Credit Default Swaps, Financial Distress and Corporate Acquisitions

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ABSTRACT

We show that credit default swap (CDS) firms which are financially distressed are more likely to conduct acquisition investments, and experience higher announcement stock returns and credit rating upgrades around acquisitions. The positive effects of CDS on acquisition outcomes for these firms are attributable to their diversification and commitment benefits, and are more pronounced for CDS acquirers without empty creditors. Additionally, consistent with CDS increasing debt capacity, financially distressed CDS acquirers are more likely to conduct cash acquisitions. We address endogeneity concerns by employing the SEC's 2004 net capital rule exemption for broker-dealers as an exogenous shock to CDS markets.

***JEL Classification*:** G14; G24; G32; G33; G34

***Keywords*:** Credit Default Swaps (CDS); Financial Distress; Mergers and Acquisitions; Endogeneity

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Over the last 20 years, a substantial fraction of the largest US listed firms have experienced the inception of credit default swap (CDS) contracts on their corporate debt.[1] Recent theoretical and empirical work suggests that these contracts may affect the corporate activities of CDS reference firms (henceforth CDS firms). For example, Saretto and Tookes (2013) find that CDS firms have higher leverage and increased debt maturities; Subrahmanyam, Tang, and Wang (2014) provide evidence that CDS firms have higher bankruptcy risk; Martin and Roychowdhury (2015) demonstrate that CDS firms report accounting earnings less conservatively; and Subrahmanyam, Tang, and Wang (2017) show that CDS firms hold higher cash balances.[2]

Theoretical models (Bolton and Oehmke (2011), Campello and Matta (2016), Darst and Refayet (2016), Danis and Gamba (2017), and Wong and Yu (2017)) identify certain benefits from CDS resulting in higher debt capacity and positive effects for shareholders and creditors, which may, however, be outweighed by the threat of "empty creditors"; these are defined as "holders of debt and CDS who no longer have an interest in the efficient continuation of the debtor, and who may push the debtor into inefficient bankruptcy or liquidation" (Bolton and Oehmke (2011)). Whilst this literature explores how CDS affect corporate investment decisions, there is a scarcity of empirical evidence on the subject.[3]

Given that corporate investments constitute a setting in which agency conflicts may arise between shareholders and creditors, analyzing CDS in this context should provide useful insights on how such conflicts are either amplified or ameliorated. Drawing on the theoretical framework of Bolton and Oehmke (2011), the main objective of this study is to empirically

[1] A CDS is similar to an insurance contract on firm debt, whereby a debt protection buyer pays a periodic premium to a debt protection seller, who in the case of a credit event (such as debt-restructuring or liquidity default) will pay the buyer the difference between the nominal and market value of the firm debt. In June 2017, outstanding CDS contracts associated with non-financial firms stood at $2.66 trillion [Source: Bank for International Settlements (Semi-annual OTC derivative statistics, Table D5. Commodity contracts, credit default swaps), https://www.bis.org/statistics/derstats.htm accessed November 2017].

[2] For an extensive review of the CDS literature, see Augustin, Subrahmanyam, Tang, and Wang (2016).

[3] In their review, Augustin et al. (2016) identify empirical testing of these theories as an important avenue for future CDS research.

examine how CDS affect corporate investments. This model predicts that financially distressed CDS firms will conduct more investments relative to financially distressed firms without CDS, via the channel of higher debt capacity,[4] with positive impacts for shareholder wealth and credit risk. However, the positive effects of CDS for financially distressed firms will be less pronounced in the presence of empty creditors.

We focus on mergers and acquisitions (M&As) as the setting for our analysis, and investigate how CDS affects: i) firm propensity to undertake acquisitions; ii) acquirer shareholder wealth; and iii) acquirer credit risk. The reasons for focusing on M&As are fourfold. First, M&As represent the largest and most important corporate investments (Harford and Li (2007)) that a firm can undertake, in which external financing is more prevalent than with capital expenditures (Elsas, Flannery, and Garfinkel (2014)). Second, since M&As increase the credit risk of acquiring firms (Acharya and Johnson (2007), Bessembinder, Kahle, Maxwell, and Xu (2009), and Furfine and Rosen (2011)), they provide a unique context for investigating the ex-ante and ex-post implications of the introduction of credit risk insurance. Third, acquisitions are more likely to intensify the inherent conflicts of interest among shareholders and creditors (Jensen and Meckling (1976), Masulis, Wang, and Xie (2007), Wang and Xie (2009), Bodnaruk and Rossi (2016)), thus providing an ideal setting for exploring the effects of CDS on corporate investments through a modified agency relationship between firm stakeholders.[5] Fourth, acquisitions have identifiable announcement dates, which are critical to our research design and enable us to clearly identify wealth effects via event study analysis, thus facilitating our identification strategy.

We employ a comprehensive sample of US firms over the period 2001-2013 to test our hypotheses. Our first empirical test provides strong support for the hypothesis that for

[4] Uysal (2011) and Harford and Uysal (2014) provide evidence that increased debt capacity leads to higher acquisition investments.

[5] As described below, the presence of CDS contracts has a direct impact on the separation of creditors' control rights from cash flow rights, thus altering the agency relationship between firm creditors and shareholders-debtors with significant implications for shareholder wealth and credit risk.

financially distressed firms the presence of CDS significantly increases acquisition activity relative to financially distressed firms without CDS. In economic terms, financially distressed CDS firms are 13.55% more likely to conduct acquisitions relative to financially distressed firms without CDS. However, the higher propensity is not uniformly distributed across all financially distressed CDS firms, and consistent with Bolton and Oehmke (2011), is driven by those firms which are not subject to the "empty creditor threat". The difference in acquisition propensity between those financially distressed CDS firms not affected by the empty creditor threat and those affected is a substantial 20.20%.

We also address potential concerns for our findings arising from both endogeneity and selection bias in CDS availability. Since acquisitions tend to increase credit risk, acquiring firms are more likely to have CDS initiated on their debt in the post-acquisition period giving rise to reverse causality concerns.[6] Furthermore, creditors with inside information on future acquisition plans may initiate CDS in advance of acquisitions (Acharya and Johnson (2007)) also giving rise to self-selection bias. Finally, unobserved omitted variables may drive both the presence of CDS and the decision to carry out acquisitions. To address these concerns, we employ the Heckman correction method along with a natural experiment-derived instrumental variable (IV) (Angrist and Krueger (1991), Angrist, Graddy, and Imbens (2000), and Angrist and Krueger (2001)) in our models. In particular, we estimate a selection model for the probability of CDS trading on corporate debt, which allows us to construct the inverse Mills ratio and then adjust our baseline results for biases due to selection on unobservable variables (Heckman and Robb (1985)). More specifically, we use an IV for CDS trading which is constructed upon an exogenous shock to investment banks' propensity to buy CDS protection. Our IV is based on the Securities and Exchange Commission (SEC) 2004 net capital rule exemption, which allowed broker-dealers affiliated with major investment banks

[6] 'Credit Default Swaps Come in from the Cold', by Richard Barley, Wall Street Journal, May 5, 2014.

to apply internal credit risk models, which recognized CDS contracts as valid hedges when computing capital requirements. This external intervention is very likely to have increased the CDS availability for firms that had relationships with these investment banks (Colonnello, Efing, and Zucchi (2017) and Colonnello (2017)), without having any plausible reason to believe that it also affected acquisitions. We find that this IV is a highly significant predictor for the inception of CDS trading, assuring the instrument's relevance, and that our results remain robust after controlling for the potential selection bias and endogeneity of CDS trading.

Next, we examine the shareholder and creditor effects of acquisitions by financially distressed CDS firms, measured respectively with cumulative abnormal returns at acquisition announcement, and the change in credit rating between pre- and post-acquisition periods. We find that financially distressed CDS acquirers earn announcement stock returns that are 5.22% higher than financially distressed non-CDS acquirers, translating into a $258 million shareholder gain for a mean-sized financially distressed acquirer. These marginal gains to financially distressed CDS firms depend critically on the lack of empty creditors, which increases stock returns by 7.26%; this translates into an economically substantial $720 million value enhancement for a mean-sized financially distressed CDS acquirer. We find a similar pattern for credit rating effects, whereby financially distressed CDS acquirers are more likely to experience credit rating upgrades post-acquisition relative to financially distressed acquirers without CDS. This pattern again depends on the lack of empty creditor presence. The results hold after controlling for endogeneity concerns and are consistent with the theoretical predictions of Bolton and Oehmke (2011).

Finally, we show that the effects of CDS on acquisition investments are more pronounced for cash financed relative to stock financed acquisitions, consistent with the view that CDS facilitate credit capital market access and lead to increased firm debt capacity.

This paper makes several contributions to the growing literature on CDS and corporate finance outcomes (Saretto and Tookes (2013), Subrahmanyam et al. (2014), Subrahmanyam et al. (2017), Martin and Roychowdhury (2015), Chava, Ganduri, and Ornthanalai (2017), Colonnello et al. (2017), and Colonnello (2017)), focusing particularly on M&As. First, it provides evidence that CDS are associated with real economic effects, by showing that CDS affect positively the acquisition propensity, shareholder wealth, and credit risk of financially distressed firms, and these effects are more pronounced when there is a lack of empty creditors, in support of the theoretical predictions of Bolton and Oehmke (2011). This is important in light of prior empirical studies which, although documenting that CDS firms can raise more external funding, do not identify how this funding is used (Augustin et al. (2016)). In this respect, we more broadly contribute to the literature on the impact of credit market frictions on firm investment (Stiglitz and Weiss (1981), Lemmon and Roberts (2010), Denis and Sibilkov (2010), and Almeida, Campello, Laranjeira, and Weisbenner (2012)).[7, 8]

Second, our findings contribute to the literature that examines the credit risk implications of M&As (Billett, King, and Mauer (2004), Bessembinder et al. (2009), Furfine and Rosen (2011), and Deng, Kang, and Low (2013)). This literature emphasizes that acquisitions lead to credit risk increases, whilst our results suggest that the level of financial distress, and the threat of empty creditors constitute important factors in determining whether acquisitions enhance or diminish the creditworthiness of acquiring firms.

Third, our study contributes to the literature that examines the impact of the separation between creditors' control and cash flow rights (and the associated effect on the relationship

[7] Acquisition investments are shown to be affected negatively by the lack of syndicated bank loan ratings (Sufi (2009)) and credit ratings (Harford and Uysal (2014)); additionally, they are affected by the level of firm credit rating (Aktas, Karampatsas, Petmezas, and Servaes (2017)).

[8] In a related empirical study, Batta and Yu (2017) show that CDS firms are negatively related to debt financing and acquisition investments, a result which they attribute to the empty creditor problem of Bolton and Oehmke (2011). While we also find a negative effect of the empty creditor threat on acquisition investments, our study isolates this effect (as well as financial distress to which the Bolton and Oehmke (2011) model strictly applies); consistent with the model, the net CDS effect on acquisition investments becomes positive.

between creditors and debtors) on different corporate finance outcomes (Chava, and Roberts (2008), Denis and Wang (2014), Nini, Smith, and Sufi (2009), Nini, Smith, and Sufi (2012), and Tan (2013)). These studies examine how conflicts of interest between creditors and debtors affect various firm decisions and firm value. We provide evidence that CDS induced changes to the debtor-creditor relationship have a beneficial impact on the level of acquisition investments, shareholders' wealth, and creditors' risk. In this sense, the presence of CDS can reduce such conflicts of interest and the associated agency costs of debt.

Fourth, our study relates to the literature on the choice of method of payment in acquisitions and particularly to recent studies which show that higher (lower) debt capacity leads to higher (lower) use of cash (stock). For example, Harford, Klasa, and Walcott (2009) and Uysal (2011) use distance from target debt ratio, whilst Karampatsas, Petmezas, and Travlos (2014) use credit ratings as a measure of debt capacity. We contribute to the understanding of the determinants of method of payment by showing that the presence of CDS has an independent positive impact on the likelihood of using cash.

The paper is organized as follows. Section I discusses the testable hypotheses. Section II describes the sample selection and data. Section III presents the empirical findings for the impact of CDS on acquisition propensity, acquirer announcement returns, and acquirer credit rating changes. Section IV presents the results for the impact of CDS on the choice of payment method. Finally, section V concludes the study.

I. Hypotheses Development

A. CDS and Acquisition Investments

In the work of Bolton and Oehmke (2011) the availability of CDS for financially distressed firms expands the set of available investment projects that can receive financing.

The unique channel for this positive effect is debt capacity,[9] which increases for the following two reasons:

(a) Diversification effect: By enabling CDS buyers to transfer credit risk to CDS sellers, CDS reduces creditors' exposure and their regulatory capital requirements, allowing them to extend more credit capital to reference firms (Duffee and Zhou (2001), Norden, Buston, and Wagner (2014), and Shan, Tang, and Yan (2014)), which is referred to as the "diversification benefit" of CDS (Bolton and Oehmke (2011)). In this respect, Hirtle (2009) and Minton, Stulz, and Williamson (2009) find that an increased use of credit derivatives by financial institutions is associated with a greater supply of credit capital.

(b) Commitment effect: A CDS contract partially or fully separates creditors' control rights from their cash flow rights, resulting in a significantly modified agency relationship between debtors and creditors.[10] In particular, according to Hu and Black (2008) and Bolton and Oehmke (2011), hedging with CDS against credit risk alters the creditors' economic interests attached to their debt claims. If the CDS insurance designates a default payment that is proportionally low relative to both the creditors' loss in default and the associated renegotiation surplus,[11] there exists a partial separation of creditors' control rights from their cash flow rights, referred to as "under-insurance". In this case, creditors have incentives to increase the value of the debt claims, implying that the interests of shareholders-debtors and those of creditors are well aligned. This means that in default, creditors tend to favor efficient firm-continuation (debt-restructuring) over inefficient firm-liquidation (bankruptcy filing)

[9] Prior studies (see for instance, Uysal (2011) and Harford and Uysal (2014)) provide evidence that increased debt capacity leads to more acquisitions.

[10] Control rights include enforcement, waiving, modification to the terms of debt contracts, rights to participate in bankruptcy proceedings, and ability to sue company directors and officers under securities and other laws. Cash flow rights include payments of principal and interest.

[11] In general, the renegotiation surplus can be seen as the continuation value of the distressed firm minus any out-of-court debt renegotiation costs. These costs can include direct costs such as fees paid for auditing, legal and investment banking services, and tax liabilities incurred upon the renegotiated debt; additionally, they can include indirect costs such as foregoing profitable investment opportunities due to managerial distraction with the debt renegotiation, and the value of managers' time and effort spent in such dealings.

strategies.[12] In this respect, Bolton and Oehmke (2011) argue that partially CDS insured creditors have stronger bargaining power vis-à-vis shareholders-debtors during any subsequent debt-restructuring relative to non-CDS insured creditors. This suggests that partially-insured CDS creditors, by having relatively stronger bargaining power, will incentivize financially distressed firms to exert greater effort towards wealth increasing economic outcomes, and induce these firms to commit ex ante to a lower probability of strategic default (Bolton and Oehmke (2011) and Danis and Gamba (2017)). This may reduce the cost of debt (Kim (2016) and Danis and Gamba (2017)) and increase debt capacity, which is referred to as the "commitment benefit" of CDS.

Therefore, we predict that financially distressed firms with CDS contracts are more likely to conduct acquisition investments relative to financially distressed firms without CDS contracts (Hypothesis 1a).

B. CDS and the Effects on Shareholders and Creditors

In the model of Bolton and Oehmke (2011), the presence of CDS on financially distressed firms has mainly two distinct benefits for shareholders and creditors. First, CDS insurance allows financially distressed firms to relax their financial constraints and therefore undertake more positive NPV acquisition investments relative to financially distressed firms without CDS insurance, thus benefiting shareholders. Due to the additional positive NPV acquisitions, creditors will also be better off, since they will have higher collateral against their claims, thus also reducing their credit risk. In addition, acquiring firms are able to substitute expensive equity financing with cheap debt financing, thus increasing firm value

[12] Relevant empirical studies demonstrate that in successful debt-restructurings, shareholders and creditors fare better than in bankruptcy filings, since in the former case both parties can share the benefits from the distribution of the renegotiation surplus (Gilson, John, and Lang (1990), Asquith, Gertner, and Scharfstein (1994), Franks and Torous (1994), Betker (1995), Davydenko and Strebulaev (2007), Chen and Strebulaev (2016), and Campello, Ladika, and Matta (2016)).

(Danis and Gamba (2017)).[13] Second, the presence of CDS reduces the risk of strategic default (due to the commitment benefit), and hence increases the ex-ante value of these additional investment projects relative to financially distressed firms without CDS.

Therefore, we predict that financially distressed acquirers with CDS contracts are associated with improved shareholder wealth (Hypothesis 2a) and creditor effects (Hypothesis 3a) relative to financially distressed acquirers without CDS contracts.

C. CDS and the Role of Empty Creditors

The above theory does not, however, apply universally across all financially distressed firms with CDS. Bolton and Oehmke (2011) introduce a third effect (in addition to the diversification and commitment effects) stemming from the degree and type of available CDS insurance. More specifically, if during financial distress the CDS insurance designates a default payment that is proportionally high relative to both the creditors' loss in default and the associated renegotiation surplus, there exists a full separation of the creditors' control rights from their cash flow rights, which is referred to as "over-insurance". In this case, creditors retain their control rights but are fully hedged against the downside risk on the collection of their cash flow rights, thus becoming empty creditors. The creditors now have incentives to act so as to reduce the value of their debt claims by favoring bankruptcy over debt-restructuring strategies, even when the latter would be the most economically efficient choice, implying a misalignment of interests between shareholders-debtors and creditors. That is, when the firm considers renegotiating its debt and the creditors are over-insured (i.e., empty creditors) against their debt claims, debt-restructuring cannot take place even when this strategy maximizes the total economic welfare. The rationale is that in this case the renegotiation surplus is the maximum the firm can offer to CDS protected creditors, which

[13] According to Danis and Gamba (2017), the discount rate of shareholders is higher than the discount rate of creditors due to the tax advantages of debt and the reduction of agency costs due to the disciplinary role of debt.

despite being positive and welfare enhancing is less than the designated CDS bankruptcy payment. Thus, empty creditors do not have the incentive to agree on a successful out-of-court debt-restructuring which would be beneficial for the survival of the firm as a going concern (Bedendo, Cathcart, and El-Jahel (2016), and Danis (2016)). Thus, the combined acquisition benefits of CDS for financially distressed firms should be relatively higher (lower) when the renegotiation frictions are weakened (strengthened) due to the lack (presence) of empty creditors, implying higher (lower) propensity to undertake acquisitions (Hypothesis 1b), higher (lower) stock abnormal returns at the acquisition announcements (Hypothesis 2b), and enhancement (deterioration) of credit quality of the outstanding debt (Hypothesis 3b).[14]

II. Sample and Data

A. Sample Selection

Our initial sample consists of all US publicly listed firms covered on COMPUSTAT/CRSP over the period 2001 to 2013. The starting date is determined by CDS data coverage on the Markit database, a commonly used CDS dealer quote source as used by other recent studies (see, for instance, Subrahmanyam et al. (2014), Danis (2016), Colonnello et al. (2017)). We identify the sample firms with available CDS and their inception date, by matching COMPUSTAT firms to Markit CDS firms using firm CUSIPs from the Markit RED entity files. We exclude firm-year observations for which there is no available Standard and Poor's (S&P) long-term debt rating, in order to reduce the statistical errors from the inclusion of unrated firms, and identify better the sample of firms that are most likely to be affected by the initiation of CDS. Based on the evidence in Saretto and Tookes (2013), the impact of CDS initiation on the increased credit supply is heterogeneous, and takes place

[14] In practical terms, the renegotiation frictions depend on the ex-ante distribution of bargaining power between creditors and debtors, and are directly linked to the contractual terms of CDS contracts (Subrahmanyam et al. (2014), Danis (2016), and Colonnello (2017)), the different types of which are described in section II below.

through public-bond markets (public-debt markets), rather than through bank-loan markets (private-debt markets). Furthermore, Oehmke and Zawadowski ((2015) and (2017)) document tighter links between CDS and bond markets rather than bank-loan markets.[15] In this respect, Faulkender and Petersen (2006) show that credit rating availability is a consistent measure for public-bond market access, and consequently rated firms have significantly more leverage compared to unrated firms. In the context of acquisition investments, Harford and Uysal (2014) use the existence of credit ratings as an indicator for public-bond market access, showing that rated firms are more likely to undertake acquisitions relative to unrated firms. Therefore, we focus on all US publicly listed firms with available S&P long-term debt ratings, and exclude unrated firms to reduce noise in the analysis.

Following previous studies (see, for instance, Harford and Uysal (2014) and Aktas et al. (2017)), we also exclude financial firms (SIC 6000-6999) and regulated utilities (SIC 4900-4999). Our final sample includes 1,727 unique firms (13,302 firm-year observations), comprising 651 CDS firms (5,201 firm-year observations) and 1,076 non-CDS firms (8,101 firm-year observations).

Acquisition data for sample firms are obtained from Thomson Financial SDC Mergers and Acquisitions Database for 2002 through 2014. We define acquisitions to include all completed mergers and acquisitions of target firms that are either, public, private, subsidiaries, majority interest acquisitions, asset acquisitions or acquisitions of certain assets made by public acquirers. To ensure that transactions represent a transfer of control, we require that the acquirer owns less than 50% of target shares prior to the acquisition announcement and seeks to acquire more than 90% after the deal. We also require that transactions are economically meaningful for acquirers, and thus that the deal value is above $1 million and the relative size (transaction value divided by acquirer market value four

[15] In Subrahmanyam et al. (2014) the 92% of the sample firms with available CDS are rated, while in our sample 91% of firms with available CDS are rated.

weeks prior to acquisition announcement) is at least 1%. This screening process identifies 2,730 acquisitions (1,103 of which are by 575 CDS unique acquirers) conducted by 858 unique acquirers.

B. Measure of Empty Creditor (Types of CDS Contracts)

As noted above, the availability of CDS contracts is associated with both positive (diversification and commitment), and negative (empty creditor) effects, and the net effect depends on the trade-off between these opposing effects. In order to disentangle the positive and negative effects, and estimate the net benefits of CDS that are unconfounded by the empty creditor problem, we exploit the heterogeneity in the contractual terms of the CDS contracts outstanding.[16]

In the CDS market there are four types of contracts that are classified by different debt-restructuring clauses, and different definitions of credit events that trigger payments from CDS sellers to CDS buyers: a) Complete Restructuring (CR); b) Modified Restructuring (MR); c) Modified-Modified Restructuring (MM); and d) No-Restructuring (XR). For the CR-, MR-, and MM-clauses, any type of debt-restructuring qualifies as a credit event triggering a payment to the CDS buyers, and their differences lie on the limitations of the deliverable obligations that accompany each clause. For the XR-clauses, debt-restructuring is excluded as a credit event, and hence we expect that XR-contracts will worsen the renegotiation frictions that are associated with the threat of empty creditors. In particular,

[16] A different approach in identifying the presence of empty creditors would be to use the aggregate volume of available CDS contracts (notional amounts outstanding) of every CDS firm in our sample. Since October 31 2008, the Depository Trust and Clearing Corporation (DTCC) publish data on the gross and net notional amounts outstanding in the CDS markets for the 1,000 largest global reference entities. However, the restricted data availability in terms of years and firms (1,000 largest) that are covered in the DTCC database cannot assist us in drawing meaningful statistical inferences, as in our analysis we are interested in financially distressed firms that have a considerably smaller size relative to the firms covered in DTCC. Therefore, using the DTCC data in our analyses is meaningless for two reasons: a) The data are censored and induce a sample selection bias in favor of the largest and more financially solvent firms which in the context of our analysis can lead to limited statistical power and Type II errors; b) The number of CDS firm-year observations with non-missing data (sample size) is small and this can lead to limited statistical power, and both Type I and II errors.

CDS buyers with XR-contracts will not receive any insurance payments in the event of a debt-restructuring and will therefore strongly favor bankruptcy over debt-restructuring procedures in order to trigger CDS default payments.

C. Measure of Financial Distress

The literature provides different measures of financial distress which indicate the likelihood of default. These measures have separate strengths and weaknesses, and are complementary with one another. We therefore attempt to reduce the error from the misidentification of financially distressed firms by constructing a composite financial distress index that is based on the common variation (principal component analysis) of three widely used measures:[17, 18] a) Altman (1968) score; b) Zmijweski (1984) score; and c) Shumway (2001) score. The Altman (1968) and Zmijweski (1984) scores use different accounting variables, while the Shumway (2001) score takes additional market variables into account. Our *financially distressed* variable is an indicator variable that is equal to one for firms that belong to the highest quartile of the estimated first principal component, and zero otherwise.[19]

D. Summary Statistics

Table I provides the yearly breakdown of sample firms, acquisition activity, proportion of CDS, non-CDS, CDS-XR firms, and acquisition activity by CDS, non-CDS, and CDS-XR firms. The proportion of CDS (column (4)) and CDS-XR firms (column (8)) exhibits an increasing trend in the early years of the millennium, reaching a peak - with almost half the sample firms having CDS - in 2007 and 2008, around the emergence of the credit crisis.

[17] See Baker and Wurgler (2006) for a similar discussion and approach in the measurement of investor sentiment and the construction of the associated index.

[18] The increase in the number of financial distress measures, in which signals about the incidence of default are generated and then considered together, enhances the signal-to-noise ratio, and minimizes the error due to the misidentification of financially distressed firms.

[19] We also consider each of the Altman (1968), Zmijweski (1984) and Shumway (2001) scores separately, with no impact on our main inferences.

Since 2008, the proportion of CDS firms has decreased, from 45.64% to 35.08% in 2013. This pattern is consistent with prior literature (see, for example, Subrahmanyam et al. (2014)). The proportion of non-CDS firms (column (6)) is reduced up to year 2007, and then increases for the rest of the sample years. The overall sample is well balanced, with approximately 40% of the firms having CDS and 60% being non-CDS firms, while 30% of the firms hold CDS-XR. Acquisition activity (column (3)) is shown to drop substantially in 2008 and 2009, before subsequently reverting to near pre-crisis levels. The time series pattern of the proportion of acquisitions by CDS (column (5)) and non-CDS (column (7)) reflects both this break in 2008-2009 and a close correlation with the proportion of CDS and non-CDS firms. CDS-XR firms exhibit an increase in acquisition activity up to 2007, some fluctuations in the period between 2008 and 2010, and then a gradual decrease in the rest of the sample years.

[Please Insert Table I About Here]

We report summary statistics on control variables for the overall sample in Table II. The definitions are provided in the Appendix. Our sample is generally representative of previous studies.

[Please Insert Table II About Here]

III. Empirical Analysis

A. CDS and Acquisition Investments

We examine the relation between the presence of CDS and acquisition investments by estimating probit and tobit regression models and controlling for various firm- and industry-characteristics, which prior literature has shown to determine acquisition investments. Table III reports the results of this analysis. To mitigate reverse causality concerns and enhance predictive ability, all independent variables are lagged by one year. All regressions also

control for year- and industry-fixed effects since acquisition activity varies across industry and time (see, for example, Mitchell and Mulherin (1996) and Harford (2005)). We opt not to employ firm-fixed effects for two reasons: a) The cross-sectional (between-firm) variation of *CDS* availability is substantially (3 times) larger than the time-series (within-firm) variation, and applying firm-fixed effects in this context runs the risk of producing inaccurate inferences.[20] b) Since we employ Maximum Likelihood (ML) estimators the inclusion of a large number of firm-fixed effects will induce an incidental parameters problem which can lead to inconsistent estimates (see Greene (2004) for a general discussion).[21] Moreover, we use heteroskedasticity-robust standard errors adjusted for firm level clustering to control for heteroskedasticity and within-cluster correlation of residuals. To ease interpretation we report marginal effects instead of regression coefficients.

In model (1) of Table 3 we run a probit regression where the dependent variable takes the value of one if the firm makes at least one acquisition in a given year, and zero otherwise. Our main variables of interest are the following set of dummy and interactive dummy variables which capture the effect on acquisition propensity relative to the base comparator group of financially healthy firms without CDS:

i) *Financially distressed* which captures the effect of financially distressed firms without CDS;

ii) *CDS*financially distressed* which captures the effect of financially distressed firms with CDS and the three restructuring CDS clauses (CR; MR; and MM);

[20] See Roberts and Whited (2012), Section 7 for a general discussion of these issues; Zhou (2001) for a similar discussion in the case of managerial ownership; Bae and Goyal (2009) in the case of the International Country Risk Guide property rights index; and Aktas et al. (2017) in the case of credit rating levels.

[21] We note however, that our results and main inferences are not affected by the inclusion of firm-fixed or random effects.

iii) *CDS-XR*financially distressed* which captures the effect of financially distressed firms with CDS and the XR CDS clause.[22]

Since Hypothesis 1a requires a direct comparison between *financially distressed* and *CDS*financially distressed;* and Hypothesis 1b requires comparison between *CDS*financially distressed* and *CDS-XR*financially distressed* respectively, rather than with the comparator benchmark, we present one-tailed p-values of Chi-square tests for these differences. In particular:

Hypothesis 1a*: CDS*financially distressed* minus *financially distressed* (presented as (a) - (c) at the bottom of Table III).

Hypothesis 1b*: CDS*financially distressed* minus *CDS-XR*financially distressed* (presented as (a) - (b) at the bottom of Table III).

Specification (1) also includes *credit rating level* and *credit rating level-squared* to control for the non-linear effect of credit ratings on acquisitions, as in Aktas et al. (2017), and other control variables: *size, excess stock return, leverage, profitability, cash holdings, market-to-book, Herfindahl index, and M&A liquidity*. Except for credit rating level and credit rating level-squared, Harford and Uysal (2014) employ similar controls.

The coefficient of *CDS*financially distressed* is a large positive (10.34%) and marginally statistically significant at the 10% level, based on two-tailed *z*-test (statistically significant at the 5% level based on one-tailed *z*-test), whilst the coefficient of *financially distressed* is negative (-3.21%) and statistically significant at the 5% level based on the two-tailed *z*-test. As shown at the bottom of the table ((a) - (c)), consistent with Hypothesis 1a, financially distressed CDS firms have a considerably higher probability of conducting acquisitions (13.55%) relative to financially distressed firms without CDS, a difference which is statistically significant at the 5% level according to the values of the Chi-square test.

[22] For this group of financially distressed firms, for which the likelihood of a strategic default and/or debt restructuring is relatively high, the existence of empty creditors constitutes a threat for the firm survival.

The coefficient of the interaction variable *CDS-XR*financially distressed* measures the negative effects of CDS on acquisition likelihood due to the presence of empty creditors, revealing a large negative (-9.86%) effect, statistically significant at the 1% level. In support of Hypothesis 1b ((a) - (b)), the absence of empty creditors leads financially distressed CDS firms to have a substantial higher probability (20.20%) of conducting acquisitions relative to financially distressed CDS firms that are under the threat of empty creditors; this difference is statistically significant at the 5% level according to the Chi-square test.

Regarding the control variables, there is a negative effect of the *CDS* variable (7.47%) and a positive effect of the *CDS-XR* variable (17.84%) on acquisition likelihood. The former measures the effects of financially healthy firms with CDS and the three restructuring CDS clauses (CR; MR; and MM); the latter measures the effects of XR clauses for financially healthy firms, for which the likelihood of strategic default and/or debt restructuring is low, and thus the empty creditor threat loses its theoretical relevance and practical importance.[23] As far as the remaining control variables, consistent with prior work, firms are more acquisitive when they have a low credit rating (credit rating level variable), high profitability, and high industry M&A volume, and less acquisitive when they are financially distressed and hold a high credit rating (credit rating level-squared variable). The effect of size on acquisition likelihood is negative, consistent with Baghai, Servaes, and Tamayo (2014) and Aktas et al. (2017) who also use a sample of rated firms, but opposite to Harford and Uysal (2014). Thus, the effect of size differs for rated versus unrated firms.[24]

In model (2) we repeat the same exercise with a tobit regression where the dependent variable is the acquisition intensity that is censored at zero (see Harford and Uysal (2014) and

[23] We note at this point that the motives for the introduction of CDS contracts for financially healthy firms are different than those for financially distressed firms, and are related with speculative (arbitrage) motives, and not with hedging motives (Oehmke and Zawadowski (2015) and Oehmke and Zawadowski (2017)). An investigation of these effects is beyond the scope of this study.

[24] We also perform a variance inflation factor test for multicollinearity and find that the correlation between the explanatory variables does not materially affect our estimates.

Aktas et al. (2017) for a similar approach) and report unconditional marginal effects instead of tobit regression coefficients.[25] The dependent variable is the sum of acquisition deal values in a given year scaled by the firm's total assets during the previous year. The tobit regression allows us to investigate whether the probit results for the probability of conducting acquisitions translate also into the actual dollars spent for these acquisitions. The results are indeed highly consistent.

The coefficient of *CDS*financially distressed* has a large positive (2.34%) and marginally statistically significant effect at the 5% level, based on two-tailed *z*-test (marginally statistically significant at the 1% level based on one-tailed *z*-test), while the coefficient of *financially distressed* is negative (-0.82%) and statistically significant at the 5% level based on the two-tailed *z*-test from the regression models (statistically significant at the 1% level based on one-tailed *z*-test). In support of Hypothesis 1a, financially distressed CDS firms spend 3.16% more on acquisitions relative to financially distressed firms without CDS, and this difference is statistically significant at the 1% level according to the values of the *Chi-square* test. The interaction variable *CDS-XR*financially distressed* carries a large negative (-2.80%), and statistically significant coefficient at the 5% level. Therefore, financially distressed CDS firms spend 5.14% more on acquisitions relative to financially distressed CDS firms that are under the threat of empty creditors. This difference is statistically significant at the 5% level.

Overall, the results from the probit and tobit analyses provide evidence that are well aligned with the theoretical predictions of Bolton and Oehmke (2011) and consistent with our Hypotheses 1a and 1b.

[Please Insert Table III About Here]

[25] It is not possible to interpret the regression coefficients of a tobit model in the same way as the OLS coefficients. The tobit regression coefficients capture the marginal effect on the latent variable. To interpret the economic significance, we need to multiply the marginal effect with the probability that an observation becomes uncensored (implying that it becomes positive in our models) (see McDonald and Moffitt (1980)).

B. CDS and Acquisition Investments: Endogeneity

The previous analysis is based on the assumption that the presence of CDS is exogenously determined. It is, however, possible that unobserved omitted variables may confound the relationship between CDS and acquisition investments, and induce a bias in our regression estimates. Moreover, CDS is more likely to be initiated when firms make acquisitions, as acquisitions are related with increases in leverage and credit risk (see, for example, Billett et al. (2004), Bessembinder et al. (2009), and Furfine and Rosen (2011)) giving rise to reverse causality concerns. Furthermore, creditors with inside information on future acquisition plans may initiate CDS in advance of acquisitions (Acharya and Johnson (2007)). In this case, self-selection bias emerges, producing unreliable estimates (Heckman (1979)). We address these concerns by using an IV that is derived from a natural experiment and apply the Heckman two-stage correction method throughout the rest of the paper.

In order to apply the Heckman two-stage approach, the choice of a valid instrument is critical. We require an instrument that satisfies two basic conditions: a) It is a random variable that is jointly independent both from the creditors' decisions to buy and sell CDS contracts, and from the firms' decisions to carry out acquisitions ("exclusion condition"); and b) It is a significant determinant of the creditors' decisions to buy and sell CDS contracts ("relevance condition") (Imbens and Angrist (1994)). Instrumental variables that are derived from natural experiments are the best candidates towards these ends, since they can exploit exogenous government policies that can trigger environmental changes that are similar to a randomized experiment, and therefore satisfy the exclusion condition (Angrist and Krueger (2001)). In that respect we exploit the SEC's 2004 net capital rule exemption for broker-dealers as a source of exogenous variation in CDS availability as in Colonnello et al. (2017) and Colonnello (2017). The net capital rule was initiated in 1975 and is related with the haircuts that can be applied to the market value of the securities that different broker-dealers

hold. The exemption to this rule was introduced in 2004 and authorized the largest broker-dealers to apply their own internal risk models in order to calculate their regulatory capital requirements.

The inception of this regulatory policy contains several features that render it an appropriate instrumental variable. First, the 2004 net capital rule exemption was exogenously introduced to the capital markets by the SEC's decision, and is arguably independent from both the lenders' decisions to buy and sell CDS contracts, and from the managers' decisions to carry out acquisition investments (thus satisfying the exclusion condition).[26]

Second, the 2004 net capital rule exemption allowed the use of several "credit risk transfer" (CRT) instruments for the calculation of capital requirements against derivative-related credit risk, which included CDS contracts. This function of CDS contracts as a credit risk transfer tool that could be used to determine the broker-dealers' regulatory capital requirements has arguably contributed to an increased demand for CDS contracts from the broker dealers who could benefit from this net capital rule change. Moreover, this exemption did not apply uniformly to all broker-dealers, but only to those with "tentative net capital" of more than $5 billion that were categorised as "consolidated supervised entities" (CSEs), which included the five major U.S. investment banks (Bear Sterns, Goldman Sachs, Lehman Brothers, Merrill Lynch, and Morgan Stanley). This suggests that since the inception of the SEC's 2004 policy these five investment banks were more likely to increase their demand for CDS contracts, and initiate new CDS positions against the debt of their borrowers relative to other banks (thus satisfying the relevance condition).

[26] Saretto and Tookes (2013), Subrahmanyam et al. (2014), and Subrahmanyam et al. (2017) who face similar endogeneity concerns in the availability of CDS employ as instrumental variables the lenders' foreign exchange hedging activities, and their tier 1 capital ratios. While it can be argued that these instruments satisfy the exclusion restriction, since they cannot affect directly the main corporate outcome variables (leverage, bankruptcy and cash holdings), it can also be argued that these instruments are still determined endogenously by the creditors' decisions to buy and sell derivative contracts and/or to manage their capital ratios, and therefore cannot be considered akin to truly randomized assignments. We note however, that we have also considered lenders' foreign exchange hedging activities, and tier 1 capital ratios as instrumental variables. The CDS effect is also significant using these two instruments, although these variables are not our first choices for the reasons mentioned above.

Based on these arguments, our instrument for CDS availability is the indicator variable *CSE relationship* which takes the value of one when: a) a CSE has underwritten or extended loans to the sample firm in the previous seven years, and b) the SEC's net capital rule exemption was introduced in the capital markets (from 2004 onwards); and zero otherwise. Given that the endogenous variable, CDS trading, is binary, we use the method proposed by Wooldridge (2002) and applied, among others, by Bharath, Dahiya, Saunders and Srinivasan (2011), Saretto and Tookes (2013), and Subrahmanyam et al. (2014). In the first step, we estimate a probit selection model for the *CDS* variable, where the right-hand-side variables include our instrument *CSE relationship* and the remaining control variables from the models in Table III. Then, based on these probit coefficient estimates, we generate the predicted probability *Pr(CDS)*, and apply this predicted probability as an instrumental variable in a Heckman treatment effects framework by calculating the *Inverse Mills ratio* for the *CDS* variable. We also repeat the same exercise for the *CDS-XR* variable and calculate the *Inverse Mills ratio* accordingly.

Table IV presents the selection models of this analysis. Models (1) and (2) report the probit estimates of the *CDS* selection regressions, and models (3) and (4) report the probit estimates of the *CDS-XR* selection regressions. The variable *CSE relationship* carries the expected positive sign, and is a statistically significant predictor of both the *CDS* and *CDS-XR* variables (models (1) and (3)) at the 1% level. Our instrumental variable *CSE relationship* meets the relevance condition, since the first-stage *F-statistic* in model (1) takes the value of 14.79, while in model (3) it takes the value of 11.93 and both estimates are larger than the conventional threshold value of 10.00 (Staiger and Stock (1997)). The remaining control variables are also interesting, as we observe that low rated and highly leveraged firms have an increased likelihood of becoming CDS referenced entities. Additionally, large firms and firms that operate in more concentrated industries have a higher likelihood of becoming CDS

referenced entities, whereas highly rated firms and firms with good stock market performance are less likely to become CDS referenced entities or have No-Restructuring CDS contracts written on their debt.

In models (2) and (4) we report the probit selection models with the inclusion of *Pr(CDS)* and *Pr(CDS-XR)* as our instrumental variables and we also augment the models by controlling for year-fixed effects. In models (1) and (3) we have not included year-fixed effects, since the construction of the variable *CSE relationship* is strongly conditioned on the yearly introduction of the SEC's 2004 net capital rule exemption, and thus is highly correlated with year-fixed effects (multicollinearity bias). However, an attractive feature of Wooldridge's (2002) model specification is its flexibility in providing more degrees of freedom in terms of the exclusion restrictions that can be applied in the first-stage models. In that respect, we can initially avoid the multicollinearity problems in models (1) and (3) by excluding year-fixed effects, and consequently enhance the predictive ability of models (2) and (4) by including year-fixed effects, without sacrificing the statistical significance and precision of our instrumental variables. This is indeed the case, since in both models (2) and (4) the Pseudo R-squared values increase after the inclusion of year-fixed effects, and the new instrumental variables *Pr(CDS)* and *Pr(CDS-XR)* satisfy the relevance condition, as long as the values of the corresponding *F-statistics* are significantly large and well beyond the conventional threshold value of 10.00.

[Please Insert Table IV About Here]

In Table V we present our baseline acquisition investment models after adjusting for endogeneity and selection bias with the Heckman correction method. Models (1) and (2) contain the same control variables as models (1) and (2) in Table III, and additionally include

the control function variables *Inverse Mills CDS* and *Inverse Mills CDS-XR*.[27] The results from the probit estimates in model (1) reveal that financially distressed CDS firms have a 12.60% higher probability of conducting acquisitions relative to financially distressed firms without CDS, which is statistically significant at the 5%. In the absence of empty creditors, financially distressed CDS firms have a substantial 20.09% higher probability of conducting acquisitions relative to financially distressed CDS firms that are under the threat of empty creditors, and this difference is statistically significant at the 5% level. Likewise, the results from the tobit regression estimates in model (2) show that financially distressed CDS firms spend 3.07% more on acquisitions relative to financially distressed firms without CDS, and this difference is statistically significant at the 5% level. Additionally, financially distressed CDS firms that are not threatened by the presence of empty creditors spend 5.87% more on acquisitions relative to financially distressed CDS firms that are threatened by the presence of empty creditors, and this difference is statistically significant at the 5% level. The signs and significance of the remaining control variables are similar to those in Table III, whilst the control function variables *Inverse Mills CDS* and *Inverse Mills CDS-XR* are not statistically significant, indicating that endogeneity biases do not constitute a major hurdle in drawing valid inferences from our regressions.

[Please Insert Table V About Here]

As an alternative test to validate the robustness of our results to omitted variable bias, we employ the sensitivity analysis method proposed by Oster (2016), which assesses the sensitivity of treatment effects to the inclusion of time varying and time invariant unobserved confounders. We estimate the bias-adjusted effect of *CDS*financially distressed* and *CDS-XR*financially distressed* on acquisition investments under different assumptions about the importance of the unobservable relative to the observable variables (the importance can vary

[27] See Wooldridge (2015) for a general discussion on how to deal with the endogeneity of nonlinear binary endogenous explanatory variables (EEV) (i.e., interaction terms) in applied econometrics.

from 0 to 1), and compare them to the effects reported in Table III (untabulated). In all the different scenarios, the coefficients of *CDS*financially distressed* and *CDS-XR*financially distressed* move further away from zero (*CDS*financially distressed* is more positive and *CDS-XR*financially distressed* is more negative), and the set of bias-adjusted coefficients does not contain a zero effect within its intervals. These results further attest to the robustness of our findings.

C. CDS and Acquirer Stock Abnormal Returns

In this section we examine the relation between CDS and acquirer announcement stock abnormal returns (Hypotheses 2a and 2b). We estimate cumulative abnormal returns (CARs) for the five-day period (-2, +2) where 0 is the announcement day as in Golubov, Petmezas, and Travlos (2012). The returns are calculated using the market model with the parameters estimated over the 240 to 41 day period prior to the acquisition announcement. The CRSP value-weighted index return is the market return.[28] Consistent with the literature (see, for example, Moeller, Schlingemann, and Stulz (2007) and Aktas et al. (2017)), the average (median) CAR is a significantly positive 0.79% (0.52%).

Table VI presents the results of the OLS regression analysis. Following the extant literature, we include a set of firm- and deal-specific characteristics as control variables together with year- and industry-fixed effects. Particularly, we include all the variables used in the previous analysis as well as deal-specific variables which prior literature has shown to affect acquirer announcement returns: *public* deals, *hostile* deals, *tender offer*, *stock* deals, *cross border*, *diversifying* deals and *relative size*. The *t*-statistics (reported in parentheses) are adjusted for heteroskedasticity and acquiring firm clustering.

[28] We also use alternative estimation methodologies (i.e., market-adjusted and equally weighted index returns), none of which materially change our results.

The coefficient of the *CDS*financially distressed* is a large positive 4.52% and statistically significant at the 5% level, based on two-tailed *t*-test (statistically significant at the 1% level based on one-tailed *t*-test). Additionally, financially distressed CDS firms experience a 5.22% increase in shareholder value relative to financially distressed firms without CDS and this value increase is statistically significant at the 1% level. Economically, this translates into a $258 million shareholder gain for a mean-sized financially distressed acquirer.[29] This supports Hypothesis 2a. Furthermore, financially distressed CDS firms experience a 7.26% increase in shareholder value relative to financially distressed CDS firms that are under the threat of empty creditors, and this value difference is statistically significant at the 5% level, in support of Hypothesis 2b. In economic terms, this translates into a $720 million shareholder gain for an average sample size financially distressed CDS acquirer. The signs and statistical significance of the remaining control variables are consistent with prior M&A literature, whilst the variable *Inverse Mills CDS* is positive and statistically significant at the 10% level.

[Please Insert Table VI About Here]

D. CDS and Change in Acquirer Credit Risk

In this section we examine the association between CDS and acquirer changes in credit rating levels (Hypotheses 3a and 3b). *ΔRating Level* is the change in the acquirer's credit rating level over the period *t-1* to *t+1* (3-year period) where year *t* is the year of acquisition. This measure is motivated by Molina (2005), Avramov, Chordia, Jostova and Philipov (2009), Furfine and Rosen (2011), Subrahmanyam et al. (2014), and Aktas et al. (2017) who employ credit rating changes to estimate changes in firm credit risk.

[29] The mean size of a financially distressed acquirer is $4,933 million, and the mean size of a financially distressed CDS acquirer is $9,911 million.

Table VII presents the results of a second-difference ordered probit regression. Our specifications control for differences in firm characteristics that can affect the change in credit rating levels between the pre- and post-acquisition periods, such as changes in firm size, excess return, leverage, profitability, cash holdings, market-to-book, interest coverage, standard deviation of returns, volatility of profitability, convertible debt, capex, property, plant and equipment, and year- and industry-fixed effects.[30]

The coefficient estimate of the variable *CDS*financially distressed* is positive and marginally statistically significant at the 5% level, based on two-tailed *z*-test (marginally statistically significant at the 1% level based on one-tailed *z*-test). This suggests that after controlling for changes in their characteristics, financially distressed CDS acquirers undertake deals that lead to improved credit ratings in the post-acquisition period. The coefficient for the variable *financially distressed* is negative and statistically significant at the 1% level, which implies that financially distressed acquirers conduct deals that lead to downgrades in the post-acquisition period. Consistent with Hypothesis 3a, financially distressed CDS firms have a higher likelihood of experiencing credit risk improvements compared to financially distressed firms without CDS, and this is statistically significant at the 1% level. Consistent with Hypothesis 3b, when the threat posed by the presence of empty creditors is not primary, financially distressed CDS firms have a higher likelihood of credit rating upgrades relative to financially distressed CDS firms that are under the threat of empty creditors, and this difference is statistically significant at the 1% level.

The impact of control variables is consistent with the literature. Acquirers experience improvements in their credit rating status when they are larger, have higher profitability, market-to-book value, cash holding, convertible debt and capital expenditures. On the other

[30] See for example, Blume, Lim, and MacKinlay (1998), Baghai et al. (2014), and Aktas et al. (2017) for the economic rationale behind the choice of these variables.

hand, acquirers experience deteriorations in credit ratings when they have higher leverage, idiosyncratic risk, and volatility in operating profitability.

[Please Insert Table VII About Here]

Collectively, the results from sections III.C and III.D provide strong support for Hypotheses 2a, 2b, 3a, and 3b, indicating that the availability of CDS for financially distressed firms generates benefits for both shareholders and creditors, and that these benefits are most pronounced when the empty creditor threat is not a first-order concern for these firms.

IV. CDS and Cash versus Stock Acquisition Investments

Finally, in order to provide further insights for the validity of our hypotheses, we examine the impact of CDS on acquisition investments by taking into account the heterogeneity in the choice of payment method. Hypothesis 1a predicts that financially distressed firms with available CDS contracts are more likely to conduct acquisition investments relative to financially distressed firms without CDS contracts, and the main channel for this effect is increased debt capacity. It is generally known that firms with better debt capacity have a higher likelihood of using cash versus stock as the method of payment for acquisition, since these firms can access the credit markets more easily and negotiate their debt contracts under favorable terms (Martin (1996), Faccio and Masulis (2005), Harford et al. (2009), and Karampatsas et al. (2014)). This documented relationship between debt capacity and cash acquisitions, can help us to support the validity of Hypothesis 1a and Hypothesis 1b since we expect financially distressed CDS firms to benefit from increased

debt capacity (due to diversification and commitment benefits), and therefore to be more likely to use cash versus stock as the method of payment.[31]

In Table VIII we present the results of an ordered probit regression model in which the dependent variable equals zero for no acquisition, one for 100% stock-financed acquisitions, and two for 100% cash-financed acquisitions. The variable *CDS*financially distressed* is positive and statistically significant at the 10% level, based on two-tailed *z*-test (statistically significant at the 5% level based on one-tailed *z*-test), while the variable *CDS-XR*financially distressed* is negative and statistically significant at the 1% level based on two-tailed *z*-test. Therefore financially distressed CDS firms have a substantially higher likelihood of conducting cash acquisitions relative to financially distressed firms without CDS. Additionally, in the absence of empty creditors financially distressed CDS firms have a substantially higher likelihood of undertaking cash acquisitions relative to financially distressed CDS firms which are under the threat of empty creditors, a difference that is statistically significant at the 1% level. These results are consistent with CDS generating benefits through the enhanced debt capacity of CDS referenced firms, and further attest to the validity of Hypotheses 1a and 1b.

[Please Insert Table VIII About Here]

V. Conclusion

This study investigates the impact of credit default swaps (CDS) in the context of corporate acquisitions. Consistent with the predictions of the theoretical model of Bolton

[31] The source of accumulated cash is beyond the scope of this analysis. The purpose of our analysis is to highlight that, irrespective of the source of cash (existing internal cash/cash raised externally) financially distressed CDS firms are more inclined to use cash versus stock, when they decide how to acquire another company due to their better access to the credit markets. The introduction of CDS for financially distressed firms has both ex-ante and ex-post implications; hence, for example firms can choose to use internal cash to conduct acquisitions based on their expectations of an easy access to external financing in the future, or can choose to raise external financing to conduct acquisitions when there is lack of internal cash, or the cost of external financing is lower than the cost of internal financing.

and Oehmke (2011), we provide evidence that financially distressed rated firms with available CDS contracts are more likely to conduct acquisition investments relative to financially distressed rated firms without available CDS contracts, which we attribute to a CDS related increase in debt capacity due to diversification and commitment benefit effects. We also show that there are negative effects associated with the introduction of CDS contracts for financially distressed firms when the threat of empty creditors is a primary concern for these firms. Additionally we show that financially distressed acquirers with available CDS experience higher announcement stock returns and higher credit ratings as compared to financially distressed acquirers without available CDS, and that these positive effects are more pronounced when the threat of empty creditors is a not primary concern for these acquirers. All these results hold after we address endogeneity concerns by using an exogenous shock to CDS markets. Finally, we find that financially distressed firms with available CDS are more likely to undertake cash acquisition investments, which again supports the notion that CDS increase debt capacity.

Overall, the results presented in this study indicate that CDS contracts are not redundant securities, but instead have real economic effects. Additionally, our findings have important implications for the policy debate on the broader welfare effects of the CDS market. In particular, it has been suggested that the increase in leverage associated with CDS (Saretto and Tookes (2013)) may not result in welfare benefits if it leads to inefficiently high precautionary cash holdings rather than an increase in investment (Subrahmanyam et al. (2017)). The evidence from this paper suggests that the availability of CDS is a mixed blessing. On the one hand, in the absence of empty creditors, financially distressed firms with available CDS undertake more acquisition investments that pay off for both shareholders and creditors. On the other hand, in the presence of empty creditors, financially distressed firms with available CDS undertake fewer

acquisition investments that impair the wealth of shareholders and creditors. Therefore, despite recent criticism against CDS, our results do not justify indiscriminate policy restrictions on the use of all CDS contracts, but rather these policies should be eclectic and discriminate well the positive from the negative effects of CDS before their actual implementation.

REFERENCES

Acharya, Viral V., and Timothy C. Johnson, 2007, Insider trading in credit derivatives, *Journal of Financial Economics* 84, 110–141.

Aktas, Nihat, Nikolaos Karampatsas, Dimitris Petmezas, and Henri Servaes, 2017, Credit ratings and acquisitions, Working Paper, WHU Otto Beisheim School of Management, University of Surrey, and London Business School, CEPR and ECGI.

Almeida, Heitor, Murillo Campello, Bruno Laranjeira, and Scott Weisbenner, 2012, Corporate debt maturity and the real effects of the 2007 credit crisis, *Critical Finance Review* 1, 3–58.

Altman, Edward I., 1968, Financial ratios, discriminant analysis and the prediction of corporate bankruptcy, *Journal of Finance* 23, 589–609.

Angrist, Joshua D., and Alan B. Krueger, 1991, Does compulsory school attendance affect schooling and earnings? *Quarterly Journal of Economics* 106, 979–1014.

Angrist, Joshua D., and Alan B. Krueger, 2001, Instrumental variables and the search for identification: From supply and demand to natural experiments, *Journal of Economic Perspectives* 15, 69–85.

Angrist, Joshua D., Kathryn Graddy, and Guido W. Imbens, 2000, The interpretation of instrumental variables estimators in simultaneous equations models with an application to the demand for fish, *Review of Economic Studies* 67, 499–527.

Asquith, Paul, Robert Gertner, and David Scharfstein, 1994, Anatomy of financial distress: An examination of junk-bond issuers, *Quarterly Journal of Economics* 109, 625–658.

Augustin, Patrick, Marti G. Subrahmanyam, Dragon Y. Tang, and Sarah Q. Wang, 2016, Credit default swaps: Past, present, and future, *Annual Review of Financial Economics* 8, 1–25.

Avramov, Doron, Tarun Chordia, Gerdana Jostova, and Alexander Philipov, 2009, Dispersion in analysts' earnings forecasts and credit rating, *Journal of Financial Economics* 91, 83-101.

Bae, Kee-Hong, and Vidhan Goyal, 2009, Creditor rights, enforcement, and bank loans, *Journal of Finance* 64, 823–860.

Baghai, Ramin, Henri Servaes, and Ane Tamayo, 2014, Have rating agencies become more conservative? Implications for capital structure and debt pricing, *Journal of Finance* 69, 1961–2005.

Baker, Malcolm, and Jeffrey Wurgler, 2006, Investor sentiment and the cross-section of stock returns, *Journal of Finance* 61, 1645–1680.

Batta, George, and Fan Yu, 2017, Credit derivatives and firm investment, Working Paper, Claremont McKenna College.

Bedendo, Mascia, Lara Cathcart, and Lina El-Jahel, 2016, Distressed debt restructuring in the presence of credit default swaps, *Journal of Money, Credit and Banking* 48, 165–201.

Bessembinder, Hendrik, Kathleen M. Kahle, William F. Maxwell, and Danielle Xu, 2009, Measuring abnormal bond performance, *Review of Financial Studies* 22, 4219–4258.

Betker, Brian L., 1995, Management's incentives, equity's bargaining power, and deviations from absolute priority in Chapter 11 bankruptcies, *Journal of Business* 68, 161–183.

Bharath, Sreedhar T., Sandeep Dahiya, Anthony Saunders, and Anand Srinivasan, 2011, Lending relationships and loan contract terms, *Review of Financial Studies* 24, 1141–1203.

Billett, Matthew T., Tao-Hsien Dolly King, and David C. Mauer, 2004, Bondholder wealth effects in mergers and acquisitions: New evidence from the 1980s and 1990s, *Journal of Finance* 59, 107–135.

Blume, Marshall E., Felix Lim, and A. Craig Mackinlay, 1998, The declining credit quality of U.S. corporate debt: Myth or reality? *Journal of Finance* 53, 1389–1413.

Bodnaruk, Andriy, and Marco Rossi, 2016, Dual ownership, returns, and voting in mergers, *Journal of Financial Economics* 120, 58–80.

Bolton, Patrick, and Martin Oehmke, 2011, Credit default swaps and the empty creditor problem, *Review of Financial Studies* 24, 2617–2655.

Campello, Murillo, Tomislav Ladika, and Rafael Matta, 2016, Renegotiation or bankruptcy? The effects of out-of-court costs on distress resolution, Working Paper, Cornell University and University of Amsterdam

Campello, Murillo, and Rafael Matta, 2016, Credit default swaps, firm financing and the economy, Working Paper, Cornell University and University of Amsterdam.

Chava, Sudheer, Rohan Ganduri, and Chayawat Ornthanalai, 2017, Are credit ratings still relevant? Working Paper, Georgia Institute of Technology, Emory University, and University of Toronto.

Chava, Sudheer, and Michael R. Roberts, 2008, How does financing impact investment? The role of debt covenants, *Journal of Finance* 63, 2085–2121.

Chen, Zhiyao, and Ilya A. Strebulaev, 2016, Bargaining power, business cycle and levered equity risk, Working Paper, Stanford University.

Colonnello, Stefano, Matthias Efing, and Francesca Zucchi, 2017, Empty creditors and strong shareholders: The real effects of credit risk trading, Working Paper, Swiss Finance Institute.

Colonnello, Stefano, 2017, Internal governance and creditor governance: Evidence from credit default swaps, Working Paper, Halle Institute for Economic Research.

Danis, Andreas, 2016, Do empty creditors matter? Evidence from distressed exchange offers, *Management Science* 63, 1285–1301.

Danis, Andreas, and Andrea Gamba, 2017, The real effects of credit default swaps, *Journal of Financial Economics*, Forthcoming.

Darst, R. Matthew, and Ehraz Refayet, 2016, Credit default swaps in general equilibrium: Spillovers, credit spreads, and endogenous default, Working Paper, Board of Governors of the Federal Reserve System.

Davydenko, Sergei A., and Ilya A. Strebulaev, 2007, Strategic actions and credit spreads: An empirical investigation, *Journal of Finance* 63, 2633–2671.

Deng, Xin, Jun-koo Kang, and Buen Sin Low, 2013, Corporate social responsibility and stakeholder value maximization: Evidence from mergers, *Journal of Financial Economics* 110, 87–109.

Denis, David J., and Valeriy Sibilkov, 2010, Financial constraints, investment, and the value of cash holdings, *Review of Financial Studies* 23, 247–269.

Denis, David J., and Jing Wang, 2014, Debt covenant renegotiations and creditor control rights, *Journal of Financial Economics* 113, 348–367.

Duffee, Gregory R., and Chunsheng Zhou, 2001, Credit derivatives in banking: Useful tools for managing risk? *Journal of Monetary Economics* 48, 25–54.

Elsas, Ralf, Mark J. Flannery, Jon A. Garfinkel, 2014, Financing major investments: Information about capital structure decisions, *Review of Finance* 18, 1341–1386.

Faccio, Mara, and Ronald W. Masulis, 2005, The choice of payment method in european mergers and acquisitions, *Journal of Finance* 60, 1345–1388.

Faulkender, Michael W., and Mitchell A. Petersen, 2006, Does the source of capital affect capital structure? *Review of Financial Studies* 19, 45–79.

Franks, Julian R., and Walter N. Torous, 1994, A comparison of financial recontracting in distressed exchanges and chapter 11 reorganizations, *Journal of Financial Economics* 35, 349–370.

Furfine, Craig H., and Richard R. Rosen, 2011, Mergers increase default risk, *Journal of Corporate Finance* 17, 832–849.

Gilson, Stuart C., Kose John, and Larry H. P. Lang, 1990, Troubled debt restructurings, *Journal of Financial Economics* 27, 315–353.

Golubov, Andrey, Dimitris Petmezas, and Nickolaos G. Travlos, 2012, When it pays to pay your investment banker: New evidence on the role of financial advisors in M&As, *Journal of Finance* 67, 271–312.

Greene, William, 2004, The behavior of the maximum likelihood estimator of limited dependent variable models in the presence of fixed effects, *Econometrics Journal* 7, 98–119.

Harford, Jarrad, 2005, What drives merger waves? *Journal of Financial Economics* 77, 529–560.

Harford, Jarrad, Sandy Klasa, and Nathan Walcott, 2009, Do firms have leverage targets? Evidence from acquisitions, *Journal of Financial Economics* 93, 1–14.

Harford, Jarrad, and Kai Li, 2007, Decoupling CEO wealth and firm performance: The case of acquiring CEOs, *Journal of Finance* 62, 917–949.

Harford, Jarrad, and Vahap B. Uysal, 2014, Bond market access and investment, *Journal of Financial Economics* 112, 147–163.

Heckman, James J., 1979, Sample selection bias as a specification error, *Econometrica* 47, 153–161.

Heckman, James J., and Richard Robb, 1985, Alternative methods for evaluating the impact of interventions: An overview, *Journal of Econometrics* 30, 239–267.

Hirtle, Beverly, 2009, Credit derivatives and bank credit supply, *Journal of Financial Intermediation* 18, 125–150.

Hu, Henry T.C., and Bernard Black, 2008, Debt, equity, and hybrid decoupling: Governance and systemic risk implications, *European Financial Management* 14, 663–709.

Imbens, Guido W., and Joshua D. Angrist, 1994, Identification and estimation of local average treatment effects, *Econometrica* 62, 467–475.

Jensen, Michael C., and William H. Meckling, 1976, Theory of the firm: Managerial behavior, agency costs and ownership structure, *Journal of Financial Economics* 3, 305–360.

Karampatsas, Nikolaos, Dimitris Petmezas, and Nickolaos G. Travlos, 2014, Credit ratings and the choice of payment method in mergers and acquisitions, *Journal of Corporate Finance* 25, 474–493.

Kim, Gi H., 2016, Credit derivatives as a commitment device: Evidence from the cost of corporate debt, *Journal of Banking and Finance* 73, 67–83.

Lemmon, Michael, and Michael R. Roberts, 2010, The response of corporate financing and investment to changes in the supply of credit, *Journal of Financial and Quantitative Analysis* 45, 555–587.

Martin, Kenneth J., 1996, The method of payment in corporate acquisitions, investment opportunities, and management ownership, *Journal of Finance* 51, 1227–1246.

Martin, Xiumin, and Sugata Roychowdhury, 2015, Do financial market developments influence accounting practices? Credit default swaps and borrowers' reporting conservatism, *Journal of Accounting and Economics* 59, 80–104.

Masulis, Ronald W., Cong Wang, and Fei Xie, 2007, Corporate governance and acquirer returns, *Journal of Finance* 62, 1851–1889.

McDonald, John F., and Robert A. Moffitt, 1980, The uses of tobit analysis, *Review of Economics and Statistics* 62, 318–321.

Minton, Bernadette, René Stulz, and Rohan Williamson, 2009, How much do banks use credit derivatives to hedge loans? *Journal of Financial Services Research* 35, 1–31.

Mitchell, Mark L., and J. Harold Mulherin, 1996, The impact of industry shocks on takeover and restructuring activity, *Journal of Financial Economics* 41, 193–229.

Moeller, Sarah B., Frederik P. Schlingemann, and René M. Stulz, 2007. How do diversity of opinion and information asymmetry affect acquirer returns, *Review of Financial Studies* 20, 2047–2078.

Molina, Carlos A., 2005, Are firms underleveraged? An examination of the effect of leverage on default probabilities, *Journal of Finance* 60, 1427–1459.

Nini, Greg, David Smith, and Amir Sufi, 2009, Creditor control rights and firm investment policy, *Journal of Financial Economics* 92, 400–420.

Nini, Greg, David Smith, and Amir Sufi, 2012, Creditor control rights, corporate governance, and firm value, *Review of Financial Studies* 25, 1713–1761.

Norden, Lars, Consuelo Silva Buston, and Wolf Wagner, 2014, Financial innovation and bank behavior: Evidence from credit markets, *Journal of Economic Dynamics and Control* 43, 130–145.

Oehmke, Martin, and Adam Zawadowski, 2015, Synthetic or real? The equilibrium effects of credit default swaps on bond markets, *Review of Financial Studies* 28, 3303–3337.

Oehmke, Martin, and Adam Zawadowski, 2017, The anatomy of the CDS market, *Review of Financial Studies*, Forthcoming.

Oster, Emily, 2016, Unobservable selection and coefficient stability: Theory and validation, forthcoming, *Journal of Business and Economics Statistics*, Forthcoming.

Roberts, Michael R., and Toni M. Whited, 2012, Endogeneity in empirical corporate finance, in George Constantinides, Milton Harris, and Rene Stulz, eds. *Handbook of the Economics of Finance* Volume 2, Elsevier.

Saretto, Alessio, and Heather Tookes, 2013, Corporate leverage, debt maturity and credit supply: The role of credit default swaps, *Review of Financial Studies* 26, 1190–1247.

Shan, Susan C., Dragon Y. Tang, and Hong Yan, 2014, Did CDS make banks riskier? The effects of credit default swaps on bank capital and lending, Working Paper, Shanghai Advanced Institute of Finance, University of Hong Kong, and University of South Carolina.

Shumway, Tyler, 2001, Forecasting bankruptcy more accurately: A simple hazard model, *Journal of Business* 74, 101–124.

Staiger, Douglas, and James H. Stock, 1997, Instrumental variables regression with weak instruments, *Econometrica* 65, 557–586.

Stiglitz, Joseph E., and Andrew Weiss, 1981, Credit rationing in markets with imperfect information, *American Economic Review* 71, 393–410.

Subrahmanyam, Marti G., Dragon Y. Tang, and Sarah Q. Wang, 2014, Does the tail wag the dog? The effect of credit default swaps on credit risk, *Review of Financial Studies* 27, 2927–2960.

Subrahmanyam, Marti G., Dragon Y. Tang, and Sarah Q. Wang, 2017, Credit default swaps, exacting creditors and corporate liquidity management, *Journal of Financial Economics* 124, 395–414.

Sufi, Amir, 2009, The real effects of debt certification: Evidence from the introduction of bank loan ratings, *Review of Financial Studies* 22, 1659–1691.

Tan, Liang, 2013, Creditor control rights, state of nature verification, and financial reporting conservatism, *Journal of Accounting and Economics* 55, 1–22.

Uysal, Vahap B., 2011, Deviation from the target capital structure and acquisition choices, *Journal of Financial Economics* 102, 602–620.

Wang, Cong, and Fei Xie, 2009, Corporate governance transfer and synergistic gains from mergers and acquisitions, *Review of Financial Studies* 22, 829–858.

Wong, Tak-Yuen, and Jin Yu, 2017, Credit default swaps and debt overhang, Working Paper, Shanghai University of Economics and Finance and Monash University.

Wooldridge, Jeffrey M., 2002, Econometric analysis of cross-section and panel data, MIT Press.

Wooldridge, Jeffrey M., 2015, Control function methods in applied econometrics, *Journal of Human Resources* 50, 420–445.

Zhou, Xianming, 2001, Understanding the determinants of managerial ownership and the link between ownership and performance: comment, *Journal of Financial Economics* 62, 559–571.

Zmijewski, Mark E., 1984, Methodological issues related to the estimation of financial distress prediction models, *Journal of Accounting Research* 22, 59–82.

Appendix A. Variable Definitions

Dependent Variables

Acquisition likelihood: Binary variable that takes the value of 1 if the firm announced at least one acquisition in year *t*, 0 otherwise. The variable is created using data from Thomson Financial SDC.

Acquisition intensity: The sum of the deal values of all completed acquisitions announced in year *t* scaled by the firm's total assets in year *t-1*. Deal values are from Thomson Financial SDC, total assets are from COMPUSTAT. Only transactions larger than 1% of market equity are included in the sample.

Acquirer CARs: Cumulative abnormal return for the acquiring firm over the 5-day event window (-2, +2) around the announcement day. The returns are calculated using the market model with the market model parameters estimated over the period between 240 and 41 days prior to the announcement. The CRSP value-weighted index return is the market return.

ΔRating level: The rating level change between year *t*+1 and year *t-1* where year *t* is the year of the acquisition.

Firm Variables

CDS: Binary variable for CDS reference firms from Markit that takes the value of 1 if the firm has CDS, 0 otherwise.

CDS-XR: Binary variable for CDS reference firms from Markit that takes the value of 1 if the firm has a No-Restructuring (XR) clause on its CDS contracts outstanding, 0 otherwise.

Financially distressed: Binary variable that takes the value of 1 when the firm belongs to the highest quartile of the estimated 1st principal component score that is based on three measures: a) Altman (1968) score; b) Zmijweski (1984) score; and c) Shumway (2001) score, 0 otherwise. The variable is created using data from COMPUSTAT.

Credit rating level: Continuous variable for rated firms from COMPUSTAT which takes the value from 1 (D rating) to 22 (AAA rating). The ratings are the Standard and Poor's ratings.

***Credit rating level^2*:** The squared term of the credit rating level variable.

Size: Firm total assets at the fiscal year-end from COMPUSTAT in US$ millions deflated using the CPI index with the base year 2001. The regressions use the natural log of this variable.

Excess stock return: The annualized market adjusted return (using the value-weighted CRSP index as benchmark).

Leverage: Total financial debt (long-term debt plus debt in current liabilities) divided by total assets. The variable is created using data from COMPUSTAT.

Profitability: Earnings before interest, taxes, depreciation and amortization (EBITDA) divided by total assets. The variable is created using data from COMPUSTAT.

Cash holdings: Cash holdings divided by total assets. The variable is created using data from COMPUSTAT.

Market-to-book: Market value of the firm (Total assets - book value of equity + market value of equity) divided by total assets. The variable is created using data from COMPUSTAT.

Interest coverage: EBITDA over interest expenses. The variable is created using data from COMPUSTAT.

StDevRet: The annualized standard deviation of daily returns for a given year. The variable is created using data from CRSP.

Volatility: The volatility of profitability, computed using the current and prior four years of data. At least two years of data are required in its computation. The variable is created using data from COMPUSTAT.

Convertible: Convertible debt divided by total assets. The variable is created using data from COMPUSTAT.

Capex: Capital expenditures divided by total assets. The variable is created using data from COMPUSTAT.

PPE: Net property, plant and equipment divided by total assets. The variable is created using data from COMPUSTAT.

Deal Variables

Public: Binary variable that takes the value of 1 if the target firm is a public firm, 0 otherwise. The variable is created using data from SDC.

Hostile: Binary variable that takes the value of 1 for deals defined as hostile or unsolicited by SDC, 0 otherwise.

Tender offer: Binary variable that takes the value of 1 for tender offers, 0 otherwise. The variable is created using data from SDC.

Stock: Binary variable that takes the value of 1 for deals where the method of payment is 100% stock, 0 otherwise. The variable is created using data from SDC.

Cross border: Binary variable that takes the value of 1 for acquisitions of non-US target firms, 0 otherwise. The variable is created using data from SDC.

Diversifying: Binary variable that takes the value of 1 if the target firm operates in a different three-digit SIC code industry relative to the acquirer, 0 otherwise. The variable is created using data from SDC.

Relative size: Ratio of the deal value to the market capitalization of the acquiring firm four weeks prior to the acquisition announcement. The variable is created using data from SDC and CRSP.

Industry Variables

Herfindahl index: Sum of squares of the market shares of all firms in a given year and three-digit SIC industry, where market share is defined as sales of the firm divided by the sum of the sales in the industry. The variable is created using data from SDC and COMPUSTAT.

M&A liquidity: Sum of acquisitions made in a given year and three-digit SIC code industry, divided by the sum of total assets of all COMPUSTAT firms with the same three-digit SIC code.

Instrumental Variables

CSE relationship*:* Binary variable that takes the value of 1 in a given firm-year if a (consolidated supervised entity (CSE) has underwritten or extended loans to the firm after the SEC's 2004 net capital rule exemption, and zero otherwise. The variable is created using data from SDC.

Table I

Credit Default Swap (CDS), Non-Credit Default Swap (Non-CDS), CDS-XR Firms and Acquisition Activity by Year

This table presents the annual number and proportion of CDS, non-CDS, and CDS-XR firms and their acquisition activity for the universe of US rated publicly listed firms over the period 2001-2013. Column (2) displays the number of unique firms in the sample. Column (3) shows the number of acquisitions. Columns (4), (6), and (8) show the proportion of CDS, non-CDS, and CDS-XR firms, respectively. Columns (5), (7) and (9) present the proportion of acquisitions by CDS, non-CDS, and CDS-XR firms, respectively. # denotes number and % denotes percentage.

Year	# Firms	# Acquisitions	% CDS firms	% Acquisitions by CDS firms	% Non-CDS firms	% Acquisitions by non-CDS firms	% CDS-XR firms	% Acquisitions by CDS-XR firms
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
2001	1,039	-	20.89%	-	79.11%	-	9.05%	-
2002	1,045	219	28.71%	16.44%	71.29%	83.56%	19.23%	10.05%
2003	1,060	185	36.42%	30.27%	63.58%	69.73%	24.62%	24.86%
2004	1,081	252	42.74%	37.30%	57.26%	62.70%	30.25%	33.33%
2005	1,053	223	44.35%	47.09%	55.65%	52.91%	33.05%	39.46%
2006	1,025	263	45.27%	48.29%	54.73%	51.71%	34.44%	40.30%
2007	994	225	46.18%	46.22%	53.82%	53.78%	35.81%	40.89%
2008	986	178	45.64%	44.38%	54.36%	55.62%	35.29%	34.83%
2009	978	118	43.87%	59.32%	56.13%	40.68%	36.40%	52.54%
2010	981	200	42.61%	49.50%	57.39%	50.50%	35.17%	46.50%
2011	994	210	39.94%	44.76%	60.06%	55.24%	32.70%	43.81%
2012	1,017	224	37.76%	41.96%	62.24%	58.04%	31.27%	38.84%
2013	1,049	198	35.08%	34.85%	64.92%	65.15%	29.08%	32.32%
2014	-	235	-	32.34%	-	67.66%	-	30.64%
Total	13,302	2,730	39.10%	40.40%	60.90%	59.60%	29.60%	35.53%

Table II

Sample Descriptive Statistics

This table presents descriptive statistics for the universe of US rated publicly listed firms over the period 2001-2013. Specifically, it reports the number of observations (N), as well as mean, median, and standard deviation values of the variables. All dollar values are in millions and adjusted to 2001 dollars by the consumer price index (CPI). Variable definitions are in the Appendix.

	N	Mean	Median	Std. Dev
Firm Variables				
CDS	13,302	0.391	-	0.488
CDS-XR	13,302	0.296	-	0.456
Financially distressed	11,567	0.250	-	0.433
Credit rating level	13,302	12.139	12.000	3.492
Size ($ million)	13,302	16,484	3,943	1.476
Excess stock return	12,333	0.097	0.027	0.452
Leverage	13,280	0.343	0.307	0.207
Profitability	13,267	0.136	0.130	0.076
Cash holdings	13,299	0.100	0.065	0.104
Market-to-book	12,973	1.670	1.440	0.789
Interest coverage	13,088	13.617	6.311	25.809
StDevRet	12,315	0.418	0.359	0.224
Volatility	12,594	0.037	0.026	0.034
Convertible	13,220	0.023	0.000	0.061
Capex	12,763	0.062	0.040	0.067
PPE	13,289	0.333	0.269	0.244
Deal Variables				
Public	2,730	0.207	-	0.405
Hostile	2,730	0.020	-	0.139
Tender offer	2,730	0.057	-	0.231
Stock	2,730	0.032	-	0.177
Cash	2,730	0.455	-	0.498
Cross border	2,730	0.204	-	0.403
Diversifying	2,730	0.498	-	0.500
Relative size	2,730	0.179	0.060	0.331
Industry Variables				
Herfindahl index	13,302	0.178	0.132	0.165
M&A liquidity	13,302	0.021	0.007	0.039

Table III

Credit Default Swaps and Acquisition Investments

This table presents the effect of CDS on acquisitions announced over the period 2002-2014 for all US publicly listed firms with available credit ratings over the period 2001-2013. Column (1) presents marginal effects of a probit specification and column (2) unconditional marginal effects of a tobit specification. The dependent variable in the probit model takes the value of 1 if the firm announced at least one acquisition exceeding 1% of the market value of its equity in year *t*, and 0 otherwise. The dependent variable in the tobit model is the ratio of the sum of all acquisitions exceeding 1% of the market value of equity announced by a firm in year *t*, divided by total assets at the end of year *t-1*. The explanatory variables are lagged by one year with respect to the dependent variable. Variable definitions are in the Appendix. All models include year and industry fixed effects, whose coefficients are suppressed and are based on calendar year and three-digit SIC code industry classification dummies, respectively. The *z*-statistics reported in parentheses are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Probit	**Tobit**
	(1)	**(2)**
CDS * Financially distressed (a)	0.1034	0.0234*
	(1.60)	(1.95)
CDS-XR * Financially distressed (b)	-0.0986***	-0.0280**
	(-2.97)	(-2.31)
Financially distressed (c)	-0.0321**	-0.0082**
	(-2.26)	(-2.39)
CDS	-0.0747***	-0.0169***
	(-3.60)	(-3.43)
CDS-XR	0.1784***	0.0346***
	(7.19)	(7.14)
Credit rating level	0.0245***	0.0043*
	(2.65)	(1.90)
Credit rating level^2	-0.0008**	-0.0001*
	(-2.39)	(-1.76)
Size	-0.0300***	-0.0082***
	(-5.27)	(-6.35)
Excess stock return	0.0100	0.0025
	(1.19)	(1.30)
Leverage	-0.0362	-0.0069
	(-1.13)	(-0.93)
Profitability	0.2161***	0.0603***
	(2.87)	(3.44)
Cash holdings	-0.0451	-0.0029
	(-0.88)	(-0.26)
Market-to-book	-0.0102	-0.0008
	(-1.47)	(-0.54)
Herfindahl index	-0.1207	-0.0302*
	(-1.44)	(-1.76)
M&A liquidity	0.9984***	0.2822***
	(9.57)	(11.08)
Industry F.E.	Yes	Yes
Year F.E.	Yes	Yes
N	11,203	11,536
Pseudo R^2	0.102	0.157
Hypothesis 1a: Chi-square test: (a) - (c) = 0	0.1355**	0.0316***
(*p*-value)	(0.026)	(0.009)
Hypothesis 1b: Chi-square test: (a) - (b) = 0	0.2020**	0.0514**
(*p*-value)	(0.017)	(0.014)

Table IV

Credit Default Swaps Selection Models

This table presents the marginal effects estimates of probit regressions that measure the availability of CDS contracts (columns (1) and (2)), and the availability of CDS-XR contracts (columns (3) and (4)) on corporate debt for all US publicly listed firms with available credit ratings over the period 2001-2013. CSE relationship is a binary variable that takes the value of 1 in a given firm-year if a CSE has underwritten public debt or extended loans to the firm after the SEC's 2004 net capital rule exemption, and zero otherwise. In line with the method proposed by Wooldridge (2002), the fitted probabilities of CDS (column (1)) and CDS-XR (column (3)) are then used as instruments for CDS and CDS-XR in columns (2) and (4), respectively. Variable definitions are in the Appendix. All models (unless stated otherwise) include either year or industry fixed effects, whose coefficients are suppressed and are based on calendar year and three-digit SIC code industry classification dummies, respectively. The *z*-statistics reported in parentheses are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	CDS		**CDS-XR**	
	(1)	**(2)**	**(3)**	**(4)**
Pr(CDS)/Pr(CDS-XR)		0.8903***		0.8964***
		(42.15)		(27.05)
CSE relationship	0.0327***		0.0286***	
	(3.85)		(3.45)	
Financially distressed	0.0122		0.0078	
	(0.53)		(0.36)	
Credit rating level	0.0688***		0.0561***	
	(3.05)		(2.80)	
Credit rating level^2	-0.0016*		-0.0018**	
	(-1.87)		(-2.53)	
Size	0.1188***		0.1086***	
	(11.48)		(10.10)	
Excess stock return	0.0072		-0.0147*	
	(0.84)		(-1.65)	
Leverage	0.1825***		0.1388**	
	(2.68)		(2.05)	
Profitability	-0.0962		-0.0304	
	(-0.75)		(-0.23)	
Cash holdings	0.1396		0.0727	
	(1.46)		(0.75)	
Market-to-book	-0.0024		0.0191	
	(-0.18)		(1.56)	
Herfindahl index	0.2355*		0.4178***	
	(1.90)		(3.45)	
M&A liquidity	0.0010		0.0082	
	(0.01)		(0.09)	
***F*-statistic (relevance condition)**	14.79	1776.32	11.93	731.68
Industry F.E.	Yes	No	Yes	No
Year F.E.	No	Yes	No	Yes
N	10,875	10,875	10,698	10,698
Pseudo R^2	0.257	0.277	0.195	0.217

Table V

Credit Default Swaps and Acquisition Investments: Heckman Correction

This table presents the Heckman correction method for the effect of CDS on acquisitions announced over the period 2002-2014 for all US publicly listed firms with available credit ratings over the period 2001-2013. Column (1) presents the marginal effects of the probit specification, while column (2) presents unconditional marginal effects of a tobit specification. The dependent variable in the probit models takes the value of one if the firm announced at least one acquisition exceeding 1% of the market value of its equity in year *t*, and zero otherwise. The dependent variable in the tobit models is the ratio of the sum of all acquisitions exceeding 1% of the market value of equity announced by a firm in year *t*, divided by total assets at the end of year *t-1*. The explanatory variables are lagged by one year with respect to the dependent variable. Variable definitions are in the Appendix. All models include year and industry fixed effects, whose coefficients are suppressed and are based on calendar year and three-digit SIC code industry classification dummies, respectively. The *z*-statistics reported in parentheses are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Probit	**Tobit**
	(1)	**(2)**
CDS * Financially distressed (a)	0.0973	0.0229*
	(1.50)	(1.84)
CDS-XR * Financially distressed (b)	-0.1036***	-0.0297**
	(-3.18)	(-2.37)
Financially distressed (c)	-0.0287*	-0.0078**
	(-1.92)	(-2.14)
CDS	-0.0677***	-0.0156***
	(-3.12)	(-3.03)
CDS-XR	0.1734***	0.0345***
	(6.91)	(6.84)
Credit rating level	0.0243***	0.0044*
	(2.60)	(1.89)
Credit rating level^2	-0.0008**	-0.0001*
	(-2.28)	(-1.70)
Size	-0.0296***	-0.0084***
	(-4.96)	(-6.03)
Excess stock return	0.0108	0.0028
	(1.25)	(1.38)
Leverage	-0.0267	-0.0047
	(-0.81)	(-0.60)
Profitability	0.1976***	0.0579***
	(2.58)	(3.18)
Cash holdings	-0.0594	-0.0070
	(-1.15)	(-0.59)
Market-to-book	-0.0117	-0.0011
	(-1.64)	(-0.68)
Herfindahl index	-0.1182	-0.0329*
	(-1.30)	(-1.74)
M&A liquidity	0.9024***	0.2678***
	(8.49)	(9.88)
Inverse Mills CDS	-0.0164	-0.0035
	(-1.44)	(-1.42)
Inverse Mills CDS-XR	0.0069	0.0023
	(0.64)	(0.97)
Industry F.E.	Yes	Yes
Year F.E.	Yes	Yes
N	10,435	10,614
Pseudo R^2	0.098	0.144
Hypothesis 1a: Chi-square test: (a) - (c) = 0	0.1260**	0.0307**
p-value	(0.037)	(0.013)
Hypothesis 1b: Chi-square test: (a) - (b) = 0	0.2009**	0.0587**
p-value	(0.017)	(0.015)

Table VI

Credit Default Swaps and Acquirer CARs

This table presents the estimates of the cross-sectional OLS regression analysis of acquirer 5-day (-2, +2) cumulative abnormal returns (CARs) around the acquisition announcement on CDS and other acquirer- and deal-specific variables. The sample includes acquisitions announced over the period 2002-2014 for all US publicly listed firms with available credit ratings over the period 2001-2013. Variable definitions are in the Appendix. The model includes year and industry fixed effects, whose coefficients are suppressed and are based on calendar year and three-digit SIC code industry classification dummies, respectively. The *t*-statistics reported in parentheses are adjusted for heteroskedasticity and acquiring firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	CARs
	(1)
CDS * Financially distressed (a)	0.0452**
	(2.41)
CDS-XR * Financially distressed (b)	-0.0274
	(-1.49)
Financially distressed (c)	-0.0070
	(-1.24)
CDS	-0.0032
	(-0.48)
CDS-XR	0.0063
	(0.96)
Credit rating level	-0.0025
	(-0.82)
Credit rating level^2	0.0001
	(0.89)
Size	-0.0052***
	(-3.05)
Excess stock return	-0.0087***
	(-2.69)
Leverage	-0.0011
	(-0.10)
Profitability	-0.0627**
	(-2.23)
Cash holdings	-0.0102
	(-0.64)
Market-to-book	0.0005
	(0.20)
Public	-0.0112**
	(-2.34)
Hostile	-0.0091
	(-0.88)
Tender offer	0.0084
	(1.61)
Stock	-0.0206**
	(-2.52)
Cross border	0.0010
	(0.33)
Diversifying	-0.0019
	(-0.67)
Relative size	0.0117*
	(1.76)
Herfindahl index	0.0471
	(1.39)
M&A liquidity	0.0425
	(1.34)
Inverse Mills CDS	0.0064*
	(1.76)
Inverse Mills CDS-XR	-0.0042
	(-1.17)
Industry F.E.	Yes
Year F.E.	Yes
N	2,135
Adjusted R^2	0.057
Hypothesis 2a: Chi-square test: (a) - (c) = 0	0.0522***
p-value	(0.006)
Hypothesis 2b: Chi-square test: (a) - (b) = 0	0.0726**
p-value	(0.023)

Table VII

Credit Default Swaps and Change in Acquirer Credit Risk

This table presents the acquirer change in the credit rating level in the period surrounding the acquisition announcement. The dependent variable is the rating level change between year *t*+1 (post-treatment period) and year *t-1* (control period) where year *t* is the year of the acquisition. Column (1) presents the estimated coefficients of an ordered probit specification. The sample includes acquisitions announced over the period 2002-2014 for all US publicly listed firms with available credit ratings over the period 2001-2013. Variable definitions are in the Appendix. The model includes year and industry fixed effects, whose coefficients are suppressed and are based on calendar year and three-digit SIC code industry classification dummies, respectively. The *z*-statistics reported in parentheses are adjusted for heteroskedasticity and acquiring firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	ΔRating Level
	(1)
CDS * Financially distressed (a)	1.3624*
	(1.94)
CDS-XR * Financially distressed (b)	-0.9875
	(-1.35)
Financially distressed (c)	-0.4018***
	(-3.26)
CDS	-0.3840**
	(-2.16)
CDS-XR	0.2138
	(1.20)
ΔSize	0.5755***
	(4.01)
ΔExcess stock return	-0.2537***
	(-3.70)
ΔLeverage	-4.0946***
	(-8.88)
ΔProfitability	1.4077**
	(2.05)
ΔCash holdings	1.1148*
	(1.89)
ΔMarket-to-book	0.1224*
	(1.69)
ΔInterest coverage	-0.0006
	(-0.32)
ΔStDevRet	-1.1988***
	(-4.08)
ΔVolatility	-2.3023*
	(-1.72)
ΔConvertible	2.2314***
	(3.72)
ΔCapex	3.9387***
	(4.71)
ΔPPE	0.5290
	(0.69)
Inverse Mills CDS	0.0387
	(0.39)
Inverse Mills CDS-XR	-0.0473
	(-0.47)
Industry F.E.	Yes
Year F.E.	Yes
N	1,372
Pseudo R^2	0.165
Hypothesis 3a: Chi-square test: (a) - (c) = 0	1.7642***
p-value	(0.008)
Hypothesis 3b: Chi-square test: (a) - (b) = 0	2.3499**
p-value	(0.048)

Table VIII

Credit Default Swaps and Method of Payment

This table presents the effect of CDS on the method of payment in acquisitions announced over the period 2002-2014 for all US publicly listed firms with available credit ratings over the period 2001-2013. Column (1) presents the estimated coefficients of an ordered probit specification. The dependent variable takes the value of zero for no acquisitions, the value of one for 100% stock-financed deals, and the value of two for 100% cash-financed deals. The explanatory variables are lagged by one year with respect to the dependent variable. Variable definitions are in the Appendix. The model includes year and industry fixed effects, whose coefficients are suppressed and are based on calendar year and three-digit SIC code industry classification dummies, respectively. The *z*-statistics reported in parentheses are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Ordered Probit
	(1)
CDS * Financially distressed (a)	0.4156*
	(1.90)
CDS-XR * Financially distressed (b)	-0.6669***
	(-3.01)
Financially distressed (c)	-0.0999
	(-1.35)
CDS	-0.1606
	(-1.49)
CDS-XR	0.4920***
	(4.65)
Credit rating level	0.0813*
	(1.86)
Credit rating level^2	-0.0021
	(-1.31)
Size	-0.0998***
	(-3.56)
Excess stock return	0.0255
	(0.59)
Leverage	-0.0639
	(-0.42)
Profitability	0.5834*
	(1.73)
Cash holdings	0.0931
	(0.41)
Market-to-book	-0.0269
	(-0.82)
Herfindahl index	-0.3904
	(-0.97)
M&A liquidity	2.3164***
	(4.81)
Inverse Mills CDS	-0.0558
	(-1.05)
Inverse Mills CDS-XR	0.0893*
	(1.75)
Industry F.E.	Yes
Year F.E.	Yes
N	10,614
Pseudo R^2	0.101
Chi-square test: (a) - (c) = 0	0.5155**
p-value	(0.019)
Chi-square test: (a) - (b) = 0	1.0825***
p-value	(0.006)