Credit default swaps around the world: Investment and financing effects

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Abstract

We analyze the impact of the introduction of credit default swaps (CDS) on real decision making within the firm, taking into consideration differences in firms' local economic and legal environments. We extend the model of Bolton and Oehmke (2011) to take into account uncertainty whether the actions taken by the reference entity will trigger credit events for the CDS obligations. We test the predictions of the model in a sample of more than 56,000 firms across 50 countries over the period 2001–2015 and find substantial evidence that the introduction of CDS affects real decisions within the firm, including those regarding leverage, investment, and the riskiness of firms' investments. Importantly, we find that the legal and market environments in which reference entities operate have an influence on the impact of CDS. The effect of CDS is larger in environments where uncertainty regarding CDS obligations is reduced and where CDS mitigate weak property rights. Our results shed light on the incomplete nature of CDS contracts in international capital markets, related to significant legal uncertainty surrounding the interpretation of underlying credit events.

Keywords: Credit default swaps, CDS, investment policy, financing policy, creditor rights, property rights, private credit, ownership concentration

JEL Classification: G3, F4, F3

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I. Introduction

Single-name corporate credit default swaps (CDS) are an important instrument for the transfer of credit risk. Researchers have argued that in addition to providing a vehicle for third-party hedging, this derivative asset can have substantial consequences for corporate financial decisions due to its effect on the payoffs of stakeholders in the underlying entities. For example, the existence of CDS may affect the financing structure of firms by influencing the monitoring intensity of lenders (Morrison (2005)), by creating an empty creditor problem (Hu and Black (2008a,b), Bolton and Oehmke (2011)), and by affecting investors' incentives to hold synthetic debt rather than primary debt, particularly during economic expansions (Oehmke and Zawadowski (2015), Campello and Matta (2013)). Bolton and Oehmke (2015) suggest that the introduction of CDS on underlying firms can have significant effects on creditors' ability to enforce their claim or affect their priority in bankruptcy; these effects may result in changes in the firms' bankruptcy risk. All of these implications can in turn result in changes in firms' funding costs and financing structure.[1] In addition, other authors have modeled the impact of CDS on liquidity policies and real investment through their effects on monitoring by creditors and risk sharing (see, e.g., Parlour and Winton (2013) and Subrahmanyam, Tang, and Wang (2017)).

There is little consensus in this literature regarding the net impact of CDS on the underlying firms. It is clear that CDS can provide better hedging opportunities for lenders, but these opportunities may be associated with inefficiencies such as excessive liquidation, reduced monitoring by lenders, and increased losses to creditors in default. However, by increasing creditor rights, CDS may also be associated with higher leverage, greater levels of investment, and less-frequent strategic default. Importantly, all of these effects are related to the legal and market framework in which the underlying entity operates. This framework includes bankruptcy codes, contract enforcement, corporate governance mechanisms, and the relative importance of public and private markets.

We extend the model in Bolton and Oehmke (2011) to allow for uncertainty regarding whether an action taken by a firm triggers a credit event for CDS held on the firm's debt. This uncertainty captures differences in the way that local bankruptcy codes interact with the standardized definitions

[1] See, e.g., Ashcraft and Santos (2009), Saretto and Tookes (2013), and Subrahmanyam, Tang, and Wang (2014), among others, for empirical justification.

of CDS contract terms set by the International Swaps and Derivatives Association (ISDA). If there is less uncertainty that a particular action will trigger payments related to CDS, the environment is considered more creditor friendly. For plausible parameter values, we demonstrate that the introduction of CDS increases debt capacity more in regimes with less uncertainty regarding credit events, as well as in environments with lower liquidation cost, weaker contract enforceability, and greater concentrations of shareholder ownership. The intuition is similar to that in Bolton and Oehmke (2011): well-functioning credit derivative contracts, such as CDS, can allow firms to overcome limited-commitment problems that arise due to weak institutional heritages. However, these benefits are larger when there is less uncertainty about the enforcement of obligations due under the swap contracts.

The results from our model highlight that the real effects of CDS on reference entities depend crucially on features of the local legal environment. Although CDS contracts are largely standardized by the ISDA, corporate bankruptcy laws and other elements of institutional structure vary substantially across countries, affecting contractual efficacy.[2] The empirical work in this area has examined these effects primarily in the context of the legal and financial environments in North America. In sharp contrast, we examine whether cross-country differences in institutional structures, particularly with regard to the legal code governing the firm, influence the impact of the introduction of CDS trading on underlying corporate financial and investment policies.

Using a sample of more than 56,000 firms from 50 countries during the period 2001–2015, we analyze the extent to which the strength of creditor rights, the degree of contract enforceability, the importance of private credit availability in the development of a country's financial markets, and the degree of shareholders' ownership concentration affect both the propensity to introduce CDS on underlying firms and their resulting financing choices, risk, and investment strategies. To our knowledge, this research is the first to analyze the consequences of CDS trading for nonfinancial firms in a global context, and it therefore provides the first detailed, large-scale, out-of-sample evidence for the effect of CDS on corporate financial policies beyond prior US studies.[3]

An analysis of the effects of CDS introduction must, by necessity, consider endogeneity biases, since CDS introduction is not random. These potential biases may be related to characteristics of firms,

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[2] Section III below provides more details on this discussion.

[3] In their survey of the CDS literature, Augustin et al. (2014:19) state that "a broader use of CDS data in international finance settings seems significantly lacking."

as well as to key attributes of firms' home countries. We address these concerns using a relatively new econometric technique that has not previously been used in the finance literature. We first estimate the market's propensity to introduce CDS on firms using an extensive array of firm and country characteristics. We then use the resulting propensity scores as a weighting mechanism for the sample in our analysis. This novel "overlap weighting" approach developed in Li, Morgan, and Zaslavsky (2017) generates similar distributions of all firm- and country-level covariates across CDS and non-CDS firms and allows us to make causal inferences on the effects of CDS introduction on corporate financial and investment policies. Although we use an extensive array of covariates, we also conduct a sensitivity analysis to examine whether our results are affected by an omitted variable bias.

Our results indicate that CDS are more likely to be introduced on firms that are headquartered in countries with weaker creditor rights, a stronger orientation toward bank financing, and lower levels of ownership concentration. These results suggest that interest in CDS, and their ability to strengthen creditor rights (what Djankov, McLiesh, and Shleifer (2007) term the "power theory of credit"), is greater in countries where creditor rights are weaker, where local lenders might particularly value the ability to hedge their exposure to borrowers, and where dispersed shareholders might be expected to do relatively little monitoring.

We find that after CDS introductions, underlying firms increase leverage in countries that have stronger creditor rights along two dimensions. The first dimension is the requirement for creditor consent in order to enter reorganization, which can act as a trigger for CDS obligations. This result is consistent with the predictions of our model: creditors with CDS protection and control over entry into reorganization have substantially higher bargaining power, allowing the firms to overcome a limited-commitment problem relating to the issuance of debt. The second dimension is the requirement that secured creditors be paid first out of liquidation proceeds. This is consistent with the model's prediction that leverage increases are greater when liquidation costs are low, particularly when excessive liquidation pressure can come from empty creditors with CDS protection.

We also find that underlying firms increase leverage more in countries with weaker contract enforceability and high levels of concentration in equity ownership. These results are consistent with the model's implications: the introduction of CDS can act as a substitute for weak property rights, especially in situations in which poor enforceability of property rights is a constraint on the supply of credit. This is also consistent with the finding in Bae and Goyal (2009) that, along with creditor rights,

property rights are an important determinant of the credit available to firms. In addition, newly introduced CDS contracts effectively enhance the debt capacity of underlying reference entities when creditors initially have an inferior bargaining position with respect to shareholders who own the majority of shares (Davydenko and Strebulaev (2007)) and, as a consequence, would have more bargaining power during private debt renegotiation in the absence of CDS.

The interaction between CDS contract design and local bankruptcy codes also influences the investment policies of firms. Specifically, in cases where there are creditor restrictions on firms' entry into bankruptcy, the presence of CDS increases the level of capital investment of firms. These effects are mitigated when the domestic credit market is robust, and there is some weak evidence that the increase in investment is larger in countries where proxies for property rights are weaker. We also find strong evidence that the effect of CDS introductions on riskier investments, which we measure using the share of research and development (R&D) in total investment, differs markedly across legal environments. That is, we find that the introduction of CDS decreases the share of R&D in capital investment in countries with creditor restrictions on firms' entry into bankruptcy. This suggests that the introduction of CDS contracts may provide an incentive for firms to invest in tangible capital, similar to the credit multiplier effects in Almeida and Campello (2007). Interestingly, in countries where managers are not allowed to manage their firms during bankruptcy, the introduction of CDS has a positive effect on the share of R&D in capital spending. We also find strong evidence that the introduction of CDS in countries with lower political risk and stronger domestic credit markets is associated with a larger increase in R&D share. This suggests that CDS contracts increase the appetite of local lenders to finance riskier or more innovative projects but do not act as a vehicle for hedging political risk.

Finally, we examine the effect of CDS introduction on the volatility of equity returns in the reference entities. We find that idiosyncratic equity return volatility increases significantly where creditor restrictions on firms' ability to enter bankruptcy are in place. Given the increased propensity of firms to invest in tangible capital in these circumstances, the increase in volatility seems unlikely to be the result of an increase in the underlying project risk. Instead, this could indicate that where creditors influence firms' ability to seek protection from payment obligations, and the presence of CDS contracts bolsters creditor rights, additional residual risk is borne by equity holders rather than the firms' creditors. This is consistent with the findings in Favara, Schroth, and Valta (2012), who document higher equity risk in the presence of strong creditors. These results suggest that when local bankruptcy codes do not conflict with the ISDA's contractual definition of the reference entity default, CDS

effectively reduce the threat of strategic default by shareholders and, as a consequence, equity risk increases following the introduction of CDS.

We perform a number of robustness checks on our results. In addition to the sensitivity analysis of omitted variables mentioned above, these tests include the use of additional control variables, a test of the conditional independence of our treatment assignment using alternative OLS estimations, the use of CDS existence rather than CDS introduction as the variable of interest, and an analysis of a sub-sample that excludes U.S. firms. The results from these tests remain qualitatively and quantitatively similar.

The remainder of this paper is organized as follows. Section II summarizes the related literature, while Section III provides institutional details about CDS. Section IV derives an extension of the Bolton and Oehmke (2011) model and specifies the resulting empirical predictions. The empirical research design and data are discussed in Sections V and VI, respectively. Section VII presents the results, including robustness checks, and Section VIII concludes.

II. Review of Related Literature

While financial derivatives have been around for more than three decades, CDS are a much more recent phenomenon. Given the role of CDS in the recent financial crisis (Stulz (2010)), the existing literature has focused primarily on the role of CDS with regard to financial institutions. Similarly, the European sovereign debt crisis has triggered interest in using CDS to study sovereign risk (see, e.g., Acharya, Drechsler, and Schnabl (2014) and Lee, Naranjo, and Sirmans (2016)). In contrast, while an extensive literature has investigated the use of derivatives on currencies, interest rates, and commodity prices by nonfinancial firms and the underlying frictions that justify their existence (see, e.g., Bartram, Brown, and Conrad (2011) and Bartram, Brown, and Fehle (2009)), much less attention has been paid to the effect of CDS on these firms. Like equity derivatives, CDS are typically not held by the reference entity; that is, nonfinancial firms are generally not CDS users. Rather, some of their claimholders, for example, bondholders, may use CDS contracts for hedging or speculative purposes. Nevertheless, a developing, relatively recent literature suggests that CDS may still affect various corporate policies of the underlying firms.[4]

[4] See Augustin et al. (2014) for an exhaustive survey of the literature.

Although CDS are, in theory, redundant derivative assets, existing research indicates that market frictions are nontrivial and hence that the introduction of CDS can have significant effects on security prices, economic incentives, and investor and firm behavior. These effects drive a wedge between the payoffs on the underlying asset (the firm's assets) and the payoff on the derivative instrument (the CDS contract). As discussed above, the mechanisms and directions of these effects differ across models. The existing empirical work provides evidence that U.S. firms with CDS have higher leverage ratios and longer debt maturity (Saretto and Tookes (2013)) and that the existence of CDS affects the cost of debt, with riskier firms experiencing an increase in spreads and safer firms experiencing a decline in spreads (Ashcraft and Santos (2009)). Subrahmanyam, Tang, and Wang (2014) also report that, following CDS introduction, U.S. firms' credit ratings tend to decline and bankruptcy risk increases.

While the empirical evidence to date indicates that CDS contracts have significant effects on the financial decisions of firms, the reference entities in these papers are headquartered in North America and, as a result, are subject to similar legal environments. The results of our theoretical model indicate that the effects of CDS introduction on leverage should be larger in countries with creditor-friendly bankruptcy codes, weaker contract enforceability, and higher concentration of shareholder ownership. Consequently, in our empirical tests, we allow the impact of CDS introduction to differ with variation in the legal and market environments in which the underlying reference entity operates.

III. CDS and the Local Legal Environment

A single-name CDS contract specifies the underlying reference entity; the maturity of the contract; the ongoing payments that are required to be made by the protection buyer to the protection seller; the definition of the credit events that would trigger an obligation due from the protection seller to the protection buyer; the manner in which the payments from seller to buyer will be determined; and the manner in which the securities that may be physically delivered into the contract will be set. There are six CDS trigger events: bankruptcy, obligation acceleration, obligation default, failure to pay, repudiation/moratorium, and restructuring. Three of these—bankruptcy, failure to pay, and restructuring—are principal credit events for corporate CDS. When a trigger event occurs, CDS are settled through credit default auctions, in which final recovery rates are determined through dealer bids, and the contract counterparties are settled accordingly either in cash or with the physical delivery of the underlying debt obligations.

CDS contracts are typically governed by rules established by the ISDA and make use of a standard set of clauses set out in the ISDA Master Agreement. Despite standard language, in the early days of CDS contracts there were significant disagreements and subsequent litigation over contract terms, including whether credit events had actually occurred, and thus whether obligations had been triggered. Over the last fifteen years, the ISDA has instituted changes in its Master Agreement in order to minimize ambiguity, create a more homogeneous CDS product, reduce counterparty risk, and streamline the processes through which settlement payments are determined. The most significant changes were included in the Big Bang Protocol in 2009. This protocol sets up regional Determination Committees (DCs) to consider whether a credit event has occurred and to manage the auction process through which final CDS payments are settled. It also created common look-back provisions for credit events to reduce basis risk for CDS traders. In addition, restructuring was excluded as a credit event for North American reference entities (this was retained, however, as a potential credit event in the rest of the world).

While these changes have created a more standardized CDS contract, the legal environment in which a reference entity operates is still important. Historically, Chapter 11 proceedings in the United States are the most common credit event trigger for CDS in the world, but reference entities that operate outside the United States are subject to bankruptcy provisions that differ in the strength of creditor protections, including the grants of automatic stays, prohibitions on debt payments, preservation of legal rights, and the length and timing of the resolution process. For CDS contracts, these differences influence decisions regarding whether a credit event has occurred, and they can also influence the timing of settlement auctions in cases where a credit event is deemed to have occurred.

For example, ISDA's DC ended up with a surprising split decision on whether CDS were triggered upon the bankruptcy filing by Abengoa, a Spanish reference entity; in this case, the local Spanish insolvency law and the global ISDA credit event definition provided conflicting interpretations of the nature of the underlying credit event.[5] In Appendix A, we provide more detail on Abengoa, as well as an example of another recent case in which consideration of specific elements of a country's bankruptcy code has played an important role in the performance of CDS.

[5] Thomson Reuters IFR, "One-word Change Triggers Abengoa CDS Split," December 9, 2015.

As these examples demonstrate, there can be significant legal issues to consider in the determination of contingent payoffs associated with CDS contracts. These issues motivate an analysis of the ways in which local bankruptcy provisions affect the underlying deliverable obligations in single-name CDS contracts and, as a result, firms' creditors. In the next section, we develop a model that takes into account uncertainty regarding whether actions taken by the firm trigger payments due under the CDS contract.

IV. Insights and Empirical Predictions from a Structural CDS Model

A. Setup

We consider a model setting that is an extension of a model proposed by Bolton and Oehmke (2011).[6] A firm raises an amount, B, of debt today (time 0) by promising a fixed payment, F, at time 1. At time 1, the firm generates a cash flow, C_1, which may be either C_1^H with probability θ, or C_1^L with probability $(1-\theta)$, where $C_1^L < C_1^H$ (H = "High" and L = "Low"). C_1^L is normalized to zero without loss of generality. Soon after time 1, the firm's continuation value, C_2 (either C_2^H with probability ϕ, or C_2^L with probability $(1-\phi)$, where $C_2^L < C_2^H$), is known with certainty to the firm's shareholders. However, there is limited verifiability of the cash flow to creditors; that is, they can only verify C_1^L, but not the magnitude of C_1^H, at time 1. The continuation value of the firm, C_2, also cannot be verified by the firm's creditors without incurring costs. If verification costs are paid by shareholders, the exact state of the world at time 2 is observable for both the firm's insiders (i.e., shareholders) and its outside claimants (i.e., creditors). We set the risk-free discount rate to zero to keep the notation simple, without loss of generality.

At time 1, if the firm fails to pay F, the firm and its creditors start private debt renegotiation. During this *out-of-court* debt negotiation, creditors can either liquidate the firm (via outright liquidation, as in Chapter 7 of the U.S. bankruptcy law, or in-court restructuring, as in Chapter 11), yielding the

[6] Our model intends to provide a simple, yet intuitive, comparative statics result that summarizes our key idea on the legal uncertainty in the recognition of the underlying trigger event of CDS. We do not develop an equilibrium model that derives the socially optimal level of the CDS notional amount, nor do we assume that the CDS notional amount that we observe in the data is socially optimal. Given the highly idiosyncratic nature of corporate bankruptcy, we simply contend that it is *ex ante* infeasible to perfectly hedge against *ex post* legal risk in the recognition of the CDS trigger event.

liquidation value S, or they can get a renegotiation surplus of $q\lambda C_2$. In this surplus, the term λC_2 takes into account that only a fraction of the continuation value, C_2, is available, due to the costs of private renegotiation; $\lambda<1$. λC_2 is, therefore, the *maximum* renegotiation surplus that accrues to both the firm and the creditors, taken together; q denotes the creditors' bargaining power relative to that of the firm (i.e., its shareholders), which reduces the value available to the latter. Based on the insight provided by Hart and Moore (1994), liquidation is typically costlier than renegotiation ($S < \lambda C_2^L$) due to the destruction of the firm's going-concern value in the event of liquidation and, hence, shareholders and creditors are motivated to avoid it.

When creditors owning CDS protection reject a renegotiation offer from the firm's shareholders, they submit a request to the DC to verify whether a credit event was, in fact, triggered. As discussed in Appendix A, there is significant variation in legal risk across country jurisdictions due to differences in legal frameworks and to the resultant conflicting interpretations of the definition of the underlying credit event (see also Simmons & Simmons (2016)). Based on this variation, we assume that there is a probability ε that a credit event is not triggered. As a specific example of this, consider a case in which the firm could credibly claim that an in-court restructuring filing is voluntary, rather than related to a credit event; this possibility would reduce the bargaining power of creditors.[7]

Under these circumstances, creditors with CDS credit protection with a notional value of N maximize their expected payoff during the private debt renegotiation with the firm. Their payoff is $max[q\lambda C_2^H, \gamma N]$ if $i = H$ at time 2, where $\gamma N = (1-\varepsilon)N + \varepsilon M$ with $M < N$, and $max[q\lambda C_2^L, N]$ if $i = L$. In each state, the first term in the square brackets denotes the payoff to CDS creditors if they agree with the firm on debt restructuring, whereas the second term in the square brackets denotes their payoff if they reject the offer from the shareholders and take their case to the DC. The parameter γ captures the legal uncertainty experienced by creditors about their payoff. Note that it reduces their payoff only in the H state at time 2, in which the continuation value of the firm turns out to be high

[7] See, for example, Bloomberg, "Noble default-swap verdict in play as test of ISDA system," September 5, 2017: "Noble's Chairman Paul Brough said on Tuesday it expects to find a buyer for its oil business by the end of September and get an extension on its covenant waivers.…Getting those things done would give the company room to settle a repayment plan with its banks and avoid default, Brough said." See also Reuters, ""Event" ends Seat Pagine CDS controversy?," December 1, 2011, about the case of Seat Pagine, an Italian company; "If the [company] bonds don't pay the coupon, … it would be a more clear-cut credit event and CDS should trigger, said David Benton, head of the derivatives practice at Allen & Overy."

(i.e., sufficient to pay off creditors), and there is some probability ε that creditors cannot trigger CDS payments. Consequently, they receive a smaller payout, M, than the contracted notional of the CDS, N.[8] In contrast, when the realization at time 2 is in the L state, there is no such ambiguity regarding the nature of the trigger event, and the payoff is N.[9]

B. Effects of Country Characteristics

The key parameters in the above setting are λ, q, and γ. We now provide a description of the economic intuition behind them and derive comparative statics for the sensitivity of the change in debt capacity (due to the introduction of a CDS contract) to changes in these parameters. The interpretation of these parameters is as follows:

- Cash flow verifiability (λ)

  Debt renegotiation is costly when property rights are poorly enforced (see, e.g., Bae and Goyal (2009) and Djankov, Hart, McLeish, and Shleifer (2008)). Hence, poor contract enforcement lowers the recovery rate and also increases the time spent in repossessing collateral during the restructuring process. These costs are captured by 1-λ, which is proportionately deducted from the continuation value, C_2.

- Creditors' bargaining power during private debt renegotiation (q)

  The bargaining power of creditors during the private renegotiation process—which is negatively correlated with the fraction of equity owned by the firm's principal shareholders, for example, the CEO and institutional investors (Davydenko and Strebulaev (2007)—determines

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[8] The value of M could vary depending on the assumed bargaining power of creditors following their failure to trigger CDS payments. For example, $M = q\lambda C_2^H$ if creditors are assumed to maintain the same bargaining power as they had in their initial round of debt negotiation with shareholders. Our results are robust as long as the bargaining power of creditors does not *increase* after their failure to trigger CDS payments, which seems a plausible assumption. We are grateful to Dmitry Chebotarev for raising this issue.

[9] Given the setup of the information asymmetry between the firm and its creditors, the creditors cannot distinguish the up-down path from the down-down path. All they can verify in the L state at time 2 is that the firm's continuation value turns out to be low, and only after costly cash flow verification. This implies that for the given state-contingent legal risk parameter, γ, a simple *ex ante* re-scaling of the CDS notional amount in accordance with the anticipated degree of legal uncertainty in the recognition of the underlying trigger event *cannot* solve our problem. As noted earlier, corporate default is also highly idiosyncratic – its context varies significantly, case by case, and therefore, it is not a straightforward exercise to extrapolate the nature of CDS legal uncertainty from other existing bankruptcy cases.

the share of the continuation value, C_2, available to creditors, with the balance going to shareholders. The greater the concentration of ownership, the weaker the creditors' bargaining power during the debt renegotiation process.

- Trigger event uncertainty (γ)

  A creditor-friendly local bankruptcy code implies less uncertainty in the recognition of the CDS trigger event, and therefore, a greater expected CDS payout (i.e., a higher γ). For instance, when the local bankruptcy codes empower creditors to limit a firm's ability to file for an *in-court* restructuring that it claims is voluntary, the trigger event definition risk in CDS contracts is reduced.

C. Debt Pricing

Our framework, which is based on the model of Bolton and Oehmke (2011), is essentially an extended binomial model that includes *ex post* trigger event uncertainty regarding the bankruptcy court's actions. In our model, along the path where the first-period cash flow is C_1^H and the continuation value turns out to be C_2^L (the up-down path), there is by construction the possibility of strategic default by shareholders in the first period. Specifically, shareholders can minimize the payment to creditors at time 1, $min\left[F,(1-\lambda)C_2^L+q\lambda C_2^L\right]$, by threatening liquidation without truthfully revealing the actual cash flow at time 1. The first term in the square brackets denotes the cost to shareholders if the firm truthfully reveals its time 1 cash flow (C_1^H) and pays F. The second term indicates the consequences of strategic default; in that case, the shareholders' outlay is the sum of the verification cost of continuation value during private debt renegotiation ($(1-\lambda)C_2^L$) and the portion of the renegotiation surplus that shareholders give up to the benefit of creditors ($q\lambda C_2^L$). (Note that this formulation assumes that the verification costs are paid entirely out of the firm's resources.) If honoring the original contract is not costly ($F \le (1-\lambda)C_2^L+q\lambda C_2^L$), the firm does not attempt strategic default; otherwise it does.

Given this incentive compatibility condition of the firm's shareholders, its debt capacity for a given F *without* CDS is

$$B=\begin{cases}\theta F+(1-\theta)\left[\phi q\lambda C_2^H+(1-\phi)q\lambda C_2^L\right] & \text{if } F\le F_C^L\\ \theta\left[\phi F+(1-\phi)q\lambda C_2^L\right]+(1-\theta)\left[\phi q\lambda C_2^H+(1-\phi)q\lambda C_2^L\right] & \text{if } F_C^L<F\le F_C^H\end{cases} \quad (1)$$

where the breakeven points for the debt F in the L and H states for the continuation value are given by $F_C^L=C_2^L\left[1-\lambda(1-q)\right]$ and $F_C^H=C_2^H\left[1-\lambda(1-q)\right]$, respectively.[10] Equation (1) presents the cash flows to the bondholders in two cases. If F is sufficiently low ($F\le F_C^L$), no strategic default occurs at the up-down node. When the debt burden becomes substantial ($F>F_C^L$), the firm finds it incentive-compatible to deviate from the original debt contract and attempts to privately renegotiate its debt. In such a case, creditors can receive only $q\lambda C_2^L$. Note that the possibility of strategic default limits the commitments that the firm can make.

In the presence of CDS, the payouts change. When creditors hold CDS contracts with a notional value of N, the payoff to the creditors in case of a credit event (π) is $\pi=\gamma N$ if $i=H$ at time 2, and $\pi=N$ if $i=L$. The firm honors the original debt contract without strategic default if $max\left[\lambda C_2-\pi,0\right]\le C_2-F$. When $\pi>q\lambda C_2$, the creditors' payout is higher when debt renegotiation occurs, and consequently the new debt proposal is not turned down by creditors. With these payouts, the firm's debt capacity is

$$B_{CDS}=\begin{cases}\theta F+(1-\theta)\left[\phi max(\gamma N,q\lambda C_2^H)+(1-\phi)N\right] & \text{if } F\le \tilde{F}_C^L\\ \theta\left[\phi F+(1-\phi)N\right]+(1-\theta)\left[\phi max(\gamma N,q\lambda C_2^H)+(1-\phi)N\right] & \text{if } \tilde{F}_C^L<F\le \tilde{F}_C^H\end{cases} \quad (2)$$

where $\tilde{F}_C^L=C_2^L-max\left[\lambda C_2^L-N,0\right]$ and $\tilde{F}_C^H=C_2^H-max\left[\lambda C_2^H-\gamma N,0\right]$, respectively. These breakeven points are defined in a manner similar to the case without CDS. However, the existence of CDS

[10] To ensure that debt is not risk free, we implicitly impose a lower bound for F, i.e., $\phi q\lambda C_2^H+(1-\phi)q\lambda C_2^L$, which would render the problem moot. If $F>F_C^H$, strategic default would always arise even in the up-up state in our binomial path, and the maximum pledgeable cash flow degenerates to $\phi q\lambda C_2^H+(1-\phi)q\lambda C_2^L$, which is less than the funding the firm would have achieved at $F=F_C^H$ in Equation (1). In our main analysis, we exclude this degenerate case and focus on the case $F\le F_C^H\equiv\overline{F}$ to avoid technical drawbacks that arise from our binomial representation of the states of the nature.

contracts changes the alternative opportunities available to the creditors, since they may be able to obtain payment by triggering default and collecting on their CDS contracts. It should be noted that $\tilde{F}_C^L \geq F_C^L$ when $N > q\lambda C_2^L$ and $\tilde{F}_C^H \geq F_C^H$ when $\gamma N > q\lambda C_2^H$, that is, when the availability of CDS contracts featuring less legal uncertainty regarding CDS trigger events mitigates the firm's limited-commitment problem by strengthening the creditors' bargaining power during private debt renegotiations.

The CDS notional can become excessive if there is substantial over-insurance of credit risk by creditors, resulting in an empty creditor problem. If $N > \lambda C_2^L$, debt renegotiation between the firm and its CDS creditors fails in the L state at time 2 (as a result of the empty creditor problem), and the debt payoff becomes the liquidation value, S ($< \lambda C_2^L$).[11] The firm's debt capacity with CDS in this case is

$$B_{CDS}^{Empty} = \begin{cases} \theta F + (1-\theta)\left[\phi max(\gamma N, q\lambda C_2^H) + (1-\phi)S\right] & \text{if } F \leq \tilde{F}_C^L \\ \theta\left[\phi F + (1-\phi)S\right] + (1-\theta)\left[\phi max(\gamma N, q\lambda C_2^H) + (1-\phi)S\right] & \text{if } \tilde{F}_C^L < F \leq \tilde{F}_C^H \end{cases} \quad (3)$$

where $\tilde{F}_C^i = C_2^i$ for $\forall i = L, H$. Here, one may see an interstate trade-off in the debt payoff across the H and L states at time 2. Specifically, under the empty creditor problem, the debt payoff could be enhanced with little legal uncertainty in the H state, while it is reduced in the L state, particularly when liquidation is quite costly (i.e., $S < q\lambda C_2^L$). The empty creditor case includes the possibility of liquidation due to the presence of excessive CDS holdings by creditors, who may be made better off by refusing to negotiate and instead triggering default, leading to liquidation.

PROPOSITION 1. The impact of CDS contracts on a firm's debt is greater

(a) the more creditor-friendly the bankruptcy codes of the country in which the firm operates $\left(\frac{\partial \Delta B}{\partial \gamma} \geq 0\right)$,

[11] The condition $N \leq \lambda C_2^H$ is implicitly imposed. Without this upper bound of N, renegotiation between the firm and creditors could *always* fail and the debt price degenerates to S, the liquidation value. We exclude this degenerate case from our analysis.

(b) the higher the liquidation value of the firm's assets $\left(\frac{\partial \Delta B}{\partial S} > 0\right)$,

(c) the weaker the contract enforceability in the jurisdiction in which the debt is issued $\left(\frac{\partial \Delta B}{\partial \lambda} < 0\right)$, *and*

(d) the more concentrated the shareholder ownership of the firm $\left(\frac{\partial \Delta B}{\partial q} < 0\right)$.

PROOF. See Appendix B.■

When the enforcement of debt contracts faces significant limited-commitment problems due to a weak institutional environment (low λ, low q), well-functioning credit derivatives contracts such as CDS can help firms overcome such institutional barriers. However, when the contingent payoff of the derivatives is affected by local legal regimes (low γ), the effects of the CDS contract may be significantly limited. Moreover, when creditors over-insure their debt positions through CDS contracts, liquidation becomes more likely than successful private renegotiation. Under such circumstances, a higher liquidation value helps reduce the cost of debt capital that the firm must raise for its positive net present value (NPV) investments.

PROPOSITION 2. The marginal impact of a firm's CDS contracts on the market value of the equity of the firm is greater

(a) the more creditor-friendly the bankruptcy code of the country in which the firm operates,
(b) the higher the liquidation value of the firm's assets,
(c) the weaker the contract enforceability in the jurisdiction in which the debt is issued, and
(d) the more concentrated the shareholder ownership of the firm.

PROOF. Proposition 1 shows that the time-0 market value enhancement of a debt claim with a face value F is greater under the conditions noted in (a)–(d). In other words, the firm can raise the same market value of debt at time 0 by promising a smaller face value than F, say F', where $F' < F$ under these conditions. Equivalently, the firm can raise a larger amount of debt capital today at time 0, B', where $B' > B$, with the same promised payment F. In the latter case, the incremental debt capital can be used to invest in positive NPV projects (if any). Hence, if the firm was previously capital constrained and unable to accept all positive NPV projects, it could then undertake more such projects once CDS contracts are traded on the debt and add to the market value of its equity. In that case, both investment and shareholder value go up under the conditions assumed in (a)–(d) above.■

PROPOSITION 3. Strategic default by shareholders of a firm with CDS contracts on its debt is less likely when the bargaining power of the firm's creditors with CDS is stronger. Consequently, the risk borne by shareholders increases

(a) the more creditor-friendly the bankruptcy code of the country in which the firm operates,

(b) the weaker the contract enforceability in the jurisdiction in which the debt is issued, and

(c) the more concentrated the shareholder ownership of the firm.

PROOF. This follows directly from the condition $\tilde{F}_C^i \geq F_C^i$ for $\forall i = L, H,$ when $\gamma N > q\lambda C_2$.■

D. Empirical Predictions

Based on the insights from the extended Bolton and Oehmke (2011) model presented above, we derive the following formal hypotheses:

HYPOTHESIS 1. The introduction of CDS is more likely to enhance debt capacity in countries with creditor-friendly bankruptcy codes, low liquidation cost, weak contract enforceability, and more concentrated shareholder ownership.

HYPOTHESIS 2. Any increase in investment after the introduction of CDS will be more evident in countries with creditor-friendly bankruptcy codes, low liquidation cost, weak contract enforceability, and more concentrated shareholder ownership.

HYPOTHESIS 3. Following the introduction of CDS, the risk of equity returns increases more in countries with creditor-friendly bankruptcy codes, weak contract enforceability, and more concentrated shareholder ownership.

V. Methodology

The decision whether to introduce CDS on an individual firm headquartered in a particular country is endogenous, and it may be affected by characteristics of both the firm and the country. For instance, it may well be that CDS contracts are introduced on levered firms that are already distressed and are likely to face a higher probability of default. In addition, the introduction of such contracts may be affected by the development of debt markets, property rights, or bankruptcy codes in each country. If such endogeneity is not taken into account, estimates of the effect of CDS introduction could be biased, since the firms that have CDS introduced on them (i.e., the treated firms) or the countries in which CDS are introduced may differ on relevant dimensions from firms or countries that do not

have CDS introductions. That is, measured differences in the outcomes of CDS introduction may be due to differences in firms' or countries' characteristics, or covariates, rather than the introduction of the CDS itself.

Other studies have addressed this concern through the use of firm-specific instruments for CDS introduction. However, in an international sample, the standard instrumental variable regression approaches widely used in U.S. samples in the literature are unlikely to satisfy the exclusion restriction due to additional confounding factors at the country level. For example, instruments such as CDS trading, used in Saretto and Tookes (2013), may be correlated with the emergence of CDS markets in different countries, and therefore related to features of the countries' debt markets. Similarly, lenders' capital ratios and lenders' portfolio concentration measures, which have also been used in the literature (see, e.g., Saretto and Tookes (2013), Subrahmanyam, Tang and Wang (2014) and Shan, Tang and Yan (2015)) can be confounded with banking regulations that may also affect availability of CDS to borrowers from the same country as the lenders. And, imposing "different country" restrictions on these lenders and borrowers results in a very significant (> 90%) reduction in sample size and a loss of power in our statistical tests. Such restrictions also introduce the possibility of selection biases associated with factors related to firms' foreign financing opportunities.[12] In addition to selection bias, imposing additional data availability restrictions will necessarily reduce variability in the legal, financial and political environments that we consider, and, as a consequence, may reduce the precision of our estimates.

We take endogeneity into account by deriving empirical predictions from our structural CDS model and through our choice of empirical method. The method, propensity weighting, is relatively new and, to our knowledge, has not been used previously in the finance literature. This weighting was developed by Li, Morgan, and Zaslavsky (2017), who term these weights "overlap weights," since the method creates a sample with the most overlap in covariates between the treated and non-treated groups. The intuition behind the method is fairly straightforward. We begin by estimating the probability that individual firms will experience a CDS introduction. This step is similar to that for propensity-score matching. However, matching may reduce sample size, particularly in settings where there

[12] Other instruments, such as geographical distance to New York (see, e.g., Shan, Tang and Yan (2015)) are not suitable in an international setting.

are multiple sets of characteristics to take into account (e.g., firm and country characteristics). Propensity weighting, in contrast, uses every observation in the sample with a positive probability of being included in both the treated and control groups.

Instead of matching, we use the estimated propensities to reweight observations in the sample in order to reduce differences in the characteristics of treated and non-treated firms. In effect, this method creates a synthetic sample for which the distribution of pretreatment variables, or covariates, is balanced across treated and nontreated firms. In this synthetic sample, there is no correlation between the treatment and the observed covariates. In addition, the size of the synthetic sample is typically much larger than that in the matching analysis, which is a particular advantage in our case as the number of firms that have CDS introduced on them is small in comparison to the total number of firms in the sample.

Specifically, consider a sample of n firms. Each firm can belong to one of two groups, where Z_{it} is the (binary) variable that indicates group membership in year t; in our case, $Z_{it} = 1$ represents the treatment, or the case where a CDS is introduced on the firm. For each firm, we observe an outcome Y_{it} and a k-dimensional set of covariates X_{ikt} in each year t. The propensity score is the probability that we observe a CDS introduction, given the covariates: $p_{it}(x_t) = \Pr(Z_{it} = 1 \mid X_{ikt} = x_t)$.

The overlap weights proposed by Li, Morgan, and Zaslavsky (2017) are

$$w_{it}(x_t) = \begin{cases} p_{it}(x_t), & for\ Z_{it} = 0 \\ 1 - p_{it}(x_t), & for\ Z_{it} = 1 \end{cases} \tag{4}$$

Note that this method weights each individual firm (treated or non-treated) by the probability that it will be assigned to the *opposing* group (non-treated or treated). Consider an individual firm that has a high estimated propensity for treatment and does, in fact, receive the treatment; this type of firm is relatively common, as it has covariate values that are comparable to those of other treated firms. Such a firm will be down-weighted to account for the commonness of its observation. In contrast, a treated firm with a low predicted probability of being treated will receive a higher weight. As a result, individual firms with a low (high) predicted probability of treatment that actually receive the treatment will be up- (down-)weighted; the up-weighting allows the low-propensity treated firm to represent a larger group of similar firms that did not receive the treatment. Similarly, for non-treated firms, those

with a low (high) probability of treatment will be down- (up-)weighted. This weighting of observations yields a synthetic sample of treated and non-treated firms with balanced covariates by construction.[13]

The method proposed by Li, Morgan, and Zaslavsky (2017) is related to inverse probability weighting, as described by Hirano and Imbens (2001). As the name suggests, inverse probability weighting uses the reciprocal of the estimated propensity for treatment to weight observations in the sample. However, inverse probability weighting has the drawback that when estimated probabilities are very small, weights can become extremely large and the resulting estimates become unstable. Rescaling of weights or arbitrary truncation/winsorization of extreme weights is typically used to address this problem. In contrast, the overlap weights proposed by Li, Morgan, and Zaslavsky (2017), which we use in this paper, are bounded between 0 and 1, do not require truncation, result in exact balance of the covariates, and, for plausible distributions of propensity weights, are associated with smaller standard errors in the estimates of treatment effects. Intuitively, the overlap weighting method results in a synthetic sample that can be interpreted as the set of firms that have a substantial probability both of having CDS introduced and of not having CDS contracts available. We estimate the effects of CDS introduction on this propensity-weighted sample.

Similar to other techniques that use propensity scores to match or weight observations, overlap weighting is based on a set of observed covariates and thus, in principle, is subject to possible omitted variable biases. Therefore, in a second step, we analyze whether our results are sensitive to the possibility of unobserved confounding variables, adapting a methodology proposed by Ichino, Mealli, and Nannicini (2008). The approach includes simulated unobserved covariates in the logit model that estimates the propensity of CDS introduction. Subsequently, the resulting confounded weights are incorporated into the outcome regressions using the same regression specifications as in

[13] There are other methods of achieving balance in treated and non-treated samples prior to estimating treatment effects; these methods include the use of covariate balancing propensity scores (CBPS) (Imai and Ratkovic (2014)) and the use of entropy balancing (see, e.g., Hainmueller (2012)). The use of CBPS involves fitting the propensity score model subject to the constraint of matching (potentially multiple) moments of the covariate distribution. This method can improve asymptotic efficiency at the expense of finite sample balance. In contrast, entropy balancing bypasses the estimation of the propensity score entirely and solves directly for the set of weights that create better balance in the moments of covariates by minimizing the distance between the synthetic sample and the original sample. Although each of these methods has the same goal, the overlap weighting method has the advantages that it yields the minimum variance of the treatment estimate among all balancing methods and gives more attention to the "overlap" population—the group of "marginal" firms that have an approximately equal probability of experiencing and not experiencing CDS introduction. In our view, firms in this group are more exposed to a shift in policy regarding CDS availability, and it is these firms for which the effects of CDS introduction are most salient.

our main analyses. This analysis allows us to assess the sensitivity of the estimates of interest to simulated unobserved confounders that affect *both* the treatment selection and the outcome variable, since such a confounder would bias the estimated treatment effect.[14]

Specifically, following Ichino, Mealli, and Nannicini (2008), we use two alternative methods to simulate confounders. In the first method, we estimate the effect of "calibrated confounders," which are specified to have an empirical distribution similar to the existing, observable covariates in the logit regression.[15] In the second method, we test whether more extreme "killer confounders" exist that could drive the estimated treatment effect to zero (Ichino, Mealli, and Nannicini; 2008). Thus, using different assumptions about the distribution of confounding factors, we can assess the robustness of the average treatment effect and test whether there exists a plausible set of confounders that eliminates the estimated treatment effect.

In Section VII.E, we analyze the robustness of our results along a number of additional dimensions. These tests include the use of additional controls in the propensity-weighting method. We also confirm the key conditional independence of our treatment assignment using alternative OLS estimations. In addition, we re-estimate the effects of CDS using CDS existence as the variable of interest, rather than CDS introduction; finally, we examine the sensitivity of our inferences to the exclusion of U.S. firms from the sample.

VI. Data

Our sample consists of all firms that have market data available on DataStream and accounting data available on WorldScope. We exclude financial firms; banks, insurance companies, real estate and other investment trusts, etc., with SIC codes 60–69. We also exclude all firm-year observations that have zero or negative values for Total Assets. Further, we exclude non-primary issues, U.S. OTC Bulletin Board and "Pink Sheet" stocks, and firms that have missing country or firm identifiers. Our final sample consists of an unbalanced panel of more than 56,000 firms across 50 countries over the

[14] Other techniques, such as Rosenbaum (1987), assess the sensitivity of significance levels and confidence intervals, rather than the sensitivity of point estimates (see Bartram, Brown and Conrad, 2011).

[15] Since calibrated confounders are constrained to be binary variables, we use binary transformations of continuous covariates (indicating whether an observation is above or below the median of that variable).

period 2001–2015. For these firms, we obtain monthly stock returns (in U.S. dollars [USD]) and market capitalization (in both USD and local currency) for individual stocks, as well as returns on the value-weighted local and global DataStream stock market indices. Accounting variables are in millions of units of local currency and include determinants of CDS availability as well as general firm characteristics (such as total assets, sales, profitability, leverage, and cash and short-term investments). All firm-level variables are winsorized at the top and bottom five percentiles and use logical limits to mitigate the effect of data errors.

Industry fixed effects are based on the Fama-French 48-industry classification. Various legal, institutional, and financial market characteristics across countries are obtained from the data available from other existing studies (La Porta et al. (1998); Djankov, McLiesh, and Shleifer (2007); and Djankov et al. (2008), among others), as well as from several major cross-country databases, including those of the International Country Risk Guide, the World Bank, and the Bank for International Settlements. Finally, CDS data are obtained from Markit.

Firms are identified as reference entities if they have CDS of any maturity during the observation year. Because the CDS data start in 2001, we can only identify CDS introductions beginning in 2002. When we refer to CDS firms and non-CDS firms, this pertains specifically to firm-year observations with and without CDS introductions. Thus, prior to CDS introduction, firm-year observations of eventual CDS firms are treated as non-CDS firms. In order to focus the identification on the introduction of CDS, we do not include firm-year observations of CDS firms after the introduction of CDS, in our main results. Appendices C and D provide definitions and summary statistics for the variables used in this paper.

VII. Results

A. CDS Availability and Introductions

Summary statistics of the sample by country and industry are reported in Table 1. In Panel A, we report the number of firms with available CDS by country and by year. Each year, there are on average 1,225 firms with available CDS. CDS availability is more common in developed countries: CDS on firms in the United States and Japan make up more than 64% of the sample. Other developed countries, such as the UK, France, Germany, and Canada, also have a relatively high proportion of CDS firms. In recent years, however, the number of firms with available CDS in countries such as India,

Hong Kong, Taiwan, and Singapore has increased.[16] The numbers of CDS introductions by country and year are reported in Panel B. CDS introductions were relatively numerous prior to the financial crisis, with the number of introductions declining sharply after 2007.

In Table 1, Panel C, we report the number of firms in each industry that have CDS available by year, using the Fama-French 48-industry groupings. We see significant variation in the patterns of CDS availability across industries. Broadly speaking, industries associated with relatively high levels of property, plant, and equipment (PP&E) (utilities, communication, transportation, oil and gas, and chemicals) appear more likely to have CDS based on their credits, while industries associated with services (fabricated products, personal services), commodities (agriculture, coal, and precious metals) and government (private defense companies) tend to have lower levels of CDS availability.[17]

B. Firm Characteristics, Country Characteristics, and CDS Introduction

The variation in CDS availability across sectors, observed in Panel C of Table 1, suggests that there are systematic differences in firms that have CDS introduced. In addition, the evidence reported in Panels A and B of Table 1 suggests that differences in country characteristics may also influence CDS introduction. We estimate the propensity of CDS introduction allowing for both firm- and country-specific characteristics.

The specific metrics of firm characteristics that we consider include measures related to size (total assets measured in USD), profitability (Tobin's *q*, market-to-book equity ratio, return on assets, gross profit margin), cash flow (dividend, cash flow to sales, free cash flow to total assets), investment (cash and short-term investments, ratios of capital expenditure and R&D to assets, and net PP&E to size), capital structure (market leverage at the firm and industry levels, ratio of convertible debt to size, debt maturity), and risk (return volatility in local currency and USD, volatility of return on assets, net foreign exchange exposure). We also include the firm's age and estimates of the firm's tax rate.

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[16] Note that there are no Chinese firms in the sample. The raw data from Markit include 23 Chinese firms. Of these, 13 are classified as financial institutions, and 7 are government affiliates, which we exclude due to their potential for being bailed out. The remaining three nonfinancial, nongovernmental firms include two whose primary listing is not in China, but in Hong Kong; these two firms are excluded because they do not meet the requirement that the primary trading location and operations be in the same country. Finally, the remaining firm (China Petroleum & Chemical Corporation) is excluded because of a data error in the Thomson database.

[17] Note that, relative to the full sample, the number of firms with available CDS is relatively small. As a consequence, matching techniques will have the disadvantage that significant portions of the overall sample are excluded from the analysis.

Country characteristics are standardized and include four categories of the local legal and financial environment: creditor rights, property rights, the availability of private credit, and the concentration of equity ownership. To measure the strength of creditor rights, we follow La Porta et al. (1998) and consider four dimensions of creditor protection: (1) restrictions on the borrower's entering reorganization without the creditors' consent (*Restrictions on Entry*); (2) no automatic stay or asset freeze to protect the firm from creditors (*No Automatic Stay*); (3) restrictions on current management's administration of the assets while in reorganization (*Management Does Not Stay*); and (4) priority of secured creditors in payments resulting from liquidation (*Secured Creditors First*). Each of the creditor rights variables is measured as an indicator variable, with a value of 1 indicating stronger creditor rights. The overall *Creditor Rights* index is the sum of the four individual indicator variables.

For measures of property rights, we use three indicators from the International Country Risk Guide developed by the PRS Group. *Law & Order* captures the strength and impartiality of the legal system as well as popular observance of the law. *Corruption* is a measure of corruption within the political system that can threaten foreign investment. *Political Risk* measures political stability within the country, using a variety of measures. Higher scores for these indices indicate better ratings (i.e., a better legal environment, less corruption, lower political risk) and, thus, better property rights.

The strength of the private credit market is measured by domestic credit extended by financial corporations to the private sector scaled by GDP (*Domestic Credit to Private Sector*), and by total credit to the private nonfinancial sector scaled by GDP (*Private Credit*), obtained from the World Development Indicators database of the World Bank and the BIS Total Credit Statistics, respectively. Finally, we use a measure of *Ownership Concentration* to capture monitoring by equity investors in the firm. This is calculated as the average percentage of common shares owned by the three largest shareholders in the 10 largest nonfinancial, privately owned domestic firms in a given country (La Porta et al. (1998)).

We estimate logit regressions in which the dependent variable is equal to 1 if CDS are introduced on an individual firm in a particular year, and 0 otherwise. In all regressions, we use year and industry fixed effects, with industries defined using the Fama-French 48-industry classifications. Standard errors are clustered at the firm level. All explanatory variables are lagged by one year.

Results from the logit regressions are reported in Table 2. Coefficients on the aggregate *Creditor Rights* index, as well as three of the four components of creditor rights, are negative and statistically significant. Specifically, we see coefficients of -0.132 (*t*-statistic = 3.1) on the *Creditor Rights* index, and

coefficients of -0.129 (*t*-statistic = 2.7), -0.316 (*t*-statistic = 6.2) and -0.130 (*t*-statistic = 2.7) on *Restrictions on Entry*, *No Automatic Stay*, and *Management Does Not Stay*, respectively. These results indicate that CDS are less (more) likely to be introduced on firms that operate in countries with strong (weak) creditor rights. The exception to this is the case in which secured creditors receive priority in payments from the proceeds of liquidation (*Secured Creditor First*). For that variable, the coefficient is statistically significant and positive, indicating that CDS introductions are more likely in environments that feature priority protection for creditors in the event of liquidation.

Property rights variables have no significant effect on the propensity to introduce CDS. In contrast, if the domestic credit market scaled by GDP is robust, CDS are more likely to be introduced (coefficient on *Domestic Credit to Private Sector* = 0.332, *t*-statistic = 5.4). This is consistent with CDS providing hedging benefits to domestic creditors, where that credit is a significant source of financing for firms. Finally, CDS are less (more) likely to be introduced in countries where ownership concentration is high (low); the coefficient on *Ownership Concentration* is negative and statistically significant (coefficient = -0.372, *t*-statistic = 7.3). This may indicate a stronger interest in CDS protection in circumstances in which a more dispersed ownership base might be expected to engage in relatively little monitoring. Ownership concentration is the most important determinant of CDS introduction across different country characteristics.

More generally, these results indicate that there are substantial differences in the characteristics of firms that experience CDS introduction compared to those that do not. In Table 3, we report descriptive statistics for the subsamples of firms that do and do not experience CDS introduction during our sample period. In addition to reporting means and standard errors, we report statistical tests for differences between these two subsamples, including *t*-tests for differences in the means and Kolmogorov-Smirnov tests for differences in the distributions of the characteristics. We also report a measure of bias between the two subsamples, calculated as in Rosenbaum and Rubin (1985).

These results clearly indicate systematic differences in both firm and country characteristics for the sample of firms with CDS introductions. Differences in average characteristics are generally highly statistically significant. The Kolmogorov-Smirnov test for differences in distributions are also highly significant in all but one country characteristic (the distribution of *Secured Creditor First*). Moreover, the majority of the bias measures indicate that the differences between firm and country characteristics across the two subsamples are also economically significant.

Combined, the results in Tables 2 and 3 reinforce the case that firms with CDS are different along many dimensions from those without them. In fact, it is virtually impossible to obtain firms with and without CDS that are closely matched across all dimensions. As a consequence, in estimating the effects of CDS introduction, we must control for these differences in covariates. In the next section, we discuss the construction of the overlap weights that we use to balance covariates across the subsamples and so correct for these differences in estimating the effects of CDS introduction.

C. Overlap Weight Calculation

To calculate overlap weights, we begin with logit regressions, again using an indicator variable for CDS introduction as the dependent variable. That is, we estimate the propensity that an individual firm *i*, operating in country *j* and in industry *k*, experiences a CDS introduction in year *t*. We use all firm and country characteristics described above jointly as explanatory variables, as well as industry and year fixed effects. Researchers such as Wooldridge (2002), Li, Morgan, and Zaslavsky (2017), and Curtis, Hammill, and Eisenstein (2007) point out that in estimating the propensity model, parsimony is not a consideration, since the model is not used to draw inferences, but only to balance the covariates in the two subsamples.

We use the selection model to estimate the probability of CDS introduction, $p_{it}(x)$, and then weight each observation by w_{it} as described in Section V above. This overlap weighting method balances the covariates in the two subsamples. In Figure 1, we illustrate the effect for selected covariates. In each panel, we present (in the left chart) the distribution of the covariate in the treated and control samples prior to overlap weighting and (in the right chart) the distribution of the covariate in the treated and control samples following the application of overlap weights. It is clear that the weighting method balances the covariates between the subsamples of firms with and firms without CDS introductions. In Appendix E, we present descriptive statistics of the two subsamples before and after overlap weighting. By construction, the overlap weights produce an exact balance in the treated and control groups.

Using the overlap weighting method, we create a synthetic sample in which CDS and non-CDS firms have the same distribution of covariates. We then use this propensity-weighted sample to estimate how CDS introduction affects firms; the outcomes that we examine include the firms' capital structure, investment choices, and risk.

D. CDS and Corporate Financial Policies

An important aspect of our analysis is the examination of whether the local legal and economic environment influences the effects of CDS on real decision in the firm. In Appendix D, we report correlations between country variables used in our analysis. Not surprisingly, many of these correlations are quite strong. For example, the correlations between property rights variables (*Political Risk*, *Corruption* and *Law & Order)* are all strongly positive; variables related to the size of private credit markets are strongly and positively related to one another, and *Ownership Concentration* is significantly correlated with creditor rights, property rights and credit variables. These correlations are not a concern when estimating propensity weights; however, in measuring treatment effects, collinearity in these variables makes inferences more difficult. As a consequence, in estimating treatment effects, we estimate the effects of country characteristics and the interaction effects of CDS introduction and individual country variables related to creditor rights, property rights, credit markets and ownership concentrations in separate regressions.[18]

(a) Leverage

In Table 4, we analyze the effects of CDS introduction on firms' leverage. Panel A shows our main results from panel estimations. In regression (1), CDS introduction is associated with a positive and significant increase in leverage. The magnitude of the coefficient (0.0123, *t*-statistic =2.20) is economically significant. Since the average firm leverage observed in our sample is 0.18, this coefficient indicates an approximate 6.8% increase in leverage associated with CDS introduction. Moreover, the coefficient on CDS introduction is positive and significant in every specification that we consider in Table 4.[19]

We see evidence consistent with Proposition 1 that following CDS introduction firms in countries with stronger creditor rights along two dimensions have significantly higher increases in leverage. Specifically, coefficients on the interactions of CDS introduction and both *Restrictions on Entry* and *Secured Creditors First* are positive and statistically significant. We consider each of these in turn. The

[18] We performed robustness checks in which we estimated the effect of CDS introductions interacted with various combinations of multiple country-specific variables. Although the statistical significance associated with individual interaction effects varied, the signs of estimated coefficients were consistent across all specifications that we considered, with the exception of those on ownership concentration. These results are the weakest in our separate regressions and are more sensitive to the inclusion of multiple country variables; as a consequence, they should be interpreted with caution.

[19] These results are broadly consistent with the findings of Saretto and Tookes (2013) and Subrahmanyam, Tang, and Wang (2014) in the North American context.

significant effect of the restriction on entry into reorganization is consistent with the implications of the model. Note that the firms' entry into reorganization can serve as a credit event and consequently trigger payments due under CDS obligations. In the context of the model, creditors who have access to CDS protection in legal environments that give them control over entry into reorganization have substantially higher bargaining power. This bargaining power allows the firm to overcome a limited-commitment problem in the issuance of debt and, consequently, the firm is able to sustain more leverage. This result is particularly interesting in light of differences in events that trigger CDS in North America versus other regions in the world. That is, since the Big Bang Protocol in 2009, in North America reorganizations are not included in the list of credit events that trigger CDS payments, while they can trigger such payments in regions other than North America.[20]

The second dimension of creditor rights that is associated with a significant positive coefficient on leverage following CDS introduction is *Secured Creditor First*. This result is consistent with the model's implication regarding liquidation cost. Specifically, the results of the model predict that the impact of CDS on debt, particularly when empty creditors could force the reference entities into liquidation rather than restructuring, will be larger where liquidation costs are lower (or liquidation values are higher). In cases in which the bankruptcy code specifies the priority of payout, the bargaining position of creditors should be stronger and the loss of value related to liquidation should be smaller (see, e.g., Davydenko and Franks (2008)).

In contrast to the significant coefficients on *Restrictions on Entry* and *Secured Creditors First*, we find no significant effects on leverage for the interaction of CDS introduction and either *No Automatic Stay* or *Management Does Not Stay*. That is, while the availability of CDS appears to influence capital structure through effects on entry into and exit from the reorganization process, CDS do not appear to affect leverage through differences in creditors' rights that bind *during* the reorganization process. Put simply, in terms of the effects of CDS introduction on leverage, all creditor rights are not alike.

We find evidence that the availability of CDS increases leverage in countries with weaker property rights: the coefficients on *Law & Order* and *Political Risk* are negative and highly significant. This evidence is consistent with the model's prediction that leverage increases more strongly in countries with weak contract enforceability. In other words, CDS provide a substitute for weak property rights.

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[20] The inclusion of CDS where restructuring is excluded as a credit event should bias our results against finding significance for *Restrictions on Entry*.

Intuitively, these contracts may act as a firm-specific liberalization mechanism, facilitating an increase in credit in countries where poor enforceability of property rights acts as a constraint on the supply of credit. This interpretation is also consistent with the arguments in Bae and Goyal (2009) that, along with creditor rights, property rights are an important determinant of the credit that is available to firms. Indeed, across regressions, *Political Risk* is the country variable that is most important in conditioning the relation between leverage and CDS introductions.

The effect on leverage is reduced when the private credit market is already robust: the coefficient on *Private Credit* is negative and significant (coefficient = -0.0255, *t*-statistic = -3.5). Finally, we observe a positive and weakly significant coefficient on *Ownership Concentration*. This result is consistent with the implications of the model; it suggests that any excessive lending or reduction in monitoring by creditors in countries that have newly introduced CDS is mitigated in countries where equity ownership is concentrated, where creditors' bargaining power is weaker, and where equity holders are expected to engage in more monitoring.

Panel B of Table 4 reports results from sensitivity analyses conducted to assess the effect of potential omitted variable bias on the results in Panel A. For each regression specification, we report the minimum and maximum coefficient for the interaction variables across simulations with 100 iterations each of alternative calibrated and killer confounders. The reported minimum/maximum values are the most extreme confounding effect across all simulations and, thus, represent the most conservative inferences; all other simulations yield values within these bounds. Comparing the regression coefficients on the interaction of CDS introduction and alternative country variables in Panel A with the results for calibrated confounders shows that the minimum and maximum coefficients in Panel B always have the same sign and significance levels as the corresponding estimated coefficients in the observed data. This evidence indicates that, for calibrated confounders, even when the outcome and the selection effect of an unobserved confounder is strong, inferences regarding the treatment effect are not overturned.

Killer confounders tend to result in a wider range of regression coefficients, but even here we observe that the direction and strength of the relations are similar to those in Panel A, indicating that the outcome and selection effects need to be very strong in order to "kill" the treatment effect. For example, the largest effect of potential unobservables results for ownership concentration. This variable, which is only significant at the 10% level in the original results, becomes insignificant when killer confounders are added to the propensity model; note that the sensitivity of inferences regarding the

ownership concentration results is also consistent with results obtained using combinations of, rather than individual, country-specific variables and suggests that inferences regarding this variable should be interpreted with caution. However, the inferences on other variables remain largely unchanged. Overall, the results in Panel B indicate that our primary results regarding the effect of CDS introduction on leverage are relatively insensitive to unobserved confounders.

(b) Capital Investment

In contrast to the work on the effects of CDS on financing, the literature on the effects of CDS on other real activity inside the firm is relatively modest. Subrahmanyam, Tang, and Wang (2017) show that U.S. firms that have CDS traded on them hold significantly more cash, perhaps in response to creditors who have incentives to be tougher in the event of a default. These authors suggest that CDS firms follow conservative liquidity policies in order to avoid costly negotiations with their creditors in the event of distress. Along similar lines, the results of Parlour and Winton (2013) suggest that the existence of CDS may allow for better investment decisions through more efficient risk sharing.

If the availability of CDS affects firms' financing, as the results in Table 4 suggest, do these changes represent only changes in capital structure, or is the financing used for additional investment? Furthermore, does the effect on investment vary with the local legal environment? If CDS contracts allow for better risk sharing, as well as strengthening creditors' bargaining power, then Proposition 2 predicts that their effect on investment, cash holdings, and risk taking should be larger in countries with weak creditor rights, less-well-developed financial markets, and less enforceability of law, and in civil-law countries, where case law and precedent are less relevant. In Table 5 we examine the association between CDS introduction and capital investment, including the interaction between CDS introductions and country characteristics.

In the baseline regression in Panel A, which looks at the average treatment effect across all countries, we find little evidence that the introduction of CDS has a significant effect: the coefficient is small and not significantly different from zero. However, there is some evidence that the CDS effect on capital investment is positive in countries with stronger creditor rights. In addition, this evidence appears to be driven by a positive effect in countries where there are restrictions on entry to reorganization. In particular, the coefficient on *Restrictions on Entry* is positive and significant (coefficient = 0.0054, *t*-statistic = 2.7); this variable is the most important country characteristic for investment. Recall that this is also the case where leverage effects were observed to be positive and significant. This suggests that the increase in leverage is financing at least some incremental capital investment.

Moreover, there is modest evidence that the effect of CDS introductions in countries with weak property rights also has a positive effect on investment. We observe a negative coefficient on *Political Risk,* although both the magnitude of the coefficient and its statistical significance are lower (coefficient = -0.0048, *t*-statistic = 1.7). This is consistent with the interpretation that the hedging benefits of CDS, where obligations are determined and payments occur outside of the local political environment, can compensate for political risk in the firms' operating environment; as a consequence, the supply of credit increases and incentivizes investment.

Below the main results in Panel A, Table 5 also reports minimum and maximum coefficients estimated while allowing for the effect of omitted variable bias. There is some evidence of sensitivity of the results in Panel A to unobserved confounders on investment. For example, the significance level of the interaction of CDS introduction and *Restriction on Entry* drops from the 1% level in Panel A to the 10% level in Panel B for both calibrated and killer confounders. For *Creditor Rights*, *Political Risk*, and *Domestic Credit to Private Sector* variables, the distribution of estimated coefficients shifts sufficiently so that minimum or maximum coefficients are sometimes insignificant when including possible confounders. Overall, inferences regarding the effect of CDS introduction on investment are more sensitive to possible omitted covariates than the leverage results reported in Table 4.

(c) Research and Development

Acharya, Amihud, and Litov (2011) argue that stronger creditor rights may affect firms' appetite to take on risky projects. In effect, the harsher penalties associated with distress in an environment with strong creditor protections reduce firms' ability to take on good but risky investments. We explore the effects of CDS introduction on investments that might be considered particularly risky. Specifically, we estimate the effect of CDS introduction on R&D share, measured as the ratio of R&D expenses to the sum of R&D expenses and capital expenditures.[21]

The results in Table 6, Panel A show that CDS introductions are associated with a decline in the share of R&D in capital investment; coefficients in all specifications are negative, and they are frequently statistically significant. In the baseline regression, the magnitude of the coefficient is 1.15%, indicating that CDS availability is associated with an approximate 1% decline in the share of R&D in real investment. Since the average ratio of R&D to total investment in our sample is approximately

[21] If both R&D expenses and capital expenditures are equal to zero, we code the share of R&D to be 0, rather than setting it to be missing.

15%, this represents a decline in R&D of close to 8%, which is economically significant. This result is consistent with CDS introduction improving creditor rights (if there is no legal barrier that limits contractual efficacy) and also acting as a disincentive to risky investment.

However, interactions between CDS introduction and the country variables indicate that the firms' environment has a significant influence on this effect. In particular, as we observed in both leverage and investment decisions, creditors' ability to restrict entry to reorganization is important. The coefficient on *Restriction on Entry* is negative and significant: this indicates that investment in particularly risky projects, measured by the R&D share, declines more sharply when CDS are available (i.e., when creditor rights are strengthened) and creditors act as a gatekeeper to reorganization. That is, although leverage increases in these circumstances, the incremental investments made by the firm are more likely to be made in tangible assets that can be collateralized.

In countries with robust credit markets and relatively strong property rights, the effect of CDS introduction on R&D share is significant and positive: the coefficients on *Political Risk, Domestic Credit to Private Sector*, and *Private Credit* are all statistically significant, with *t*-statistics of 3.1, 2.7, and 2.6, respectively. This suggests that the hedging benefits of CDS facilitate incremental investment in risky projects where monitoring abilities are strong and the risk of expropriation is relatively low. In terms of economic significance, *Political Risk* is the single most important country interaction term.

As the results in Panel B show, the consideration of possible unobserved confounders leads to modest changes in the inferences regarding the effect of CDS introduction on R&D intensity: *Secured Creditors First* is no longer marginally significant, as it is in Panel A, and the inference regarding the availability of private credit is weakened, since the coefficient on *Private Credit,* which is significant at the 5% level in Panel A, is insignificant for extreme confounders. However, the effects for *Management Does Not Stay*, *Domestic Credit* and *Political Risk* are significant for all simulated confounders, although the most extreme simulated confounders are associated with a drop in significance from the 1% level to the 5% level.

(d) Risk

In addition to examining the influence of CDS introduction on R&D as a proxy for risk, we also estimate its effect on the idiosyncratic volatility of equity returns in the reference entities. These results are presented in Table 7. The baseline regression estimates, and other specifications included in Panel A of the table, indicate that there is little evidence that CDS introductions affect risk. However, as in

our other results, we find evidence in line with Proposition 3 that the local environment has some influence on the effects of CDS availability.

In particular, we continue to find that creditor restrictions on firms' ability to enter bankruptcy are important. Where these restrictions are in place, idiosyncratic risk increases significantly when CDS are introduced. Given the increased propensity to invest in tangible capital in these circumstances (cf. Table 6), the increase in volatility seems unlikely to be the result of an increase in the underlying project risk. Instead, consistent with Proposition 3, this result suggests that where creditors influence firms' ability to seek protection from payment obligations, and the presence of CDS contracts bolsters creditor rights, additional residual risk is borne by equity holders rather than the firms' creditors. This interpretation is also consistent with the increase in leverage observed under these circumstances in Table 4: incremental credit is available precisely because creditor rights receive additional protection, strategic default becomes less likely, and shifting risk to the firms' creditors is more difficult. In fact, this result may at least partially explain the firms' shift to investment in tangible rather than intangible projects. We also find that idiosyncratic risk is lower after CDS introduction for firms in countries with weaker property rights, and especially in countries with higher political risk, more robust credit markets, and lower ownership concentration.

Regressions including simulated potential unobserved confounders in Panel B show that the main results are quite robust to omitted variable bias. The significance of selected variables is marginally reduced in some instances, such as *Law&Order* (down from 1% to 10% level), *Political Risk* (significant at 5% level instead of 1% level) and *Domestic Credit* (significant at the 10% instead of the 1% significance level) for maximum coefficients and killer confounders; only for *Private Credit* is the maximum coefficient with killer confounders insignificant.

Overall, the results from Tables 4-7 indicate that the introduction of CDS has statistically and economically significant effects on real decisions inside the firm. The results of the sensitivity analyses indicate that it is unlikely that possible omitted variables would overturn inferences for changes in leverage and risk associated with CDS introduction; the inferences regarding the effect of CDS introduction on changes in investment are more sensitive to potential biases related to omitted variables. Note, however, that the sensitivity analysis does not indicate that an omitted variable is likely to exist; rather, it provides an estimate of how results might change if extreme values of such confounders were to exist.

E. Robustness Tests

We carry out several further tests to document the robustness of our results. These include the use of additional controls in the propensity weighting method, the re-estimation of our results using OLS, the re-estimation of a sample that excludes U.S. firms, and the use of CDS existence rather than CDS introduction as the variable of interest.

(a) Additional controls

In Table 8 we estimate the regressions in Tables 4–7 including lagged firm characteristics as additional controls. The firm characteristics for regressions with leverage (Panel A) are *Debt Maturity*, *Market/Book*, *PPE/Size*, *Cash Flow/Sales*, *Cash and Short-Term Investments/Total Assets (log)*, *Total Assets in USD (log)*, *ROA Volatility (log)*, *Tax Rate*, and *Leverage Market Value (Industry Median)*. The firm characteristics for the capital investment and R&D share regressions (Panels B and C, respectively) are *Market/Book*, *Return on Assets (3y)*, and *PPE/Size*. The firm characteristics for the risk regressions (Panel D) are *Market/Book*, *Leverage Market Value*, and *Total Assets in USD (log)*. The inclusion of the additional controls has only a marginal effect on the sample size. Overall, the economic magnitudes and statistical significance of the effects of CDS introduction are preserved; qualitatively, the results are robust to these augmented controls, although there is some variation in the results related to interactions of CDS with risk. While many of these firm characteristics are inputs into the overlap weights, we do not observe that the inclusion of these characteristics makes the estimation of differences in outcome variables more efficient.

(b) OLS estimation

Bun and Harrison (2014) show that the ordinary least squares (OLS) estimator of the coefficient of the interaction term between an endogenous regressor and an exogenous covariate is consistent, and asymptotically normally distributed, under typical conditions.[22] Correspondingly, in our setting, the main variable of interest is the interaction between endogenous (CDS introduction) and exogenous (legal and institutional characteristics) regressors.[23] In Appendix F, we present results analogous to

[22] These conditions are generally satisfied for higher-order dependence between endogenous and exogenous regressors, i.e., the conditional joint independence between the regression outcome and the endogenous covariates, given the exogenous variable.

[23] For similar implications of the econometrics, see also Annan and Schlenker (2015), among many others. It is also worth noting that all of our creditor rights variables and the ownership concentration variable are taken from La Porta et al. (1998), and thus are predetermined prior to the beginning of our sample period.

those in Tables 4–7 using OLS, that is, without applying the overlap weights. Panels A–D in Appendix F report the OLS results for leverage, capital investment, R&D share, and risk, respectively. The sample for the OLS estimation is substantially larger than that used in the main tables, since we do not require the joint availability of all lagged firm and country characteristics needed to estimate the overlap weights. However, the point estimates of our main interaction terms are similar in terms of signs and significance levels to those in the main tables.

(c) Exclusion of U.S. firms

Note that the evidence in Table 1 indicates that approximately 40% of the CDS introductions in our sample are for U.S. reference entities, for which restructuring has been excluded as a trigger event since the 2009 Big Bang Protocol.[24] To highlight the truly global aspects of our main results as well as to confirm that *No Restructuring (XR)* CDS contracts are not driving our main findings, we re-estimate our tests excluding U.S. firms from the sample.[25] Although removing U.S. firms reduces the overall sample size, we are still left with more than 800 CDS introductions and a substantial amount of cross-sectional variation in the sample. We find that the results in the ex-U.S. sample are qualitatively similar to those reported in Tables 4–7, with the sign and significance of the variables of interest comparable to those reported in our main tests. These results are reported in Appendix G.

(d) CDS Introduction vs. CDS Existence

As part of the identification strategy, our tests are focused on the introduction of CDS rather than CDS existence, i.e. we distinguish between firm-years where sample firms had no CDS traded on them and those firm-years where CDS were first traded on sample firms. This method is similar to the difference-in-difference approach in Saretto and Tookes (2013) that focusses on the years before/after CDS introduction. In contrast, other studies often refer to CDS introduction, but actually study CDS existence by simply measuring whether a firm has CDS traded on it in a particular year or not. We investigate whether our results are sensitive to defining our CDS variable as CDS introduction as opposed to CDS existence. We find that our main results are robust to this alternative approach.

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[24] As a result, no-restructuring (XR) CDS contracts form the majority of the U.S. single-name corporate CDS contracts in the post–Big Bang period.

[25] Canadian single-name corporate CDS are also XR CDS contracts in the post–Big Bang time period. The exclusion of Canadian firms from our robustness test does not change our conclusions. These results are available upon request.

VIII. Conclusion

We analyze the impact of CDS introduction on real decision making within the firm, taking into consideration features of the local economic and legal environments of firms. We extend the model of Bolton and Oehmke (2011) to take into account uncertainty regarding whether actions taken by the reference entity will trigger CDS obligations. The model provides structure to our analysis and generates empirical predictions that we test in a sample of more than 56,000 firms across 50 countries over the period 2001–2015.

We find that CDS are more likely to be introduced on firms that are headquartered in countries with weaker creditor rights, a stronger orientation toward bank financing, and lower levels of ownership concentration. These results suggest that CDS are considered particularly valuable in circumstances in which local lenders can use them to hedge their exposure to borrowers, and in which dispersed shareholders might be expected to do relatively little monitoring.

We use a novel overlap weighting method to control for endogenous differences in the samples of firms with and without CDS introductions. We find that, after CDS introduction, the affected firms increase leverage in countries with stronger creditor rights along two dimensions. The first dimension is the case in which creditor consent is required to enter reorganization. This is consistent with the predictions of the model: creditors with CDS protection and control over entry into reorganization have substantially higher bargaining power. This mitigates the limited-commitment problem faced by the firm and allows for higher levels of leverage. The second dimension is the case in which the bankruptcy code requires that secured creditors be paid first out of liquidation proceeds. This is consistent with the model's prediction that leverage increases more strongly with the introduction of CDS (and the concomitant enhancement of creditor rights) if liquidation costs are low. In addition, the model predicts that CDS introduction will increase leverage more strongly in countries with weaker contract enforceability and high levels of concentration in equity ownership. The results are consistent with all of these predictions.

We also find evidence that the interaction between the CDS contract design and local bankruptcy codes influences the investment policies of the firm. Specifically, in cases where there are creditor restrictions on firms' entering reorganization—the circumstance in which leverage increases—the presence of CDS increases the level of capital investment by the firm. These effects are mitigated when the domestic credit market is robust, and there is some weak evidence that the increase in in-

vestment is larger in countries where property rights indices are weaker. We also find strong evidence that the effect of CDS introductions on riskier investments, which we measure using the share of R&D in total real investment, differs markedly across legal environments. That is, we find that the introduction of CDS decreases the share of R&D in countries with creditor restrictions on entering bankruptcy. This suggests that the introduction of CDS may provide an incentive for firms to invest more heavily in tangible capital. Interestingly, in countries where managers are not allowed to participate in the administration of the company during bankruptcy, the introduction of CDS increases the share of R&D in capital spending. We also find strong evidence that firms in countries with lower political risk and stronger domestic credit markets experience a larger increase in R&D share following the introduction of CDS.

Finally, we examine the effect of CDS introduction on the volatility of the equity returns of the reference entities. We find that where creditor restrictions on firms' ability to enter bankruptcy exist, idiosyncratic equity return volatility increases significantly. Given the increased propensity to invest in tangible capital in these circumstances, the increase in volatility seems unlikely to be the result of an increase in the underlying project risk. Instead, higher volatility may indicate that where creditors influence firms' ability to seek protection from payment obligations and the presence of CDS contracts bolsters creditor rights, the likelihood of strategic default declines and additional residual risk is borne by equity holders rather than the creditors of the firm.

Overall, we find substantial evidence that the introduction of CDS affects real decisions of nonfinancial firms, including choices regarding leverage, investment, and the risk of the investments taken by the firm. Importantly, we find that the legal and market environments in which the reference entity operates have an influence on the impact of CDS. The effect of CDS is larger in countries where the uncertainty regarding firms' CDS obligations is reduced, and where CDS mitigate weak property rights. These results highlight the incomplete nature of CDS contracts in global capital markets, a feature that has been largely overlooked in the burgeoning academic literature on credit derivatives. We demonstrate that real-world credit risks interact meaningfully with local legal regimes, since the recognition of underlying credit events that could trigger contractual payments is subject to the uncertainty of regulatory or judicial interpretation. Given the recent wave of credit event definition changes by the ISDA, which aims to alleviate such legal uncertainty in CDS contracts, the measurement of the extent to which such contractual remedies can effectively restore the hedging efficacy of the credit derivatives market is an important and as yet unaddressed research subject. We hope to return to this question in our subsequent research.

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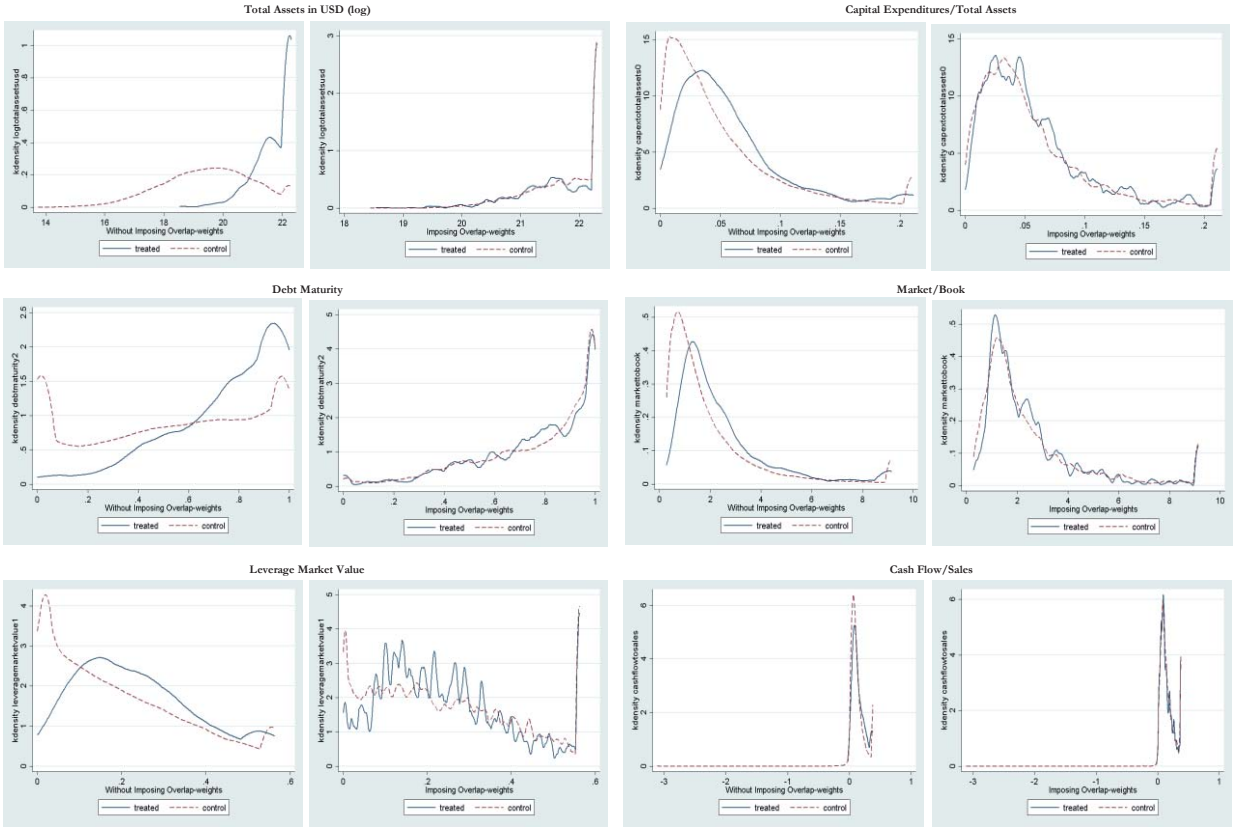
Figure 1: Covariate Balancing of Sample Firms

This figure shows the covariate balancing of sample firms a year prior to CDS introduction by plotting the distributions for treated firms (i.e., firms in the year of CDS introduction) and control firms (i.e., firms without CDS introductions in that year) before and after imposing overlap weights. Panel A shows results for selected firm characteristics; Panel B shows results for selected country characteristics. The sample consists of an unbalanced panel of more than 56,000 nonfinancial firms across 50 countries over the period 2001–2015. Market data are from DataStream, accounting data are from WorldScope, and CDS data are from Markit.

Panel A: Firm Characteristics



Panel B: Country Characteristics

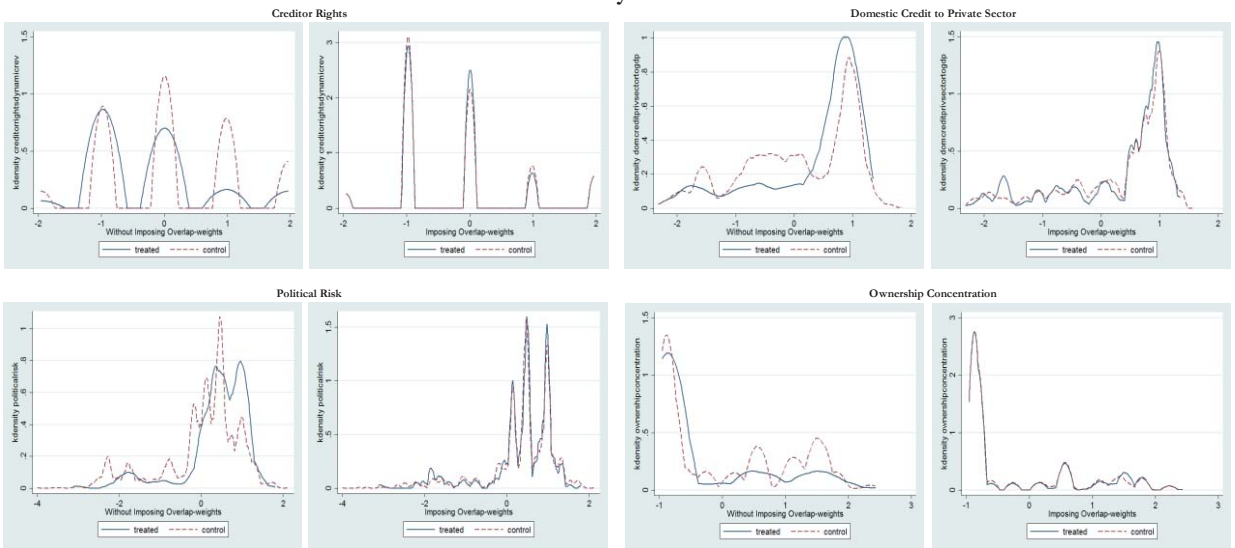


Table 1: International CDS Introductions and Availability

This table shows the number of CDS reference entities by year across countries (Panel A) and industries (Panel C). It also shows the number of CDS introductions by year across countries (Panel B). The sample consists of an unbalanced panel of more than 56,000 nonfinancial firms across 50 countries over the period 2001–2015. Market data are from DataStream, accounting data are from WorldScope, and CDS data are from Markit.

Panel A: CDS Availability by Country and Year

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average
Argentina						1	1	1	1	2	3	3	3	3		2
Australia	9	17	20	23	23	23	22	22	22	22	22	22	23	23	17	21
Austria			1	1	2	4	5	5	5	5	6	6	6	6	2	4
Bahrain										1	1	1	1	1		1
Belgium		1	1	4	4	4	3	4	4	4	4	4	4	5		4
Brazil				2	6	7	9	12	16	16	14	14	13	12		11
Canada	9	18	25	37	42	42	39	39	37	37	34	34	32	34	3	31
Chile			1	2	3	3	5	5	7	7	7	7	7	7		5
Colombia						1	1					1	1	1		1
Czech Republic		1	1	1	2	2	2	1	1	1	1	1	1	1		1
Denmark	1	1	1	3	3	3	3	3	3	3	4	4	4	4		3
Egypt							1	1	1	1	1	1	1	1		1
Finland	5	7	6	7	7	7	7	8	8	8	8	8	7	7		7
France	28	36	42	44	45	45	44	45	43	42	43	45	47	48	4	40
Germany	17	20	29	36	37	40	41	43	45	45	44	44	45	45	10	36
Greece	1	2	2	2	2	3	3	3	3	2	2	2	2	2		2
Hong Kong	4	5	7	10	14	21	30	37	38	37	39	44	45	45	7	26
Hungary						1	1	1	1	1	1	1	1			1
India		1	1	1	6	15	32	49	50	52	53	52	51	52	43	33
Indonesia					2	5	5	5	7	7	8	9	9	9		7
Ireland		1	1	1	2	1	1	1								1
Israel		1	1	1	1	1	1	1	1	1	2	3	3	3		2
Italy	7	9	10	14	15	17	18	19	20	20	18	19	22	23		17
Japan	27	61	121	202	247	267	285	289	288	286	282	278	280	276	255	230
Kazahkstan							1	1	1	1	1	1	1	1		1
Korea, Republic Of	4	9	10	11	16	17	18	20	21	23	25	27	27	27		18
Luxembourg					2	1										2
Malaysia	2	2	2	3	6	6	6	7	7	7	7	7	7	7	4	5
Mexico			1	1	3	4	7	9	10	10	12	11	11	11		8
Netherlands	8	9	13	15	15	16	12	12	12	12	12	12	12	13	1	12
New Zealand	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	2
Norway	2	2	2	3	5	5	5	7	7	6	6	6	6	6		5
Philippines			1	2	3	5	6	6	6	6	6	7	7	7	1	5
Poland	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1
Portugal	2	3	3	4	4	4	4	4	4	4	4	4	4	5		4
Qatar								1	1	1	1	1	1	1		1
Romania					1	1	1	1	1	1	1	1	1			1
Russian Federation					2	3	5	5	5	5	5	5	4	4		4
Saudi Arabia							1	1	2	2	2	2	2	2	1	2
Singapore	1	2	3	3	5	5	7	7	7	7	9	10	10	10	1	6
South Africa				1	2	2	2	4	5	5	6	6	6	6	4	4
Spain	5	7	8	11	11	11	13	13	12	10	10	12	12	12		11
Sri Lanka								1	1	1	1	1	1	1		1
Sweden	7	10	10	12	12	14	14	14	14	14	13	13	12	13	1	12
Switzerland	4	7	7	9	11	11	12	14	13	13	12	13	13	13		11
Taiwan			6	16	20	24	26	27	27	26	26	28	27	27		23
Thailand		2	2	2	6	7	10	9	9	10	8	8	8	8		7
Turkey						2	2	2	2	2	1	1	1	1		2
United Arab Emirates						1	1	1	1	1	1	1	1	1		1
United Kingdom	31	48	62	65	66	69	64	59	58	58	60	60	55	58	32	56
United States	251	347	447	566	615	641	670	661	655	634	626	623	609	599	130	538
Total	427	631	849	1,117	1,271	1,365	1,449	1,483	1,485	1,462	1,455	1,467	1,450	1,445	519	1,225

(continued)

Table 1: International CDS Introductions and Availability (continued)

Panel B: CDS Introductions by Country and Year

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Argentina					1				1	1					3
Australia	8	3	3	2			3				1	1			21
Austria		1		1	2	1				1					6
Bahrain									1						1
Belgium	1		3				1						1		6
Brazil			2	4	1	2	3	5							17
Canada	9	7	12	6	3	1		1	1		1		1		42
Chile		1	1	1	1	1		2							7
Colombia					1						1				2
Czech Republic	1			1											2
Denmark			2							1					3
Egypt						1									1
Finland	2	1					1								4
France	10	6	4	1			1			1	2	2	1		28
Germany	4	9	7	3	3	2	2	2	2						34
Greece	1				1										2
Hong Kong	1	2	3	4	7	9	7	1		2	5	1			42
Hungary					1										1
India	1			5	9	17	17	3	2			3			57
Indonesia				2	3			2		2					9
Ireland	1			1											2
Israel	1									1	1				3
Italy	2	1	5	1	2	1	1	1			1	2	1		18
Japan	34	62	81	46	24	20	10	6	1	2		2			288
Kazahkstan						1									1
Korea, Republic Of	5	1	1	5	1	1	2	1	2	2	2				23
Luxembourg				2											2
Malaysia			1	3			1								5
Mexico		1		2	1	3	2	1		2					12
Netherlands	2	3	2	1	1								1		10
New Zealand				1							1				2
Norway			1	2			2								5
Philippines		1	1	1	2	1					1				7
Poland															0
Portugal	1		1										1		3
Qatar							1								1
Romania				1											1
Russian Federation				2	1	2									5
Saudi Arabia						1		1							2
Singapore	1	1		2		2		1		2	1				10
South Africa			1	1			2	1		1					6
Spain	2	1	3			2	1				1				10
Sri Lanka							1								1
Sweden	3		2		2										7
Switzerland	3		2	2		2	2								11
Taiwan		6	10	4	4	2	1				2				29
Thailand	2			4	1	4			1						12
Turkey					2										2
United Arab Emirates					1										1
United Kingdom	18	14	5	2	7	4	4	1	2	2	2				61
United States	105	116	113	74	46	67	15	9	6	11	19	6	5	1	593
Total	218	237	266	187	128	147	80	38	19	31	41	17	11	1	1,421

(continued)

Table 1: International CDS Introductions and Availability (continued)

Panel C: CDS Availability by Industry and Year

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average
Agriculture	1	1	2	2	4	5	6	5	7	6	7	7	6	6	3	5
Food Products	11	14	20	24	31	33	36	36	36	35	36	38	38	37	18	30
Candy & Soda	4	4	5	9	10	11	12	11	11	8	9	9	9	9	1	8
Beer & Liquor	6	9	13	16	16	18	18	17	17	17	17	17	15	15	6	14
Tobacco Products	9	9	8	9	9	10	10	8	8	8	8	8	8	8	1	8
Recreation	4	7	8	12	13	12	12	12	12	11	11	11	12	12	8	10
Entertainment	5	6	8	12	14	16	19	17	18	18	16	17	16	17	7	14
Printing and Publishing	9	10	13	18	21	24	20	18	18	18	18	18	17	17	6	16
Consumer Goods	15	17	22	24	25	25	25	27	26	26	26	27	27	26	9	23
Apparel	5	6	8	12	12	11	9	10	10	11	11	9	10	9	1	9
Healthcare	3	4	10	13	13	14	14	16	17	17	17	16	16	15	2	12
Medical Equipment	4	7	10	11	12	12	15	15	15	14	15	16	17	17	7	12
Pharmaceutical Products	10	20	26	38	41	45	51	49	43	42	41	40	39	41	12	36
Chemicals	19	30	40	54	65	64	64	68	69	70	67	67	68	68	25	56
Rubber and Plastic Products	1	1		3	3	3	4	5	5	5	5	4	4	4	3	4
Textiles		1	2	4	4	4	5	6	6	6	6	6	6	5	4	5
Construction Materials	7	15	19	27	31	30	34	37	37	37	36	36	35	35	13	29
Construction	3	11	17	27	33	42	56	62	64	64	64	68	66	67	31	45
Steel Works Etc	10	13	18	29	35	35	38	44	43	44	45	46	46	46	25	34
Fabricated Products								1	1	1	1	1	1	1	1	1
Machinery	10	25	35	45	50	55	56	56	56	55	56	56	56	57	33	47
Electrical Equipment	3	6	10	12	17	18	21	22	22	21	21	18	18	18	10	16
Automobiles and Trucks	25	34	39	47	56	60	63	64	63	60	61	63	63	60	22	52
Aircraft	6	8	10	11	11	11	10	10	11	11	11	11	11	11	1	10
Shipbuilding, Railroad Equipment							2	2	2	3	4	4	3	4	2	3
Defense	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	2
Precious Metals	1	1	1	3	3	2	3	3	3	3	3	3	3	3		3
Non-Metallic and Industrial Metal Mining	3	8	13	15	16	15	17	18	18	18	19	19	18	19	6	15
Coal			1	4	5	5	6	6	6	6	6	7	6	6		5
Petroleum and Natural Gas	27	45	55	63	66	76	81	81	81	80	77	82	80	83	9	66
Utilities	43	71	87	117	137	148	150	153	150	146	147	141	143	139	32	120
Communication	46	55	74	79	92	97	101	104	107	103	102	106	105	102	24	86
Personal Services	1	3	3	4	6	6	7	7	7	8	8	9	7	8	1	6
Business Services	13	21	35	52	63	68	73	73	72	75	75	80	77	78	27	59
Computers	9	9	14	19	23	27	28	27	28	27	26	27	27	27	11	22
Electronic Equipment	15	22	38	57	65	71	69	71	71	68	67	62	61	60	22	55
Measuring and Control Equipment	4	8	10	12	13	13	14	14	14	14	13	13	13	13	8	12
Business Supplies	11	12	14	21	24	26	32	32	34	34	31	33	33	33	11	25
Shipping Containers	4	5	10	12	12	12	13	13	13	14	14	14	14	13	2	11
Transportation	21	35	52	75	79	85	87	87	89	86	88	91	94	93	44	74
Wholesale	8	14	19	22	33	36	37	40	40	38	39	38	36	36	21	30
Retail	37	44	53	69	74	81	92	94	91	90	90	87	85	85	34	74
Restaurants, Hotels, Motels	10	15	20	26	26	30	29	31	33	33	32	33	33	33	13	26
Other Industries	3	4	6	6	6	7	8	9	9	9	7	7	6	7	2	6
Total	427	631	849	1,117	1,271	1,365	1,449	1,483	1,485	1,462	1,455	1,467	1,450	1,445	519	1,195

Table 2: Propensity for CDS Introduction

This table shows the results of logit regressions in which the CDS introduction dummy (i.e., only the first year of CDS trading for each firm) is the dependent variable. Firm characteristics and (standardized) country characteristics serve as explanatory variables, and all are lagged by one year. Country variables are grouped into four categories: (1) creditor rights, (2) property rights, (3) private credit availability, and (4) equity ownership concentration. For creditor rights, we use an aggregate index (*Creditor Rights*) as well as its four subindices, namely restrictions on a firm's entering reorganization without creditors' consent (*Restriction on Entry*); no "automatic stay" or "asset freeze" (*No Automatic Stay*); restriction on management's administration of the firm's assets pending resolution of the reorganization (*Management Does Not Stay*); and payment of secured creditors first out of any liquidation proceeds (*Secured Creditors First*). For property rights, we consider the following three measures: *Law & Order*, *Corruption*, and *Political Risk*, where higher index values indicate stronger protection for private properties. Private credit availability is measured by domestic credit by financial corporations to the private sector scaled by GDP (*Domestic Credit to Private Sector*) and by total credit to the private nonfinancial sector scaled by GDP (*Private Credit*). All regressions include the following firm characteristics: the natural logarithm of total assets (in USD), Tobin's *q*, the market-to-book equity ratio, return on assets (3-year average), gross profit margin (3-year average), a dividend dummy, cash flow to sales, free cash flow to total assets, the natural logarithm of cash and short-term investments, capital expenditures to total assets, R&D to assets, net PP&E to size, market leverage, industry median market leverage, convertible debt to size, debt maturity, return volatility in local currency and in USD, volatility of return on assets, net foreign exchange exposure, firm age, and tax rate. Regressions also include year and Fama-French 48-industry fixed effects. Standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. The sample period is 2002–2015.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
		Creditor Rights				Property Rights			Private Credit Availability		
	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not Stay	Secured Creditors First	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
Country Variable	-0.132***	-0.129***	-0.316***	-0.130***	0.240***	0.049	-0.012	-0.016	0.332***	-0.070	-0.372***
	(0.042)	(0.048)	(0.051)	(0.049)	(0.048)	(0.041)	(0.049)	(0.056)	(0.062)	(0.054)	(0.051)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005
Pseudo R-Squared	0.396	0.396	0.400	0.396	0.398	0.395	0.395	0.395	0.399	0.395	0.401

Table 3: Firm- and Country-Level Characteristics without Imposition of Overlap Weights

This table compares firm- and country-level characteristics between firm-years with CDS introductions (Treated) and without CDS introductions (Control) in the prior year. It reports the mean and standard errors for treated and control firms; the percentage bias according to Rosenbaum and Rubin (1985); and test statistics and *p*-values of *t*-tests and Kolmogorov-Smirnov tests. The sample consists of an unbalanced panel of more than 56,000 nonfinancial firms across 50 countries over the period 2001–2015. Market data are from DataStream, accounting data are from WorldScope, and CDS data are from Markit. The sample is limited to firm-year observations for which all reported firm- and country-level variables are jointly available. Given the differences in characteristics between treated and control firms, we use overlap weights (Li, Morgan, and Zaslavsky (2017)) for our main analysis that balance the covariates between these samples (see Appendix E).

	Treated (N=782)		Control (N=79,223)			t-test		Kolmogorov-Smirnov test	
	Mean	Std. Err.	Mean	Std. Err.	% Bias	*t*	*p*-value	D	*p*-value
Firm Characteristics									
Cash Flow/Sales	0.148	0.004	0.112	0.001	28%	6.61	0.000	0.1394	0.000
Convertible Debt/Size	0.011	0.001	0.002	0.000	53%	22.07	0.000	0.2050	0.000
Debt Maturity	0.756	0.008	0.528	0.001	78%	18.68	0.000	0.3067	0.000
Dividend	0.835	0.013	0.759	0.002	19%	4.93	0.000	0.0757	0.000
Free Cash Flow/Total Assets	0.025	0.002	0.026	0.000	-2%	-0.49	0.628	0.0658	0.002
Gross Profit Margin (3y)	0.306	0.006	0.271	0.001	20%	5.32	0.000	0.1023	0.000
Leverage Market Value	0.242	0.005	0.191	0.001	33%	8.95	0.000	0.2035	0.000
Leverage Market Value (Industry Median)	0.167	0.003	0.152	0.000	21%	5.82	0.000	0.1067	0.000
Age (log)	2.793	0.028	2.557	0.003	31%	8.85	0.000	0.2776	0.000
ROA Volatility (log)	-3.900	0.031	-3.543	0.004	-38%	-10.02	0.000	0.1487	0.000
Total Assets in USD (log)	21.772	0.023	19.529	0.006	187%	40.08	0.000	0.6941	0.000
Market/Book	2.482	0.069	1.944	0.007	28%	8.06	0.000	0.2362	0.000
Net FX-Exposure	0.119	0.008	0.117	0.001	1%	0.2	0.843	0.0747	0.000
PPE (Net)/Size	0.394	0.010	0.390	0.001	1%	0.37	0.710	0.0612	0.006
Return On Assets (3y)	0.062	0.002	0.060	0.000	3%	0.71	0.476	0.0511	0.035
Tax Rate	0.344	0.005	0.305	0.001	27%	6.87	0.000	0.1763	0.000
Tobin's Q	1.322	0.034	1.182	0.004	14%	3.84	0.000	0.2133	0.000
Return Volatility in LC (log)	-1.146	0.013	-0.969	0.002	-43%	-10.6	0.000	0.1810	0.000
Return Volatility in USD (log)	-1.108	0.013	-0.915	0.002	-46%	-11.53	0.000	0.1976	0.000
Capital Expenditures/Total Assets	0.060	0.002	0.051	0.000	18%	4.88	0.000	0.1571	0.000
R&D/Total Assets	0.014	0.001	0.010	0.000	15%	4.43	0.000	0.1154	0.000
Cash and Short-term Investments/Total Assets (log)	-2.718	0.046	-2.379	0.005	-26%	-7.11	0.000	0.1174	0.000
Country Characteristics									
Restrictions on Entry	-0.211	0.030	0.094	0.004	-32%	-8.12	0.000	0.1328	0.000
No Automatic Stay on Assets	-0.301	0.029	0.099	0.004	-43%	-10.81	0.000	0.1869	0.000
Management Does Not Stay	-0.141	0.036	0.059	0.004	-20%	-5.59	0.000	0.0997	0.000
Secured Creditors First	0.109	0.030	0.033	0.003	8%	2.2	0.028	0.0231	0.804
Law&Order	0.241	0.034	-0.049	0.004	30%	7.99	0.000	0.1323	0.000
Corruption	0.091	0.028	0.009	0.003	9%	2.33	0.020	0.1495	0.000
Political Risk	0.388	0.028	0.018	0.003	42%	10.63	0.000	0.2319	0.000
Domestic Credit to Private Sector	0.349	0.032	0.062	0.003	31%	8.36	0.000	0.2489	0.000
Private Credit	0.026	0.029	-0.010	0.003	4%	1.02	0.306	0.1328	0.000
Ownership Concentration	-0.334	0.033	0.086	0.004	-43%	-11.26	0.000	0.2629	0.000

Table 4: Effects of CDS on Leverage

The table shows the average treatment effect of CDS introductions on the market leverage (defined as the sum of total debt and preferred stock divided by market value of total asset) of the treated (ATET) using overlap weights (Li, Morgan, and Zaslavsky (2017)). Panel A shows the main results from the panel estimation with overlap weights. The treatment is the introduction of CDS (i.e., only the first year of CDS trading for each firm). The regressions further include CDS interaction effects with lagged (standardized) country characteristics, as well as the lagged country variables themselves. The use of overlap weights ensures that covariates are perfectly balanced between treated firms and control firms in the year before treatment (see Appendix E). Panel B shows results from a sensitivity analysis with regards to potential omitted variable bias. Panel B reports results from tests of the sensitivity of the main results to the effect of potential unobserved omitted variables in the estimation of the balancing weights, adapting a simulation approach proposed by Ichino, Mealli, and Nannicini (2008). The regression specifications (2) to (12) are the same as in Panel A of the table. The sensitivity analysis simulates alternatively calibrated confounders or killer confounders in the estimation of the balancing weights that are subsequently used to assess the average treatment effect on the treated (ATET) using overlap weights (Li, Morgan, and Zaslavsky (2017)). Calibrated confounders are specified to have an empirical distribution similar to the existing observable covariates in the logit regression that yields the inputs to the balancing weights. We use binary transformations of continuous covariates, i.e., indicator variables whether an observation is above or below the median of that variable. Separately, we also use killer confounders to assess whether more extreme unobserved omitted covariates exist that eliminate the treatment effect. We simulate 100 iterations of calibrated and killer confounders and re-estimate the effect of CDS introduction and country interactions for each iteration. For each outcome regression specification, the panel reports the minimum and maximum coefficients for the interaction variables across calibrated and killer confounders. Country variables are grouped into four categories: (1) creditor rights, (2) property rights, (3) private credit availability, and (4) equity ownership concentration. For the credit rights, we use an aggregate index (*Creditor Rights*) as well as its four subindices, namely restrictions on a firm's entering reorganization without creditors' consent (*Restriction on Entry*); no "automatic stay" or "asset freeze" (*No Automatic Stay*); restriction on management's administration of the firm's assets pending resolution of the reorganization (*Management Does Not Stay*); and payment of secured creditors first out of any liquidation proceeds (*Secured Creditors First*). For property rights, we consider the following three measures: *Law & Order*, *Corruption*, and *Political Risk*, where higher index values indicate stronger protection for private properties. Private credit availability is measured by domestic credit by financial corporations to the private sector scaled by GDP (*Domestic Credit to Private Sector*) and by total credit to the private nonfinancial sector scaled by GDP (*Private Credit*). All regressions include year and Fama-French 48-industry fixed effects. Standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. The sample consists of an unbalanced panel of more than 56,000 nonfinancial firms across 50 countries over the period 2001–2015. Market data are from DataStream, accounting data are from WorldScope, and CDS data are from Markit.

(continued)

Table 4: Effects of CDS on Leverage (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Creditor Rights					Property Rights			Private Credit Availability		
	Baseline	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not	Secured Creditors First	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
Panel A: Main Results												
CDS Introduction x Country		0.0042	0.0152**	-0.0055	-0.0060	0.0143**	-0.0192***	-0.0085	-0.0308***	-0.0105	-0.0255***	0.0105*
Variable		(0.0055)	(0.0067)	(0.0064)	(0.0056)	(0.0061)	(0.0056)	(0.0072)	(0.0074)	(0.0068)	(0.0073)	(0.0062)
Country Variable		-0.0010	-0.0140***	0.0009	0.0118***	-0.0095***	-0.0004	-0.0108**	0.0063	0.0026	0.0156***	-0.0043
		(0.0033)	(0.0039)	(0.0038)	(0.0040)	(0.0033)	(0.0034)	(0.0042)	(0.0046)	(0.0044)	(0.0047)	(0.0039)
CDS Introduction	0.0123**	0.0133**	0.0149***	0.0109*	0.0116**	0.0111**	0.0158***	0.0129**	0.0228***	0.0154***	0.0123**	0.0152***
	(0.0056)	(0.0057)	(0.0057)	(0.0057)	(0.0056)	(0.0056)	(0.0057)	(0.0057)	(0.0063)	(0.0060)	(0.0055)	(0.0059)
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	79,686	79,686	79,686	79,686	79,686	79,686	79,686	79,686	79,686	79,686	79,686	79,686
Adj. R-Squared	0.188	0.188	0.191	0.188	0.191	0.190	0.194	0.194	0.196	0.189	0.193	0.189
Panel B: Sensitivity Analysis												
Calibrated Confounders	Minimum	0.0039	0.0147**	-0.0062	-0.0061	0.0141**	-0.0193***	-0.0090	-0.0309***	-0.0110	-0.0258***	0.0101*
	Maximum	0.0046	0.0156**	-0.0048	-0.0056	0.0146**	-0.0187***	-0.0080	-0.0305***	-0.0099	-0.0251***	0.0109*
Killer Confounders	Minimum	0.0026	0.0115*	-0.0081	-0.0079	0.0113*	-0.0212***	-0.0089	-0.0349***	-0.0177**	-0.0299***	0.0072
	Maximum	0.0053	0.0171**	-0.0002	-0.0045	0.0146**	-0.0163***	-0.0064	-0.0254***	-0.0067	-0.0213***	0.0171**

Table 5: Effects of CDS on Capital Investment

The table shows the average treatment effect of CDS introductions on the capital investment (defined as capital expenditures divided by total assets) of the treated (ATET) using overlap weights (Li, Morgan, and Zaslavsky (2017)). Panel A shows the main results from the panel estimation with overlap weights. The treatment is the introduction of CDS (i.e., only the first year of CDS trading for each firm). The regressions further include CDS interaction effects with lagged (standardized) country characteristics, as well as the lagged country variables themselves. The use of overlap weights ensures that covariates are perfectly balanced between treated firms and control firms in the year before treatment (see Appendix E). Panel B shows results from a sensitivity analysis with regards to potential omitted variable bias. Panel B reports results from tests of the sensitivity of the main results to the effect of potential unobserved omitted variables in the estimation of the balancing weights, adapting a simulation approach proposed by Ichino, Mealli, and Nannicini (2008). The regression specifications (2) to (12) are the same as in Panel A of the table. The sensitivity analysis simulates alternatively calibrated confounders or killer confounders in the estimation of the balancing weights that are subsequently used to assess the average treatment effect on the treated (ATET) using overlap weights (Li, Morgan, and Zaslavsky (2017)). Calibrated confounders are specified to have an empirical distribution similar to the existing observable covariates in the logit regression that yields the inputs to the balancing weights. We use binary transformations of continuous covariates, i.e., indicator variables whether an observation is above or below the median of that variable. Separately, we also use killer confounders to assess whether more extreme unobserved omitted covariates exist that eliminate the treatment effect. We simulate 100 iterations of calibrated and killer confounders and re-estimate the effect of CDS introduction and country interactions for each iteration. For each outcome regression specification, the panel reports the minimum and maximum coefficients for the interaction variables across calibrated and killer confounders. Country variables are grouped into four categories: (1) creditor rights, (2) property rights, (3) private credit availability, and (4) equity ownership concentration. For the credit rights, we use an aggregate index (*Creditor Rights*) as well as its four subindices, namely restrictions on a firm's entering reorganization without creditors' consent (*Restriction on Entry*); no "automatic stay" or "asset freeze" (*No Automatic Stay*); restriction on management's administration of the firm's assets pending resolution of the reorganization (*Management Does Not Stay*); and payment of secured creditors first out of any liquidation proceeds (*Secured Creditors First*). For property rights, we consider the following three measures: *Law & Order*, *Corruption*, and *Political Risk*, where higher index values indicate stronger protection for private properties. Private credit availability is measured by domestic credit by financial corporations to the private sector scaled by GDP (*Domestic Credit to Private Sector*) and by total credit to the private nonfinancial sector scaled by GDP (*Private Credit*). All regressions include year and Fama-French 48-industry fixed effects. Standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. The sample consists of an unbalanced panel of more than 56,000 nonfinancial firms across 50 countries over the period 2001–2015. Market data are from DataStream, accounting data are from WorldScope, and CDS data are from Markit.

(continued)

Table 5: Effects of CDS on Capital Investment (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Creditor Rights					Property Rights			Private Credit Availability		
	Baseline	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not	Secured Creditors First	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
Panel A: Main Results												
CDS Introduction x Country		0.0027*	0.0054***	0.0031	-0.0013	0.0015	-0.0005	0.0001	-0.0048*	-0.0050**	-0.0035	0.0022
Variable		(0.0016)	(0.0020)	(0.0019)	(0.0016)	(0.0018)	(0.0019)	(0.0024)	(0.0028)	(0.0022)	(0.0026)	(0.0019)
Country Variable		-0.0004	-0.0007	-0.0015	0.0005	0.0007	-0.0036***	-0.0022*	-0.0042**	-0.0018	-0.0033**	0.0023*
		(0.0010)	(0.0012)	(0.0011)	(0.0012)	(0.0010)	(0.0012)	(0.0013)	(0.0017)	(0.0014)	(0.0016)	(0.0012)
CDS Introduction	0.0013	0.0019	0.0022	0.0021	0.0012	0.0012	0.0014	0.0013	0.0030	0.0028	0.0013	0.0019
	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0016)	(0.0017)	(0.0017)	(0.0017)	(0.0021)	(0.0019)	(0.0016)	(0.0018)
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005
Adj. R-Squared	0.263	0.264	0.266	0.264	0.263	0.264	0.268	0.264	0.275	0.271	0.271	0.267
Panel B: Sensitivity Analysis												
Calibrated Confounders	Minimum	0.0030*	0.0040*	0.0032	0.0002	0.0010	-0.0013	0.0002	-0.0049*	-0.0045**	-0.0025	0.0015
	Maximum	0.0035**	0.0044*	0.0037*	0.0008	0.0011	-0.0008	0.0006	-0.0041	-0.0040*	-0.0017	0.0019
Killer Confounders	Minimum	0.0022	0.0039*	0.0020	-0.0009	0.0006	-0.0022	-0.0003	-0.0075**	-0.0060**	-0.0051**	0.0034
	Maximum	0.0042**	0.0049*	0.0047**	0.0016	0.0012	-0.0004	0.0011	-0.0023	-0.0031	0.0001	0.0034

Table 6: Effects of CDS on R&D Share

The table shows the average treatment effect of CDS introductions on the R&D share (defined as R&D divided by the sum of R&D and capital expenditures) of the treated (ATET) using overlap weights (Li, Morgan, and Zaslavsky (2017)). Panel A shows the main results from the panel estimation with overlap weights. The treatment is the introduction of CDS (i.e., only the first year of CDS trading for each firm). The regressions further include CDS interaction effects with lagged (standardized) country characteristics, as well as the lagged country variables themselves. The use of overlap weights ensures that covariates are perfectly balanced between treated firms and control firms in the year before treatment (see Appendix E). Panel B shows results from a sensitivity analysis with regards to potential omitted variable bias. Panel B reports results from tests of the sensitivity of the main results to the effect of potential unobserved omitted variables in the estimation of the balancing weights, adapting a simulation approach proposed by Ichino, Mealli, and Nannicini (2008). The regression specifications (2) to (12) are the same as in Panel A of the table. The sensitivity analysis simulates alternatively calibrated confounders or killer confounders in the estimation of the balancing weights that are subsequently used to assess the average treatment effect on the treated (ATET) using overlap weights (Li, Morgan, and Zaslavsky (2017)). Calibrated confounders are specified to have an empirical distribution similar to the existing observable covariates in the logit regression that yields the inputs to the balancing weights. We use binary transformations of continuous covariates, i.e., indicator variables whether an observation is above or below the median of that variable. Separately, we also use killer confounders to assess whether more extreme unobserved omitted covariates exist that eliminate the treatment effect. We simulate 100 iterations of calibrated and killer confounders and re-estimate the effect of CDS introduction and country interactions for each iteration. For each outcome regression specification, the panel reports the minimum and maximum coefficients for the interaction variables across calibrated and killer confounders. Country variables are grouped into four categories: (1) creditor rights, (2) property rights, (3) private credit availability, and (4) equity ownership concentration. For the credit rights, we use an aggregate index (*Creditor Rights*) as well as its four subindices, namely restrictions on a firm's entering reorganization without creditors' consent (*Restriction on Entry*); no "automatic stay" or "asset freeze" (*No Automatic Stay*); restriction on management's administration of the firm's assets pending resolution of the reorganization (*Management Does Not Stay*); and payment of secured creditors first out of any liquidation proceeds (*Secured Creditors First*). For property rights, we consider the following three measures: *Law & Order*, *Corruption*, and *Political Risk*, where higher index values indicate stronger protection for private properties. Private credit availability is measured by domestic credit by financial corporations to the private sector scaled by GDP (*Domestic Credit to Private Sector*) and by total credit to the private nonfinancial sector scaled by GDP (*Private Credit*). All regressions include year and Fama-French 48-industry fixed effects. Standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. The sample consists of an unbalanced panel of more than 56,000 nonfinancial firms across 50 countries over the period 2001-2015. Market data are from DataStream, accounting data are from WorldScope, and CDS data are from Markit.

(continued)

Table 6: Effects of CDS on R&D Share (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Creditor Rights					Property Rights			Private Credit Availability		
	Baseline	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not Stay	Secured Creditors	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
Panel A: Main Results												
CDS Introduction x Country		0.0040	-0.0144**	0.0062	0.0169***	-0.0088*	0.0035	-0.0028	0.0235***	0.0173***	0.0171**	-0.0047
Variable		(0.0056)	(0.0063)	(0.0066)	(0.0064)	(0.0051)	(0.0054)	(0.0076)	(0.0076)	(0.0065)	(0.0067)	(0.0055)
Country Variable		-0.0117***	-0.0271***	-0.0238***	0.0035	0.0169***	0.0157***	0.0142***	0.0319***	0.0345***	0.0366***	-0.0292***
		(0.0039)	(0.0039)	(0.0044)	(0.0042)	(0.0030)	(0.0027)	(0.0037)	(0.0039)	(0.0036)	(0.0036)	(0.0036)
CDS Introduction	-0.0115*	-0.0106*	-0.0140**	-0.0099	-0.0094	-0.0108*	-0.0122*	-0.0113*	-0.0195***	-0.0167***	-0.0115*	-0.0128**
	(0.0064)	(0.0064)	(0.0062)	(0.0063)	(0.0064)	(0.0063)	(0.0064)	(0.0064)	(0.0066)	(0.0063)	(0.0061)	(0.0061)
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005
Adj. R-Squared	0.518	0.519	0.533	0.523	0.521	0.520	0.522	0.520	0.537	0.544	0.542	0.531
Panel B: Sensitivity Analysis												
Calibrated Confounders	Minimum	0.0005	-0.0146**	-0.0005	0.0134**	-0.0061	0.0012	-0.0026	0.0192**	0.0159**	0.0114	-0.0065
	Maximum	0.0010	-0.0143**	0.0002	0.0140**	-0.0057	0.0018	-0.0014	0.0199**	0.0171**	0.0119	-0.0059
Killer Confounders	Minimum	-0.0031	-0.0219**	-0.0094	0.0124*	-0.0062	0.0012	-0.0036	0.0189**	0.0157**	0.0115	-0.0123*
	Maximum	0.0010	-0.0144**	0.0001	0.0156**	0.0011	0.0037	0.0021	0.0258**	0.0265***	0.0164*	-0.0062

Table 7: Effects of CDS on Risk

The table shows the average treatment effect of CDS introductions on the idiosyncratic risk (in local currency) of the treated (ATET) using overlap weights (Li, Morgan, and Zaslavsky (2017)). Panel A shows the main results from the panel estimation with overlap weights. The treatment is the introduction of CDS (i.e., only the first year of CDS trading for each firm). The regressions further include CDS interaction effects with lagged (standardized) country characteristics, as well as the lagged country variables themselves. The use of overlap weights ensures that covariates are perfectly balanced between treated firms and control firms in the year before treatment (see Appendix E). Panel B shows results from a sensitivity analysis with regards to potential omitted variable bias. Panel B reports results from tests of the sensitivity of the main results to the effect of potential unobserved omitted variables in the estimation of the balancing weights, adapting a simulation approach proposed by Ichino, Mealli, and Nannicini (2008). The regression specifications (2) to (12) are the same as in Panel A of the table. The sensitivity analysis simulates alternatively calibrated confounders or killer confounders in the estimation of the balancing weights that are subsequently used to assess the average treatment effect on the treated (ATET) using overlap weights (Li, Morgan, and Zaslavsky (2017)). Calibrated confounders are specified to have an empirical distribution similar to the existing observable covariates in the logit regression that yields the inputs to the balancing weights. We use binary transformations of continuous covariates, i.e., indicator variables whether an observation is above or below the median of that variable. Separately, we also use killer confounders to assess whether more extreme unobserved omitted covariates exist that eliminate the treatment effect. We simulate 100 iterations of calibrated and killer confounders and re-estimate the effect of CDS introduction and country interactions for each iteration. For each outcome regression specification, the panel reports the minimum and maximum coefficients for the interaction variables across calibrated and killer confounders. Country variables are grouped into four categories: (1) creditor rights, (2) property rights, (3) private credit availability, and (4) equity ownership concentration. For the credit rights, we use an aggregate index (*Creditor Rights*) as well as its four subindices, namely restrictions on a firm's entering reorganization without creditors' consent (*Restriction on Entry*); no "automatic stay" or "asset freeze" (*No Automatic Stay*); restriction on management's administration of the firm's assets pending resolution of the reorganization (*Management Does Not Stay*); and payment of secured creditors first out of any liquidation proceeds (*Secured Creditors First*). For property rights, we consider the following three measures: *Law & Order*, *Corruption*, and *Political Risk*, where higher index values indicate stronger protection for private properties. Private credit availability is measured by domestic credit by financial corporations to the private sector scaled by GDP (*Domestic Credit to Private Sector*) and by total credit to the private nonfinancial sector scaled by GDP (*Private Credit*). All regressions include year and Fama-French 48-industry fixed effects. Standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. The sample consists of an unbalanced panel of more than 56,000 nonfinancial firms across 50 countries over the period 2001–2015. Market data are from DataStream, accounting data are from WorldScope, and CDS data are from Markit.

(continued)

Table 7: Effects of CDS on Risk (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Creditor Rights					Property Rights			Private Credit Availability		
	Baseline	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not Stay	Secured Creditors	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
Panel A: Main Results												
CDS Introduction x Country		0.0024	0.0532***	-0.0009	-0.0188	-0.0197	-0.0343***	0.0108	-0.0506***	-0.0358***	-0.0386***	0.0577***
Variable		(0.0128)	(0.0128)	(0.0148)	(0.0117)	(0.0136)	(0.0132)	(0.0162)	(0.0143)	(0.0132)	(0.0143)	(0.0130)
Country Variable		-0.0107	-0.0171**	0.0000	-0.0200***	0.0210***	-0.0096	-0.0464***	-0.0486***	-0.0131*	-0.0420***	-0.0200***
		(0.0071)	(0.0074)	(0.0083)	(0.0071)	(0.0070)	(0.0069)	(0.0080)	(0.0088)	(0.0076)	(0.0088)	(0.0074)
CDS Introduction	-0.0070	-0.0065	0.0021	-0.0073	-0.0095	-0.0054	-0.0006	-0.0078	0.0102	0.0038	-0.0071	0.0090
	(0.0118)	(0.0120)	(0.0117)	(0.0126)	(0.0117)	(0.0118)	(0.0121)	(0.0118)	(0.0127)	(0.0128)	(0.0116)	(0.0126)
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	79,610	79,610	79,610	79,610	79,610	79,610	79,610	79,610	79,610	79,610	79,610	79,610
Adj. R-sq	0.271	0.272	0.275	0.271	0.278	0.272	0.277	0.280	0.296	0.279	0.291	0.277
Panel B: Sensitivity Analysis												
Calibrated Confounders	Minimum	0.0022	0.0518***	-0.0012	-0.0191	-0.0201	-0.0345***	0.0069	-0.0530***	-0.0373***	-0.0400***	0.0567***
	Maximum	0.0038	0.0534***	-0.0005	-0.0173	-0.0168	-0.0337**	0.0119	-0.0498***	-0.0354***	-0.0380***	0.0582***
Killer Confounders	Minimum	-0.0051	0.0464***	-0.0068	-0.0281**	-0.0198	-0.0359***	-0.0004	-0.0609***	-0.0414***	-0.0454***	0.0548***
	Maximum	0.0049	0.0535***	0.0024	-0.0166	-0.0158	-0.0255*	0.0292	-0.0315**	-0.0266*	-0.0266	0.0584***

Table 8: Robustness Tests

The table shows the average treatment effect of CDS introductions on the market leverage (Panel A), capital investment (Panel B), R&D share (Panel C), and idiosyncratic risk (in local currency) (Panel D) of the treated (ATET) using overlap weights (Li, Morgan, and Zaslavsky (2017)). Market leverage is defined as the sum of total debt and preferred stock divided by market value of total assets; capital investment is defined as capital expenditures divided by total assets; R&D share is defined as R&D divided by the sum of R&D and capital expenditures. The treatment is the introduction of CDS (i.e., only the first year of CDS trading for each firm). The regressions further include CDS interaction effects with lagged (standardized) country characteristics, as well as the lagged country variables themselves and lagged firm characteristics. The use of overlap weights ensures that covariates are perfectly balanced between treated firms and control firms in the year before treatment (see Appendix E). Country variables are grouped into four categories: (1) creditor rights, (2) property rights, (3) private credit availability, and (4) equity ownership concentration. For the credit rights, we use an aggregate index (*Creditor Rights*) as well as its four subindices, namely restrictions on a firm's entering reorganization without creditors' consent (*Restriction on Entry*); no "automatic stay" or "asset freeze" (*No Automatic Stay*); restriction on management's administration of the firm's assets pending resolution of the reorganization (*Management Does Not Stay*); and payment of secured creditors first out of any liquidation proceeds (*Secured Creditors First*). For property rights, we consider the following three measures: *Law & Order*, *Corruption*, and *Political Risk*, where higher index values indicate stronger protection for private properties. Private credit availability is measured by domestic credit by financial corporations to the private sector scaled by GDP (*Domestic Credit to Private Sector*) and by total credit to the private nonfinancial sector scaled by GDP (*Private Credit*). The lagged firm characteristics in Panel A are *Debt Maturity*, *Market/Book*, *PPE/Size*, *Cash Flow/Sales*, *Cash and Short-Term Investments/Total Assets (log)*, *Total Assets in USD (log)*, *ROA Volatility (log)*, *Tax Rate*, and *Leverage Market Value (Industry Median)*. The lagged firm characteristics in Panels B and C are *Market/Book*, *Return on Assets (3y)*, and *PPE/Size*. The lagged firm characteristics in Panel D are *Market/Book*, *Leverage Market Value*, and *Total Assets in USD (log)*. All regressions also include year and Fama-French 48-industry fixed effects. Standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. The sample consists of an unbalanced panel of more than 56,000 nonfinancial firms across 50 countries over the period 2001–2015. Market data are from DataStream, accounting data are from WorldScope, and CDS data are from Markit.

Panel A: Effects of CDS on Leverage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Creditor Rights					Property Rights			Private Credit Availability		
	Baseline	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not Stay	Secured Creditors First	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
CDS Introduction x Country Variable		0.0061	0.0168***	0.0003	-0.0041	0.0090	-0.0145***	-0.0074	-0.0293***	-0.0140**	-0.0253***	0.0121**
		(0.0049)	(0.0060)	(0.0058)	(0.0051)	(0.0064)	(0.0055)	(0.0067)	(0.0068)	(0.0064)	(0.0071)	(0.0060)
Country Variable		-0.0039	-0.0065*	-0.0044	0.0065*	-0.0119***	-0.0016	-0.0125***	0.0023	-0.0004	0.0101**	0.0001
		(0.0028)	(0.0034)	(0.0034)	(0.0037)	(0.0032)	(0.0029)	(0.0036)	(0.0039)	(0.0039)	(0.0040)	(0.0037)
CDS Introduction	0.0127**	0.0141***	0.0156***	0.0128**	0.0122**	0.0119**	0.0153***	0.0132***	0.0227***	0.0169***	0.0127**	0.0160***
	(0.0050)	(0.0051)	(0.0051)	(0.0052)	(0.0051)	(0.0051)	(0.0052)	(0.0051)	(0.0056)	(0.0054)	(0.0050)	(0.0054)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	79,686	79,686	79,686	79,686	79,686	79,686	79,686	79,686	79,686	79,686	79,686	79,686
Adj. R-Squared	0.343	0.343	0.345	0.343	0.344	0.345	0.347	0.349	0.351	0.346	0.347	0.345

(continued)

Table 8: Robustness Tests (continued)

Panel B: Effects of CDS on Capital Investment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Creditor Rights					Property Rights			Private Credit Availability		
	Baseline	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not Stay	Secured Creditors First	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
CDS Introduction x Country Variable		0.0018	0.0043**	0.0023	-0.0013	0.0004	-0.0008	-0.0008	-0.0049*	-0.0057***	-0.0048**	0.0030*
		(0.0016)	(0.0019)	(0.0018)	(0.0015)	(0.0017)	(0.0019)	(0.0023)	(0.0026)	(0.0021)	(0.0024)	(0.0018)
Country Variable		-0.0014	-0.0014	-0.0038***	0.0002	0.0014	-0.0015	-0.0008	-0.0017	0.0010	-0.0004	-0.0003
		(0.0009)	(0.0012)	(0.0010)	(0.0010)	(0.0009)	(0.0011)	(0.0012)	(0.0016)	(0.0013)	(0.0015)	(0.0011)
CDS Introduction	0.0013	0.0017	0.0021	0.0019	0.0012	0.0013	0.0015	0.0014	0.0030	0.0030*	0.0013	0.0021
	(0.0015)	(0.0016)	(0.0016)	(0.0016)	(0.0015)	(0.0015)	(0.0016)	(0.0016)	(0.0020)	(0.0018)	(0.0015)	(0.0017)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005
Adj. R-Squared	0.336	0.336	0.338	0.338	0.336	0.337	0.337	0.336	0.341	0.340	0.340	0.337

(continued)

Table 8: Robustness Tests (continued)

Panel C: Effects of CDS on R&D Share

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Creditor Rights					Property Rights			Private Credit Availability		
	Baseline	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not Stay	Secured Creditors First	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
CDS Introduction x Country Variable		0.0053	-0.0134**	0.0074	0.0152**	-0.0040	0.0045	0.0006	0.0236***	0.0205***	0.0209***	-0.0076
		(0.0056)	(0.0061)	(0.0066)	(0.0062)	(0.0052)	(0.0053)	(0.0073)	(0.0075)	(0.0064)	(0.0068)	(0.0055)
Country Variable		-0.0081**	-0.0258***	-0.0165***	0.0059	0.0147***	0.0088***	0.0105***	0.0257***	0.0275***	0.0302***	-0.0215***
		(0.0037)	(0.0038)	(0.0042)	(0.0041)	(0.0027)	(0.0026)	(0.0035)	(0.0041)	(0.0036)	(0.0038)	(0.0036)
CDS Introduction	-0.0115*	-0.0103*	-0.0138**	-0.0096	-0.0096	-0.0112*	-0.0123**	-0.0116*	-0.0195***	-0.0177***	-0.0115*	-0.0136**
	(0.0062)	(0.0062)	(0.0060)	(0.0061)	(0.0062)	(0.0061)	(0.0062)	(0.0062)	(0.0065)	(0.0061)	(0.0060)	(0.0060)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005	80,005
Adj. R-Squared	0.543	0.544	0.557	0.546	0.547	0.546	0.545	0.545	0.558	0.563	0.562	0.552

(continued)

Table 8: Robustness Tests (continued)

Panel D: Effects of CDS on Risk

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Creditor Rights					Property Rights			Private Credit Availability		
	Baseline	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not Stay	Secured Creditors First	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
CDS Introduction x Country Variable		-0.0058	0.0302**	0.0032	-0.0196*	-0.0259*	-0.0124	0.0358**	-0.0113	-0.0123	-0.0073	0.0430***
		(0.0122)	(0.0122)	(0.0140)	(0.0112)	(0.0139)	(0.0127)	(0.0155)	(0.0141)	(0.0126)	(0.0135)	(0.0123)
Country Variable		0.0003	-0.0079	0.0127	-0.0102	0.0136**	-0.0157**	-0.0494***	-0.0491***	-0.0204***	-0.0437***	-0.0100
		(0.0067)	(0.0073)	(0.0080)	(0.0070)	(0.0068)	(0.0067)	(0.0074)	(0.0080)	(0.0073)	(0.0083)	(0.0071)
CDS Introduction	-0.0069	-0.0083	-0.0018	-0.0060	-0.0095	-0.0047	-0.0046	-0.0094	-0.0031	-0.0032	-0.0069	0.0050
	(0.0112)	(0.0114)	(0.0111)	(0.0120)	(0.0112)	(0.0114)	(0.0115)	(0.0112)	(0.0120)	(0.0120)	(0.0112)	(0.0118)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	79,610	79,610	79,610	79,610	79,610	79,610	79,610	79,610	79,610	79,610	79,610	79,610
Adj. R-Squared	0.331	0.331	0.332	0.332	0.334	0.332	0.334	0.338	0.343	0.335	0.341	0.334

Appendix A: CDS Contracts and the Local Legal Environment

The ISDA Master Agreement and its annexures for CDS contracts standardize definitions and language in order to create a more homogeneous and liquid product and to reduce basis risk and transactions costs. Nevertheless, the specific local legal environment in which a reference entity is headquartered is important for the CDS contract. In effect, the laws to which the reference entity is subject must be "mapped" to the language used in the CDS contract. Below we describe two recent cases in which an analysis of local law was required in order to determine whether a credit event had occurred.

A. Abengoa

Abengoa, a Spanish conglomerate, filed for insolvency relief under a provision of Spanish law in November 2015. The regional Determination Committee (DC), in considering whether a credit event had occurred, sought an analysis of whether the specific provision that Abengoa had triggered (Article 5bis) was relief that was similar to "a judgment of insolvency or bankruptcy," as the 2014 ISDA Definitions of Credit Events required. In its analysis, the DC noted that Article 5bis provided relief only for certain Abengoa assets, was quite time limited, and suspended enforcement of claims but did not suspend payment obligations. On the basis of this analysis of a specific provision of Spanish insolvency law, the DC determined that no credit event had occurred.[26]

B. Portugal Telecom

In late 2013, Portugal Telecom and a Brazilian telecommunications company, Oi, announced a merger that was subsequently completed in 2014. Portugal Telecom had a financing subsidiary, PTIF, which was a CDS reference entity in Europe. In June 2015, Oi sold Portugal Telecom but retained PTIF. In June 2016, Oi and its subsidiaries filed for reorganization under Brazilian law. The Determination Committee considered elements of reorganization law in Brazil in order to assess whether this filing constituted a credit event. They concluded that specific elements of the law, including an automatic stay (allowing the firm relief from its creditors), payment relief during reorganization (combined with the fact that reorganization would take a considerable period of time), and elements of the debt restructuring that were allowed under the reorganization, were similar to a judgment of insolvency or bankruptcy. As a consequence, the DC ruled that a credit event had occurred.

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[26] Shortly after this episode (in December 2015), a failure-to-pay event for Abengoa did occur, and CDS were triggered.

Appendix B: Derivation of Proposition 1

For $\gamma N \geq q\lambda C_2^H$ and/or $N \geq q\lambda C_2^L$, where $\tilde{F}_C^i \geq F_C^i$ for $\forall i = L,H$, we define the firm's net improvement in its debt value due to CDS as $\Delta B \equiv B_{CDS} - B$. As CDS are written on the existing debt obligations, we consider only the case in which debt financing is feasible in the absence of CDS ($B > 0$). Hence, we focus on the case $F \leq F_C^H \equiv \bar{F}$.

When the outstanding CDS notional is not excessive$(N \leq \lambda C_2^L)$, the increase in debt value with CDS, ΔB, is given as

$$\begin{cases} (1-\theta)\left[\phi max(\gamma N - q\lambda C_2^H, 0) + (1-\phi)(N - q\lambda C_2^L)\right] & \text{if } F \leq F_C^L \\ \theta(1-\phi)\left(F - q\lambda C_2^L\right) + (1-\theta)\left[\phi max(\gamma N - q\lambda C_2^H, 0) + (1-\phi)(N - q\lambda C_2^L)\right] & \text{if } F \in (F_C^L, \tilde{F}_C^L] \\ \theta(1-\phi)\left(N - q\lambda C_2^L\right) + (1-\theta)\left[\phi max(\gamma N - q\lambda C_2^H, 0) + (1-\phi)(N - q\lambda C_2^L)\right] & \text{if } F > \tilde{F}_C^L \end{cases} \quad \text{(B.1)}$$

This, in turn, implies the following comparative statics:

$$\frac{\partial \Delta B}{\partial \gamma} = (1-\theta)\phi N 1_{\gamma N > q\lambda C_2^H} \quad \text{(B.2)}$$

$$\frac{\partial \Delta B}{\partial \lambda} = \begin{cases} -(1-\theta) q\left[\phi C_2^H 1_{\gamma N > q\lambda C_2^H} + (1-\phi) C_2^L\right] & \text{if } F \leq F_C^L \\ -\theta(1-\phi) q C_2^L - (1-\theta) q\left[\phi C_2^H 1_{\gamma N > q\lambda C_2^H} + (1-\phi) C_2^L\right] & \text{if } F > F_C^L \end{cases} \quad \text{(B.3)}$$

$$\frac{\partial \Delta B}{\partial q} = \begin{cases} -(1-\theta) \lambda\left[\phi C_2^H 1_{\gamma N > q\lambda C_2^H} + (1-\phi) C_2^L\right] & \text{if } F \leq F_C^L \\ -\theta(1-\phi) \lambda C_2^L - (1-\theta) \lambda\left[\phi C_2^H 1_{\gamma N > q\lambda C_2^H} + (1-\phi) C_2^L\right] & \text{if } F > F_C^L \end{cases} \quad \text{(B.4)}$$

For the case in which there is excessive CDS notional, $N > \lambda C_2^L$, which causes the empty creditor problem, ΔB is given as

$$\begin{cases} (1-\theta)\left[\phi max(\gamma N - q\lambda C_2^H, 0) + (1-\phi)(S - q\lambda C_2^L)\right] & \text{if } F \leq F_C^L \\ \theta(1-\phi)\left(F - q\lambda C_2^L\right) + (1-\theta)\left[\phi max(\gamma N - q\lambda C_2^H, 0) + (1-\phi)(S - q\lambda C_2^L)\right] & \text{if } F \in (F_C^L, \tilde{F}_C^L] \\ \theta(1-\phi)\left(S - q\lambda C_2^L\right) + (1-\theta)\left[\phi max(\gamma N - q\lambda C_2^H, 0) + (1-\phi)(S - q\lambda C_2^L)\right] & \text{if } F > \tilde{F}_C^L \end{cases} \quad \text{(B.5)}$$

The comparative statics in this case are as follows:

$$\frac{\partial \Delta B}{\partial \gamma} = (1-\theta)\phi N 1_{\gamma N > q\lambda C_2^H} \tag{B.6}$$

$$\frac{\partial \Delta B}{\partial S} = \begin{cases} (1-\theta)(1-\phi) & \text{if } F \le F_C^L \\ (1-\phi) & \text{if } F > F_C^L \end{cases} \tag{B.7}$$

$$\frac{\partial \Delta B}{\partial \lambda} = \begin{cases} -(1-\theta) q \left[\phi C_2^H 1_{\gamma N > q\lambda C_2^H} + (1-\phi) C_2^L \right] & \text{if } F \le F_C^L \\ -\theta(1-\phi) q C_2^L - (1-\theta) q \left[\phi C_2^H 1_{\gamma N > q\lambda C_2^H} + (1-\phi) C_2^L \right] & \text{if } F > F_C^L \end{cases} \tag{B.8}$$

$$\frac{\partial \Delta B}{\partial q} = \begin{cases} -(1-\theta) \lambda \left[\phi C_2^H 1_{\gamma N > q\lambda C_2^H} + (1-\phi) C_2^L \right] & \text{if } F \le F_C^L \\ -\theta(1-\phi) \lambda C_2^L - (1-\theta) \lambda \left[\phi C_2^H 1_{\gamma N > q\lambda C_2^H} + (1-\phi) C_2^L \right] & \text{if } F > F_C^L \end{cases} \tag{B.9}$$

It follows that $\left(\frac{\partial \Delta B}{\partial \gamma} \ge 0 \right)$, $\left(\frac{\partial \Delta B}{\partial S} > 0 \right)$, $\left(\frac{\partial \Delta B}{\partial \lambda} < 0 \right)$, and $\left(\frac{\partial \Delta B}{\partial q} < 0 \right)$.■

Appendix C: Variable Definitions

This table shows the definitions of the main firm and country characteristics used in the study.

Variable Name	Definition
Firm Characteristics	
Cash Flow/Sales	Cash Flow/Sales
Convertible Debt/Size	Convertible Debt / SizeMarketValue
Debt Maturity	[LongTermDebt (due more than 1 year) + PreferredStock] / TotalDebtAndPreferredStock
Dividend	Dummy variable with value 1 if a dividend was paid; 0 otherwise
Free Cash Flow/Total Assets	(FundsFromOperations - CapitalExpendituresAdditi - CashDividendsPaidTotal) / TotalAssets
Gross Profit Margin (3y)	Average of up to 3 years of GrossProfitMargin
Leverage Market Value	TotalDebtAndPreferredStock / TotalAssetsMarketValue
Leverage Market Value (Industry Median)	TotalDebtAndPreferredStock / TotalAssetsMarketValue, Industry median
Age (log)	log (Age)
ROA Volatility (log)	Natural Logarithm of ROAVolatility
Total Assets in USD (log)	Natural Logarithm of TotalAssetsUSD
Market/Book	MarketValue/(CommonEquity + DeferredTaxes)
Net FX-Exposure	Foreign Sales - Foreign Assets (missing values set to zero)
PPE (Net)/Size	PPENet / SizeMarketValue
Return On Assets (3y)	Average of up to 3 years of ReturnOnAssets
Tax Rate	Tax Rate
Tobin's Q	SizeMarketValue / TotalAssets
Return Volatility in LC (log)	Natural logarithm of volatility of weekly stock returns in local currency
Return Volatility in USD (log)	Natural logarithm of volatility of weekly stock returns in USD
Capital Expenditures/Total Assets	CapitalExpendituresAdditi / TotalAssets, with missing values set to zero
R&D/Total Assets	ResearchDevelopment / TotalAssets, with missing values set to zero
Cash and Short-term Investments/Total Assets (log)	Natural logarithm of CashAndSTInvToTA_tru
R&D Share	R&D/(R&D + Capital Expenditures), with R&D Share set to zero if R&D and Capital Expenditures are both 0.
Idiosyncratic Risk in LC (log)	Natural Logarithm of the annualized volatility of the residual from a regression of weekly stock returns in local currency on local and global market index returns
Country Characteristics	
Creditor Rights	Creditor Rights Aggregate Score (from La Porta et al., 1998)
Restrictions on Entry	Restrictions on the borrower entering reorganization without the creditors' consent (from La Porta et al., 1998)
No Automatic Stay on Assets	No automatic stay or asset freeze to protect the firm from creditors (from La Porta et al., 1998)
Management Does Not Stay	Restrictions on current management administering the assets while in reorganization (from La Porta et al., 1998)
Secured Creditors First	Priority of secured creditors in payments resulting from liquidation (from La Porta et al., 1998)
Law&Order	A measure of the strength and impartiality of the legal system as well as popular observance of the law (PRS Group, 2015)
Corruption	A measure of corruption within the political system that can threaten foreign investment (PRS Group, 2015)
Political Risk	Measures political stability within the country using a variety of measures (PRS Group, 2015)
Domestic Credit to Private Sector	Private credit from banks to GDP (World Bank, 2016)
Private Credit	Total credit in the non-financial sector to GDP (BIS, 2015)
Ownership Concentration	Average percentage of common shares owned by the three largest shareholders in the 10 largest nonfinancial, privately owned domestic firms in a given country (La Porta et al., 1998)

Appendix D: Summary Statistics of Variables

Panel A of this table reports the summary statistics of the main variables used in the study. Panel B of the table reports the pairwise correlation matrix for our main country characteristics. P-values are reported in parentheses. The sample consists of an unbalanced panel of more than 56,000 nonfinancial firms across 50 countries over the period 2001–2015. Market data are from DataStream, accounting data are from WorldScope, and CDS data are from Markit.

Panel A: Summary Statistics of Firm and Country Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
						Percentiles		
	Observations	Mean	Std. Dev.	Minimum	p25	p50	p75	Maximum
Firm Characteristics								
Cash Flow/Sales	380,555	-0.14	0.78	-3.11	0.01	0.07	0.14	0.38
Convertible Debt/Size	260,840	0.00	0.01	0.00	0.00	0.00	0.00	0.05
Debt Maturity	342,920	0.50	0.36	0.00	0.14	0.53	0.84	1.00
Dividend	416,784	0.48	0.50	0.00	0.00	0.00	1.00	1.00
Free Cash Flow/Total Assets	409,355	-0.07	0.23	-0.84	-0.09	0.00	0.05	0.15
Gross Profit Margin (3y)	386,086	0.20	0.33	-0.87	0.11	0.22	0.38	0.69
Leverage Market Value	344,268	0.18	0.18	0.00	0.01	0.13	0.30	0.56
Leverage Market Value (Industry Median)	416,784	0.13	0.08	0.00	0.05	0.13	0.19	0.28
Age (log)	416,752	2.03	1.08	0.00	1.39	2.30	2.83	3.95
ROA Volatility (log)	293,866	-3.00	1.27	-5.07	-3.95	-3.13	-2.15	-0.41
Total Assets in USD (log)	416,760	18.27	2.24	13.76	16.83	18.32	19.83	22.31
Market/Book	343,708	2.17	2.26	0.27	0.72	1.33	2.60	9.14
Net FX-Exposure	416,784	0.08	0.22	-0.74	0.00	0.00	0.01	0.98
PPE (Net)/Size	368,729	0.37	0.37	0.00	0.06	0.25	0.58	1.27
Return On Assets (3y)	375,617	-0.06	0.27	-0.94	-0.05	0.03	0.08	0.19
Tax Rate	242,250	0.29	0.17	0.00	0.18	0.29	0.39	0.66
Tobin's Q	371,913	1.59	1.74	0.31	0.61	0.93	1.67	7.40
Return Volatility in LC (log)	364,728	-0.71	0.60	-1.71	-1.16	-0.75	-0.30	0.47
Return Volatility in USD (log)	361,711	-0.67	0.59	-1.65	-1.11	-0.71	-0.26	0.50
Capital Expenditures/Total Assets	416,784	0.05	0.06	0.00	0.01	0.03	0.07	0.21
R&D/Total Assets	416,784	0.02	0.04	0.00	0.00	0.00	0.01	0.15
Cash and Short-term Investments/Total Assets (log)	413,586	-2.25	1.54	-5.56	-3.23	-2.10	-1.09	0.00
R&D Share	4167,84	0.15	0.28	0.00	0.00	0.00	0.13	1.00
Idiosyncratic Risk in LC (log)	360,292	-0.82	0.63	-1.89	-1.30	-0.87	-0.39	0.42
Country Characteristics								
Creditor Rights	415,811	2.00	1.02	0.00	1.00	2.00	3.00	4.00
Restrictions on Entry	415,811	0.25	0.44	0.00	0.00	0.00	1.00	1.00
No Automatic Stay on Assets	415,811	0.32	0.47	0.00	0.00	0.00	1.00	1.00
Management Does Not Stay	415,811	0.53	0.50	0.00	0.00	1.00	1.00	1.00
Secured Creditors First	415,811	0.90	0.31	0.00	1.00	1.00	1.00	1.00
Law&Order	415,905	4.85	0.88	1.00	5.00	5.00	5.00	6.00
Corruption	415,905	3.69	1.01	1.00	3.00	4.00	4.50	6.00
Political Risk	415,905	78.48	8.64	44.00	76.50	80.50	84.00	97.00
Domestic Credit to Private Sector	393,829	133.80	53.88	8.77	96.44	137.10	182.40	233.70
Private Credit	378,638	146.30	48.16	16.80	130.30	157.30	175.00	462.10
Ownership Concentration	400,491	0.32	0.15	0.18	0.20	0.23	0.41	0.67

Panel B: Pair-wise Correlations of Country Characteristics

	Creditor Rights Index	Restrictions on Entry	No Automatic Stay on Assets	Management Does Not Stay	Secuired Creditors First	Law & Order	Corruption	Political Risk	Credit to Private Sector	Private Credit
Restrictions on Entry	0.50									
	(0.00)									
No Automatic Stay on Assets	0.79	0.27								
	(0.00)	(0.00)								
Management Does Not Stay	0.69	0.02	0.39							
	(0.00)	(0.00)	(0.00)							
Secuired Creditors First	0.28	-0.19	0.08	0.04						
	(0.00)	(0.00)	(0.00)	(0.00)						
Law & Order	0.02	-0.28	0.09	-0.01	0.36					
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)					
Corruption	-0.04	-0.30	0.11	-0.12	0.32	0.72				
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)				
Politicalrisk	-0.02	-0.42	0.08	0.04	0.33	0.79	0.77			
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
Domestic Credit to Private Sector	-0.04	-0.34	-0.13	0.03	0.48	0.48	0.45	0.58		
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)		
Private Credit	0.13	-0.32	0.15	0.18	0.37	0.67	0.62	0.71	0.73	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
Ownership Concentration	0.17	0.43	0.29	-0.09	-0.40	-0.48	-0.21	-0.42	-0.68	-0.43
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Appendix E: Firm- and Country-Level Characteristics with Imposition of Overlap Weights

This table compares firm- and country-level characteristics between firm-years with CDS introductions (Treated) and without CDS introductions (Control) in the prior year. It shows the mean and standard errors for treated and control firms, and the percentage bias according to Rosenbaum and Rubin (1985). The sample consists of an unbalanced panel of more than 56,000 nonfinancial firms across 50 countries over the period 2001–2015. Market data are from DataStream, accounting data are from WorldScope, and CDS data are from Markit. The sample is limited to firm-year observations for which all reported firm- and country-level variables are jointly available. Observations are weighted using overlap weights (Li, Morgan, and Zaslavsky (2017)).

	Treated (N=782)		Control (N=79,223)		
	Mean	Std. Err.	Mean	Std. Err.	% Bias
Firm Characteristics					
Cash Flow/Sales	0.149	0.004	0.149	0.002	0%
Convertible Debt/Size	0.010	0.001	0.010	0.000	0%
Debt Maturity	0.752	0.009	0.752	0.003	0%
Dividend	0.835	0.014	0.835	0.005	0%
Free Cash Flow/Total Assets	0.024	0.002	0.024	0.001	0%
Gross Profit Margin (3y)	0.306	0.006	0.306	0.003	0%
Leverage Market Value	0.239	0.005	0.239	0.003	0%
Leverage Market Value (Industry Median)	0.165	0.003	0.165	0.001	0%
Age (log)	2.763	0.029	2.763	0.011	0%
ROA Volatility (log)	-3.881	0.032	-3.881	0.013	0%
Total Assets in USD (log)	21.715	0.025	21.715	0.007	0%
Market/Book	2.447	0.069	2.447	0.032	0%
Net FX-Exposure	0.122	0.009	0.122	0.003	0%
PPE (Net)/Size	0.394	0.011	0.394	0.004	0%
Return On Assets (3y)	0.063	0.002	0.063	0.001	0%
Tax Rate	0.339	0.005	0.339	0.002	0%
Tobin's Q	1.302	0.032	1.302	0.014	0%
Return Volatility in LC (log)	-1.141	0.013	-1.141	0.005	0%
Return Volatility in USD (log)	-1.101	0.014	-1.101	0.005	0%
Capital Expenditures/Total Assets	0.060	0.002	0.060	0.001	0%
R&D/Total Assets	0.013	0.001	0.013	0.000	0%
Cash and Short-term Investments/Total Assets (log)	-2.681	0.047	-2.681	0.019	0%
Country Characteristics					
Restrictions on Entry	-0.171	0.033	-0.171	0.012	0%
No Automatic Stay on Assets	-0.263	0.032	-0.263	0.011	0%
Management Does Not Stay	-0.126	0.036	-0.126	0.015	0%
Secured Creditors First	0.083	0.033	0.083	0.010	0%
Law&Order	0.182	0.036	0.182	0.016	0%
Corruption	0.069	0.030	0.069	0.013	0%
Political Risk	0.340	0.031	0.340	0.012	0%
Domestic Credit to Private Sector	0.299	0.035	0.299	0.012	0%
Private Credit	-0.002	0.032	-0.002	0.012	0%
Ownership Concentration	-0.275	0.036	-0.275	0.012	0%

Appendix F: OLS Regressions of CDS Effects

This table shows the results from OLS regressions of market leverage (Panel A), capital investment (Panel B), R&D share (Panel C), and idiosyncratic risk (in local currency) (Panel D) on CDS introductions (i.e., only the first year of CDS trading for each firm) and their interaction effects with lagged (standardized) country characteristics, as well as the lagged country variables themselves and lagged firm characteristics. Market leverage is defined as the sum of total debt and preferred stock divided by market value of total assets; capital investment is defined as capital expenditures divided by total assets; R&D share is defined as R&D divided by the sum of R&D and capital expenditures. Country variables are grouped into four categories: (1) creditor rights, (2) property rights, (3) private credit availability, and (4) equity ownership concentration. For the credit rights, we use an aggregate index (*Creditor Rights*) as well as its four subindices, namely restrictions on a firm's entering reorganization without creditors' consent (*Restriction on Entry*); no "automatic stay" or "asset freeze" (*No Automatic Stay*); restriction on management's administration of the firm's assets pending resolution of the reorganization (*Management Does Not Stay*); and payment of secured creditors first out of any liquidation proceeds (*Secured Creditors First*). For property rights, we consider the following three measures: *Law & Order*, *Corruption*, and *Political Risk*, where higher index values indicate stronger protection for private properties. Private credit availability is measured by domestic credit by financial corporations to the private sector scaled by GDP (*Domestic Credit to Private Sector*) and by total credit to the private nonfinancial sector scaled by GDP (*Private Credit*). The lagged firm characteristics in Panel A are *Debt Maturity*, *Market/Book*, *PPE/Size*, *Cash Flow/Sales*, *Cash and Short-Term Investments/Total Assets (log)*, *Total Assets in USD (log)*, *ROA Volatility (log)*, *Tax Rate*, and *Leverage Market Value (Industry Median)*. The lagged firm characteristics in Panels B and C are *Market/Book*, *Return on Assets (3y)*, and *PPE/Size*. The lagged firm characteristics in Panel D are *Market/Book*, *Leverage Market Value*, and *Total Assets in USD (log)*. All regressions also include year and Fama-French 48-industry fixed effects. Standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. The sample consists of an unbalanced panel of more than 56,000 nonfinancial firms across 50 countries over the period 2001–2015. Market data are from DataStream, accounting data are from WorldScope, and CDS data are from Markit.

Panel A: Effects of CDS on Leverage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Creditor Rights					Property Rights			Private Credit Availability		
	Baseline	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not Stay	Secured Creditors First	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
CDS Introduction x		0.0054	0.0129**	-0.0002	0.0052	-0.0083	-0.0162***	-0.0176***	-0.0191***	-0.0129**	-0.0117*	0.0113**
Country Variable		(0.0046)	(0.0055)	(0.0054)	(0.0046)	(0.0058)	(0.0047)	(0.0058)	(0.0059)	(0.0054)	(0.0061)	(0.0050)
Country Variable		0.0050***	0.0034***	0.0022**	0.0067***	-0.0020*	-0.0068***	-0.0133***	-0.0075***	-0.0064***	-0.0019*	0.0067***
		(0.0010)	(0.0010)	(0.0010)	(0.0011)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0011)	(0.0010)	(0.0010)
CDS Introduction	0.0357***	0.0375***	0.0386***	0.0361***	0.0371***	0.0370***	0.0391***	0.0364***	0.0422***	0.0406***	0.0356***	0.0404***
	(0.0048)	(0.0049)	(0.0049)	(0.0050)	(0.0048)	(0.0049)	(0.0049)	(0.0048)	(0.0053)	(0.0051)	(0.0048)	(0.0051)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	107,346	107,346	107,346	107,346	107,346	107,346	107,346	107,346	107,346	107,346	107,346	107,346
Adj. R-Squared	0.227	0.228	0.228	0.227	0.229	0.227	0.229	0.233	0.229	0.229	0.227	0.229

(continued)

Appendix F: OLS Regressions of CDS Effects (continued)

Panel B: Effects of CDS on Capital Investment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Creditor Rights					Property Rights			Private Credit Availability		
	Baseline	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not Stay	Secured Creditors First	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
CDS Introduction x		0.0024*	0.0061***	0.0004	0.0008	-0.0005	-0.0056***	-0.0059***	-0.0084***	-0.0046***	-0.0063***	0.0041***
Country Variable		(0.0013)	(0.0018)	(0.0015)	(0.0012)	(0.0015)	(0.0016)	(0.0020)	(0.0022)	(0.0017)	(0.0020)	(0.0015)
Country Variable		-0.0002	0.0004*	0.0004*	-0.0018***	0.0015***	0.0003	0.0004**	-0.0017***	-0.0034***	-0.0027***	0.0013***
		(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
CDS Introduction	0.0037***	0.0044***	0.0052***	0.0040***	0.0036***	0.0036***	0.0051***	0.0044***	0.0073***	0.0066***	0.0044***	0.0057***
	(0.0013)	(0.0013)	(0.0014)	(0.0013)	(0.0013)	(0.0013)	(0.0014)	(0.0013)	(0.0017)	(0.0015)	(0.0013)	(0.0014)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	236,375	236,375	236,375	236,375	236,375	236,375	236,375	236,375	236,375	236,375	236,375	236,375
Adj. R-Squared	0.176	0.176	0.176	0.176	0.177	0.177	0.176	0.176	0.177	0.179	0.178	0.177

(continued)

Appendix F: OLS Regressions of CDS Effects (continued)

Panel C: Effects of CDS on R&D Share

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Creditor Rights					Property Rights			Private Credit Availability		
	Baseline	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not Stay	Secured Creditors First	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
CDS Introduction x		0.0165***	-0.0091*	0.0061	0.0211***	0.0005	-0.0119***	-0.0185***	0.0143***	-0.0064	0.0169***	0.0081*
Country Variable		(0.0047)	(0.0047)	(0.0051)	(0.0054)	(0.0043)	(0.0040)	(0.0058)	(0.0054)	(0.0049)	(0.0051)	(0.0045)
Country Variable		-0.0247***	-0.0379***	-0.0297***	0.0003	0.0200***	0.0348***	0.0290***	0.0417***	0.0610***	0.0389***	-0.0541***
		(0.0013)	(0.0012)	(0.0012)	(0.0013)	(0.0012)	(0.0009)	(0.0011)	(0.0010)	(0.0013)	(0.0011)	(0.0012)
CDS Introduction	0.0333***	0.0306***	0.0225***	0.0245***	0.0369***	0.0306***	0.0283***	0.0311***	0.0193***	0.0125**	0.0257***	0.0131***
	(0.0054)	(0.0053)	(0.0051)	(0.0051)	(0.0054)	(0.0053)	(0.0053)	(0.0055)	(0.0053)	(0.0050)	(0.0052)	(0.0050)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	236,375	236,375	236,375	236,375	236,375	236,375	236,375	236,375	236,375	236,375	236,375	236,375
Adj. R-Squared	0.277	0.285	0.294	0.288	0.277	0.281	0.290	0.285	0.294	0.313	0.292	0.310

(continued)

Appendix F: OLS Regressions of CDS Effects (continued)

Panel D: Effects of CDS on Risk

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Creditor Rights					Property Rights			Private Credit Availability		
	Baseline	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not Stay	Secured Creditors First	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
CDS Introduction x		0.0082	0.0262**	0.0137	0.0033	-0.0242	-0.0248**	-0.0076	-0.0476***	-0.0486***	-0.0452***	0.0268**
Country Variable		(0.0116)	(0.0111)	(0.0129)	(0.0103)	(0.0148)	(0.0123)	(0.0130)	(0.0127)	(0.0116)	(0.0126)	(0.0119)
Country Variable		-0.0220***	-0.0198***	0.0006	-0.0410***	0.0215***	0.0244***	0.0167***	0.0104***	0.0259***	0.0114***	-0.0121***
		(0.0020)	(0.0020)	(0.0019)	(0.0019)	(0.0021)	(0.0020)	(0.0021)	(0.0020)	(0.0021)	(0.0020)	(0.0021)
CDS Introduction	0.0395***	0.0377***	0.0432***	0.0436***	0.0316***	0.0377***	0.0410***	0.0383***	0.0570***	0.0524***	0.0406***	0.0449***
	(0.0109)	(0.0110)	(0.0109)	(0.0116)	(0.0107)	(0.0112)	(0.0112)	(0.0109)	(0.0119)	(0.0118)	(0.0109)	(0.0117)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	247,351	247,351	247,351	247,351	247,351	247,351	247,351	247,351	247,351	247,351	247,351	247,351
Adj. R-Squared	0.409	0.410	0.410	0.409	0.413	0.410	0.410	0.409	0.409	0.410	0.409	0.409

Appendix G: Results Excluding U.S. Firms

This appendix reports the average treatment effect of CDS introduction for non-U.S. firms on the market leverage ratio (Panel A), capital investment to assets ratio (Panel B), R&D share (Panel C), and log stock return volatility in local currency (Panel D) using overlap weights (Li, Morgan, and Zaslavsky (2017)). Market leverage is defined as the sum of total debt and preferred stock divided by market value of total assets; capital investment is defined as capital expenditures divided by total assets; and R&D share is defined as R&D divided by the sum of R&D and capital expenditures. Country variables are grouped into four categories: (1) creditor rights, (2) property rights, (3) private credit availability, and (4) equity ownership concentration. For the credit rights, we use an aggregate index (*Creditor Rights*) as well as its four subindices, namely restrictions on a firm's entering reorganization without creditors' consent (*Restriction on Entry*); no "automatic stay" or "asset freeze" (*No Automatic Stay*); restriction on management's administration of the firm's assets pending resolution of the reorganization (*Management Does Not Stay*); and payment of secured creditors first out of any liquidation proceeds (*Secured Creditors First*). For property rights, we consider the following three measures: *Law & Order*, *Corruption*, and *Political Risk*, where higher index values indicate stronger protection for private properties. Private credit availability is measured by domestic credit by financial corporations to the private sector scaled by GDP (*Domestic Credit to Private Sector*) and by total credit to the private nonfinancial sector scaled by GDP (*Private Credit*). Year and Fama-French 48-industry fixed effects are controlled for in all columns. Standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. The sample period is 2001–2015. Market data are from DataStream, accounting data are from WorldScope, and CDS data are from Markit.

Panel A: Effects of CDS on Leverage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Creditor Rights					Property Rights			Private Credit Availability		
	Baseline	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not Stay	Secured Creditors First	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
CDS Introduction x Country Variable		0.0097	0.0208***	-0.0026	-0.0091	0.0153**	-0.0176***	-0.0078	-0.0291***	-0.0174**	-0.0292***	0.0138**
		(0.0069)	(0.0071)	(0.0071)	(0.0086)	(0.0066)	(0.0064)	(0.0080)	(0.0078)	(0.0075)	(0.0074)	(0.0068)
Country Variable		-0.0152***	-0.0225***	-0.0064	0.0013	-0.0089**	0.0021	-0.0094**	0.0040	0.0071	0.0118**	-0.0079*
		(0.0039)	(0.0043)	(0.0044)	(0.0052)	(0.0035)	(0.0037)	(0.0042)	(0.0048)	(0.0051)	(0.0048)	(0.0044)
CDS Introduction	0.0136*	0.0122*	0.0126*	0.0136*	0.0173**	0.0145**	0.0126*	0.0124*	0.0220***	0.0137*	0.0131*	0.0132*
	(0.0071)	(0.0073)	(0.0070)	(0.0071)	(0.0082)	(0.0071)	(0.0070)	(0.0071)	(0.0076)	(0.0071)	(0.0070)	(0.0071)
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	65,132	65,132	65,132	65,132	65,132	65,132	65,132	65,132	65,132	65,132	65,132	65,132
Adj. R-Squared	0.207	0.212	0.217	0.209	0.208	0.210	0.212	0.213	0.217	0.210	0.216	0.209

(continued)

Appendix G: Results Excluding U.S. Firms (continued)

Panel B: Effects of CDS on Capital Investment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Creditor Rights					Property Rights			Private Credit Availability		
	Baseline	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not Stay	Secured Creditors First	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
CDS Introduction x Country Variable		0.0023	0.0043**	0.0029	-0.0052**	0.0026	-0.0002	0.0026	-0.0050*	-0.0032	-0.0022	0.0007
		(0.0021)	(0.0021)	(0.0021)	(0.0026)	(0.0018)	(0.0021)	(0.0026)	(0.0027)	(0.0023)	(0.0025)	(0.0019)
Country Variable		-0.0013	-0.0000	-0.0018	-0.0019	0.0007	-0.0035***	-0.0023*	-0.0047***	-0.0036**	-0.0050***	0.0041***
		(0.0011)	(0.0013)	(0.0013)	(0.0013)	(0.0009)	(0.0011)	(0.0013)	(0.0016)	(0.0014)	(0.0014)	(0.0012)
CDS Introduction	0.0034*	0.0030	0.0031	0.0035*	0.0056**	0.0035*	0.0033*	0.0038*	0.0050**	0.0035*	0.0036*	0.0034*
	(0.0020)	(0.0021)	(0.0020)	(0.0020)	(0.0025)	(0.0020)	(0.0020)	(0.0020)	(0.0024)	(0.0020)	(0.0020)	(0.0020)
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	65,324	65,324	65,324	65,324	65,324	65,324	65,324	65,324	65,324	65,324	65,324	65,324
Adj. R-Squared	0.230	0.231	0.234	0.231	0.239	0.233	0.237	0.232	0.250	0.243	0.246	0.239

(continued)

Appendix G: Results Excluding U.S. Firms (continued)

Panel C: Effects of CDS on R&D Share

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Creditor Rights					Property Rights			Private Credit Availability		
	Baseline	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not Stay	Secured Creditors First	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
CDS Introduction x Country Variable		0.0038	-0.0146**	0.0038	0.0343***	-0.0111**	0.0024	-0.0065	0.0218***	0.0170**	0.0149**	-0.0029
		(0.0062)	(0.0064)	(0.0072)	(0.0085)	(0.0049)	(0.0054)	(0.0079)	(0.0075)	(0.0066)	(0.0064)	(0.0057)
Country Variable		-0.0108**	-0.0295***	-0.0249***	0.0171***	0.0175***	0.0188***	0.0163***	0.0347***	0.0440***	0.0418***	-0.0389***
		(0.0043)	(0.0042)	(0.0046)	(0.0047)	(0.0032)	(0.0028)	(0.0038)	(0.0040)	(0.0041)	(0.0038)	(0.0044)
CDS Introduction	-0.0115	-0.0118	-0.0105	-0.0110	-0.0268***	-0.0122	-0.0110	-0.0125*	-0.0189**	-0.0127*	-0.0134*	-0.0117
	(0.0076)	(0.0077)	(0.0074)	(0.0075)	(0.0080)	(0.0077)	(0.0075)	(0.0076)	(0.0074)	(0.0070)	(0.0071)	(0.0073)
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	65,324	65,324	65,324	65,324	65,324	65,324	65,324	65,324	65,324	65,324	65,324	65,324
Adj. R-Squared	0.533	0.534	0.559	0.542	0.553	0.537	0.542	0.536	0.567	0.585	0.578	0.563

(continued)

Appendix G: Results Excluding U.S. Firms (continued)

Panel D: Effects of CDS on Risk

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Creditor Rights					Property Rights			Private Credit Availability		
	Baseline	Creditor Rights	Restriction on Entry	No Automatic Stay	Management Does Not Stay	Secured Creditors First	Law&Order	Corruption	Political Risk	Domestic Credit to Private Sector	Private Credit	Ownership Concentration
CDS Introduction x Country Variable		0.0125	0.0355**	0.0166	-0.0248	-0.0081	0.0230*	0.0585***	0.0104	-0.0003	0.0092	0.0218*
		(0.0166)	(0.0142)	(0.0154)	(0.0174)	(0.0140)	(0.0127)	(0.0163)	(0.0138)	(0.0134)	(0.0127)	(0.0132)
Country Variable		0.0073	0.0076	0.0075	-0.0032	0.0070	-0.0495***	-0.0830***	-0.0834***	-0.0495***	-0.0587***	0.0117
		(0.0075)	(0.0081)	(0.0083)	(0.0092)	(0.0066)	(0.0064)	(0.0068)	(0.0079)	(0.0082)	(0.0079)	(0.0077)
CDS Introduction	0.0102	0.0075	0.0082	0.0105	0.0208	0.0097	0.0107	0.0193	0.0095	0.0114	0.0129	0.0098
	(0.0146)	(0.0149)	(0.0145)	(0.0146)	(0.0165)	(0.0146)	(0.0144)	(0.0146)	(0.0147)	(0.0144)	(0.0144)	(0.0145)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	65,229	65,229	65,229	65,229	65,229	65,229	65,229	65,229	65,229	65,229	65,229	65,229
Adj. R-Squared	0.439	0.440	0.444	0.440	0.440	0.439	0.451	0.462	0.470	0.452	0.455	0.442