rating of AAA+; 2 corresponds to AAA; 3 corresponds to AAA-, and so on. Rated is a dummy variable equal to one if the firm has a Standard and Poor's rating. Investment Grade is a dummy equal to one if the firm has an investment grade rating (i.e., BBB or higher). Bond/Debt is the fraction of total debt that are bonds and notes. Bond Maturity is the maturity of the firms bonds and notes, in years. Lease/Debt is the fraction of total debt that are lease obligations. Lease Maturity is the maturity of lease obligations, in years. Loan/Debt is the fraction of total debt that are term loans or revolvers. Loan maturity is the maturity of term and revolver loan obligations, in years. CP/Debt is the fraction of commercial paper in total debt. CP Maturity is the stated maturity of the firm's Commercial Paper Program. TP/Debt is the fraction of trust preferred obligations in total debt. TP Maturity is defined as the maturity of trust preferred obligations, in years. Other/Debt is the fraction of other obligations in total debt. Other Maturity is defined as the maturity of other obligations. "S&P 500 and CDS" indicates that the firm is in the S&P 500 sample and has traded CDS contracts on its debt (CDS quoted in Bloomberg) during year t. "S&P and no CDS" indicates that the firm does not have traded CDS on its debt.

Panel A: Firm Variables

	S&P 500					S&P 500 and CDS Trading					S&P 500 and no CDS Trading				
	Mean	Median	Stdev	Min	Max	Mean	Median	Stdev	Min	Max	Mean	Median	Stdev	Min	Max
Book Leverage	0.25	0.23	0.14	0.00	1.39	0.27	0.26	0.13	0.00	0.75	0.22	0.20	0.15	0.00	1.39
Market Leverage	0.16	0.13	0.12	0.00	0.71	0.18	0.16	0.11	0.00	0.56	0.13	0.10	0.12	0.00	0.71
Debt Maturity	8.68	7.06	6.60	0.08	72.45	9.75	8.41	6.75	0.08	72.45	7.61	5.89	6.27	0.08	59.53
Asset Maturity	8.09	6.17	6.05	0.45	71.82	8.54	6.81	5.83	0.45	35.15	7.65	5.59	6.23	0.46	71.82
Market to Book	1.93	1.64	0.99	0.57	13.73	1.71	1.53	0.68	0.57	7.44	2.15	1.80	1.19	0.58	13.73
Fixed Asset	0.31	0.25	0.23	0.00	0.94	0.34	0.28	0.23	0.00	0.93	0.29	0.22	0.22	0.01	0.94
Profitability	0.11	0.10	0.08	-0.33	0.86	0.10	0.09	0.07	-0.33	0.64	0.11	0.10	0.09	-0.26	0.86
Size	9.01	8.97	1.15	4.62	12.96	9.54	9.41	1.00	6.91	12.95	8.48	8.43	1.04	4.62	12.96
CP Program	0.31	0.00	0.46	0.00	1.00	0.36	0.00	0.48	0.00	1.00	0.25	0.00	0.44	0.00	1.00
Volatility	0.03	0.02	0.04	0.00	0.38	0.03	0.02	0.04	0.00	0.38	0.04	0.02	0.04	0.00	0.37
Abnormal Earnings	0.01	0.01	0.34	-9.49	7.89	0.02	0.01	0.25	-2.11	4.21	0.01	0.01	0.41	-9.49	7.89
Investment Tax Credit	0.04	0.02	0.05	-0.00	0.28	0.05	0.02	0.06	0.00	0.28	0.04	0.02	0.05	-0.00	0.26
Loss Carry Forward	0.05	0.00	0.21	0.00	5.48	0.03	0.00	0.07	0.00	1.01	0.07	0.00	0.29	0.00	5.48
Rating	8.61	9.00	3.97	0.00	27.00	9.31	9.00	2.84	0.00	27.00	7.93	9.00	4.73	0.00	27.00
Rated	0.91	1.00	0.28	0.00	1.00	1.00	1.00	0.04	0.00	1.00	0.83	1.00	0.38	0.00	1.00
Investment Grade	0.72	1.00	0.45	0.00	1.00	0.82	1.00	0.38	0.00	1.00	0.62	1.00	0.48	0.00	1.00

Panel B: Debt Decomposition

	S&P 500					S&P 500 and CDS Trading					S&P 500 and no CDS Trading				
	Mean	Median	Stdev	Min	Max	Mean	Median	Stdev	Min	Max	Mean	Median	Stdev	Min	Max
Bond/Debt	0.74	0.84	0.29	0.00	1.00	0.77	0.86	0.25	0.00	1.00	0.70	0.81	0.32	0.00	1.00
Bond Maturity	9.47	7.87	7.48	0.00	75.45	10.76	9.16	7.85	0.00	75.45	8.20	6.61	6.87	0.00	66.05
Lease/Debt	0.02	0.00	0.09	0.00	1.00	0.02	0.00	0.05	0.00	0.60	0.03	0.00	0.12	0.00	1.00
Lease Maturity	9.75	5.00	13.78	0.00	88.50	10.25	5.46	12.63	0.00	86.50	9.22	4.50	14.91	0.00	88.50
Loan/Debt	0.12	0.01	0.22	0.00	1.00	0.08	0.01	0.16	0.00	1.00	0.16	0.02	0.26	0.00	1.00
Loan Maturity	1.58	0.76	2.73	0.00	31.25	1.56	0.67	2.95	0.00	31.25	1.60	0.94	2.49	0.00	29.08
CP/Debt	0.06	0.00	0.14	0.00	1.00	0.06	0.00	0.13	0.00	1.00	0.06	0.00	0.16	0.00	1.00
CP Maturity	0.08	0.08	0.00	0.08	0.08	0.08	0.08	0.00	0.08	0.08	0.08	0.08	0.00	0.08	0.08
TP/Debt	0.01	0.00	0.06	0.00	0.88	0.01	0.00	0.07	0.00	0.84	0.01	0.00	0.05	0.00	0.88
TP Maturity	25.47	26.44	11.72	0.58	55.66	26.70	28.50	10.26	0.58	54.50	23.22	21.50	13.81	0.70	55.66
Other/Debt	0.05	0.00	0.13	0.00	1.00	0.06	0.01	0.13	0.00	0.98	0.04	0.00	0.12	0.00	1.00
Other Maturity	4.51	2.00	6.24	0.00	42.50	5.12	2.00	7.06	0.00	42.50	3.52	2.00	4.49	0.00	29.50

Table 2: Predicted Signs

This table presents predicted signs of the coefficients in the simultaneous equations model of leverage and maturity.

Variable	Leverage Equation Sign	Leverage Equation Explanation	Maturity Equation Sign	Maturity Equation Explanation
CDS Trading	+	CDSs allow suppliers of capital to hedge risk and increase their willingness to extend credit.	+	CDSs allow suppliers of capital to hedge risk and increase their willingness to extend longer maturity credit.
CDS Traded	+/–	This variable controls for unobservable differences between firms that eventually have CDS versus non-CDS firms.	+/–	This variable controls for unobservable differences between firms that eventually have CDS versus non-CDS firms.
Leverage			+	Firms face liquidity risk when they roll over short-term debt. Firms with high leverage choose more long maturity debt to avoid excessive liquidation.
Debt Maturity	+	Firms face liquidity risk when they roll over short-term debt. Firms with short maturity debt will therefore choose less leverage.		
Industry Asset Maturity			+	Maturity matching of assets and liabilities can reduce underinvestment problems Myers (1977). Firms in the same industries have common characteristics that might impact asset maturities.
Industry Leverage	+	Firms in the same industries have common characteristics that might impact leverage ratios.		
Market to Book	–	Firms with high growth opportunities should use low leverage to mitigate underinvestment incentives (Meyers, 1977).	–	Firms with high growth opportunities will choose short maturity debt so that debt is due before options to invest expire, thereby mitigating underinvestment problems.
Fixed Assets	+	Tangible assets have high collateral values, increasing firms' debt capacity.	+	Fixed Assets are included because Graham, Li and Qiu (2008) find that asset tangibility is related to loan maturity.
Profitability	+/–	The free cash flow hypothesis (e.g., Jensen (1986)) predicts that firms with high profitability will take on greater leverage since interest payments discipline wasteful spending incentives. On the other hand, Meyers (1984) argues that firms have a pecking order, first using internal funds. High profit firms would therefore have less leverage.	+	Profitability is included in the maturity equation due to recent empirical findings by Graham, Li and Qiu (2008) who find that profitability is related to loan maturity.
Size	+/–	Larger firms are more diversified, so may have greater debt capacity (Lewellen, 1971). Larger firms also have fewer asymmetric information problems so will have greater access to equity markets, decreasing debt.	+	Diamond (1991) predicts an increasing and then decreasing relationship between debt maturity and credit quality/liquidity risk.
CP Program	+	Firms with commercial paper programs are expected to have higher leverage due to access to these additional debt markets (as in Faulkender and Petersen (2006))	–	Diamond (1991) predicts an increasing and then decreasing relationship between debt maturity and credit quality/liquidity risk.
Volatility	–	Increased earnings volatility increases default probabilities, decreasing debt capacity.	–	Increased earnings volatility increases default probabilities, decreasing optimal maturity.

Variable	Leverage Equation Sign	Leverage Equation Explanation	Maturity Equation Sign	Maturity Equation Explanation
Abnormal Earnings	+	If there is a signaling effect associated with leverage choice (Ross, 1977), leverage will be positively related to abnormal earnings.	–	If there is a signaling effect associated with maturity choice (as in Diamond (1991) and Flannery (1986)), maturity will be negatively related to abnormal earnings.
Tax Credit	–	Alternative tax shields can reduce the value of long term debt.	–	Alternative tax shields can reduce the value of long-term debt (e.g., Brick and Raviv (1995) in which upward sloping yield curve makes long term-debt more valuable).
Loss Carry Forward	–	Alternative tax shields can reduce the value of long-term debt.	–	Alternative tax shields can reduce the value of long-term debt.
Rated	+	Rated firms are expected to have higher leverage due to access to public debt markets (as in Faulkender and Petersen (2006)).	+	Unrated firms have lower credit quality and may find it more difficult to borrow longer-term debt.
Investment Grade	+/–	Control variable. The assets underlying CDSs tend to be investment grade. We include this dummy variable to ensure that our inferences about the impact of CDS are not due to differences in credit rating.	+/–	Control variable. The assets underlying CDSs tend to be investment grade. We include this dummy variable to ensure that our inferences about the impact of CDS are not due to differences in credit rating.

Table 3: Corporate Leverage, Debt Maturity and Credit Default Swaps

Panel A presents ordinary least squares (One Equation) and two-stage least squares (Two Equations) regression results of annual leverage on the explanatory variables from Johnson (2003), plus two credit default swap variables, an industry leverage control, and debt rating dummies. Panel B reports the results of the maturity equation regression. CDS Trading is a dummy variable equal to one if the firm has quoted CDS contracts on its debt during year t. We also add CDS Traded, a dummy variable equal to one if the firm has a traded CDS during the 2002-2010 sample period. The explanatory variable not already defined in Table 1 are Industry Leverage and Industry Asset Maturity, defined as the mean leverage and the mean asset maturity of all firms in the 2-digit SIC code. Industry Leverage is based on industry book leverage in the Book Leverage regressions and on industry market leverage in the Market Leverage regressions. In Columns 3, 4, 7, and 8 both leverage and maturity are treated as endogenous variables and their equations are estimated simultaneously using two stage least squares. The regression specification shown in Columns 1, 3, 5 and 7 include time and industry fixed effects. Industry fixed effects and the CDS Traded dummy variable are replaced with firm fixed effects in the specification shown in Columns 2, 4, 6 and 8. All standard errors are clustered at the firm level. The identifying variable for the leverage equation is Industry Leverage. The identifying variable for the debt maturity equation is Industry Asset Maturity. The sample is composed of non-financial firms in the S&P 500 index during the 2002-2010 period granting a total of 3168 firm/year observations.

Panel A: Leverage Regression

	Book Leverage				Market Leverage			
	One Equation		Two Equations		One Equation		Two Equations	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Debt Maturity	0.001	0.000	0.005	-0.002	0.000	-0.000	0.002	-0.003
	(1.45)	(0.67)	(0.77)	(-0.48)	(0.79)	(-0.03)	(0.43)	(-0.69)
Industry Leverage	0.367	0.194	0.373	0.202	0.375	0.273	0.380	0.281
	(6.49)	(2.85)	(6.59)	(2.84)	(8.55)	(5.34)	(7.91)	(5.41)
Market to Book	-0.006	-0.013	-0.005	-0.013	-0.030	-0.026	-0.030	-0.026
	(-0.78)	(-2.92)	(-0.76)	(-2.92)	(-5.42)	(-4.13)	(-5.38)	(-4.13)
Fixed Asset	0.095	0.044	0.080	0.044	0.055	0.000	0.048	-0.000
	(2.93)	(0.85)	(1.88)	(0.85)	(2.56)	(0.00)	(1.65)	(-0.01)
Profitability	0.130	-0.076	0.140	-0.079	-0.075	-0.167	-0.070	-0.169
	(1.80)	(-1.53)	(1.94)	(-1.59)	(-1.72)	(-4.47)	(-1.59)	(-4.51)
Size	-0.023	-0.022	-0.023	-0.023	-0.006	-0.010	-0.006	-0.010
	(-4.37)	(-1.99)	(-4.44)	(-2.04)	(-1.58)	(-1.22)	(-1.63)	(-1.27)
Volatility	-0.059	-0.037	-0.037	-0.053	-0.051	-0.071	-0.042	-0.084
	(-0.54)	(-0.33)	(-0.33)	(-0.45)	(-0.77)	(-1.01)	(-0.63)	(-1.18)
Abnormal Earnings	0.007	0.000	0.007	0.001	0.005	0.002	0.005	0.002
	(1.12)	(0.08)	(1.17)	(0.10)	(0.98)	(0.35)	(1.00)	(0.36)
Tax Credit	0.079	-0.103	0.015	-0.080	0.006	-0.066	-0.023	-0.046
	(0.73)	(-0.67)	(0.10)	(-0.49)	(0.08)	(-0.62)	(-0.20)	(-0.42)
Loss Carry Forward	0.027	0.018	0.024	0.015	0.011	-0.001	0.010	-0.004
	(1.40)	(0.54)	(1.20)	(0.47)	(1.09)	(-0.06)	(0.88)	(-0.15)
Rated	0.111	0.137	0.112	0.140	0.081	0.067	0.082	0.069
	(5.27)	(3.71)	(5.27)	(3.74)	(6.28)	(3.75)	(6.25)	(3.77)
Investment Grade	-0.090	-0.032	-0.093	-0.032	-0.081	-0.034	-0.082	-0.034
	(-7.14)	(-2.99)	(-6.75)	(-2.97)	(-8.49)	(-3.82)	(-7.36)	(-3.80)
CP Program	0.019	0.005	0.027	0.005	0.004	0.003	0.008	0.003
	(2.18)	(1.15)	(1.74)	(1.12)	(0.74)	(0.84)	(0.70)	(0.80)
CDS Traded	0.004		0.001		0.001		-0.000	
	(0.34)		(0.07)		(0.14)		(-0.04)	
CDS Trading	0.055	0.018	0.050	0.020	0.033	0.009	0.031	0.011
	(5.33)	(2.43)	(3.68)	(2.30)	(4.76)	(1.70)	(3.25)	(1.81)
Time Fixed Effects	X	X	X	X	X	X	X	X
Industry Fixed Effects	X		X		X		X	
Firm Fixed Effects		X		X		X		X
Clustered SE	X	X	X	X	X	X	X	X
Adj-R^2	0.340	0.793	0.339	0.793	0.537	0.837	0.537	0.837

Panel B: Debt Maturity Regression

	Book Leverage				Market Leverage			
	One Equation		Two Equations		One Equation		Two Equations	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Leverage	2.017	1.184	-10.339	-3.256	0.242	0.166	-16.332	2.282
	(1.05)	(0.72)	(-1.17)	(-0.14)	(0.10)	(0.07)	(-1.53)	(0.15)
Industry Asset Maturity	0.239	0.481	0.298	0.484	0.248	0.482	0.312	0.481
	(1.81)	(2.71)	(2.05)	(2.74)	(1.87)	(2.70)	(2.17)	(2.73)
Market to Book	-0.004	-0.031	-0.144	-0.092	-0.019	-0.043	-0.588	0.015
	(-0.02)	(-0.13)	(-0.55)	(-0.24)	(-0.07)	(-0.18)	(-1.42)	(0.03)
Fixed Asset	1.153	-2.147	2.533	-1.897	1.363	-2.082	2.453	-2.105
	(0.62)	(-0.94)	(1.23)	(-0.71)	(0.73)	(-0.91)	(1.26)	(-0.92)
Profitability	-2.075	-0.484	-0.375	-0.842	-1.776	-0.549	-3.207	-0.163
	(-0.64)	(-0.20)	(-0.11)	(-0.27)	(-0.55)	(-0.22)	(-0.94)	(-0.04)
Size	0.105	-0.385	-0.174	-0.482	0.060	-0.409	-0.019	-0.392
	(0.37)	(-0.73)	(-0.48)	(-0.64)	(0.22)	(-0.78)	(-0.07)	(-0.72)
Volatility	-4.436	-4.994	-4.949	-5.139	-4.515	-5.023	-4.786	-4.900
	(-1.00)	(-1.14)	(-1.13)	(-1.17)	(-1.02)	(-1.16)	(-1.10)	(-1.09)
Abnormal Earnings	-0.032	0.041	0.032	0.040	-0.023	0.040	0.036	0.037
	(-0.16)	(0.27)	(0.15)	(0.27)	(-0.11)	(0.27)	(0.17)	(0.24)
Tax Credit	12.339	6.885	13.783	6.516	12.574	6.795	12.596	6.892
	(1.86)	(0.85)	(2.01)	(0.82)	(1.91)	(0.84)	(1.95)	(0.86)
Loss Carry Forward	0.926	-0.720	1.150	-0.637	0.962	-0.698	1.011	-0.697
	(1.15)	(-0.58)	(1.39)	(-0.49)	(1.21)	(-0.57)	(1.24)	(-0.57)
Rated	-0.389	0.799	1.104	1.430	-0.166	0.956	1.300	0.805
	(-0.42)	(0.74)	(0.82)	(0.43)	(-0.18)	(0.89)	(1.02)	(0.57)
Investment Grade	1.134	0.116	-0.038	-0.031	0.964	0.082	-0.457	0.157
	(1.84)	(0.18)	(-0.04)	(-0.03)	(1.52)	(0.12)	(-0.42)	(0.19)
CP Program	-1.825	0.015	-1.577	0.039	-1.786	0.021	-1.685	0.014
	(-4.19)	(0.05)	(-3.45)	(0.13)	(-4.13)	(0.07)	(-3.91)	(0.05)
CDS Traded	0.928		1.043		0.945		1.017	
	(1.33)		(1.47)		(1.35)		(1.46)	
CDS Trading	1.091	0.675	1.788	0.756	1.196	0.695	1.748	0.676
	(1.90)	(1.76)	(2.44)	(1.23)	(2.10)	(1.82)	(2.67)	(1.59)
Time Fixed Effects	X	X	X	X	X	X	X	X
Industry Fixed Effects	X		X		X		X	
Firm Fixed Effects		X		X		X		X
Clustered SE	X	X	X	X	X	X	X	X
Adj-R^2	0.123	0.678	0.124	0.678	0.122	0.678	0.125	0.678

Table 4: CDS Liquidity Proxies

This table presents ordinary least squares (One Equation) and two-stage least squares (Two Equations) regression results of leverage and maturity on the explanatory variables in Tables 3, plus CDS market liquidity proxies for the sub-sample of firms for which CDS Trading equals one. CDS Count is defined as the log number of daily CDS quotes on Bloomberg during year t (across all maturities). Bid-Ask Spread is defined as the average daily bid-ask spread for CDSs on the firm's debt, as disseminated on Bloomberg, during year t. All other variables are defined in Tables 1 and 3. Time and industry fixed effects are included in all regressions. Standard errors are clustered at the firm level. The sample is composed by non-financial firms in the S&P 500 index for which a CDS is trading during the 2002-2010 period granting a total of 1578 firm/year observations.

Panel A: Leverage Regression

	Book Leverage				Market Leverage			
	One Equation		Two Equations		One Equation		Two Equations	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Debt Maturity	-0.001	-0.001	-0.002	-0.004	-0.001	-0.001	-0.004	-0.005
	(-1.62)	(-1.75)	(-0.42)	(-1.04)	(-1.99)	(-2.05)	(-1.57)	(-1.98)
Industry Leverage	0.363	0.352	0.359	0.330	0.330	0.325	0.303	0.288
	(4.55)	(4.43)	(4.28)	(3.95)	(5.29)	(5.22)	(4.58)	(4.37)
Market to Book	-0.007	-0.003	-0.007	-0.002	-0.057	-0.055	-0.057	-0.055
	(-0.67)	(-0.25)	(-0.66)	(-0.23)	(-8.20)	(-7.79)	(-8.17)	(-7.72)
Fixed Asset	0.094	0.097	0.097	0.110	0.052	0.053	0.066	0.072
	(2.46)	(2.53)	(2.23)	(2.53)	(1.98)	(2.03)	(2.16)	(2.38)
Profitability	0.092	0.080	0.091	0.077	-0.032	-0.038	-0.035	-0.044
	(0.95)	(0.84)	(0.94)	(0.81)	(-0.49)	(-0.58)	(-0.53)	(-0.67)
Size	-0.023	-0.021	-0.023	-0.020	-0.010	-0.009	-0.009	-0.007
	(-3.11)	(-2.93)	(-3.07)	(-2.67)	(-1.87)	(-1.72)	(-1.69)	(-1.37)
Volatility	-0.020	-0.044	-0.016	-0.022	0.023	0.012	0.050	0.047
	(-0.15)	(-0.32)	(-0.11)	(-0.16)	(0.23)	(0.12)	(0.50)	(0.47)
Abnormal Earnings	0.020	0.020	0.020	0.019	0.009	0.009	0.008	0.008
	(2.20)	(2.11)	(2.18)	(1.99)	(1.34)	(1.27)	(1.19)	(1.05)
Tax Credit	-0.127	-0.124	-0.116	-0.068	-0.103	-0.103	-0.047	-0.027
	(-1.01)	(-0.97)	(-0.75)	(-0.43)	(-1.23)	(-1.21)	(-0.48)	(-0.27)
Loss Carry Forward	0.074	0.066	0.073	0.059	0.006	0.002	-0.001	-0.008
	(0.85)	(0.77)	(0.85)	(0.69)	(0.11)	(0.04)	(-0.01)	(-0.15)
Investment Grade	-0.069	-0.063	-0.069	-0.058	-0.065	-0.062	-0.061	-0.055
	(-4.11)	(-3.78)	(-3.91)	(-3.33)	(-4.96)	(-4.78)	(-4.29)	(-3.88)
CP Program	0.033	0.031	0.031	0.025	0.014	0.013	0.007	0.004
	(3.06)	(2.96)	(2.27)	(1.77)	(1.98)	(1.90)	(0.79)	(0.45)
CDS Counts	0.007		0.008		0.004		0.005	
	(1.90)		(1.80)		(1.52)		(1.79)	
CDS Bid-Ask		-0.175		-0.194		-0.082		-0.107
		(-2.77)		(-2.85)		(-2.27)		(-2.74)
Time Fixed Effects	X	X	X	X	X	X	X	X
Industry Fixed Effects	X	X	X	X	X	X	X	X
Clustered SE	X	X	X	X	X	X	X	X
Adj-R^2	0.323	0.330	0.320	0.328	0.527	0.529	0.526	0.529

Panel B: Maturity Regression

	Book Leverage				Market Leverage			
	One Equation		Two Equations		One Equation		Two Equations	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Leverage	-5.358	-5.637	-21.246	-28.181	-7.917	-8.142	-31.797	-35.881
	(-1.91)	(-1.99)	(-1.94)	(-2.29)	(-2.10)	(-2.15)	(-2.18)	(-2.37)
Industry Asset Maturity	0.364	0.354	0.384	0.376	0.358	0.349	0.364	0.352
	(2.18)	(2.11)	(2.32)	(2.28)	(2.15)	(2.09)	(2.22)	(2.14)
Market to Book	-0.046	0.048	-0.185	-0.037	-0.479	-0.406	-1.928	-2.024
	(-0.09)	(0.09)	(-0.35)	(-0.07)	(-0.89)	(-0.75)	(-1.96)	(-2.04)
Fixed Asset	0.151	0.376	1.954	3.032	0.133	0.337	1.913	2.463
	(0.06)	(0.14)	(0.69)	(1.05)	(0.05)	(0.13)	(0.71)	(0.91)
Profitability	1.399	1.023	1.971	1.588	0.456	0.067	-1.809	-2.709
	(0.28)	(0.21)	(0.39)	(0.31)	(0.09)	(0.01)	(-0.34)	(-0.51)
Size	0.126	0.205	-0.259	-0.293	0.166	0.246	-0.102	-0.038
	(0.35)	(0.57)	(-0.54)	(-0.61)	(0.47)	(0.70)	(-0.25)	(-0.09)
Volatility	8.828	7.979	10.313	9.343	9.365	8.579	12.492	11.783
	(1.09)	(1.01)	(1.25)	(1.14)	(1.17)	(1.09)	(1.46)	(1.39)
Abnormal Earnings	-0.199	-0.219	0.086	0.183	-0.239	-0.261	-0.067	-0.065
	(-0.39)	(-0.44)	(0.16)	(0.35)	(-0.47)	(-0.53)	(-0.13)	(-0.13)
Tax Credit	8.088	8.210	6.327	5.875	7.724	7.836	4.834	4.573
	(0.92)	(0.94)	(0.72)	(0.68)	(0.88)	(0.90)	(0.57)	(0.55)
Loss Carry Forward	-2.340	-2.611	-1.109	-1.047	-2.676	-2.953	-2.440	-2.786
	(-0.71)	(-0.81)	(-0.35)	(-0.34)	(-0.81)	(-0.90)	(-0.76)	(-0.89)
Investment Grade	0.580	0.824	-0.566	-0.648	0.459	0.697	-1.073	-0.991
	(0.65)	(0.94)	(-0.48)	(-0.54)	(0.51)	(0.78)	(-0.83)	(-0.77)
CP Program	-1.481	-1.514	-0.915	-0.745	-1.543	-1.579	-1.153	-1.146
	(-2.52)	(-2.57)	(-1.33)	(-1.08)	(-2.62)	(-2.67)	(-1.84)	(-1.85)
CDS Counts	0.388		0.504		0.378		0.465	
	(1.74)		(2.17)		(1.70)		(2.06)	
CDS Bid-Ask		-5.754		-10.102		-5.410		-7.941
		(-2.08)		(-2.91)		(-1.98)		(-2.69)
Time Fixed Effects	X	X	X	X	X	X	X	X
Industry Fixed Effects	X	X	X	X	X	X	X	X
Clustered SE	X	X	X	X	X	X	X	X
Adj-R^2	0.125	0.126	0.127	0.132	0.126	0.127	0.130	0.133

Table 5: Instrumental Variables Approach

Panels A and B present instrumental variables regressions for leverage and debt maturity, wherein the instruments for CDS Trading are the amount of agricultural loans and the amount of relative to the total amount of loans of the lead syndicate banks that firms have borrowed money from in the past five years (Lender Agricultural Loans), and the amount of foreign exchange derivatives used for hedging purposes (not trading) relative to the total amount of loans of the lead syndicate banks that firms have borrowed money from in the past five years (Lender Foreign Exchange Derivatives). We instrument CDS Trading in the leverage and maturity equations, when those are assumed to be independent (One Equation) and simultaneously determined (Two Equations). All variables are defined in Tables 1 and 3. The identifying variables for the leverage equation is Industry Leverage. The identifying variables for the debt maturity equation is Industry Asset Maturity. The regression specification shown in Columns 1, 3, 5 and 7 include time and industry fixed effects. Industry fixed effects and the CDS Traded dummy variable are replaced with firm fixed effects in the specification shown in Columns 2, 4, 6 and 8. Standard errors are clustered at the firm level. The sample is composed of non-financial firms in the S&P 500 index during the 2002-2010 period granting a total of 2502 firm/year observations.

Panel A: Leverage Regression

	Book Leverage				Market Leverage			
	One Equation		Two Equations		One Equation		Two Equations	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Debt Maturity	0.000	0.001	-0.003	-0.011	-0.000	0.000	-0.005	-0.008
	(0.50)	(1.47)	(-0.45)	(-0.93)	(-0.10)	(0.97)	(-1.23)	(-0.94)
Industry Leverage	0.323	0.217	0.302	0.220	0.329	0.235	0.287	0.267
	(4.66)	(2.41)	(3.78)	(2.32)	(6.19)	(4.41)	(4.49)	(4.09)
Market to Book	-0.014	-0.016	-0.013	-0.016	-0.037	-0.026	-0.036	-0.026
	(-2.15)	(-2.85)	(-1.92)	(-2.96)	(-4.80)	(-3.55)	(-4.21)	(-3.63)
Fixed Asset	0.088	0.040	0.095	0.055	0.045	0.021	0.055	0.030
	(2.44)	(0.66)	(2.31)	(0.86)	(1.89)	(0.50)	(1.91)	(0.69)
Profitability	0.061	-0.060	0.070	-0.064	-0.108	-0.161	-0.090	-0.161
	(0.71)	(-0.94)	(0.77)	(-1.04)	(-2.12)	(-4.15)	(-1.52)	(-4.15)
Size	-0.023	-0.037	-0.027	-0.039	-0.007	-0.019	-0.015	-0.020
	(-3.69)	(-2.46)	(-2.48)	(-2.56)	(-1.70)	(-1.82)	(-1.54)	(-1.95)
Volatility	-0.190	0.039	-0.200	0.065	-0.117	-0.049	-0.132	-0.034
	(-1.53)	(0.22)	(-1.48)	(0.37)	(-1.48)	(-0.51)	(-1.60)	(-0.36)
Abnormal Earnings	0.014	0.006	0.012	0.003	0.012	0.005	0.008	0.003
	(1.84)	(0.74)	(1.58)	(0.39)	(1.76)	(0.53)	(1.23)	(0.34)
CP Program	0.027	0.005	0.023	0.003	0.011	0.004	0.003	0.003
	(2.87)	(1.08)	(1.58)	(0.67)	(1.76)	(1.15)	(0.32)	(0.73)
Tax Credit	-0.037	-0.128	0.018	0.032	-0.072	-0.071	0.020	0.038
	(-0.29)	(-0.74)	(0.12)	(0.14)	(-0.81)	(-0.63)	(0.17)	(0.25)
Loss Carry Forward	0.058	0.017	0.066	-0.010	0.016	-0.036	0.030	-0.055
	(0.91)	(0.32)	(0.99)	(-0.18)	(0.36)	(-0.83)	(0.66)	(-1.20)
Investment Grade	-0.064	-0.012	-0.064	-0.005	-0.062	-0.019	-0.062	-0.015
	(-4.59)	(-0.95)	(-4.22)	(-0.32)	(-5.91)	(-2.03)	(-4.97)	(-1.38)
CDS Trading IV	0.073	0.097	0.104	0.187	0.046	0.113	0.105	0.174
	(4.91)	(1.85)	(1.92)	(1.80)	(4.31)	(2.18)	(2.06)	(2.06)
Time Fixed Effects	X	X	X	X	X	X	X	X
Industry Fixed Effects	X		X		X		X	
Firm Fixed Effects		X		X		X		X
Clustered SE	X	X	X	X	X	X	X	X
Adj-R^2	0.296	0.802	0.267	0.802	0.515	0.848	0.502	0.848

Panel B: Maturity Regression

	Book Leverage				Market Leverage			
	One Equation		Two Equations		One Equation		Two Equations	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Leverage	-0.041	3.108	-29.920	-3.629	-1.822	2.952	-33.257	13.704
	(-0.02)	(1.52)	(-2.20)	(-0.14)	(-0.70)	(1.13)	(-2.29)	(0.61)
Industry Asset Maturity	0.243	0.315	0.309	0.251	0.247	0.319	0.283	0.260
	(1.68)	(2.06)	(2.05)	(1.44)	(1.71)	(2.02)	(1.93)	(1.65)
Market to Book	-0.106	-0.015	-0.443	-0.121	-0.175	0.019	-1.232	0.300
	(-0.39)	(-0.06)	(-1.38)	(-0.27)	(-0.64)	(0.08)	(-2.24)	(0.49)
Fixed Asset	0.069	-1.023	3.055	-0.180	0.172	-1.008	1.834	-0.955
	(0.03)	(-0.36)	(1.20)	(-0.05)	(0.08)	(-0.36)	(0.83)	(-0.31)
Profitability	0.820	-0.097	1.889	-0.547	0.497	0.392	-3.242	2.111
	(0.26)	(-0.04)	(0.58)	(-0.18)	(0.15)	(0.15)	(-0.77)	(0.45)
Size	0.069	0.047	-1.061	-0.235	0.055	-0.083	-0.773	0.196
	(0.25)	(0.07)	(-1.85)	(-0.17)	(0.20)	(-0.12)	(-1.67)	(0.21)
Volatility	0.814	2.352	-4.531	2.681	0.724	2.614	-2.364	2.815
	(0.15)	(0.37)	(-0.73)	(0.41)	(0.14)	(0.41)	(-0.39)	(0.44)
Abnormal Earnings	-0.203	-0.201	0.107	-0.175	-0.185	-0.206	-0.007	-0.240
	(-0.74)	(-0.80)	(0.30)	(-0.68)	(-0.67)	(-0.82)	(-0.02)	(-0.95)
CP Program	-1.654	-0.124	-0.729	-0.097	-1.632	-0.117	-1.145	-0.173
	(-3.77)	(-0.46)	(-1.35)	(-0.34)	(-3.73)	(-0.43)	(-2.53)	(-0.62)
Tax Credit	10.695	11.590	10.595	11.569	10.499	11.712	8.952	12.145
	(1.39)	(1.42)	(1.39)	(1.46)	(1.37)	(1.42)	(1.23)	(1.48)
Loss Carry Forward	2.166	-1.520	3.750	-1.623	2.170	-1.551	2.546	-1.023
	(0.78)	(-0.63)	(1.35)	(-0.67)	(0.78)	(-0.65)	(0.91)	(-0.37)
Investment Grade	1.013	0.487	-1.273	0.451	0.896	0.540	-1.523	0.722
	(1.88)	(0.64)	(-1.13)	(0.59)	(1.61)	(0.72)	(-1.26)	(0.90)
CDS Trading IV	3.125	5.421	7.767	6.638	3.218	5.984	7.859	4.178
	(4.22)	(1.70)	(3.24)	(1.12)	(4.43)	(1.86)	(3.34)	(0.77)
Time Fixed Effects	X	X	X	X	X	X	X	X
Industry Fixed Effects	X		X		X		X	
Firm Fixed Effects		X		X		X		X
Clustered SE	X	X	X	X	X	X	X	X
Adj-R^2	0.150	0.674	0.138	0.673	0.151	0.674	0.138	0.673

Table 6: Changes in Leverage and Debt Maturity around CDS Introduction — CDS Firms versus Matched Sample, Multivariate Analysis

This table presents regression results of changes in leverage and maturity on changes in the explanatory variables defined in Tables 3. All variables are expressed in changes relative to a matched firm (variable definitions are in Tables 1 and 3.). Industry and time fixed effects are in all regressions. The matched sample of non-CDS firms is chosen based on propensity scores obtained by estimating a probit model of the likelihood of CDS Trading. In such model, to guarantee that no outcome variable is included as a regressor, all independent variables are lagged by one year. Further, to guarantee that firms are on parallel trends prior to CDS introduction, one year changes in leverage and debt maturity are also included as regressors. We report results only for the case where each CDS firm is matched to one control firms. The sample is composed of non-financial firms in the S&P 500 index during the 2002-2010. During that period we observe 145 firm/year observations that correspond to a CDS introduction.

Panel A: Leverage Regression

	Book Leverage		Market Leverage	
	Year t–1 to t	Year t–1 to t+1	Year t–1 to t	Year t–1 to t+1
Δ Debt Maturity	0.002	0.001	0.001	-0.001
	(1.40)	(0.66)	(0.54)	(-0.61)
Δ Industry Leverage	0.257	0.211	0.415	0.401
	(2.54)	(2.00)	(3.15)	(3.44)
Δ Market to Book	0.000	0.000	0.000	0.000
	(3.34)	(6.05)	(0.39)	(3.47)
Δ Fixed Asset	-0.053	-0.093	-0.076	-0.154
	(-0.69)	(-0.88)	(-0.94)	(-1.49)
Δ Profitability	-0.368	-0.206	-0.612	-0.318
	(-3.15)	(-1.56)	(-5.65)	(-2.26)
Δ Size	0.042	0.007	0.062	0.029
	(1.82)	(0.36)	(3.74)	(1.39)
Δ Volatility	-0.123	-0.256	0.346	-0.586
	(-0.43)	(-0.98)	(1.63)	(-3.55)
Δ Tax Credit	-0.733	-0.083	-0.390	0.231
	(-2.49)	(-0.17)	(-1.82)	(0.59)
Δ Loss Carryforward	0.122	0.210	0.079	0.084
	(1.73)	(1.99)	(1.27)	(1.06)
Δ Abnormal Earnings	-0.002	0.010	0.000	0.018
	(-0.70)	(0.78)	(0.07)	(1.05)
Δ Investment Grade	0.003	-0.013	0.002	-0.007
	(0.18)	(-0.86)	(0.14)	(-0.50)
Δ CP Program	0.003	0.019	0.006	0.011
	(0.32)	(1.60)	(0.71)	(1.08)
CDS Trading	0.015	0.023	0.015	0.018
	(1.95)	(2.30)	(2.38)	(2.28)
Time Fixed Effects	X	X	X	X
Industry Fixed Effects	X	X	X	X
Adj-R^2	0.303	0.266	0.465	0.370
Observations	290	290	290	290

Panel B: Maturity Regression

	Book Leverage		Market Leverage	
	Year t–1 to t	Year t–1 to t+1	Year t–1 to t	Year t–1 to t+1
Δ Leverage	5.412	1.739	2.174	-1.157
	(1.53)	(0.72)	(0.53)	(-0.45)
Δ Asset Maturity	0.209	0.154	0.178	0.165
	(0.81)	(0.78)	(0.67)	(0.82)
Δ Market to Book	-0.004	-0.002	-0.003	-0.001
	(-2.53)	(-1.25)	(-1.88)	(-0.84)
Δ Fixed Asset	0.491	-2.024	0.321	-2.392
	(0.13)	(-0.84)	(0.08)	(-0.99)
Δ Profitability	5.587	7.739	4.952	6.977
	(1.53)	(1.96)	(1.22)	(1.84)
Δ Size	0.763	-0.933	0.901	-0.885
	(0.76)	(-1.10)	(0.86)	(-1.05)
Δ Volatility	2.119	-7.890	0.761	-8.939
	(0.41)	(-1.28)	(0.13)	(-1.48)
Δ Tax Credit	0.977	0.482	-2.097	0.780
	(0.10)	(0.06)	(-0.22)	(0.09)
Δ Loss Carry Forward	-3.987	-4.319	-3.515	-3.870
	(-2.30)	(-2.59)	(-2.03)	(-2.46)
Δ Abnormal Earnings	0.043	-0.283	0.026	-0.240
	(0.29)	(-1.12)	(0.18)	(-1.00)
Δ Investment Grade	-0.538	-0.092	-0.529	-0.117
	(-1.24)	(-0.13)	(-1.21)	(-0.17)
Δ CP Program	0.269	-0.308	0.291	-0.262
	(0.61)	(-0.63)	(0.65)	(-0.54)
CDS Trading	0.641	0.592	0.696	0.656
	(1.86)	(1.52)	(1.96)	(1.66)
Time Fixed Effects	X	X	X	X
Industry Fixed Effects	X	X	X	X
Adj-R^2	0.161	0.079	0.151	0.077

Table 7: Regional Supply Shocks: Within State Debt Defaults

This table presents ordinary least squares (One Equation) and two-stage least squares (Two Equations) regression results of leverage and debt maturity on the explanatory variables in Table 3, plus a local credit market supply shock variable. State Default is the credit market supply shock variable, defined as defined as the dollar value of all defaulted debt by Compustat firms outside of the sample firm's industry and headquartered in the sample firm's state during year t-1, divided by the total book value of debt of all Compustat firms outside of the sample firms industry and headquartered in the state at the beginning of year t-1. State Default × CDS Trading is the credit supply shock and CDS Trading interaction variable. All other variables are defined in Tables 1 and 3. Leverage regression results are shown in Panel A. Results of the Maturity regression are in Panel B. The identifying variables for the leverage equation is Industry Leverage. The identifying variable for the debt maturity equation is Industry Asset Maturity. The regression specification shown in Columns 1, 3, 5 and 7 include time and industry fixed effects. Industry fixed effects and the CDS Traded dummy variable are replaced with firm fixed effects in the specification shown in Columns 2, 4, 6 and 8. Standard errors are clustered at the firm level. The sample is composed of non-financial firms in the S&P 500 index during the 2002-2010 period granting a total of 3168 firm/year observations.

Panel A: Leverage Regression

	Book Leverage				Market Leverage			
	One Equation		Two Equations		One Equation		Two Equations	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Debt Maturity	0.001	0.000	0.005	-0.003	0.000	-0.000	0.002	-0.003
	(1.42)	(0.60)	(0.74)	(-0.49)	(0.75)	(-0.09)	(0.41)	(-0.70)
Industry Leverage	0.366	0.199	0.372	0.207	0.375	0.275	0.379	0.283
	(6.48)	(2.92)	(6.58)	(2.90)	(8.55)	(5.39)	(7.89)	(5.46)
Market to Book	-0.006	-0.013	-0.006	-0.013	-0.030	-0.026	-0.030	-0.026
	(-0.79)	(-2.92)	(-0.76)	(-2.93)	(-5.41)	(-4.11)	(-5.38)	(-4.12)
Fixed Asset	0.095	0.049	0.081	0.049	0.055	0.004	0.049	0.004
	(2.94)	(0.94)	(1.88)	(0.95)	(2.57)	(0.09)	(1.65)	(0.09)
Profitability	0.129	-0.077	0.138	-0.079	-0.076	-0.167	-0.071	-0.169
	(1.78)	(-1.54)	(1.91)	(-1.61)	(-1.74)	(-4.50)	(-1.60)	(-4.55)
Size	-0.023	-0.023	-0.023	-0.023	-0.006	-0.010	-0.006	-0.011
	(-4.37)	(-2.02)	(-4.43)	(-2.07)	(-1.58)	(-1.24)	(-1.63)	(-1.30)
Volatility	-0.060	-0.040	-0.038	-0.055	-0.053	-0.074	-0.043	-0.088
	(-0.55)	(-0.35)	(-0.34)	(-0.47)	(-0.80)	(-1.06)	(-0.65)	(-1.24)
Abnormal Earnings	0.007	0.000	0.007	0.000	0.005	0.002	0.005	0.002
	(1.08)	(0.03)	(1.14)	(0.04)	(0.95)	(0.32)	(0.97)	(0.33)
Tax Credit	0.077	-0.109	0.015	-0.087	0.005	-0.068	-0.023	-0.049
	(0.71)	(-0.71)	(0.10)	(-0.53)	(0.07)	(-0.65)	(-0.19)	(-0.45)
Loss Carry Forward	0.027	0.018	0.024	0.015	0.011	-0.002	0.010	-0.004
	(1.40)	(0.54)	(1.20)	(0.47)	(1.09)	(-0.08)	(0.88)	(-0.16)
Rated	0.111	0.137	0.111	0.140	0.081	0.067	0.081	0.069
	(5.24)	(3.71)	(5.25)	(3.73)	(6.26)	(3.75)	(6.23)	(3.77)
Investment Grade	-0.089	-0.032	-0.093	-0.032	-0.080	-0.034	-0.082	-0.034
	(-7.09)	(-2.96)	(-6.64)	(-2.93)	(-8.44)	(-3.81)	(-7.24)	(-3.78)
CP Program	0.019	0.005	0.026	0.005	0.004	0.003	0.007	0.003
	(2.17)	(1.17)	(1.70)	(1.14)	(0.72)	(0.84)	(0.67)	(0.80)
CDS Traded	0.005		0.001		0.001		-0.000	
	(0.35)		(0.07)		(0.16)		(-0.02)	
CDS Trading	0.052	0.015	0.048	0.017	0.031	0.008	0.029	0.009
	(5.05)	(2.08)	(3.75)	(2.05)	(4.47)	(1.42)	(3.31)	(1.58)
State Defaults	-0.142	-0.087	-0.122	-0.099	-0.058	-0.009	-0.049	-0.020
	(-1.74)	(-1.51)	(-1.36)	(-1.59)	(-1.02)	(-0.22)	(-0.78)	(-0.43)
State Defaults × CDS Trading	0.230	0.234	0.158	0.264	0.147	0.131	0.115	0.157
	(1.83)	(2.49)	(0.93)	(2.30)	(1.69)	(1.81)	(0.92)	(1.88)
Time Fixed Effects	X	X	X	X	X	X	X	X
Industry Fixed Effects	X		X		X		X	
Firm Fixed Effects		X		X		X		X
Clustered SE	X	X	X	X	X	X	X	X
Adj-R^2	0.341	0.794	0.339	0.794	0.537	0.837	0.537	0.838

Panel B: Maturity Regression

	Book Leverage				Market Leverage			
	One Equation		Two Equations		One Equation		Two Equations	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Leverage	1.966	1.072	-10.330	-2.269	0.164	0.046	-16.251	2.757
	(1.02)	(0.65)	(-1.17)	(-0.10)	(0.07)	(0.02)	(-1.52)	(0.19)
Industry Asset Maturity	0.235	0.483	0.294	0.485	0.244	0.484	0.308	0.482
	(1.77)	(2.72)	(2.01)	(2.75)	(1.84)	(2.71)	(2.13)	(2.74)
Market to Book	-0.006	-0.036	-0.145	-0.082	-0.022	-0.049	-0.586	0.025
	(-0.02)	(-0.15)	(-0.56)	(-0.22)	(-0.08)	(-0.20)	(-1.41)	(0.06)
Fixed Asset	1.239	-1.920	2.623	-1.715	1.449	-1.855	2.540	-1.892
	(0.67)	(-0.84)	(1.28)	(-0.63)	(0.78)	(-0.81)	(1.31)	(-0.82)
Profitability	-2.150	-0.517	-0.476	-0.789	-1.868	-0.596	-3.297	-0.099
	(-0.66)	(-0.22)	(-0.15)	(-0.26)	(-0.59)	(-0.24)	(-0.97)	(-0.03)
Size	0.102	-0.401	-0.175	-0.475	0.059	-0.424	-0.020	-0.402
	(0.36)	(-0.76)	(-0.48)	(-0.64)	(0.21)	(-0.82)	(-0.07)	(-0.74)
Volatility	-4.677	-5.069	-5.197	-5.185	-4.757	-5.104	-5.046	-4.939
	(-1.08)	(-1.16)	(-1.22)	(-1.18)	(-1.10)	(-1.18)	(-1.18)	(-1.09)
Abnormal Earnings	-0.050	0.027	0.011	0.026	-0.041	0.027	0.015	0.023
	(-0.25)	(0.18)	(0.05)	(0.17)	(-0.20)	(0.18)	(0.07)	(0.15)
Tax Credit	12.270	6.608	13.679	6.312	12.495	6.515	12.501	6.647
	(1.85)	(0.82)	(1.99)	(0.79)	(1.90)	(0.80)	(1.93)	(0.83)
Loss Carry Forward	0.920	-0.704	1.142	-0.642	0.955	-0.684	1.003	-0.683
	(1.14)	(-0.57)	(1.38)	(-0.50)	(1.20)	(-0.57)	(1.23)	(-0.56)
Rated	-0.402	0.798	1.076	1.271	-0.181	0.947	1.268	0.754
	(-0.43)	(0.74)	(0.80)	(0.39)	(-0.19)	(0.88)	(1.00)	(0.54)
Investment Grade	1.162	0.129	0.002	0.020	0.990	0.096	-0.412	0.191
	(1.90)	(0.20)	(0.00)	(0.02)	(1.57)	(0.14)	(-0.37)	(0.24)
CP Program	-1.839	0.020	-1.592	0.038	-1.800	0.025	-1.701	0.017
	(-4.24)	(0.07)	(-3.49)	(0.13)	(-4.17)	(0.09)	(-3.95)	(0.06)
CDS Traded	0.943		1.059		0.961		1.034	
	(1.35)		(1.50)		(1.38)		(1.48)	
CDS Trading	0.904	0.567	1.564	0.620	1.005	0.584	1.524	0.562
	(1.56)	(1.49)	(2.12)	(1.11)	(1.75)	(1.54)	(2.31)	(1.36)
State Defaults	-4.270	-4.382	-6.388	-4.664	-4.597	-4.472	-5.704	-4.460
	(-0.89)	(-1.59)	(-1.34)	(-1.42)	(-0.95)	(-1.62)	(-1.21)	(-1.62)
State Defaults × CDS Trading	16.979	10.496	20.056	11.237	17.447	10.728	19.820	10.412
	(1.95)	(2.12)	(2.37)	(1.50)	(2.01)	(2.16)	(2.33)	(1.93)
Time Fixed Effects	X	X	X	X	X	X	X	X
Industry Fixed Effects	X		X		X		X	
Firm Fixed Effects		X		X		X		X
Clustered SE	X	X	X	X	X	X	X	X
Adj-R^2	0.124	0.678	0.125	0.678	0.123	0.678	0.126	0.678

Appendix

A: Capital IQ Screen

Alcoa, Inc. (NYSE:AA) > Financials > Capital Structure Details

[<< Return to Capital Structure Summary]

Key Stats | Income Statement | Balance Sheet | Cash Flow | Multiples | Cap. Structure | Ratios | Supplemental | Industry Specific | Pension/OPEB | Segments

Source: A 2008 filed Feb-17-2009

Currency: Reported Currency **Conversion:** Historical Go [More Options >>]

Principal Due in Millions of the reported currency.

FY 2008 Capital Structure As Reported Details

Description	Type	Principal Due (USD)	Coupon Rate	Maturity	Seniority	Secured	Convertible	Repayment Currency
5.375% Notes, due 2013	Bonds and Notes	600.0	5.375%	2013	Senior	No	No	USD
5.55% Notes, due 2017	Bonds and Notes	750.0	5.550%	Feb-01-2017	Senior	No	No	USD
5.72% Notes, due 2019	Bonds and Notes	750.0	5.720%	2019	Senior	No	No	USD
5.87% Notes, due 2022	Bonds and Notes	627.0	5.870%	2022	Senior	No	No	USD
5.9% Notes, due 2027	Bonds and Notes	625.0	5.900%	2027	Senior	No	No	USD
5.95% Notes due 2037	Bonds and Notes	625.0	5.950%	2037	Senior	No	No	USD
6% Notes, due 2012	Bonds and Notes	517.0	6.000%	2012	Senior	No	No	USD
6% Notes, due 2013	Bonds and Notes	750.0	6.000%	2013	Senior	No	No	USD
6.5% Bonds, due 2018	Bonds and Notes	250.0	6.500%	2018	Senior	No	No	USD
6.5% Notes, due 2011	Bonds and Notes	584.0	6.500%	2011	Senior	No	No	USD
6.625% Notes, due 2008	Bonds and Notes	-	6.625%	2008	Senior	No	No	USD
6.75% Bonds, due 2028	Bonds and Notes	300.0	6.750%	2028	Senior	No	No	USD
6.75% Notes, due 2018	Bonds and Notes	750.0	6.750%	2018	Senior	No	No	USD
7.375% Notes, due 2010	Bonds and Notes	511.0	7.375%	2010	Senior	No	No	USD
Alcoa Alumnio S.A. 7.5% Export Notes, due 2008	Bonds and Notes	-	7.500%	2008	Senior	Yes	No	USD
Commercial Paper	Commercial Paper	1,535.0	4.000%	Dec-31-2009	Senior	No	No	USD
Loans - BNDES	Term Loans	100.0	NA	Sep-01-2029	Senior	Yes	No	USD
Medium-Term Notes, due 2009-2013	Bonds and Notes	23.0	7.100%	2009 - 2013	Senior	No	No	USD
Other Debt	Other Borrowings	189.0	NA	-	Senior	No	No	USD
Project Loans - BNDES	Term Loans	196.0	NA	Apr-01-2015	Senior	Yes	No	USD
Project Loans - BNDES	Term Loans	250.0	NA	Apr-01-2015	Senior	Yes	No	USD
Short-Term Accounts Payable Settlement Arrangements with Certain Vendors and Third-party Intermediaries	Other Borrowings	236.0	NA	Dec-31-2008	Senior	No	No	USD
Short-Term Borrowings	Other Borrowings	242.0	NA	Dec-31-2008	Senior	No	No	USD

FY 2007 Capital Structure As Reported Details

Description	Type	Principal Due (USD)	Coupon Rate	Maturity	Seniority	Secured	Convertible	Repayment Currency
5.375% Notes, due 2013	Bonds and Notes	600.0	5.375%	2013	Senior	No	No	USD
5.55% Notes, due 2017	Bonds and Notes	750.0	5.550%	Feb-01-2017	Senior	No	No	USD
5.72% Notes, due 2019	Bonds and Notes	750.0	5.720%	2019	Senior	No	No	USD
5.87% Notes, due 2022	Bonds and Notes	627.0	5.870%	2022	Senior	No	No	USD
5.9% Notes, due 2027	Bonds and Notes	625.0	5.900%	2027	Senior	No	No	USD
5.95% Notes due 2037	Bonds and Notes	625.0	5.950%	2037	Senior	No	No	USD
6% Notes, due 2012	Bonds and Notes	517.0	6.000%	2012	Senior	No	No	USD
6% Notes, due 2013	Bonds and Notes	-	6.000%	2013	Senior	No	No	USD
6.5% Bonds, due 2018	Bonds and Notes	250.0	6.500%	2018	Senior	No	No	USD
6.5% Notes, due 2011	Bonds and Notes	584.0	6.500%	2011	Senior	No	No	USD
6.625% Notes, due 2008	Bonds and Notes	150.0	6.625%	2008	Senior	No	No	USD
6.75% Bonds, due 2028	Bonds and Notes	300.0	6.750%	2028	Senior	No	No	USD
6.75% Notes, due 2018	Bonds and Notes	-	6.750%	2018	Senior	No	No	USD
7.375% Notes, due 2010	Bonds and Notes	511.0	7.375%	2010	Senior	No	No	USD
Alcoa Alumnio S.A. 7.5% Export Notes, due 2008	Bonds and Notes	21.0	7.500%	2008	Senior	Yes	No	USD
Commercial Paper	Commercial Paper	856.0	5.400%	Dec-31-2008	Senior	No	No	USD
Medium-Term Notes, due 2009-2013	Bonds and Notes	43.0	7.100%	2009 - 2013	Senior	No	No	USD
Other Debt	Other Borrowings	200.0	NA	-	Senior	No	No	USD
Short-Term Accounts Payable Settlement Arrangements with Certain Vendors and Third-party Intermediaries	Other Borrowings	314.0	NA	Dec-31-2008	Senior	No	No	USD
Short-Term Borrowings	Other Borrowings	249.0	NA	Dec-31-2008	Senior	No	No	USD

Financial data provided by Capital IQ
A Standard & Poor's Business

Table A.1: Corporate Leverage, Debt Maturity and Credit Default Swaps

Panel A and B present ordinary least squares (One Equation) and two-stage least squares (Two Equations) regression results of annual leverage and debt maturity on various explanatory variables. The specifications are identical to those in Table 3 but the sample is composed only by firms that have a traded CDS during the 2002-2010 sample period. In Columns 3, 4, 7, and 8 both leverage and maturity are treated as endogenous variables and their equations are estimated simultaneously using two stage least squares. The regression specification shown in Columns 1, 3, 5 and 7 include year and industry fixed effects. Industry fixed effects are replaced with firm fixed effects in the specification shown in Columns 2, 4, 6 and 8. All standard errors are clustered at the firm level. The identifying variable for the leverage equation is Industry Leverage. The identifying variable for the debt maturity equation is Industry Asset Maturity. The sample is composed of non-financial firms in the S&P 500 index during the 2002-2010 period granting a total of 1578 firm/year observations.

Panel A: Leverage Regression

	Book Leverage				Market Leverage			
	One Equation		Two Equations		One Equation		Two Equations	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Debt Maturity	-0.001	0.000	-0.002	-0.004	-0.000	-0.000	-0.003	-0.000
	(-0.77)	(0.01)	(-0.44)	(-0.58)	(-1.08)	(-0.38)	(-0.84)	(-0.06)
Industry Leverage	0.345	0.212	0.343	0.230	0.352	0.236	0.347	0.236
	(5.13)	(2.70)	(5.14)	(2.72)	(7.23)	(4.20)	(7.03)	(3.92)
Market to Book	-0.011	-0.014	-0.011	-0.015	-0.049	-0.041	-0.050	-0.041
	(-1.12)	(-2.08)	(-1.15)	(-2.11)	(-8.39)	(-7.18)	(-8.34)	(-7.19)
Fixed Asset	0.113	0.045	0.120	0.046	0.065	0.014	0.076	0.014
	(3.02)	(0.77)	(2.56)	(0.78)	(2.63)	(0.29)	(2.41)	(0.29)
Profitability	0.070	-0.088	0.070	-0.092	-0.075	-0.144	-0.076	-0.144
	(0.76)	(-1.55)	(0.75)	(-1.64)	(-1.32)	(-3.40)	(-1.33)	(-3.42)
Size	-0.025	-0.021	-0.025	-0.021	-0.010	-0.012	-0.010	-0.012
	(-3.86)	(-1.36)	(-3.83)	(-1.36)	(-2.28)	(-1.10)	(-2.28)	(-1.09)
Volatility	0.009	0.036	0.014	0.027	0.042	0.041	0.051	0.040
	(0.06)	(0.21)	(0.10)	(0.16)	(0.47)	(0.42)	(0.56)	(0.42)
Abnormal Earnings	0.019	0.002	0.018	0.002	0.011	-0.000	0.010	-0.000
	(2.85)	(0.47)	(2.41)	(0.40)	(2.24)	(-0.11)	(1.78)	(-0.11)
Tax Credit	0.000	-0.112	0.024	-0.096	-0.030	-0.112	0.005	-0.112
	(0.00)	(-0.70)	(0.18)	(-0.59)	(-0.39)	(-1.01)	(0.05)	(-1.02)
Loss Carry Forward	0.074	0.090	0.069	0.085	0.006	0.052	-0.003	0.052
	(0.87)	(1.48)	(0.82)	(1.39)	(0.11)	(1.11)	(-0.05)	(1.11)
Rated	0.232	0.149	0.237	0.168	0.106	0.038	0.112	0.038
	(8.14)	(3.60)	(7.57)	(3.17)	(3.63)	(1.99)	(3.72)	(1.36)
Investment Grade	-0.069	-0.027	-0.068	-0.026	-0.066	-0.029	-0.063	-0.029
	(-4.65)	(-2.25)	(-4.42)	(-2.06)	(-5.89)	(-2.63)	(-5.26)	(-2.60)
CP Program	0.022	0.008	0.020	0.008	0.010	0.006	0.006	0.006
	(2.45)	(1.69)	(1.59)	(1.65)	(1.61)	(1.69)	(0.66)	(1.67)
CDS Trading	0.054	0.020	0.056	0.023	0.026	0.008	0.030	0.008
	(4.98)	(2.69)	(4.29)	(2.52)	(3.68)	(1.56)	(3.29)	(1.30)
Time Fixed Effects	X	X	X	X	X	X	X	X
Industry Fixed Effects	X		X		X		X	
Firm Fixed Effects		X		X		X		X
Clustered SE	X	X	X	X	X	X	X	X
Adj-R^2	0.404	0.813	0.403	0.813	0.594	0.853	0.594	0.853

Panel B: Debt Maturity Regression

	Book Leverage				Market Leverage			
	One Equation		Two Equations		One Equation		Two Equations	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Leverage	-2.300	0.357	-9.641	9.163	-4.296	-0.863	-15.579	18.665
	(-0.90)	(0.13)	(-0.88)	(0.35)	(-1.23)	(-0.25)	(-1.19)	(0.88)
Industry Asset Maturity	0.373	0.500	0.384	0.503	0.375	0.501	0.388	0.483
	(2.23)	(2.72)	(2.26)	(2.77)	(2.25)	(2.72)	(2.29)	(2.75)
Market to Book	-0.361	-0.099	-0.484	0.043	-0.556	-0.142	-1.167	0.700
	(-0.69)	(-0.24)	(-0.90)	(0.08)	(-1.02)	(-0.33)	(-1.39)	(0.71)
Fixed Asset	0.860	-1.965	1.918	-2.447	0.925	-1.933	1.966	-2.227
	(0.38)	(-0.66)	(0.76)	(-0.73)	(0.42)	(-0.66)	(0.84)	(-0.75)
Profitability	1.317	-0.912	1.845	-0.059	0.723	-1.088	-0.399	2.119
	(0.26)	(-0.30)	(0.37)	(-0.01)	(0.15)	(-0.35)	(-0.08)	(0.45)
Size	-0.113	-0.027	-0.298	0.163	-0.097	-0.045	-0.206	0.185
	(-0.35)	(-0.04)	(-0.67)	(0.17)	(-0.31)	(-0.06)	(-0.58)	(0.23)
Volatility	4.753	-1.903	5.367	-2.343	5.131	-1.830	6.630	-3.087
	(0.63)	(-0.46)	(0.71)	(-0.54)	(0.68)	(-0.44)	(0.88)	(-0.72)
Abnormal Earnings	-0.594	-0.093	-0.484	-0.114	-0.596	-0.093	-0.510	-0.073
	(-1.37)	(-0.31)	(-1.01)	(-0.38)	(-1.37)	(-0.31)	(-1.11)	(-0.24)
Tax Credit	7.826	2.764	8.142	3.630	7.617	2.639	7.328	4.682
	(1.00)	(0.27)	(1.02)	(0.36)	(0.98)	(0.26)	(0.96)	(0.47)
Loss Carry Forward	-3.186	-0.569	-2.696	-1.349	-3.344	-0.491	-3.356	-1.532
	(-0.99)	(-0.22)	(-0.82)	(-0.39)	(-1.03)	(-0.19)	(-1.05)	(-0.53)
Rated	3.478	5.527	5.121	4.155	3.380	5.618	4.478	4.828
	(2.60)	(2.04)	(1.84)	(0.82)	(2.75)	(2.09)	(2.46)	(1.76)
Investment Grade	0.614	0.466	0.082	0.716	0.492	0.430	-0.267	1.010
	(0.77)	(0.57)	(0.07)	(0.67)	(0.60)	(0.52)	(-0.22)	(0.97)
CP Program	-1.298	0.018	-1.126	-0.056	-1.305	0.026	-1.183	-0.099
	(-2.55)	(0.05)	(-2.02)	(-0.14)	(-2.57)	(0.07)	(-2.26)	(-0.26)
CDS Trading	1.267	0.734	1.678	0.560	1.255	0.748	1.562	0.596
	(2.00)	(1.77)	(2.00)	(0.77)	(2.00)	(1.81)	(2.24)	(1.26)
Time Fixed Effects	X	X	X	X	X	X	X	X
Industry Fixed Effects	X		X		X		X	
Firm Fixed Effects		X		X		X		X
Clustered SE	X	X	X	X	X	X	X	X
Adj-R^2	0.120	0.656	0.120	0.656	0.121	0.656	0.122	0.656

Table A.2: Probit Model for CDS Trading

This table presents estimation results of a probit model of CDS Trading on various control variables. The fitted value of the regression is used as an instrumental variable, as described by Wooldrige (2008), in the leverage and maturity equations of Table 5. The variables that identify CDS Trading are amount of agricultural loans and the amount of relative to the total amount of loans of the lead syndicate banks that firms have borrowed money from in the past five years (Lender Agricultural Loans), and the amount of foreign exchange derivatives used for hedging purposes (not trading) relative to the total amount of loans of the lead syndicate banks that firms have borrowed money from in the past five years (Lender Foreign Exchange Derivatives). Time and Industry fixed effects are included in each specification. The sample is composed of non-financial firms in the S&P 500 index during the 2002-2010 period granting a total of 3168 firm/year observations.

	(1)	(2)
Constant	-6.235	-6.152
	(-7.35)	(-7.26)
Industry Asset Maturity	-0.022	-0.023
	(-2.58)	(-2.47)
Industry Book Leverage	1.449	
	(4.16)	
Industry Market leverage		1.205
		(2.83)
Market to Book	-0.238	-0.241
	(-4.17)	(-4.23)
Fixed Asset	0.478	0.541
	(2.26)	(2.57)
Profitability	-2.017	-1.943
	(-3.31)	(-3.20)
Size	0.576	0.577
	(16.73)	(16.80)
Volatility	1.450	1.342
	(1.60)	(1.49)
Abnormal Earnings	0.100	0.098
	(1.03)	(1.02)
Lender Agricultural Loans	-68.792	-68.471
	(-5.20)	(-5.19)
Lender Foreign Currency Derivatives	5.576	5.591
	(4.15)	(4.16)
CP Program	-0.063	-0.063
	(-0.92)	(-0.92)
Tax Credit	-1.497	-1.299
	(-2.06)	(-1.79)
Loss Carry Forward	-0.368	-0.358
	(-0.91)	(-0.89)
Investment Grade	0.546	0.537
	(6.88)	(6.78)
Time Fixed Effects	X	X
Industry Fixed Effects	X	X
Pseudo-R^2	0.275	0.273

Table A.3: CDS Trading and Future Performance

This table presents regression results of various measures of firm performance, measured at time t on CDS Trading and other control variables measured at time $t-1$. The regression specification shown in Columns 1, 3, 5 and 7 include year and industry fixed effects. Columns 2, 4, 6 and 8 include time and firm fixed effects. All standard errors are clustered at the firm level. The sample is composed of non-financial firms in the S&P 500 index during the 2002-2010 period granting a total of 3168 firm/year observations.

	Profitability		Default		Market to Book		Volatility	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Leverage	0.019	0.044	0.882	0.984	0.015	-0.172	-0.002	-0.024
	(1.99)	(2.34)	(3.80)	(3.70)	(0.18)	(-1.09)	(-0.60)	(-2.30)
Debt Maturity	0.000	-0.000	0.001	0.001	0.001	-0.001	-0.000	-0.000
	(0.67)	(-0.48)	(0.31)	(0.26)	(0.53)	(-0.51)	(-2.20)	(-2.31)
Industry Asset Maturity	-0.000	-0.000	0.018	0.027	0.002	0.003	-0.001	-0.001
	(-0.20)	(-0.13)	(1.91)	(1.39)	(0.75)	(0.32)	(-3.13)	(-1.86)
Industry Leverage	-0.007	0.001	0.153	-0.091	-0.128	-0.781	0.017	-0.003
	(-0.48)	(0.02)	(0.46)	(-0.16)	(-0.92)	(-2.40)	(2.21)	(-0.15)
Market to Book	0.018	0.023	-0.150	-0.060	0.753	0.508	0.003	0.003
	(6.93)	(5.65)	(-4.02)	(-1.78)	(34.18)	(8.76)	(2.92)	(1.48)
Fixed Asset	0.022	-0.009	-0.172	-0.193	-0.003	-0.190	0.008	0.042
	(2.87)	(-0.36)	(-0.88)	(-0.56)	(-0.04)	(-0.83)	(2.28)	(3.48)
Profitability	0.643	0.315	-1.025	-1.189	0.535	-0.076	-0.055	-0.115
	(16.77)	(6.78)	(-2.69)	(-2.51)	(2.12)	(-0.27)	(-2.93)	(-3.98)
Size	-0.000	-0.004	-0.174	-0.038	-0.034	-0.177	-0.001	-0.003
	(-0.04)	(-0.66)	(-4.35)	(-0.35)	(-3.63)	(-3.40)	(-1.89)	(-0.86)
Volatility	0.023	-0.071	2.304	0.261	0.342	0.166	0.855	0.592
	(0.50)	(-0.71)	(3.62)	(0.33)	(1.24)	(0.37)	(37.02)	(14.19)
Abnormal Earnings	0.004	0.006	0.031	0.031	-0.016	-0.005	0.000	0.002
	(1.57)	(2.01)	(0.78)	(1.12)	(-0.97)	(-0.26)	(0.04)	(0.88)
Tax Credit	-0.003	-0.042	0.106	-1.037	-0.330	-0.183	-0.003	-0.117
	(-0.18)	(-0.61)	(0.18)	(-1.18)	(-2.03)	(-0.37)	(-0.27)	(-2.51)
Loss Carry Forward	-0.009	0.008	-0.191	0.068	0.013	0.147	-0.004	-0.004
	(-1.72)	(0.83)	(-2.22)	(0.53)	(0.43)	(0.86)	(-2.13)	(-0.24)
Rated	-0.007	-0.008	4.509	3.148	-0.033	0.102	0.002	0.001
	(-1.48)	(-0.58)	(37.19)	(7.46)	(-0.66)	(0.78)	(0.98)	(0.11)
Investment Grade	0.007	-0.004	-1.262	-0.709	0.019	-0.032	-0.004	-0.004
	(2.20)	(-0.65)	(-17.57)	(-8.53)	(0.73)	(-0.61)	(-2.70)	(-1.56)
CP Program	-0.001	-0.005	-0.269	0.058	0.028	-0.017	0.000	0.000
	(-0.40)	(-1.80)	(-5.21)	(1.81)	(1.77)	(-0.72)	(0.02)	(0.39)
CDS Traded	0.004		0.112		0.020		0.003	
	(1.63)		(1.50)		(0.81)		(2.17)	
CDS Trading	-0.002	-0.001	0.048	-0.032	-0.011	-0.016	-0.000	-0.001
	(-1.03)	(-0.18)	(0.80)	(-0.78)	(-0.49)	(-0.49)	(-0.08)	(-0.90)
Time Fixed Effects	X	X	X	X	X	X	X	X
Industry Fixed Effects	X		X		X		X	
Firm Fixed Effects		X		X		X		X
Clustered SE	X	X	X	X	X	X	X	X
Adj-R^2	0.736	0.784	0.760	0.892	0.802	0.828	0.753	0.786