

The Exodus from Sovereign Risk: Sovereign Ceiling Violations in Credit Default Swap Markets

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Abstract

This paper examines sovereign ceiling violations (SCVs) in credit default swap (CDS) markets, whereby private sector firms have lower CDS spreads relative to their sovereign counterparts with equal contractual terms. Using 5-year CDS spreads on 2,364 companies in 54 countries during 2004-2011, we find that firms exposed to better property rights institutions through their foreign asset positions (Institutional channel) and firms whose stocks are listed on exchanges with stricter disclosure requirements (Informational channel) tend to violate the sovereign ceiling rule. Our results suggest that firm-level global asset and information connections are important mechanisms to delink firms from their sovereign risk.

Key words: Credit default swap, sovereign ceiling, transfer and convertibility risk, asset geographic location, cross-listing, property rights, creditor rights, disclosure requirement, credit rating

JEL Classification: F23, F34, F36, G01, G15, K40

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1. Introduction

To what extent can private sector firms delink themselves from sovereign risk? It is well known that while governments play an important role in financial markets, they can also generate externalities arising from their actions and their ability to compel and proscribe. For example, governments suffering from large budget deficits and slow economic growth may limit the ability of private sector firms to service their external debt obligations. Budget deficits may also presage increases in corporate taxes or other corporate infringements, increasing potential default risks.¹ In the aftermath of the recent global credit risk crisis where sovereign credit default swap (CDS) spreads rose dramatically from an average of 30 bps to above 250 bps in 2008 and remained above 100 bps thereafter (see Figure 1), there is an increasing concern about the transferring of sovereign risks to private sector firms. Anecdotal evidence further suggests that these corporate and investor concerns are warranted, as governments such as Argentina have turned towards heterodox, interventionist economic policies whereby they have imposed increasingly invasive corporate restrictive measures such as expropriations and foreign-exchange, trade, and capital controls.²

[Insert Figure 1 here]

While both resident and non-resident claimants are exposed to potential sovereign risk effects, distant non-resident claimants are often particularly concerned about the violation and enforcement of their property rights by foreign governments. Major credit rating agencies term such foreign investor concerns “transfer and convertibility” (T&C) risk – the risk of exchange controls being imposed by sovereign authorities that prevent or impede the private sector’s ability to convert local currency into foreign currency and make transfers to non-resident claimants.³ Given that a country’s government is often

¹ See, for example, Ernst and Young (January, 2012), “Global Tax Policy and Controversy Briefing.”

² See, for example, *Wall Street Journal*: “Argentina to Seize Control of Oil Firm” (M. Moffett and T. Turner, April 17, 2012) and “Dollars Become Scarce as Argentina Cries Peso” (M. Moffett, June 13, 2012).

³ See, for instance, FitchRatings (2004), “Country Ceiling Ratings and Rating above the Sovereign”; Moody’s (2006), “A Guide to Moody’s Sovereign Ratings”; and S&P (2008), “2008 Corporate Criteria: Analytical Methodology.”

the most senior claimant on the countries' wealth, with T&C risk, private sector debt claims cannot usually be offered better terms and prices than those offered by that country's government. This "sovereign ceiling" rule has been applied broadly to private sector credit ratings by the three major rating agencies for many years. However, the rule is not inviolable as exemplified by S&P's listings of numerous entities across countries with ratings exceeding that of their sovereign.⁴

In this paper, we examine sovereign ceiling violations (SCVs) in international CDS markets – situations in which a corporate CDS spread is lower than its sovereign counterpart with equal contractual terms such as tier, maturity, restructuring clause, and settlement currency. Using credit spread information on firm-level 5-year CDS contracts for 2,364 companies in 54 countries during 2004-2011, we provide a comprehensive picture on SCVs and investigate the channels through which private sector firms, in part, delink themselves from sovereign risk. Controlling for firm- and country-level fundamentals, we find firms exposed to better property rights institutions through their foreign asset positions and stock listings on exchanges with stricter disclosure requirements tend to violate the sovereign ceiling rule. These channels capture distinct effects beyond those associated with exposures to foreign country fundamentals. We further find that SCVs from the CDS market unidirectionally predict SCVs in S&P credit ratings. Put together, our results suggest that firm-level global asset and information network connections are important in firms delinking themselves from sovereign risk.

Our study contributes to three important research streams. First, we contribute to the sovereign ceiling literature (Durbin and Ng, 2005) by using the international CDS market to examine the patterns and determinants of SCVs. Prior studies are limited to a small number of firms with international bond market data, while we provide a comprehensive picture using 2,364 firms in 54 countries over an 8-year period.⁵ The

⁴ On September 10, 2012, for example, S&P listed over a hundred private sector entities that exceed the ratings on the sovereign in the country of domicile. See "Corporate and Government Ratings that Exceed the Sovereign Rating," S&P, September 10, 2012.

⁵ Durbin and Ng (2005) use the yield spreads on only 108 corporate bonds from emerging markets and also discuss the difficulties in testing SCVs using international bond data because of their illiquidity and non-standardization of contractual terms. In related studies, Grandes and Peter (2005) examine SVCs

international CDS market provides an ideal setting to analyze the patterns and determinants of SCVs relative to bond markets. For example, CDS contracts are standardized in their maturities and restructuring clauses, regardless of whether the underlying credit entity is corporate or sovereign. This standardization of the contracts enables one to define SCVs by comparing a firm's credit spread to its sovereign counterpart with equal contractual terms. CDS contracts are also more liquid than the bonds issued by the same entities (Longstaff, Mithal, and Neis, 2005). Finally, CDS investors are often perceived as more sophisticated and informed than investors in other financial markets (Acharya and Johnson, 2007; Berndt and Ostrovnaya, 2008), which suggests potentially greater market information content than credit ratings.

Second, we also contribute to the international corporate linkages and exposure literature by uniquely highlighting the role of a firm's asset distribution across countries and the firm's equity cross-listing status in determining the firm's effective exposure to institutional and informational environments across countries. Several studies in this literature highlight how the foreign affiliates of multinational firms bring international exposures to the multinational firms' capital structure through the effects of varying tax rates and creditor rights in the countries of their foreign affiliates (Noe, 2000; Desai, Foley, and Hines, 2004). The literature also emphasizes that stricter disclosure of information through equity cross-listings in more transparent markets helps a firm mitigate the information risk borne by the firm's non-local shareholders, thereby enhancing the firm's access to external capital markets (Pagano, Roell, and Zechner, 2002; Lins, Strickland, and Zenner, 2005; Bailey, Karolyi, and Salva, 2006).⁶ Our global asset distribution and equity cross-listing channels extend these international corporate linkage notions.

Third, we contribute to the burgeoning literature on the effects of a local government's legal and institutional characteristics on the structure and pricing of financial claims (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 2002; Shleifer and

using bond market data for 9 firms in South Africa, while Borensztein, Cowan, and Valenzuela (2007) examine SCVs in S&P credit ratings in emerging markets.

⁶ For a discussion on countrywide liberalizations, see Bekaert and Harvey (2000) and Bekaert, Harvey, and Lundblad (2005).

Wolfenzon, 2002; Qian and Strahan, 2007; Bae and Goyal, 2009). Our study highlights that not only do the home country's institutional characteristics matter for the pricing of a firm's claims, but so do those of foreign institutions that the firm is connected to through global asset and information connections. We provide evidence on the importance of these two channels as firm-level liberalization mechanisms.⁷

[Insert Figure 2 here]

As shown in Panel A of Figure 2, the frequency and magnitude of SCVs in the international CDS market have increased, particularly during 2008-2011. The magnitude of the SCVs reached over 100 bps per annum, on average, which is substantial given that the average CDS spreads for companies at the AAA and BBB ratings levels during the same time period were 79 and 189 bps, respectively. Looking at the cross-sectional patterns in Panel B of Figure 2, we further see that the SCVs are more prevalent in countries with weak institutional characteristics in terms of property rights/creditor rights protections and low information disclosure requirements.

Motivated by these SCV patterns in Figure 2, we examine how each firm's foreign asset geographic location and its stock cross-listing status in foreign markets serve as mechanisms to delink themselves from their local government's T&C risk.⁸ We hypothesize that firms whose foreign assets are located in countries with better property rights institutions than their home country mitigate their investors' T&C risk concerns due to stronger legal rules and conditions that govern the firms' assets in those foreign markets (Institutional channel, hereafter).⁹ We also conjecture that stricter disclosure requirements imposed by foreign exchanges where a firm's stock is cross-listed alleviates T&C risk concerns through improved transparency and reductions in firm informational frictions (Information channel, hereafter). We expect that the influence of both channels is greater during the recent sovereign credit risk crisis given the increases in government distress (increasing investors' sovereign T&C risk concerns) and deterioration of firm

⁷ Relatedly, Miller and Reisel (2011) provide evidence on the ability of security-level contracts to overcome the deficiencies of country-level creditor protections.

⁸ We interchangeably use the terms, T&C risk and sovereign risk, throughout the text hereafter.

⁹ A recent paper by Choi, Gulati, and Posner (2011) examines the spread between the yield of Greek sovereign bonds that have Greek choice-of-law terms and that of Greek sovereign bonds that have English choice-of-law terms. They find that Greek-law bonds have higher yields and lower prices, and the spread between two types of bonds increases in probability of Greek default.

operational information.

An underlying assumption of our foregoing arguments is that both institutional and informational qualities influence the degree of sovereign T&C risk.¹⁰ We first validate this assumption at the sovereign contract level and document that countries with better property rights, better creditor rights, and more transparent informational environments have lower CDS spreads. More importantly, these effects exist above and beyond those associated with both local and regional fundamental economic factors (Ang and Longstaff, 2011; Longstaff, Pan, Pedersen, and Singleton, 2011). We use various proxies for institutional factors, including measures of property rights protection compiled by the International Country Risk Guide (ICRG) and Heritage Foundation databases as well as creditor rights proxies constructed by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) and Djankov, McLeish, and Shleifer (2007). We use the required number of disclosed items and disclosure frequency mandated by local exchanges as proxies for informational factors (Bushman, Piotroski, and Smith, 2004). We find that for a one standard deviation increase in the degree of property rights, there is a statistically significant 64% to 76% drop in the annual average sovereign CDS spread relative to its sample average, depending on the proxy we use for the property rights measures. We also find both economically and statistically significant effects of creditor rights and disclosure requirements on sovereign CDS spreads, even though the magnitudes of their effects are less than half that associated with property rights protection.

While we show that both institutional and informational factors influence sovereign-level CDS spreads, do firms' foreign asset holdings across countries and their stock cross-listing status explain SCVs in corporate CDS contracts? As an initial step to answer this question, we analyze the determinants of the difference in CDS spreads between firms and their local sovereign market. We find that firms whose foreign assets are located in countries with stronger property rights and creditor rights institutions than their country of domicile have substantially lower relative CDS spreads to that of

¹⁰ Bai and Wei (2012) provide some recent support for this view that T&C risk concerns are greater in institutions with weak property rights. However, they do not address the channels through which private sector firms delink themselves from their sovereign T&C risk.

their home sovereign. Further analyses reveal that stricter disclosure requirements associated with a firm's foreign stock cross-listings also reduces the firm's credit spread relative to that of its home sovereign, confirming the effectiveness of the informational channel to induce SCVs in the CDS market.¹¹ Both the institutional and informational factors are economically significant, with an average 26 bps combined impact on the corporate CDS spreads over their sovereigns. We document stronger effects from these two channels during the recent sovereign credit risk crisis.

Importantly, we show that it is the geographic location of a firm's asset that matters; neither the aggregate amount of a firm's foreign assets nor sales explains the difference in the CDS spreads between a firm and its home sovereign. This identification highlights the importance of geographic information of a firm's foreign assets to measure the effective institutional exposure that a multinational company has. Our results are also robust to controlling for the firm's exposure to foreign fundamentals such as GDPs and stock market volatilities of connected foreign countries through their foreign asset positions. Since we pair firm and sovereign CDS contracts with equal contractual terms, any difference in restructuring clause that may affect their recovery rates also does not explain our findings.

Do credit ratings reflect these factors in their sovereign ceiling rules? For this test, we use the S&P credit rating difference between a firm and its sovereign. We find that S&P does not fully incorporate the geographic information of a firm's foreign assets into their credit rating. However, they do reflect some firm-level aggregate foreign sales information, but not the information on locational exposures. Taken together, our credit rating results suggest that major rating agencies often underestimate the effect of the institutional channel in their corporate credit rating assessment, particularly during the recent crisis period.

As a further robustness test, we confirm that both the institutional and informational channels continue to explain SCVs using various probit regressions with a

¹¹ It should be noted that the relative CDS spread of a firm to that of its home sovereign does not guarantee a violation of the sovereign ceiling rule if the relative spread is positive. We address this point later by showing the robustness of our results using signed differences in CDS spreads between firms and their home sovereign markets.

set of SCV indicator variables that are both transaction cost adjusted and signed. The results are also robust to alternative modeling approaches that include ordered probit models using bucketed violation count variables as dependent variables.

Coming full circle, we compare the information content of SCVs in the CDS market to those defined with S&P credit ratings. We find that the SCVs from the CDS market have strong predictive power on credit ratings-based SVCs in subsequent years. In sharp contrast, we do not find evidence of SCVs from credit ratings predicting SCVs in CDS markets. These results suggest that information from the CDS market flows to rating agencies, supporting the view that market driven CDS spreads are useful in assessing the credit quality of underlying private sector companies in a more timely and informative manner (Hull, Predescu, and White, 2004; Flannery, Houston, and Partnoy, 2010; Chava, Ganduri, and Ornathanalai, 2012).

The remainder of this paper is organized as follows: In Section 2, we provide institutional and pricing background on the CDS market, while in the following Section 3 we develop our main testing hypotheses. In Section 4, we describe our sample and main variables. We provide our main findings in Section 5. Section 6 provides some concluding comments.

2. Institutional background on CDS market

A CDS is a bilateral insurance contract over a fixed term whose payment is contingent on the default of an underlying credit entity (also often called reference entity). The “trigger” event of the reference entity’s default includes bankruptcy, failure to pay, repudiation and moratorium, obligation acceleration, obligation default, and restructuring.¹² A CDS contract is associated with bonds or any credit assets issued by a reference entity, and it trades on the over-the-counter market.

¹² Since the original International Swaps and Derivatives Association (ISDA) agreement in 1999, there are six general categories of trigger events that mandate the payment from the protection seller to the protection buyer. They are bankruptcy, failure to pay, repudiation/moratorium, obligation acceleration, obligation default, and restructuring. For corporate borrowers, there are three principle credit events such as bankruptcy, failure to pay, and restructuring. Since 1999, several minor modifications have been made by the ISDA, in April 2001 and January 2003. The modifications are mostly about the definition of restructuring. However, for standard North American corporate transactions from April 8, 2009 onwards, restructuring events are excluded from trigger events following 2009 ISDA Credit Derivatives Determinations Committees and Auction Settlement CDS Protocol known as ‘Big Bang’ Protocol.

The party that sells the default insurance (protection seller) pays the full face value of the underlying bond issued by a reference entity upon the entity's default, while the other party that purchases the insurance claim (protection buyer) periodically pays fees over the term of the swap to the protection seller until the reference entity defaults and upon the default, delivers the defaulted underlying bond to the protection seller. With this CDS contract, the buyer transfers the default risk of the reference entity to the seller, which bears the full loss given default (LGD). The seller collects fees from protection buyers that are proportional to the expected discounted value of LGD. The fees are called CDS spreads, which are quoted in basis points per annum of the contract's notional value, and are usually paid quarterly. The spreads capture both the recovery rate of the underlying bond and the hazard rate that the reference entity could default in an infinitesimal time interval conditioning that the entity does not default by that time. A fair CDS spread, both from a buyer's and a seller's perspectives, is defined as the constant periodic annuity whose expected discounted value until the reference entity's default equates the expected discounted value of LGD.¹³ The reference entity of the swap could be a private sector firm or a government. In the former case, we call the CDS contract a corporate CDS, and in the latter case a sovereign CDS.

Each CDS contract comes with its own maturity of the insurance period, a restructuring clause that defines trigger events and further denotes the types of bond that a protection buyer could deliver to a protection seller upon the trigger events, and the base currency of its settlement. Maturities span from a few months to 10-years or more, but 5-year maturities are the most liquidly traded corporate and sovereign CDS's (Longstaff et al., 2005). A restructuring clause could have a material impact on a CDS spread since it determines the types of trigger events and affects the recovery rate of an underlying obligation by limiting the types of deliverable obligations upon such events. Therefore, it is possible that two CDS contracts with equal contractual terms but different restructuring clauses could come up with different spread values, even if they

¹³ Under the flat hazard rate and constant recovery rate assumptions, the fair spread can be simplified to the product of the hazard rate and the constant LGD per \$1-notional in a continuous time setup. Hence, the fair spread captures the expected LGD for a \$1-notional under the risk-neutral probability measure. See Appendix A for more details on the derivation of this pricing relation in a continuous time setup.

are written on the same reference entity (Packer and Zhu, 2005; Berndt et al., 2007).

There are four distinct restructuring types that are mostly different in the delivery options of underlying obligations: 1) Full restructuring (FR), which allows the delivery of any bond of maturity up to 30 years issued by the underlying credit entity; 2) Modified restructuring (MR), which limits the deliverable obligations to those with a maturity of 30 months or less after the termination date of the CDS contract; 3) Modified-modified restructuring (MMR), which limits the deliverable assets to be the bonds with a maturity shorter than 60 months for restructured obligations and 30 months for all other obligations; and 4) No restructuring (XR), which excludes all restructuring events from trigger events.

To make direct comparisons on the credit risks of two different reference entities, all contractual terms of the two CDS contracts must be matched to filter out other potential contract risk profiles that are unrelated to the underlying credit risks of the two reference entities. In our analysis, we carefully match and compare the spread of a 5-year private sector CDS to that of its sovereign counterpart with equal maturity, tier, restructuring clause, and settlement currency to eliminate the non-credit risk profiles that may cause the two spreads to diverge from each other, even if the two reference entities are perceived to have similar credit qualities.

3. Hypotheses development

Suppose that a country is in financial distress and unable to pay back its debt obligations. Consider a hypothetical firm that has all of its assets located within that country, and thus, the assets are largely governed by the rules and conditions imposed by the distressed government in which the firm and its assets reside. One can envision two scenarios for this purely domestic firm, default (D-state) and non-default (ND-state). In a D-state, the firm's creditors may not fully capture the residual value of the firm's assets if the distressed government intervenes in the post-default restructuring process. The government can affect the restructuring process either directly by changing the rules and conditions on how the creditors can pull out the residual value of the defaulted firm's assets, or indirectly by prohibiting any capital outflows from the

country.¹⁴ Even in an ND-state, the firm's creditors are still concerned about the increase in the firm's default probability that is induced by potential increases in taxes or other forms of government expropriation attempts on the firm's cash flows or assets. Due to this potential violation of their property rights in either state, lenders are not willing to pay favorable prices for the firm's debt obligations, which results in higher spreads on CDS contracts written on that firm's debt obligations.

However, if the firm had a portion of its assets in other countries with better property rights, the firm's creditors would expect more transparent and credible enforcement of the rules and laws applied to that firm's foreign assets. Alternatively, they may anticipate a potential flow of subsidizing capital from the firm's foreign operations to its domestic operations. For these reasons, the creditors' concerns on the local government's T&C risk would be mitigated, which could enhance the lenders' *ex ante* expectation on the recovery rate of their bond positions (recovery rate effect) and could also lead to a lower perceived default probability of the underlying credit entity (default probability effect). This could result in a lower CDS contract spread written on this firm's bond. From the foregoing arguments, we hypothesize:

H1: When a firm has foreign assets in countries with better property rights, the firm's CDS spread is lower, ceteris paribus.

Better creditor rights enhance the efficiency and speed of post-default restructuring and lowers within-creditor conflict of interest. Creditor rights are particularly relevant when firms are in a D-state, with better creditor rights increasing the recovery value that creditors can potentially pull out of debtors in the restructuring process (recovery rate effect) and thus leading to a higher *ex ante* corporate bond price. This implies a lower CDS contract spread on that bond.

H2: When a firm has foreign assets in countries with better creditor rights, the firm's CDS spread is lower, ceteris paribus.

Without a comprehensive picture of a firm's operations, firm investors cannot

¹⁴ This indirect capital control by a local government could be a particular concern for non-resident claimants.

accurately measure the firm's true default risk (measurement error in default risk forecast) and the potential recovery value upon the firm's default (measurement error in recovery rate forecast). Hence, the price of the bond issued by a firm whose balance sheet information is limitedly disclosed to its creditors could be discounted due to these information opacity reasons. Following the notions used in the home bias literature (Coval and Moskowitz, 2001; Mian, 2006), informational opacity could be a more serious concern to foreign investors, and such investors would not be willing to pay favorable bond prices unless the issuer disclosed its accounting information in a more frequent and comprehensive manner. More stringent equity cross-listing requirements help alleviate foreign investor concerns since they often require additional degrees of disclosure on the frequency and number of items regarding corporate balance sheet information. The aforementioned discussion gives rise to our last hypothesis:

H3: When a firm's equity is listed on foreign exchanges with stricter disclosure requirements, the firm's CDS spread is lower, ceteris paribus.

From the above hypotheses, we expect more CDS sovereign ceiling violations for firms whose assets are located in countries with better property rights and creditor rights than those of the firm's local government as well as for firms whose stocks are cross-listed on exchanges with stricter disclosure requirements than its domestic exchange. The effects of these institutional and informational channels on corporate CDS spreads are expected to be stronger as the probability of local government's default increases, and thus, T&C risk concerns are more severe.

4. Data and variables

We gather daily CDS contract data for corporations and governments over the years 2004-2011 from Markit Group, and we use the 5-year CDS contract since it is the most liquidly trading contract among the CDS maturities (Longstaff et al., 2005; Acharya and Johnson, 2007; Ericsson et al., 2009). Markit provides details for each firm's CDS contract, including firm-level information (ticker, country, region, industry, and credit rating composite) and contract-specific information (tier, restructuring type, currency, and depth). Depth refers to the number of distinct contributors to each daily

CDS spread collected by Markit. We use depth as a measure of CDS liquidity (e.g., high depth indicates high liquidity).

In our SCV analysis, we match each firm’s CDS to its corresponding sovereign CDS with the same contract characteristics, including tier, restructuring type, and currency. This matching between the firm and sovereign CDS contracts helps alleviate concerns on the “cheapest-to-deliver” option inherent in the different restructuring types (Berndt et al., 2007).

4.1 Sovereign-level variables

We collect country-level economic, institutional, and other control data from various sources. We acquire each country’s sovereign S&P credit rating from Datastream and convert them into a numerical score that ranges from 0-21 (21 is equal to a AAA rating, 20 is equal to a AA+ rating, etc.) to form a variable called *Sovereign S&P Credit Rating*. *GDP* and *Government Debt (% of GDP)* are downloaded from the International Monetary Fund (IMF). External government debt is retrieved from the World Bank and scaled by GDP to form the variable *External Debt (% of GDP)*. We collect stock market index returns for each country from Datastream and compute a standard deviation of weekly log returns each year to form local *Stock Market Volatility*.

To measure each country’s institutional and informational environments, we collect data from several sources. From La Porta et al. (1998) and Djankov et al. (2007) we gather information on each country’s legal origin: English, French, Germanic, Scandinavian, and Socialist legal origins. We also utilize four variables that measure the general strength of a country’s property rights:

- *Property Rights* measures the extent to which government creates and enforces laws that protect private property and the extent to which government expropriates private property (source: Heritage Foundation).¹⁵
- *Rule of Law* is an assessment of the law and order tradition of the country (source: International Country Risk Guide, ICRG).

¹⁵ Dittmar and Yuan (2008) use Heritage Foundation data to measure each country’s economic freedom.

- *Repudiation Risk* measures the country's risk of contract repudiation or postponement due to budgetary issues, political pressure, or a change in government (source: ICRG).
- *Expropriation Risk* measures the extent to which a country's government confiscates or nationalizes private property or enterprise (source: ICRG).

Next, we use two variables that represent a country's willingness to provide power and protection to creditors:

- *Creditor Rights* measures the legal protection allocated to creditors to have influence over decisions that affect the value of their position. Specifically, this variable takes into account (1) creditors' voice in restructuring decisions, (2) automatic stay of creditors, (3) priority given to creditors in bankruptcy, and (4) the degree to which creditors have control over the firm's assets during reorganization (source: La Porta et al., 1998; Djankov et al., 2007).
- *Ln(Contract Enforcement Days)* records the average number of days it takes to resolve a creditor payment dispute in the courts. We use this variable as a measure of the efficiency and enforcement of the legal system as it pertains to creditor rights (source: Djankov et al., 2007).

To capture a country's level of informational transparency, we utilize two disclosure requirement variables that capture distinct dimensions of disclosure.¹⁶

- *Disclosure: Number of Items* records a country's required number of disclosed items on a wide range of topics, including general information, financial condition, and corporate governance (source: Bushman et al., 2004).
- *Disclosure: Frequency* measures a country's required timeliness of financial reporting through the frequency of interim reports (source: Bushman et al., 2004).

All these institutional and informational variables are standardized to have mean zero and the standard deviation of one.

[Insert Table 1 here]

¹⁶ Bushman et al. (2004) also use these firm-specific information environments variables as proxies for country-level informational transparency.

The country-level variable summary statistics are provided in Panel A of Table 1. There are 54 countries, with an average annualized 5-year sovereign CDS daily spread of 122.33 bps. The average depth of the 5-year sovereign contract is 7.428. The average sovereign S&P credit rating score is 17.173, which approximately corresponds to A+ rating. The average $\ln(GDP)$ is 6.013 and is equivalent to \$408.70 billion ($=\exp(6.013)$). The average government debt issuance (*Government Debt*) represents 55.101% of the country's GDP.

4.2 Firm-level Variables

We gather firm-level financial data from Datastream, Worldscope, and Thomson One. While we can readily match firms across these three databases, no reliable firm identifier exists to link the Markit CDS database to these other firm-level financial databases. To link the Markit CDS data with the firm-level financial data, we manually match the Markit and Datastream databases by firm name, country, and industry. We successfully match 2,364 firms in 54 countries.¹⁷

From the Thomson One database, we collect an annual S&P credit rating for each firm and convert it into a numerical score that ranges from 0-21 (21 is equal to a AAA rating, 20 is equal to a AA+ rating, etc.). We subtract *Sovereign S&P Credit Rating* from the firm's credit rating to form *S&P Credit Rating Difference*. A difference of 1 signifies a one sub-notch (+/-) difference.

We collect market capitalization, total assets, total debt, long-term debt, short-term debt, and net cash flow at the end of each calendar year from Worldscope. The variable $\ln(\text{Market Capitalization})$ is defined as the natural log of market capitalization. *Leverage* is defined as total debt over total assets. *Short-term Debt Fraction* is equal to short-term debt over the sum of short-term debt and long-term debt. *Cash Flow to Assets* is defined as net cash flow over total assets. We also collect each firm's stock price returns from Datastream and create *Stock Return Volatility*, which is computed as the standard deviation of the firm's weekly log returns in a given year. We compute

¹⁷ Our manual inspection using these key mapping variables results in a 78% match rate between the Markit and Datastream databases.

Number of Stock Exchanges by counting in Datastream the number of exchanges on which the firm has listed its equity.

4.3 Scaled exposure and extra disclosure variables

There are a few ways of measuring the percentage of total foreign assets out of total assets for each firm in a given year. Worldscope provides a variable that explicitly states the percentage of total foreign assets, and it also provides the amounts of total assets and total international assets so that foreign assets percentage can be computed by dividing total international assets by total assets. We use the former to measure the total foreign asset percentage, *Foreign Assets (fraction of Total Assets)*. However, in instances where no foreign assets percentage is explicitly provided, we use the computed value from the latter. We similarly construct our total foreign sales percentage variable, *Foreign Sales (fraction of Total Sales)*.

In addition to the aggregate view of foreign assets, Worldscope also provides geographically segmented financial information. Up to ten geographic segments are reported, and companies can input the description of the geographic segment as they choose. Thus, a firm has flexibility to assign a single country or multiple countries to a single geographic segment. We count the number of geographic segments reported by the firm to construct the variable *Number of Geographic Segments*.

To determine if a firm’s international asset exposure at the country-level has a net positive or negative effect relative to the firm’s home country, it is necessary to compare the institutional characteristics of the foreign countries in which the firm has assets with the institutional characteristics of the firm’s home country. We address this issue by creating firm-level “scaled exposures” to various institutional and economic environment variables that measure the firm’s international exposure and scales it by *Foreign Assets (fraction of Total Assets)*. Appendix B provides our detailed steps in identifying and constructing each of our scaled exposure variables. Using the foreign institutional characteristics associated with each of the firm’s asset segments, we define the “Scaled Exposure” variable ($ScaledExposure_{iy}$) for firm- i in year- y :

$$ScaledExposure_{iy} = ForAsset\%_{iy} \times \left[\sum_{s=1}^{10} \left(SegInstValue_{iys} \times \frac{SegAsset_{iys}}{ForAsset_{iy}} \right) - HomeValue_{iy} \right] \quad Eq. (1)$$

where $ForAsset\%_{iy}$ is *Foreign Assets (fraction of Total Assets)*, $SegInstValue_{iys}$ is the institutional value of segment- s , $SegAsset_{iys}$ is the amount of assets in segment- s , $ForAsset_{iy}$ is the total amount of foreign assets of the firm, and $HomeValue_{iy}$ is the institutional value of the firm's home country.

We create a firm-level "Scaled Exposure" variable using each of the following country-level macroeconomic and institutional variables: *GDP*, local *Stock Market Volatility*, *Property Rights*, *Rule of Law*, *Repudiation Risk*, *Expropriation Risk*, *Creditor Rights*, and $Ln(Contract Enforcement Days)$.¹⁸

A firm based in a country with low disclosure requirements may have to increase its informational transparency when it lists its equity on an exchange in a country with higher disclosure requirements. To assess a firm's level of transparency, we examine the disclosure requirements of the countries in which the firm has listed its equity on an exchange. We create two "Extra Disclosure" variables for firm- i in year- y , which are equal to the maximum disclosure index value among all countries that list the firm's equity in excess to the disclosure index value of the firm's home country:

$$ExtraDisclosure_{iy} = \text{Max} \left[HomeExchange_c, Exchange_{c1}, Exchange_{c2} \dots \right] - HomeExchange_c \quad Eq. (2)$$

where $HomeExchange_c$ refers to the disclosure requirement index value of the firm's home country and $Exchange_{c1}$, $Exchange_{c2}$, etc. refers to the disclosure requirement index values of each country in which the firm lists its equity. Using this method, we

¹⁸ For example, *Scaled Exposure: Property Rights* measures the net positive or negative exposure by comparing the *Property Rights* of the foreign countries in which the firm owns assets with the *Property Rights* of the firm's home country and then scales the exposure according to the total percentage of the firm's foreign assets.

construct *Extra Disclosure: Number of Items Reported* and *Extra Disclosure: Frequency and Count*.¹⁹

The firm level “Scaled Exposure” and “Extra Disclosure” variables are all standardized to have mean zero and the standard deviation of one.

In Panel B of Table 1, we provide summary statistics on our firm-level variables. There are 2,364 firms from 54 countries.²⁰ The average value of the annualized 5-year firm CDS daily spread is 195.511 bps, and the firm CDS contracts have an average market depth of 5.628. The average firm size in our sample is \$18.37 billion ($=\exp(23.634)$), with an average firm leverage of 29.9%. On average, firms in our sample cross-list their stock on 2.348 different exchanges (*Number of Stock Exchanges*) and operate in the 3.693 different segments (*Number of Geographic Segments*). In Appendix D and E, we further provide the details of our firm/country coverage and descriptions of all our variables that are defined in this data section, respectively. The correlation matrix among these variables is also provided in Appendix F.

5. Main results

5.1. Local institutional and informational factors in sovereign CDS spreads

In this section, we first examine the extent to which local institutional characteristics and the degree of disclosure requirement mandated by local stock exchanges are priced in sovereign CDS spreads. A central assumption of our main hypotheses developed in Section 3 is that investors in private sector claims are concerned about a local government’s T&C risk, which could be exacerbated if their claims reside in countries with weak property rights institutions and poor information quality. These T&C risk concerns could also apply to the government securities since both the enforceability of the sovereign financial contracts and the availability of the

¹⁹ For example, if a firm based in Brazil has its equity listed in both Brazil and the United States, then its overall level of transparency as measured by *Extra Disclosure: Number of Items Reported* will be equal to the disclosure requirement index value of the United States minus that of the Brazil.

²⁰ The 2,364 firms are those who have both 5-year CDS spread and market capitalization information. Due to the joint availability of balance sheet information, this firm sample is reduced some in our multivariate regression settings. There are seven countries that have only one firm in our dataset (Cyprus, Egypt, Kazakhstan, Panama, Poland, Puerto Rico, and Sri Lanka). The firms in these countries are excluded in our firm-level analyses where we control for various fixed-effects, though the seven countries are included in our sovereign-level analysis.

information associated with those sovereign-issued claims differ across countries, depending on their local institutional and informational qualities.

Hence, we could view this sovereign CDS test as a thought experiment such that we treat each country's government as a hypothetical private entity that is safest from a local government's T&C risk. By varying the institutional and informational qualities of each government, we can then examine how such factors affect their CDS spreads in a purely multinational setting. Confirming the influence of those factors on sovereign CDS spreads validates our key assumption on the close relation between the degree of local government's T&C risk and the government's institutional/informational qualities.

As institutional factors, we consider a country's legal origin, our four proxies for property rights protection (*Property Rights, Rule of Law, Repudiation Risk, and Risk of Expropriation*), and two proxies for creditor rights protection (*Creditor Rights and Ln(Contract Enforcement Days)*). For informational factors, we use *Disclosure: Number of Items Reported* and *Disclosure Requirement: Frequency and Count*.

[Insert Figure 3 here]

In Figure 3, we provide scatter-plots of each country's natural logarithm of the annual average value of 5-year sovereign CDS daily spreads against each of our institutional and informational factors using our full 54-country sample. In the top four panels of Figure 3, one can see that sovereign CDS spreads decrease in each of our four local property rights protection measures (*Property Rights, Rule of Law, Repudiation Risk, and Risk of Expropriation*). In the following two panels, a similar tendency is observed with our two local creditor rights protection proxies. This tendency is clearly depicted in the panel where we use *Ln(Contract Enforcement Days)* as a proxy for the local creditor rights. The plot shows that the longer it takes for creditors to seize their recovery value from a defaulted institution, the higher is the institution's CDS spread. In the last two panels of Figure 3, one can see a decreasing sovereign spread as the country's local stock exchange mandates stricter disclosure requirement in both the number of items to be reported and the reporting frequency.

While the figures are suggestive of a relation between sovereign CDS spreads and their institutional and informational environments, they do not control for other factors

that are likely to affect these spreads. In Table 2 we report annual panel regressions to confirm these findings in multivariate settings. Our main left-hand-side (LHS) variable is the natural logarithm of the annual average value of 5-year sovereign CDS daily spreads. The main right-hand-side (RHS) variables of this regression are *French Legal Origin* dummy (La Porta et al., 1998; Djankov et al., 2007) and our institutional and informational variables.

[Insert Table 2 here]

Following the sovereign CDS and bond pricing literature (Claessens et al., 2007; Ejsing and Lemke, 2009; Longstaff et al., 2011; Dieckmann, and Plank, 2011), we control for local fundamental variables, including *Stock Market Volatility*, $\ln(GDP)$, *Government Debt (% of GDP)*, *External Debt (% of GDP)*. Longstaff et al. (2011) and Ang and Longstaff (2011) emphasize the importance of regional and systemic factors in explaining sovereign CDS spreads. To control for such effects, we additionally control for $\ln(Region\ CDS\ Spread)$ -- the natural logarithm of average CDS spread for other countries in the same region. Similar to Longstaff et al. (2011), we group corresponding countries into North America, Latin America, Asia, Europe, and the Middle East/Other and compute $\ln(Region\ CDS\ Spread)$ for each region. We control for year fixed effects to control for a potential global factor effect (Longstaff et al., 2011), which will capture average sovereign CDS spreads effects in each year. Sovereign CDS in our sample could have different restructuring clauses and denominated currencies. We control for the fixed effects associated with these contractual term differences (restructuring type and currency dummies), and we also control for liquidity effects by including *Sovereign CDS Depth* in the RHS. Standard errors are clustered at each country level to adjust for any within-country autocorrelations of the regression residuals.

In column (1) of Table 2, we primarily focus on the influence of legal origins on sovereign CDS spreads. La Porta et al. (2008) find that legal rules originated from French civil law are associated with poor protection for outside investors/creditors and less developed financial markets than those from civil law origin. In column (1), we find significantly higher CDS spreads for the countries from French legal origin. The point estimate of 0.393 for *French Legal Origin* is statistically significant the 5% level,

consistent with La Porta et al.'s (2008) predictions.

Columns (2) to (5) provide the regression results with local property rights measures. We find a significantly negative point estimates for all four property rights variables (*Property Rights*, *Rule of Law*, *Repudiation Risk*, and *Expropriation Risk*). The results indicate that countries with poor property rights protection indeed pay higher costs to raise their government debt. The effects are both economically and statistically significant at the 1% level. In column (2), the point estimate of *Property Rights*, -0.654, implies 65.4% decrease in sovereign CDS spread for a one standard deviation increase of that property rights measure.²¹ This effect corresponds to a substantial 80 bps decrease in sovereign CDS spreads given that our sample average of sovereign CDS spread is 122.33 bps.

We repeat the same exercise for *Creditor Rights* (column (6)) and *Ln(Contract Enforcement Days)* (column (7)), finding a similar negative effect of stronger creditor rights protection on the sovereign spreads. Both effects are statistically significant at least at the 10% level, and among the two, the effect associated with *Ln(Contract Enforcement Days)* is stronger in both its economic and statistical significance.²²

In columns (8) and (9), we examine the influence of our local informational factors on sovereign CDS spreads. We find a significantly negative point estimate, particularly for *Disclosure: Number of Items*. Overall, these results, together with our previous results with local property rights and creditor rights protection measures, indicate that local institutional and informational qualities affect sovereign credit spreads. These findings validate our key assumption that these qualities influence the degree of each institution's T&C risk.

We conduct a horse race regression in the remaining columns (10) to (13) to disentangle the relative effects of our variables. Using the complete specifications, we find that local property rights measures have the most significant effect on sovereign CDS spreads in terms of their economic and statistical significance. Notably, the

²¹ All local institutional and information factors are standardized to have the mean of zero and standard deviation of one to easily interpret their economic magnitudes.

²² Note that the higher the value of *Ln(Contract Enforcement Days)*, the weaker the strength of creditor rights protection.

statistical significance of *French Legal Origin* dummy disappears in these four columns except column (11). This suggests that the effect previously captured by the French legal origin dummy in column (1) could be driven by the strength of each institution’s property rights protection.

In each model specification in Table 2, our fundamental control variables typically have correct expected signs and statistical significance (positive sign for *Ln(Regional CDS Spread)*, *Stock Market Volatility*, *Government Debt (% of GDP)*, *External Debt (% of GDP)*; and negative sign for *Ln(GDP)*). However, the liquidity measure, *Sovereign CDS Depth*, has the opposite sign to our prior. In the next section where we analyze the determinants of CDS spread difference between a firm and its local government, we also control for their liquidity effects and find that the sovereign liquidity measure recovers its expected negative sign.

5.2 The determinants of sovereign ceiling violations (SCV)

5.2.1 CDS spread difference: Firm minus sovereign

In this section, we examine the determinants of SCVs in CDS market and find that the difference in spreads tends to be smaller and becomes negative as the firm is exposed to better institutional and informational environments through its foreign asset holdings and its stock cross-listing status.

Major rating agencies provide guidelines on their sovereign ceiling rule.²³ For example, S&P in its 2008 corporate credit rating guideline states, “*corporate ratings above those on the sovereign are possible where there is strong implicit or explicit support from a highly rated parent in another jurisdiction, and/or there is significant cash-flow diversity derived from operations in several countries.*”

With this guideline in mind, we first conduct a univariate analysis to examine the extent to which a firm’s multinational status affects its “own” CDS spread. We report the univariate results in Panel A of Table 3. We use one of the following variables as proxies for a firm’s multinational status: 1) *No. of Stock Exchanges*, 2) *No. of Geog.*

²³ See more in S&P, 2008 Corporate Criteria: Analytical Methodology, April 15, 2008, Moodys, August 2006, A Guide to Moodys Sovereign Ratings, FitchRatings, June 2004, Country Ceiling Ratings and Rating Above the Sovereign.

Segments, 3) *Foreign Assets (fraction of Total)*, and 4) *Foreign Sales (fraction of Total)*. Using each variable, we sort our sample firms and put them into four different buckets: Zero, Low, Medium, and High. Here “Zero” implies zero international exposure. As discussed earlier in the introduction, SCVs in CDS market are more pervasive during the recent crisis period, 2008-2011 (see Panel A of Figure 2). To incorporate this observed time trend in our analysis, we further decompose our sample into two sub-periods: pre-crisis period (2004-2007) and crisis period (2008-2011). Then, we compute the average firm CDS spread in each bucket for the two sub-periods and report the results in Panel A of Table 3.

[Insert Table 3 here]

In Panel A of Table 3, one can see that average corporate CDS spreads in both sub-periods are lower for the firms whose stocks are cross-listed in multiple foreign exchanges (*No. of Stock Exchanges*) and whose assets are located in multiple countries (*No. of Geog. Segments*). These results are consistent with the rating agencies’ guidelines. Moreover, the differences in average CDS spreads between purely domestic firms (Zero) and multinational firms (High) become larger during the crisis period.

When we sort the firms based on each firm’s aggregate foreign assets amount (*Foreign Assets (fraction of Total)*), the CDS spreads of multinational firms (High) are lower than purely domestic companies (Zero). These results are also consistent with the sovereign ceiling guidelines reported by major rating agencies. The differences again increase in their magnitudes during the crisis period (pre-crisis, -22.55 bps vs. crisis, -113.56 bps). We find similar results when we sort firms using *Foreign Sales (fraction of Total)*. Overall, Panel A of Table 3 shows that the CDS spreads of multinational firms are lower than those of purely domestic firms in terms of their asset and equity cross-listing information exposures.

In Panel B of Table 3, we consider a more elaborate treatment of a firm’s foreign assets and sales exposure variables (*Foreign Assets (fraction of Total)* and *Foreign Sales (fraction of Total)*). We incorporate the locational information of a firm’s foreign assets and construct the effective institutional qualities that the multinational firm is exposed to across its various markets as discussed in Section 4.3. In Panel B of Table 3, we

provide evidence on the extent to which a firm’s multinational status affects its own CDS spread similar to Panel A, but here we instead use our scaled institutional exposure measures as sorting variables. We consider our four property rights proxies and two creditor rights proxies to show the relevance of these scaled institutional factors on a firm’s average CDS spread. Panel B shows that CDS spreads of firms whose foreign assets are exposed to better property rights institutions (Net High) have lower average CDS spreads than those exposed to poor property rights institutions (Net Low). We also find a similar tendency with creditor rights protection measures. The difference in average corporate CDS spreads between Net High and Net Low firms are indeed widened during the crisis period, suggesting that T&C risk concerns became more severe during the crisis period. Overall, our univariate results in Panel B of Table 3 provide some support for our main hypotheses, though they do not control for other factors that are likely to influence the CDS spread.

In Table 4, we extend our findings to examine the potential determinants of SCVs in the CDS market by running annual panel regressions in a multivariate setting. In these regressions, we use the CDS spread difference between a firm and its local government as our main LHS variable (i.e., *Firm-Sovereign CDS Difference*). As explanatory variables, we consider our scaled institutional and informational factors that fully incorporate the locational information on a firm’s foreign assets and its equity cross-listing on foreign exchanges. The scaled variables are: 1) for the property rights protection, *Scaled Exposure: Property Rights, Rule of Law, Repudiation Risk, and Expropriation Risk*; 2) for the creditor rights protection, *Scaled Exposure: Creditor Rights Protection, Ln(Contract Enforcement Days)*; and 3) for disclosure requirement, *Extra Disclosure: Number of Items Reported and Frequency and Count*.

We motivate our use of the *Firm-Sovereign CDS Difference* as our LHS variable from the definition of a SCV. A SCV is defined as an event where *Firm-Sovereign CDS Difference* becomes strictly negative. Hence, a lower value of *Firm-Sovereign CDS Difference* in a given firm-year does not necessarily imply that the firm-year is indeed a SCV event. However, the analysis on the determinants of this CDS spread difference between a firm and its sovereign counterpart could be informative on the potential

determinants of the actual SCV events. As a first step to explore the potential determinants of SCVs, we use a regression framework to examine the relationship between the *Firm-Sovereign CDS Difference* and both of our institutional and informational factors.

The regression is conducted at each firm-year level, and we include the following firm level, time-varying controls: $\ln(\text{Market Capitalization})$, *Leverage*, *Short-term Debt Fraction*, *Cash Flow to Assets*, and *Stock Return Volatility*. The use of all these control variables is well-motivated in the corporate credit risk literature (see Collin-Dufresne et al., 2001, among others).²⁴ We control for country and the year fixed effects. The inclusion of both fixed effects alleviates potential concerns of any omitted regional and global factors that may affect both the firm and sovereign CDS spreads (Longstaff et al., 2011). Any regional fixed effects are implicitly explained by our country-level fixed effects. Different industries may have different degrees of exposures to the domestic business cycles (Durbin and Ng, 2005). To capture this industry heterogeneity, we also control for the industry fixed effects in the regression. To account for the liquidity effects of both firm and sovereign CDS contracts, we include both *Firm CDS Depth* and *Sovereign CDS Depth* as additional controls. Each firm's CDS contract is matched with its local government's CDS based on their restructuring clauses and base currencies, and thus, each matched firm-sovereign CDS pair used in this analysis could vary in these two contractual terms. We control for such contractual term variations by including restructuring type and settlement currency dummies, and cluster the standard errors at the firm level to adjust for within-firm persistence of the regression residuals.

[Insert Table 4 here]

Panel A of Table 4 reports our main results. In the first four columns (1) to (4), one can see significant negative effects of scaled property rights variables on the firm-sovereign CDS spread difference. In column (1), the point estimate on *Scaled Exposure: Property Rights* is -12.09, indicating that for a one standard deviation increase in that

²⁴ One could also hypothesize that firms with greater corporate liquidity might be in a better position to delink themselves from their sovereign risk. At the same time, this corporate liquidity could also be subject to greater T&C risk (Caprio et al., 2011). In untabulated results, we find a statistically weak and negative relation between corporate cash holding/cash growth variables and SCVs. Our main results are also robust to the inclusion of these additional corporate liquidity controls.

scaled property rights variable, there is approximately a 12.09 bps decrease in excess corporate CDS spread over its local government's CDS spread. This effect is statistically significant at the 5% level. In the remaining three columns, we see both qualitatively and quantitatively similar results for the other three scaled property rights variables. The effects with one standard deviation increase in their values range from 9 to 13 bps.

In the next two columns (5) and (6), we use the scaled creditor rights measures. Both measures have the correct expected signs (negative for *Scaled Exposure: Creditors Rights Protection* and positive for *Scaled Exposure: Ln(Contract Enforcement Days)*), and their point estimates are statistically significant. Their economic impact with a one standard deviation increase suggests a 2.41 to 9.22 bps lower corporate CDS spread relative to its local government's CDS spread.

In columns (7) and (8), we repeat the same exercise with our scaled informational factors, *Extra Disclosure: Number of Items Reported* and *Frequency and Count*. Both variables have significantly negative point estimates. For example, the economic magnitude of the effect of *Extra Disclosure: Number of Items Reported* is 13.36 bps for a one standard deviation increase in that variable.

In the last four columns (9) to (12), we run a horse race regression with all of our scaled institutional and informational variables. We use each of two scaled creditor rights and disclosure related variables in those specifications, while we use each scaled property rights measures one at a time. We find that most of the scaled exposures based on property rights, creditor rights, and extra disclosure related variables significantly explain the deviation of corporate CDS spreads from their sovereign counterparts. Among them, scaled property rights and extra disclosure related variables are most significant in explaining SCVs in the CDS market in terms of both their economic and statistical significance. As a whole, these institutional and informational factors are economically significant, having an average 26 bps combined effect on the relative corporate CDS spreads to their sovereign counterparts.

5.2.1.1 CDS spread difference robustness checks: Total foreign asset exposure, scaled foreign fundamental exposure, crisis period interactions, regulated industry effects, and econometric procedures

It could be argued that our scaled institutional variables and extra disclosure requirement measures simply capture the aggregate exposure of the firm to foreign institutions, not the locational information of a firm’s asset segments and its equity cross-listings. To show the robustness of our results to such concerns, we repeat the same regressions with additional controls, *Foreign Assets (fraction of Total Assets)* and *Foreign Sales (fraction of Total Sales)*. Panel B of Table 4 provides these results. The point estimates of these two additional controls are not statistically significant in most of our specifications, except columns (6) and (11). At the same time, the point estimates of both our scaled property rights and extra disclosure requirement variables are little changed in their economic magnitudes and statistical significance, even after controlling for these additional aggregate foreign assets/sales exposures. This confirms that the geographic segmentation information of a firm’s assets, not the aggregate foreign exposure itself, appears to explain the divergence of the firm’s CDS spread from its sovereign counterpart. It should be noted that the effect of *Scaled Exposure: Creditor Rights Protection* is not generally robust, showing the opposite sign of its effect on the *Firm-Sovereign CDS Difference*, which is particularly observed in column (5). However, the variable recovers its expected sign and statistical significance in the last four columns of Panel B of Table 4 where we conduct the horse race regressions using all of our institutional and informational variables.

Another potential concern is that our scaled institutional and informational variables are simply capturing a firm’s exposure to foreign fundamentals, such as a foreign country’s GDP and that country’s stock market volatility.²⁵ To further show that our scaled measures and informational variables have explanatory power for the *Firm-Sovereign CDS spread difference*, we control for scaled foreign country fundamental exposures: *Scaled Exposure: Ln(GDP)* and *Stock Market Volatility*. The results in Panel C of Table 4 show that our findings are not driven by these foreign fundamental exposure concerns and confirm that indeed our scaled institutional factors and extra

²⁵ Huang (2012), Li et al. (2012), and Nguyen (2012) recently find that a firm’s foreign asset exposure to foreign market conditions are not fully incorporated into the firm’s equity prices in a timely manner.

disclosure requirement measures capture their own incremental effects on the firm-sovereign CDS spread difference.²⁶

T&C risk concerns are expected to be more severe to foreign investors when the local government is in distress, with a high default probability. From Figure 1, we show that there is a dramatic increase in global 5-year sovereign CDS spreads, and thus, we expect that the effects of scaled property rights, creditor rights, and informational factors are stronger during this crisis period. To test this hypothesis, we interact each of these variables with a crisis indicator variable that takes a value of one for 2008-2011 and zero otherwise. The results are reported in Panel D of Table 4. We find that scaled property rights measures and extra disclosure requirement have significant incremental effects in explaining the SCVs, especially during the crisis. The coefficient estimate on the interaction term between *Scaled Exposure: Creditor Rights* and the crisis dummy has the opposite sign to our expectation. However, the effect is not statistically significant, with a t-stat on the interaction term of approximately 0.12-0.88.

While we control for industry fixed-effects, there may be some additional potentially interesting cross-industry T&C risk effects. In particular, banks arguably face potentially higher T&C risk since they are often perceived to be more likely to be nationalized than retailers, and governments in trouble may find banks as the most readily accessible source for foreign exchange (Durbin and Ng, 2005). A recent study by Acharya et al. (2011) also theoretically demonstrates how a financial sector' risk of default is more closely tied with the sovereign credit risk upon the announcement of bailouts through a "collateral damage" channel. In untabulated results, we examine such interactive effects using a financial sector dummy with our four scaled property rights, two scaled creditor rights, and two extra disclosure variables. We find some support consistent with higher banking T&C risk with our four scaled property rights variables and *Extra Disclosure: Number of Items Reported*, particularly during the recent crisis period. However, the financial sector interactive effect is generally weak for the other

²⁶ It should be noted that both *Scaled Exposure: Ln(GDP)* and *Stock Market Volatility* have correct point estimate signs (negative for *Ln(GDP)* and positive for *Stock Market Volatility*). They have a statistically significant influence on the *Firm-Sovereign CDS Difference* when they are included individually, without being interrupted by both of our institutional and informational factors (columns (1) and (6)). However, their significance disappears once we control for our main institutional/informational quality variables.

measures such as the two scaled creditor rights variables and another extra disclosure variable related to the frequency and count.

In additional untabulated robustness checks, we further conducted various conditional analyses using alternative regression specifications such as quantile regression approaches that are less sensitive to potential outlier effects. We again obtained similar quantitative and qualitative results to our reported findings.²⁷ All these untabulated results are available on request.

5.2.2 S&P credit rating difference: Firm minus sovereign

To what extent do ratings agencies account for geographical foreign asset segmentation information or foreign equity cross-listing disclosure requirement information in their sovereign ceiling rating rules? Similarly, do they account for simple aggregate measures of a firm's foreign operations? More importantly, how do their ratings perform compared to CDS market results, particularly during the crisis period? In this section we address these questions by using an experimental design similar to our earlier firm-sovereign CDS spread difference analysis. However, instead of using the CDS spread difference, we use S&P's credit rating score difference between a firm and its local government.²⁸

[Insert Table 5 here]

Panel A of Table 5 provides some preliminary evidence on the information content of sovereign ceiling credit rating differences. We start our analysis with aggregate foreign exposure measures, together with the simple counts of the number of stock exchanges and the number of geographic segments of a firm's assets. We find that S&P credit rating differences take into account the number of stock exchanges. *Number of Geographic Segments* and *Foreign Sales (fraction of Total Sales)* have a significantly positive influence on the relative corporate credit ratings to their sovereign counterparts,

²⁷ When we further conduct the quantile regression test with an alternative specification such as using *Firm CDS Spread* alone as a LHS variable while controlling for *Sovereign CDS Spread* on the RHS, our reported results are robust, both economically and statistically.

²⁸ In untabulated regression results, we use composite credit ratings provided by Markit, which are based on the ratings from all major rating agencies. These composite ratings do not have sub-notch information. However, we get both quantitatively and qualitatively similar results to those using S&P credit ratings with sub-notch information. These results are available on request from the authors.

particularly during the crisis. However, the rating spreads do not appear to utilize the aggregate foreign asset information in either sample period.

In Panel B of Table 5, we directly examine whether our scaled property rights, creditor rights, and extra disclosure variables are incorporated into the corporate credit ratings relative to their sovereign counterparts. Looking at columns (1) to (4), none of the scaled property rights variables affects the credit rating difference between a firm and its local government, indicating that the effective property rights applied to a multinational firm is not reflected in the firm's credit rating. In columns (5) and (8), there is some evidence that the *Scaled Exposure: Creditor Rights* and *Extra Disclosure: Frequency and Count* are reflected in the relative corporate credit ratings. However, in column (6), the point estimate sign on *Scaled Exposure: Ln(Contract Enforcement Days)* is opposite to our expectation (i.e., negative expected sign for this variable).

Overall, our results suggest that S&P sovereign ceiling credit rating differences do not substantively reflect a firm's geographical foreign asset information. However, we provide some evidence consistent with S&P sovereign ceiling credit rating differences taking into account a firm's cross-listing locations, particularly during the crisis period. In comparison with our cross-listing evidence from the CDS market, the overall cross-listing impact on the sovereign ceiling credit rating difference is statistically weaker.

To further show that CDS market investors more efficiently incorporate a firm's foreign asset geographical information as well as equity cross-listing information into their corporate and sovereign CDS pricing, we re-run our earlier firm-sovereign CDS spread difference regressions, while also controlling for S&P credit rating differences. Looking at the results in Panel C of Table 5, we find that the effective property rights and extra disclosure requirement in the number of reported items still well-explain the CDS spread difference between a firm and its local government, especially during the crisis period. These results suggest some superior informational efficiency in the CDS market relative to credit ratings, and also suggest that there could be potential informational spillovers from CDS markets to credit ratings. We address these informational spillovers in Section 5.3.

5.2.3 CDS sovereign ceiling violation probit and ordered-probit analysis

So far, our results suggest that cross-sectional differences in firm relative CDS spreads to their local government spreads are well-explained by the firms' effective foreign institutional exposures and informational benefits that come from their stocks' foreign cross-listing status. A more direct test on the determinants of SCVs in CDS market requires that we define a SCV event, which refers to the case where a firm's CDS spread is strictly lower than that of its local government.

We define an SCV event at each firm-year level in the following two ways: 1) a dummy variable that takes a value of one if a firm's CDS daily spread falls below its sovereign counterpart in at least one trading day during a year (*Firm Violator Dummy (Simple method)*) and 2) a dummy variable that takes a value of one if the annual average value of daily CDS spreads of a firm is lower than that of its sovereign counterpart (*Firm Violator Dummy (Mean method)*). The former dummy captures both transient and permanent violations, whereas the latter captures relatively more permanent violations that last approximately for a year. To account for violation frequency, we also use a third method - *Firm Violator Buckets (Bucket Method)*. In this method, we classify firms into four violation buckets (0, 1, 2, 3) based on the number of days a firm experiences a SCV using the *Simple* method. The bucket number of 0 indicates a non-violator, 1 indicates an infrequent violator, 2 indicates a medium violator, and 3 indicates a frequent violator.

These SCV classification approaches, however, are subject to measurement errors that mainly arise from transaction costs involved in both corporate and sovereign CDS contracts. Instead of using ad-hoc cutoffs to define meaningfully lower corporate CDS spreads relative to their sovereign counterparts, we utilize the information on average bid-ask spreads available for both firm and sovereign CDS contracts to create transaction cost cutoff bounds. We compile the bid and ask quotes for both firm and sovereign CDS contracts from an alternative data source, Credit Market Analysis (CMA), provided through Datastream. The CMA data is less accurate and complete than the Markit data, so merging these datasets at the firm-level results in a sample reduction and introduces potential errors. To avoid these problems, we filter out

distinctively inconsistent spread observations between the two databases, take a country average by year, and apply the transactions costs across all firms in the respective country. This approach enables us to minimize both the sample reduction and the introduction of data errors. Appendix C provides more details on our transaction cost adjustment procedure.

Using the transaction cost-adjusted dummy variables and bucketed frequency variables, we run both probit and ordered probit regressions. As shown previously in Figure 2, SCVs are more pervasive during the crisis period, so we focus on the crisis period in this analysis. We use the same specification from Table 4, Panel A and cluster the standard errors at the firm level.

[Insert Table 6 here]

In the first four columns of Table 6, we use *Firm Violator Dummy (Simple Method)*. The results reported in columns (1) to (4) confirm that both scaled institutional and informational factors well-explain the intensity of a firm to violate the sovereign ceiling rule during the crisis period. Among them, our four scaled property rights protection proxies and the extra disclosure variable in number of items reported appear to more significantly explain the intensity of a firm to violate the sovereign ceiling rule. When we repeat the same analysis using *Firm Violator Dummy (Mean Method)* in columns (5) to (8), we obtain largely similar results to the *Simple Method* results. In those columns, all of our institutional and informational factors significantly explain the intensity of a firm to violate the sovereign ceiling rule in the CDS market at least at the 10% level.

Looking at the ordered probit results in columns (9) to (12), we again obtain results consistent with our earlier findings. Overall, we find that the better property and creditor rights that a firm is exposed to through its foreign asset positions and the stricter disclosure requirement mandated by foreign stock exchanges where its stocks are cross-listed, the more likely it is that the firm is regarded as a safer entity than its local government. Taken together, our results in Table 6 confirm our earlier findings reported in Table 4 where we use the firm-sovereign CDS spread difference regressions.

5.3 Information spillovers from CDS markets to credit ratings

We previously show that our scaled institutional and informational factors explain CDS spread differences between a firm and its sovereign, above and beyond what is explained by their credit rating difference (Table 5, Panel C). In this section, we revisit these results and more directly test information spillovers from CDS market SCVs to S&P credit ratings SCVs and vice versa.

[Insert Figure 4 here]

As motivating analysis, Figure 4 provides a time line depicting the dynamic relation between first time SCVs based on S&P credit ratings (CDS spreads) at event year t and the percentage of those SCVs that were SCVs in the CDS market (S&P credit ratings) 2-years prior, 1-year prior, and at event year t . Figure 4 clearly shows that SCVs in CDS market precede S&P credit rating SCVs. More than 80% of the firms that are first time S&P SCVs in year t are also contemporaneously classified as CDS SCVs. In addition, among these S&P SCVs in year t , more than 60% of them ($=50\%/83.30\%$) were already classified as SCVs in the CDS markets 1-year prior to the event year t . Going back two years from the initial S&P SCV event year t , we continue to find that CDS market SCVs precede S&P SCVs, with the CDS market classifying approximately half of the SCVs ($=40.27\%/83.30\%$) two-years prior to the S&P SCV. In sharp contrast, we do not find any compelling evidence that S&P SCVs precede CDS market SCVs. Only 1.90 percent of first time CDS SCVs in year t are also contemporaneously classified as S&P SCVs, while less than one percent of 1-year and 2-year S&P SCVs precede the initial CDS SCV. These results provide a clear illustration of the information dynamics of SCVs from CDS markets versus S&P credit ratings, showing that the CDS market SCV information precedes S&P's credit rating SCV information.²⁹

[Insert Table 7 here]

In Table 7, we use a multivariate regression framework to further confirm the lead-lag SCV relations suggested by Figure 4. In columns (1) and (2) of Table 7, we

²⁹ Though not tabulated, we also find significantly smaller firm versus sovereign market CDS spreads one- and two-years prior to future S&P SCV events. The SCVs predicted from the CDS market are also economically significant with an average SCV CDS spread of approximately 66 bps at one- and two-years back.

measure the extent to which the CDS market has SCV information content in S&P credit rating SCVs. In these specifications, we use a dummy variable to denote a firm becomes an S&P SCV in a given year ($\Delta S\&P$ Violation) as our dependent variable. As explanatory variables in column (1), we use the 1-year and 2-year lagged changes in the CDS violation dummy (based on *Firm Violator Dummy -- Mean Method*), where the change in the CDS violation dummy (ΔCDS Violation) could have a value of one (or negative one) if the firm becomes (or stops being) a CDS violator in a given year and zero otherwise. We further control for $Ln(\text{Market Capitalization})$, *Leverage*, *Short-term Debt Fraction*, *Cash Flow to Assets*, and *Stock Return Volatility* on the RHS of the regression. We also control for industry, region, and crisis period, restructuring type fixed-effects. In column (2), we additionally control for the 1-year and 2-year lagged values of change in the S&P violation dummy, where the change in the S&P violation dummy ($\Delta S\&P$ Violation) could have a value of one (or negative one) if a firm becomes (or stops being) an S&P violator in a given year and zero otherwise. These regressions are all probit regressions, and we cluster the standard errors at the firm level.

The results in column (1) show that both 1-year and 2-year lagged values of change in CDS violation dummy significantly predict the event that a firm becomes an S&P violator in the subsequent year at the 1% level. These results are consistent with our earlier findings in Figure 4 suggesting that there is leading SCV information in the CDS market on SCVs in S&P credit ratings. Column (2) of Table 7 further shows that the results are robust to including 1- and 2-year lagged values of $\Delta S\&P$ Violation on the RHS of the regression.

While the results in the first two columns suggest that CDS market SCVs provide information on S&P SCVs, they are not yet fully convincing of unidirectional information spillovers from CDS markets to credit ratings since the opposite result could also potentially occur. To show that this reverse causality is not the case, in column (3) we use ΔCDS Violation dummy as our dependent variable and lagged values of $\Delta S\&P$ Violation dummies as explanatory variables along with all of our earlier control

variables.³⁰ In column (4), we further include the 1- and 2-year lagged values of ΔCDS *Violation* dummies as additional explanatory variables. In both columns (3) and (4), we do not find any evidence that SCV information flows from credit ratings to the CDS market, which is again consistent with our earlier results depicted in Figure 4.

In columns (5) to (8), we report several additional robustness checks. In column (5), we use a multinomial logit regression specification to jointly estimate the likelihood of becoming an S&P violator as well as stopping an S&P violation event. We repeat the same multinomial logit regression in column (6) using CDS market SCV events as our main dependent variables. We find that the change in violation status of a firm in the CDS market predicts both becoming an S&P violator and stopping an S&P violation in the subsequent years (column (5)), whereas we do not find any significant S&P SCV predictability on SCVs in the CDS market (column (6)). In columns (7) and (8), using an ordered probit regression specification further confirms the robustness of our results to alternative regression specifications.³¹

Overall, our results in Figure 4 and Table 7 strongly suggest a unidirectional flow of SCV information from CDS markets to credit ratings. These results support the view recently proposed by several researchers that market CDS spreads are useful in assessing the credit quality of underlying private sector companies in a more timely and informative manner (Hull, Predescu, and White, 2004; Flannery, Houston, and Partnoy, 2010; Chava, Ganduri, and Ornthalalai, 2012).

6. Conclusion

Violations of the “sovereign ceiling” rule have been relatively underexplored in the credit risk literature. We fill this gap by investigating the underlying nature and determinants of sovereign ceiling violations (SCVs) in both the international CDS market and the credit ratings assigned by one of the three major rating agencies, S&P.

³⁰ Note that both $\Delta S\&P$ *Violation* and ΔCDS *Violation* dummies have a binary value of either one or zero if they are used as dependent variables, whereas they could have a value of one, zero, or negative one if they are used as explanatory variables.

³¹ To become an S&P SCV violator, a firm has to improve its S&P credit rating relative to that of its sovereign market. A similar but opposite argument can be made in the case where a firm stops an S&P SCV violation. To capture this potentially ordered nature of the two events, we also conduct a robustness test using an ordered probit regression specification.

Using 5-year CDS spreads on 2,364 private sector companies in 54 countries, together with their sovereign CDS counterparts with equal contractual terms, we document that SCVs in the CDS market become more pervasive during the recent sovereign credit risk crisis, and they are more frequently observed in countries with weak institutional and informational qualities.

To explain these temporal and cross-sectional patterns of SCVs in the international CDS market, we first hypothesize that both the institutional and informational qualities of a local government are closely related to the degree of investors' concerns regarding the government's transfer and convertibility risk, termed "T&C risk." We propose two novel channels (Institutional and Informational) through which private sector companies could delink themselves from their local governments' T&C risk, thereby alleviating investors' concerns: 1) placing some firm assets in foreign countries with better property and creditor rights protection, and 2) cross-listing their stocks on foreign exchanges where stricter information disclosure is mandated.

We provide evidence showing that both our institutional and informational channels help explain the temporal and cross-sectional patterns of SCVs. These channels also capture distinct effects beyond those associated with firm- and country-level fundamentals as well as their exposures to foreign country fundamentals. Indeed, firms that are effectively exposed to better property/creditor rights institutions and firms whose stocks are trading on foreign exchanges with stricter information revelation requirements exhibit meaningfully lower credit spreads than those of their home governments. However, we find little support that S&P ratings fully reflect these important global networks that multinational firms have to improve their foreign institutional and information exposures. In line with this finding, we provide further evidence showing that SCVs from the CDS market unidirectionally predict SCVs in S&P credit ratings, suggesting that CDS spreads measure underlying corporate credit risks in a more timely and informative manner than credit ratings assigned by S&P.

Taken together, our results suggest that firms can, in part, avoid their sovereign government's potential grabbing risk exposure through firm-level global asset connections in countries with better institutional and informational environments.

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Appendix

A. Continuous time CDS pricing under a flat hazard rate term structure and constant recovery rate assumptions

Consider a continuous time set up with a \$1-notional T -maturity CDS. Let r_t denote the continuously compounded default-free interest rate, and thus $Z(t) = e^{-\int_0^t r_s ds}$ the corresponding T -maturity default-free discounting factor. Let s be the annual clean spread that should be paid continuously from the protection buyer to the protection seller until the trigger event of the CDS reference entity.

Let h be the constant hazard rate that derives a trigger event in an infinitesimal time interval, $[t, t + \delta t]$. Assume that the trigger event arrives following a Poisson process with the intensity parameter of h . Then, the survival probability up to time- t is given as $Q(t) = e^{-\int_0^t h ds}$. Finally, let the constant recovery rate be denoted by R .

With the fair spread of s , the value of the premium payment leg, $E_0 \left[s \int_0^T Z(t) Q(t) dt \right]$, should equate the value of the protection leg, $E_0 \left[(1 - R) \int_0^T Z(t) \frac{\partial}{\partial t} (1 - Q(t)) dt \right] = h(1 - R) E_0 \left[\int_0^T Z(t) Q(t) dt \right]$ where the expectations are taken under the risk-neutral probability measure. Hence, under the flat hazard rate term structure, $s = h(1 - R)$ ■

B. Construction details of each “Scaled Exposure” variable

To construct each “Scaled Exposure” variable, we take four steps.

1. We examine the description of each geographic segment in which the firm owns assets and assign it an institutional value. If a segment description is a country, then we assign the segment the institutional value of that country. If a segment description is a region, then we compute a GDP-weighted average of the institutional values of the countries in that region. If the segment description is a combination of countries or regions, we compute the equally-weighted average of the institutional values for the combination of countries or regions. We exclude the primary geographic segment that represents the firm’s home country.
2. Using the resulting institutional value (or economic value) for each geographic segment, we aggregate the total effect of all of the firm’s foreign assets by computing the average institutional value across all of the firm’s segments, weighted by the amount of assets the firm has in each segment. This provides an overall picture of the firm’s institutional exposure.
3. We take the resulting aggregated foreign institutional value and subtract the domestic institutional value (i.e., the value of the firm’s home country). This difference between the foreign

and domestic institutional value indicates whether the firm’s foreign asset exposure results in a net positive or negative institutional effect relative to the firm’s pure domestic institutional effect.

4. The net effect is multiplied by *Foreign Assets (fraction of Total Assets)*. We do this to incorporate the overall importance of the firm’s foreign assets to the firm. For instance, the institutional difference between the foreign and home countries matters much more to a firm that has 50% foreign assets than a firm that has only 5% foreign assets. This step essentially scales the foreign-domestic institutional difference to a level that reflects its relevance to the firm as a whole.

These four steps lead to Eq. (1) in Section 4.3. ■

C. Sovereign ceiling violation variable descriptions

The simplest form of a sovereign ceiling violation in the CDS market is when the firm CDS spread falls below the sovereign CDS spread. We call these firms “violators” because their CDS spreads violate the sovereign ceiling rule. Given a daily data frequency, it is straightforward to identify firm violators on a daily basis. However, designating firms as violators on an annual basis entails some alternative approaches. We use three approaches for classifying annual violators: the Simple, Mean, and Bucket Violation Methods.³²

a) *Firm Violator Dummy (Simple Method)*

In this method, the violator dummy equals one if the firm CDS spread violates the sovereign ceiling rule in *at least one day* during the year. This is the least stringent approach among our violation classification methods, and we later also account for transaction costs that reduce the likelihood of a spurious or transient violator classification. The appealing feature of this method is its comprehensiveness in including the broadest set of sovereign ceiling violations.

b) *Firm Violator Dummy (Mean Method)*

The violator dummy equals one in this method if the variable *Firm-Sovereign CDS Difference* is negative. In other words, if the annual average of the daily additional firm CDS spread over the sovereign CDS spread is negative, the firm is flagged as a sovereign ceiling violator. This is a more strict way of designating a firm as a sovereign ceiling violator since the violation must be persistent or of great magnitude.

c) *Firm Violator Buckets (Bucket Method)*

In this method, we classify firms into four violation buckets (0, 1, 2, 3) based on the number of days a firm experiences a SCV during a given year, with higher numbers of violation days based on

³² Though not tabulated, we tried various other classification methods as additional robustness checks and had qualitatively similar results.

the *Simple* method resulting in firms being placed in higher buckets. 0 indicates a non-violator, 1 indicates an infrequent violator, 2 indicates a medium violator, and 3 indicates a frequent violator. This method takes into account the frequency and length of violations.

Simply comparing the firm and sovereign CDS spreads may not be sufficient to identify “meaningful” sovereign ceiling violations. Transaction costs or liquidity differences may put upward or downward pressure on CDS spreads and cause some small violations. To address this issue, we transaction cost adjust the CDS spreads and control for potential liquidity effects -- even though we are using the most liquid sovereign and firm CDS 5-year contracts in our analysis.

Markit does not include transaction cost information with its CDS data, so we turn to an alternative data source, Credit Market Analysis (CMA), provided through Datastream. CMA provides the daily bid, ask, and mid prices for each CDS in its database. A trader who seeks to take advantage of a potential sovereign ceiling arbitrage strategy might buy the premium of the firm CDS and sell the premium of the sovereign CDS. In this spirit, we estimate trading costs by computing the difference between the ask price and the mid price for every firm CDS and the difference between the bid price and the mid price for every sovereign CDS in the CMA database. Then, we average these two calculations by country for each year in our sample.

The CMA data are less accurate and complete than the Markit data, so merging these datasets at the firm-level results in a sample reduction and introduces potential errors. To avoid these problems, we filter out distinctively inconsistent spread observations between the two databases, take a country average by year approach, and apply the transactions costs across all firms in the respective country - minimizing both the sample reduction and the introduction of data errors.

Upon merging these trading cost spreads into the Markit data, we can account for transaction costs by incorporating the bid-ask spread information into our calculation of each of our two sovereign ceiling violation dummy variables. At the daily level, we include our transaction cost estimates in our calculation of the additional CDS spread required by investors to hold the firm CDS over the sovereign CDS, as shown in Eq. (3) for the *Firm-Sovereign CDS Difference, Transaction Cost Adjusted* ($FirmSovCDSDiff_{id}^{TA}$) for firm- i on day- d .

$$FirmSovCDSDiff_{id}^{TA} = \left(\left(FirmCDS_{id} + FirmAsk_{cy} \right) - \left(SovCDS_{cd} - SovBid_{cy} \right) \right), \quad \text{Eq. (3)}$$

where $FirmAsk_{cy}$ is the average difference between the ask and mid price for firm CDS based in country c in year y , $SovBid_{cy}$ is the average difference between the bid and mid price for the sovereign

CDS spread. At this point, we adjust the two firm violator dummy methods and bucket method in the following manner:

a) *Firm Violator Dummy (Simple Method):* Transaction-Cost Adjustment

The dummy variable equals one if the firm's CDS spread falls below the sovereign CDS spread, after adjusting for transaction costs, in at least a one day during the year (i.e., $FirmSovCSDiff_{id}^{TA}$ is negative on at least one day).

b) *Firm Violator Dummy (Mean Method):* Transaction-Cost Adjustment

We compute the yearly average of the transaction-cost adjusted CDS difference for each firm. Second, we flag the firm as a violator if the average is negative.

c) *Firm Violator Buckets (Bucket Method):* Transaction-Cost Adjustment

We again classify firms into four violation buckets (0, 1, 2, 3) based on the number of days a firm experiences a SCV using the Simple Violation Method adjusted for transactions costs. ■

D. Firm and country coverage: Sovereign ceiling violations (base unit: firm year)

The sovereign ceiling violation in the credit default swap (CDS) market is computed using two methods: the simple method and mean method. The simple method flags a firm-year as a violation event if the firm's CDS daily spread falls below its sovereign counterpart in any trading day during that year. The mean method flags a firm-year as a violation event if the annual average value of the firm's CDS daily spread is less than its sovereign counterpart in that year. For each of these two methods, we compute the fraction (%) of the violation events relative to the total firm-year observations in Entire Sample Period (2004-2011), Pre-Crisis Period (2004-2007), and Crisis Period (2008-2011). CDS spreads are from Markit, and each violation calculation adjusts for transaction costs by incorporating average bid/ask spreads for firm CDS and sovereign CDS observations for each country and year from the CMA CDS database (see Appendix C for more details). This table represents the observations in our complete annualized CDS dataset, which includes the firms that have an observable market capitalization. The empirical results corresponding to the firm-level analysis are based on part of these firm-year observations, depending on the joint availability of the independent variables. There are seven countries with only one firm each in our dataset (Cyprus, Egypt, Kazakhstan, Panama, Poland, Puerto Rico, and Sri Lanka). The firms in these countries are excluded in our firm-level analyses where we control for various fixed-effects, though the seven countries are included in our sovereign-level analysis.

Country	Entire Sample Period (2004-2011)			Pre-Crisis Period (2004-2007)			Crisis Period (2008-2011)		
	Total Firm Years	Simple Method Violation %	Mean Method Violation %	Total Firm Years	Simple Method Violation %	Mean Method Violation %	Total Firm Years	Simple Method Violation %	Mean Method Violation %
Argentina	14	93%	57%	5	100%	0%	9	89%	89%
Australia	344	2%	1%	155	0%	0%	189	3%	1%
Austria	46	24%	4%	14	0%	0%	32	34%	6%
Bahrain	12	25%	0%	4	0%	0%	8	38%	0%
Belgium	54	28%	15%	22	0%	0%	32	47%	25%
Brazil	75	21%	12%	23	48%	39%	52	10%	0%
Canada	430	5%	1%	216	0%	0%	214	10%	3%
Chile	36	6%	0%	11	0%	0%	25	8%	0%
China	21	0%	0%	6	0%	0%	15	0%	0%
Colombia	3	33%	0%	2	50%	0%	1	0%	0%
Cyprus	3	0%	0%	1	0%	0%	2	0%	0%
Czech Republic	13	31%	23%	6	0%	0%	7	57%	43%
Denmark	47	2%	0%	24	0%	0%	23	4%	0%
Egypt	5	40%	0%	1	0%	0%	4	50%	0%
Finland	88	0%	0%	40	0%	0%	48	0%	0%
France	472	10%	2%	228	0%	0%	244	19%	4%
Germany	422	2%	0%	197	0%	0%	225	4%	0%
Greece	44	39%	27%	20	0%	0%	24	71%	50%
Hong Kong	178	2%	0%	86	0%	0%	92	3%	0%
Hungary	12	42%	0%	4	0%	0%	8	63%	0%
India	180	15%	4%	79	0%	0%	101	27%	8%
Indonesia	19	42%	0%	9	33%	0%	10	50%	0%
Ireland	45	36%	13%	18	0%	0%	27	59%	22%
Israel	13	54%	23%	5	0%	0%	8	88%	38%
Italy	185	36%	16%	83	0%	0%	102	65%	29%
Japan	2352	19%	9%	1087	0%	0%	1265	35%	17%
Kazakhstan	1	0%	0%	0	0%	0%	1	0%	0%
Korea (Republic of)	157	12%	5%	75	0%	0%	82	23%	10%
Luxembourg	19	84%	79%	0	0%	0%	19	84%	79%
Malaysia	80	5%	0%	37	0%	0%	43	9%	0%
Mexico	74	14%	8%	25	20%	12%	49	10%	6%
Netherlands	231	5%	1%	105	0%	0%	126	10%	2%
New Zealand	16	25%	0%	5	0%	0%	11	36%	0%
Norway	78	0%	0%	37	0%	0%	41	0%	0%
Panama	8	100%	75%	4	100%	100%	4	100%	50%
Philippines	40	63%	30%	16	63%	31%	24	63%	29%
Poland	7	57%	43%	3	0%	0%	4	100%	75%
Portugal	51	27%	16%	23	0%	0%	28	50%	29%
Puerto Rico	1	0%	0%	0	0%	0%	1	0%	0%
Qatar	23	22%	4%	4	0%	0%	19	26%	5%
Russian Federation	58	5%	2%	20	0%	0%	38	8%	3%
Saudi Arabia	17	12%	0%	2	0%	0%	15	13%	0%
Singapore	76	0%	0%	31	0%	0%	45	0%	0%
South Africa	35	14%	3%	12	17%	0%	23	13%	4%
Spain	121	29%	13%	40	0%	0%	81	43%	20%
Sri Lanka	2	100%	100%	0	0%	0%	2	100%	100%
Sweden	185	6%	0%	94	0%	0%	91	13%	0%
Switzerland	78	18%	8%	17	0%	0%	61	23%	10%
Taiwan	48	0%	0%	23	0%	0%	25	0%	0%
Thailand	42	10%	0%	21	0%	0%	21	19%	0%
Turkey	31	26%	0%	12	25%	0%	19	26%	0%
United Arab Emirates	8	62%	38%	2	0%	0%	6	83%	50%
United Kingdom	710	13%	4%	241	0%	0%	469	20%	6%
United States	5894	3%	0%	2821	0%	0%	3073	5%	0%
Total	13204	24%	12%	6016	8%	3%	7188	32%	15%

E. Variable descriptions

<i>Variable Name</i>	<i>Variable Description</i>	<i>Source</i>	<i>Dates</i>
Sovereign-Level Variables			
Ln(Mean Sovereign CDS Spread)	Daily CDS spreads (in basis points) are averaged for each year. The natural log is taken.	Markit	2004-2011
Sovereign S&P Credit Rating	End-of-year credit rating for each country is downloaded and converted into a numerical score (a higher score indicates a higher credit rating). A change of 1 is associated with a +/- sub-notch change.	Datastream	2004-2011
Ln(Mean Region CDS Spread)	For each country, this variable is computed as the natural log of the mean spread of the <i>other</i> countries in the region.	Markit	2004-2011
Ln(GDP)	Annual GDP (in \$ billions) is downloaded for each country and averaged with the lagged value. The natural log is taken.	International Monetary Fund (IMF)	2004-2011
Government Debt (% of GDP)	Annual government debt as a percentage of GDP is downloaded for each country (in \$) and averaged with the lagged value.	International Monetary Fund (IMF)	2004-2011
External Debt (% of GDP)	Annual external government debt is downloaded from the World Bank for each country. This value is divided by the GDP.	World Bank	2004-2011
Stock Market Volatility	A stock market index is downloaded for each country and the log return of weekly index price changes is computed. Then, the volatility (standard deviation) of weekly log returns is computed for each year.	Datastream	2004-2011
Sovereign CDS Depth	Daily CDS depth is averaged for each year. Depth represents the number of contributors to a CDS spread on a given day.	Markit	2004-2011
Property Rights	The strength of the country's property rights. Specifically, it reflects the extent to which government laws protect private property, the extent to which government enforces these laws, and the extent to which government expropriates private property. A high value indicates strong property rights. It is standardized.	Heritage Foundation	2004-2011
Rule of Law	An assessment of the law and order tradition of the country provided by the rating agency International Country Risk. A high value indicates a strong rule of law. It is standardized.	ICRG	1997
Repudiation Risk	The country's risk of contract repudiation or postponement due to budgetary issues, political pressure, or a change in government. A high value indicates low repudiation risk. It is standardized.	ICRG	1997
Expropriation Risk	The government's ability or likelihood to outright confiscate or nationalize private property or enterprise. A high value indicates a low risk of repudiation. It is standardized.	ICRG	1997
Creditor Rights	An index that aggregates various creditor rights. Specifically, it includes aspects of regulation around reorganization, automatic stay, ranking of creditors in bankruptcy, and administrative rights of property during process of reorganization. A high value indicates strong creditor rights. It is standardized.	La Porta et al. (1998); Djankov et al. (2007)	2004-2007
Ln(Contract Enforcement Days)	Number of days it takes to resolve a payment dispute through the courts. Methodology is discussed in Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2003). A high value indicates a high level of inefficiency of the courts. It is standardized.	Djankov et al. (2007)	2003
Disclosure: Number of Items Reported	A country's required number of disclosed items on a wide range of topics, including general information, financial condition, and corporate governance. A high value indicates higher disclosure requirements and greater informational transparency. It is standardized.	Bushman et al. (2004)	2004
Disclosure: Frequency and Count	A country's required timeliness of financial reporting through the frequency of interim reports. A high value indicates higher disclosure requirements and greater informational transparency. It is standardized.	Bushman et al. (2004)	2004

Appendix E: Variable descriptions – *Continued*

Variable Name	Variable Description	Source	Dates
<i>Firm-Level Variables</i>			
Firm-Sovereign CDS Difference	The daily CDS difference is computed by subtracting the sovereign CDS spread from the firm CDS spread. This daily difference is averaged for each year.	Markit	2004-2011
Firm-Sovereign S&P Credit Rating Difference	End-of-year firm S&P credit ratings are downloaded and converted into a numerical score and then subtracted from the corresponding sovereign credit rating.	Thomson One / Worldscope	2004-2011
Ln(Market Capitalization)	End-of-year market capitalization (\$) is averaged with its lagged value. It is winsorized at the 1% level. The natural log is taken.	Thomson One / Worldscope	2004-2011
Leverage	Total debt is divided by total assets. The result is winsorized at the 1% level.	Thomson One / Worldscope	2004-2011
Short-term Debt Fraction	Short-term debt is divided by the sum of short-term debt and long-term debt. The result is winsorized at the 1% level.	Thomson One / Worldscope	2004-2011
Cash Flow to Assets	First, cash flow is divided by total assets. The result is winsorized at the 1% level.	Thomson One / Worldscope	2004-2011
Stock Return Volatility	First, weekly stock prices are downloaded for each firm, and the log return is computed. Second, the volatility (standard deviation) of weekly log returns is computed for each year.	Datastream	2004-2011
CDS Depth	Daily CDS depth is averaged for each year. Depth represents the number of contributors to a CDS spread on a given day.	Markit	2004-2011
Number of Stock Exchanges	The number of stock exchanges on which the firm has listed its equity.	Datastream	2004-2011
Number of Geographic Segments	The number of geographic segments that the firm lists in its geographically segmented financial information.	Thomson One / Worldscope	2004-2011
Foreign Assets (fraction of Total Assets)	The firm's foreign assets as a fraction of total assets as reported. If missing, the variable is replaced by international assets divided by total assets.	Thomson One / Worldscope	2004-2011
Foreign Sales (fraction of Total Sales)	The firm's foreign sales as a fraction of total sales as reported. If missing, the variable is replaced by international sales divided by total sales.	Thomson One / Worldscope	2004-2011
Scaled Exposure: Property Rights	The difference between the Property Rights (see definition above) of the foreign countries in which the firm has assets and the firm's home country, multiplied by foreign assets (as a fraction of Total Assets).	Worldscope / Heritage Foundation	2004-2011
Scaled Exposure: Rule of Law	The difference between the Rule of Law (see definition above) of the foreign countries in which the firm has assets and the firm's home country, multiplied by foreign assets (as a fraction of Total Assets).	Worldscope / ICRG	2004-2011
Scaled Exposure: Repudiation Risk	The difference between the Repudiation Risk (see definition above) of the foreign countries in which the firm has assets and the firm's home country, multiplied by foreign assets (as a fraction of Total Assets).	Worldscope / ICRG	2004-2011
Scaled Exposure: Expropriation Risk	The difference between the Expropriation Risk (see definition above) of the foreign countries in which the firm has assets and the firm's home country, multiplied by foreign assets (as a fraction of Total Assets).	Worldscope / ICRG	2004-2011
Scaled Exposure: Creditor Rights	The difference between the Creditor Rights (see definition above) of the foreign countries in which the firm has assets and the firm's home country, multiplied by foreign assets (as a fraction of Total Assets).	Worldscope / La Porta et al. (1998); Djankov et al. (2007)	2004-2011

Appendix E: Variable descriptions – *Continued*

Variable Name	Variable Description	Source	Dates
Scaled Exposure: Ln(Contract Enforcement Days)	The difference between the Ln(Contract Enforcement Days) (see definition above) of the foreign countries in which the firm has assets and the firm's home country, multiplied by foreign assets (as a fraction of Total Assets).	Worldscope / Djankov et al. (2007)	2004-2011
Extra Disclosure: Number of Items Reported	The maximum value for Disclosure: Number of Items Reported (see definition above) of all the countries in which the firm has equity listed on an exchange minus the home country's value.	Worldscope / Bushman et al. (2004)	2004-2011
Extra Disclosure: Frequency and Count	The maximum value for Disclosure: Frequency and Count (see definition above) of all the countries in which the firm has equity listed on an exchange minus the home country's value.	Worldscope / Bushman et al. (2004)	2004-2011

F. Correlation Matrix

Sovereign-Level Correlation Matrix

	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)	15)	16)	17)
1) Mean Sovereign CDS Spread (bps)	1.00																
2) Ln(Mean Sovereign CDS, bps)	0.55	1.00															
3) Sovereign S&P Credit Rating	-0.60	-0.69	1.00														
4) Ln(Region Mean Sovereign CDS, bps)	0.27	0.81	-0.36	1.00													
5) Stock Market Volatility	0.26	0.50	-0.19	0.49	1.00												
6) Ln(GDP, \$ Billions)	-0.10	-0.12	0.18	-0.08	0.08	1.00											
7) Government Debt (% of GDP)	0.18	0.09	-0.12	0.06	-0.05	0.41	1.00										
8) External Debt (% of GDP)	0.13	0.18	0.08	0.16	0.24	0.01	0.09	1.00									
9) Sovereign CDS Depth	0.10	0.42	-0.58	0.29	0.13	-0.02	-0.03	-0.05	1.00								
10) Property Rights	-0.41	-0.61	0.87	-0.33	-0.14	0.09	-0.09	0.18	-0.68	1.00							
11) Rule of Law	-0.30	-0.62	0.76	-0.44	-0.13	0.27	0.10	0.15	-0.67	0.83	1.00						
12) Repudiation Risk	-0.42	-0.64	0.86	-0.38	-0.13	0.27	0.16	0.19	-0.56	0.83	0.84	1.00					
13) Expropriation Risk	-0.40	-0.64	0.84	-0.42	-0.13	0.36	0.18	0.22	-0.60	0.84	0.89	0.95	1.00				
14) Creditor Rights	-0.19	-0.16	0.30	-0.02	-0.13	-0.26	-0.17	-0.08	-0.20	0.35	0.20	0.32	0.21	1.00			
15) Ln(Contract Enforcement Days)	0.16	0.32	-0.47	0.12	-0.01	-0.02	0.00	-0.09	0.44	-0.52	-0.43	-0.51	-0.47	-0.36	1.00		
16) Disclosure (Number of Items Reported)	-0.25	-0.38	0.59	-0.16	-0.13	-0.10	-0.24	0.08	-0.54	0.55	0.43	0.42	0.42	0.18	-0.42	1.00	
17) Disclosure (Frequency and Count)	-0.17	-0.22	0.28	-0.12	-0.19	0.21	0.03	-0.02	-0.26	0.13	0.32	0.11	0.18	-0.26	0.20	0.34	1.00

Firm-Level Correlation Matrix

	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)	15)	16)	17)	18)	19)	20)	21)	22)	23)
1) Firm CDS Spread (bps)	1.00																						
2) Firm-Sovereign CDS Difference (bps)	0.96	1.00																					
3) S&P Credit Rating Difference	-0.49	-0.54	1.00																				
4) Ln(Market Capitalization, \$)	-0.32	-0.33	0.65	1.00																			
5) Leverage (Debt-to-Assets)	0.30	0.29	-0.30	-0.20	1.00																		
6) Short-term Debt Fraction	-0.17	-0.17	0.23	0.32	-0.43	1.00																	
7) Cash Flow to Assets	-0.12	-0.10	0.02	0.00	-0.10	0.13	1.00																
8) Stock Return Volatility	0.54	0.51	-0.38	-0.23	0.15	-0.11	-0.09	1.00															
9) Firm CDS Depth	-0.13	-0.10	0.08	0.11	-0.03	0.11	0.08	-0.11	1.00														
10) Number of Stock Exchanges	-0.09	-0.10	0.22	0.23	-0.10	0.19	0.03	-0.03	0.19	1.00													
11) Number of Geographic Segments	-0.07	-0.08	0.18	0.25	-0.24	0.38	0.06	0.04	0.12	0.31	1.00												
12) Foreign Assets (fraction of Total Assets)	-0.07	-0.07	0.13	0.19	-0.15	0.25	0.09	-0.02	0.10	0.27	0.46	1.00											
13) Foreign Sales (fraction of Total Sales)	-0.05	-0.06	0.08	0.17	-0.25	0.36	0.14	0.01	0.13	0.32	0.70	0.60	1.00										
14) Scaled Exposure: Ln(GDP)	0.03	0.01	0.00	0.00	0.03	-0.05	-0.02	-0.01	0.02	0.02	0.02	-0.01	0.06	1.00									
15) Scaled Exposure: Stock Market Volatility	0.05	0.04	-0.03	0.02	0.04	-0.02	-0.08	0.01	0.01	-0.01	-0.08	-0.10	-0.03	0.49	1.00								
16) Scaled Exposure: Property Rights	-0.01	-0.01	-0.05	-0.10	-0.08	0.05	0.15	0.03	0.02	0.13	0.28	0.46	0.32	-0.10	-0.27	1.00							
17) Scaled Exposure: Rule of Law	-0.02	-0.02	-0.05	-0.08	-0.08	0.09	0.18	0.02	0.03	0.13	0.33	0.48	0.34	-0.21	-0.32	0.85	1.00						
18) Scaled Exposure: Repudiation Risk	-0.04	-0.05	0.08	0.14	-0.04	0.17	0.10	0.01	0.05	0.17	0.32	0.44	0.30	-0.08	-0.14	0.65	0.70	1.00					
19) Scaled Exposure: Expropriation Risk	-0.07	-0.07	0.07	0.05	-0.07	0.12	0.08	-0.03	0.04	0.11	0.21	0.33	0.21	-0.20	-0.13	0.51	0.56	0.57	1.00				
20) Scaled Exposure: Creditor Rights	-0.03	-0.03	0.05	0.09	0.04	-0.07	-0.08	-0.05	-0.03	-0.01	-0.11	-0.13	-0.08	0.29	0.19	-0.05	-0.24	0.07	-0.11	1.00			
21) Scaled Exposure: Ln(Contract Enforce Days)	0.03	0.04	-0.09	-0.18	0.00	-0.08	-0.01	0.01	-0.01	-0.10	-0.15	-0.23	-0.18	-0.27	-0.21	-0.25	-0.27	-0.53	-0.23	-0.29	1.00		
22) Extra Disclosure: Number of Items Reported	-0.06	-0.10	0.28	0.23	-0.04	0.15	-0.06	-0.02	0.10	0.48	0.24	0.22	0.22	-0.01	0.01	0.06	0.06	0.21	0.13	0.10	-0.15	1.00	
23) Extra Disclosure: Frequency and Count	-0.01	-0.08	0.16	0.10	-0.03	0.10	-0.09	-0.01	0.07	0.33	0.18	0.21	0.19	0.14	0.09	0.03	-0.08	0.14	0.09	0.10	-0.07	0.43	1.00

Table 1**Summary Statistics**

This table presents the sovereign- and firm-level summary statistics for 54 countries and 2,364 firms. Credit Default Swap (CDS) spreads are provided in basis points (bps). *N* represents country-year observations at the sovereign-level and firm-year observations at the firm-level. For a more detailed description of each variable, see Section 4 with Appendix B.

Panel A. Sovereign-Level Summary Statistics

<i>Variable Name</i>	<i>Mean</i>	<i>Stan. Dev.</i>	<i>Median</i>	<i>Min</i>	<i>Max</i>	<i>N</i>
Mean Sovereign CDS Spread (bps)	122.330	246.630	56.915	1.000	3148.804	361
Ln(Mean Sovereign CDS, bps)	-0.899	1.678	-0.564	-4.605	3.450	361
Sovereign CDS Depth	7.428	3.376	7.351	2.000	16.103	361
Sovereign S&P Credit Rating	17.173	3.959	18.000	1.000	21.000	329
Ln(Region Mean Sovereign CDS, bps)	4.019	1.580	4.571	0.129	7.499	351
Stock Market Volatility	0.040	0.018	0.037	0.011	0.118	344
Ln(GDP, \$ Billions)	6.013	1.352	5.799	2.513	9.603	357
Government Debt (% of GDP)	55.101	34.160	49.015	4.408	222.535	355
External Debt (% of GDP)	0.713	1.282	0.385	-5.486	10.378	344
Property Rights	0.000	1.000	0.145	-2.099	1.267	360
Rule of Law	0.000	1.000	0.169	-2.430	1.141	341
Repudiation Risk	0.000	1.000	0.469	-1.867	1.354	341
Expropriation Risk	0.000	1.000	0.543	-2.571	1.062	289
Creditor Rights	0.000	1.000	-0.050	-1.932	1.833	342
Ln(Contract Enforcement Days)	0.000	1.000	0.256	-2.069	2.299	336
Disclosure (Number of Items Reported)	0.000	1.000	0.270	-1.993	1.653	274
Disclosure (Frequency and Count)	0.000	1.000	0.231	-2.718	1.249	274

Panel B. Firm-Level Summary Statistics

<i>Variable Name</i>	<i>Mean</i>	<i>Stan. Dev.</i>	<i>Median</i>	<i>Min</i>	<i>Max</i>	<i>N</i>
Firm CDS Spread (bps)	195.511	468.413	85.828	4.065	8972.103	13204
Firm-Sovereign CDS Difference (bps)	155.264	463.900	48.780	-3106.181	8929.783	13204
Firm CDS Depth	5.628	4.125	4.131	2.000	27.367	13204
S&P Credit Rating Difference	-6.763	3.559	-7.000	-20.000	12.000	9370
Ln(Market Capitalization, \$)	23.634	2.360	23.366	10.108	32.626	13204
Leverage (Debt-to-Assets)	0.299	0.169	0.289	0.000	0.727	13204
Short-term Debt Fraction	0.495	0.252	0.493	0.000	1.000	13204
Cash Flow to Assets	0.077	0.056	0.070	-0.017	0.202	13204
Stock Return Volatility	0.048	0.026	0.042	0.000	0.174	11850
Number of Stock Exchanges	2.348	1.087	2.000	1.000	8.000	13148
Number of Geographic Segments	3.693	2.337	3.000	1.000	10.000	11966
Foreign Assets (fraction of Total Assets)	0.183	0.243	0.067	0.000	1.000	13204
Foreign Sales (fraction of Total Sales)	0.292	0.296	0.212	0.000	1.000	13167
Scaled Exposure: Ln(GDP)	0.000	1.000	-0.009	-5.119	5.768	12223
Scaled Exposure: Stock Market Volatility	0.000	1.000	0.122	-11.267	12.978	12363
Scaled Exposure: Property Rights	0.000	1.000	-0.321	-4.377	5.356	12240
Scaled Exposure: Rule of Law	0.000	1.000	-0.341	-5.145	5.811	11663
Scaled Exposure: Repudiation Risk	0.000	1.000	-0.439	-3.869	5.685	11569
Scaled Exposure: Expropriation Risk	0.000	1.000	0.033	-7.794	8.358	11653
Scaled Exposure: Creditor Rights	0.000	1.000	-0.032	-4.304	6.071	11618
Scaled Exposure: Ln(Contract Enforce Days)	0.000	1.000	0.246	-13.625	9.104	11141
Extra Disclosure: Number of Items Reported	0.000	1.000	-0.321	-0.321	8.164	12861
Extra Disclosure: Frequency and Count	0.000	1.000	-0.282	-0.282	10.565	12867

Table 2

Determinants of Sovereign Credit Risk

This table presents panel regressions on the natural log of the annual mean sovereign Credit Default Swap (CDS) spread. CDS data are provided by Markit, and spreads are expressed in basis points (bps). The analysis covers 54 countries over the years 2004-2011. The panel regressions are at yearly intervals and utilize standard errors that are clustered at the country level. There are four primary categories of independent variables: Legal Origin, Property Rights Protection, Creditor Rights Protection, and Disclosure Requirements. The Legal Origin category contains a dummy variable for *French Legal Origin*. The variables *Property Rights*, *Rule of Law*, *Repudiation Risk*, *Expropriation Risk*, *Creditor Rights*, *Disclosure (Number of Items)*, and *Disclosure (Frequency)* are each standardized such that the mean is equal to zero and the standard deviation is equal to one.

	<i>Dependent Variable: Ln(Sovereign CDS Spread, bps)</i>												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<i>Control Variables</i>													
Ln(Region CDS Spread)	0.418*** (9.72)	0.372*** (9.35)	0.365*** (8.76)	0.349*** (8.63)	0.344*** (8.49)	0.427*** (9.41)	0.375*** (8.28)	0.378*** (8.08)	0.375*** (7.87)	0.369*** (8.75)	0.331*** (7.38)	0.319*** (7.59)	0.332*** (8.03)
Stock Market Volatility	1.616*** (4.16)	1.336*** (3.66)	1.904*** (4.19)	1.591*** (3.59)	2.942*** (5.86)	1.877*** (4.54)	1.878*** (4.79)	2.982*** (5.29)	3.069*** (5.30)	2.981*** (5.67)	3.196*** (5.94)	2.742*** (5.38)	2.859*** (5.58)
Ln(GDP)	-0.409*** (-6.35)	-0.367*** (-7.33)	-0.261*** (-5.59)	-0.229*** (-5.44)	-0.0977* (-1.87)	-0.464*** (-6.14)	-0.443*** (-5.58)	-0.375*** (-5.07)	-0.369*** (-4.81)	-0.243*** (-4.54)	-0.227*** (-4.08)	-0.176*** (-3.18)	-0.111** (-2.06)
Government Debt (% of GDP)	0.0112*** (5.06)	0.0117*** (6.32)	0.00988*** (5.53)	0.0109*** (6.54)	0.00901*** (5.69)	0.0111*** (4.90)	0.0131*** (5.77)	0.0103*** (4.50)	0.0115*** (5.08)	0.00689*** (3.82)	0.00872*** (4.75)	0.00928*** (5.23)	0.00830*** (4.95)
External Debt (% of GDP)	0.0462 (1.50)	0.0942*** (3.20)	0.0825*** (2.76)	0.0980*** (3.31)	0.137*** (4.57)	0.0530* (1.67)	0.0676** (2.24)	0.0675** (2.19)	0.0497 (1.61)	0.113*** (3.73)	0.0984*** (3.21)	0.111*** (3.84)	0.130*** (4.33)
Sovereign CDS Depth	0.111*** (6.25)	0.0826*** (5.21)	0.0767*** (4.77)	0.0875*** (5.87)	0.0658*** (4.12)	0.0992*** (5.49)	0.101*** (5.48)	0.115*** (5.77)	0.134*** (6.93)	0.0779*** (4.17)	0.0872*** (4.63)	0.0988*** (5.68)	0.0764*** (4.30)
<i>Legal Origin</i>													
French Legal Origin	0.393** (2.07)									0.158 (1.01)	0.291* (1.88)	-0.0712 (-0.44)	0.103 (0.73)
<i>Property Rights Protection</i>													
Property Rights		-0.654*** (-9.21)								-0.560*** (-6.03)			
Rule of Law			-0.639*** (-8.77)								-0.426*** (-5.00)		
Repudiation Risk				-0.701*** (-10.47)								-0.749*** (-7.37)	
Expropriation Risk					-0.763*** (-11.03)								-0.629*** (-7.14)

Table 2 – Continued

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<i>Creditor Rights Protection</i>													
Creditor Rights						-0.154*				0.0481	0.0184	0.0474	0.0285
						(-1.78)				(0.80)	(0.30)	(0.80)	(0.53)
Ln(Contract Enforcement Days)							0.370***						
							(3.98)						
<i>Disclosure Requirements</i>													
Disclosure: Number of Items								-0.251***		-0.0376	-0.0502	-0.0442	-0.0569
								(-2.96)		(-0.53)	(-0.69)	(-0.63)	(-0.89)
Disclosure: Frequency									-0.0374				
									(-0.46)				
Cluster													
Fixed Effects													
Observations	350	350	321	321	267	326	320	252	252	252	252	252	252
Adjusted R ²	0.784	0.863	0.853	0.862	0.895	0.774	0.801	0.854	0.843	0.897	0.880	0.906	0.898

T-statistics are provided in parenthesis, and statistical significance is indicated by *, **, *** for 10%, 5% and 1%, respectively.

Table 3

CDS Spreads and Multinational Firms

This table presents the average firm CDS spread (in basis points) of 2,364 firms in 54 countries at varying degrees of international presence (for a total of 13,204 firm years).

Panel A examines the variables *Number of Stock Exchanges*, *Number of Geographic Segments*, *Foreign Assets (fraction of Total Assets)*, and *Foreign Sales (fraction of Total Sales)*. In Panel A, each variable is divided into four buckets. The first bucket, labeled “Zero”, represents firms that have zero international exposure (i.e., firms that are purely domestic). The second, third and fourth buckets, labeled “Low”, “Med” and “High”, respectively, represent firms with increasing international presence. The buckets for *Number of Stock Exchanges* include Zero (1), Low (2-3), Medium (4-5), and High (6+). The buckets for *Number of Geographic Segments* include Zero (1), Low (2-3), Medium (4-6), and High (7+). The buckets for *Foreign Assets (fraction of Total Assets)* include Zero (0%), Low (0.01%-15%), Medium (15%-40%), and High (40%-100%). The buckets for *Foreign Sales (fraction of Total Sales)* include Zero (0%), Low (0.01%-15%), Medium (15%-40%), and High (40%-100%). A t-test is performed between High and Zero bucket groups.

Panel B examines the firm’s exposure to foreign institutions by considering the “Scaled Exposure” variables, which are a weighted average of the institutional values of the countries in which the firm has assets. “Net Low” includes firms that have a net negative exposure (i.e., the foreign countries have weaker institutions than the firm’s home country), and “Net High” includes firms that have a net positive exposure (i.e., the foreign countries have stronger institutions than the firm’s home country). However, the interpretation holds in the opposite way for *Ln(Contract Enforcement Days)*. A t-Test is performed between Net High and Net Low exposure groups.

Panel A. Mean Firm CDS Spread and International Presence

International Presence Variable	Pre-Crisis Period (2004-2007)					Crisis Period (2008-2011)				
	Zero	Low	Med	High	t-Test (High – Zero)	Zero	Low	Med	High	t-Test (High – Zero)
No. of Stock Exchanges	106.05 140.65	78.14 112.89	45.42 73.46	27.16 25.00	-78.89*** 0.0000	260.71 289.88	206.72 239.63	116.89 90.28	143.58 121.32	-117.13*** 0.0000
No. of Geog. Segments	96.18 122.23	84.02 114.14	69.30 113.92	66.56 67.99	-29.62*** 0.0000	275.13 311.89	223.91 256.57	167.68 173.35	124.00 64.49	-151.14*** 0.0000
Foreign Asset (fraction of Total)	87.50 132.73	81.40 101.96	68.61 113.35	64.95 80.01	-22.55*** 0.0000	250.96 293.49	202.16 224.32	176.83 203.52	137.40 96.70	-113.56*** 0.0000
Foreign Sales (fraction of Total)	88.74 125.37	78.24 101.26	68.94 134.90	74.35 89.55	-14.39*** 0.0001	260.24 305.88	241.15 259.02	200.51 238.92	136.86 97.45	-123.38*** 0.0000

P-values are provided for the t-Tests, and statistical significance is indicated by *, **, *** for 10%, 5% and 1%, respectively

Table 3 – Continued

Panel B. Mean Firm CDS Spread and “Scaled Exposure” Variables

“Scaled Exposure” Variable	<i>Pre-Crisis Period (2004-2007)</i>			<i>Crisis Period (2008-2011)</i>		
	Net Low	Net High	t-Test (High-Low)	Net Low	Net High	t-Test (High-Low)
<i>Property Rights Protection</i>						
Property Rights	84.52 <i>131.50</i>	80.95 <i>119.11</i>	-3.560 <i>0.3263</i>	238.59 <i>284.88</i>	215.05 <i>238.81</i>	-23.54*** <i>0.0005</i>
Rule of Law	84.05 <i>131.46</i>	82.44 <i>121.67</i>	-1.610 <i>0.6404</i>	235.79 <i>280.25</i>	222.85 <i>254.68</i>	-12.95** <i>0.0491</i>
Repudiation Risk	91.64 <i>138.70</i>	69.82 <i>106.28</i>	-21.82*** <i>0.0000</i>	240.77 <i>281.52</i>	216.18 <i>253.25</i>	-24.59*** <i>0.0002</i>
Expropriation Risk	95.38 <i>154.24</i>	83.46 <i>127.94</i>	-11.92*** <i>0.0000</i>	236.90 <i>276.96</i>	220.03 <i>258.89</i>	-16.87** <i>0.0114</i>
<i>Creditor Rights Protection</i>						
Creditor Rights	91.01 <i>136.01</i>	65.74 <i>104.58</i>	-25.28*** <i>0.0000</i>	238.45 <i>278.98</i>	212.56 <i>248.84</i>	-25.88*** <i>0.0000</i>
Ln(Contract Enforcement Days)	60.00 <i>99.84</i>	90.68 <i>134.61</i>	30.67*** <i>0.0000</i>	191.91 <i>229.83</i>	241.83 <i>280.19</i>	49.92*** <i>0.0002</i>

P-values are provided for the t-Tests, and statistical significance is indicated by *, **, *** for 10%, 5% and 1%, respectively

Table 4: Firm-Sovereign CDS Spread Difference

All panels in this table present panel regressions on *CDS Spread Difference*, which is defined as the firm’s annual mean CDS spread minus the corresponding annual mean sovereign CDS spread. CDS spreads are provided by Markit and are expressed in basis points. The analysis includes 2,364 firms in 54 countries over the years 2004-2011. The crisis period is defined as years 2008-2011. The panel regressions are at yearly intervals and utilize standard errors that are clustered at the firm level. Panel A includes variables that measure a firm’s exposure to foreign country institutions, which are divided into three groups: Property Rights Protection, Creditor Rights Protection, and Disclosure Requirements. Within each group, there are a number of “Scaled Exposure” variables, which are constructed as an asset-weighted average of the institutional values of all foreign countries in which a firm has assets and then scaled by *Foreign Assets (fraction of Total Assets)*. Panel B presents the same set of regressions with additional aggregate *Foreign Assets (fraction of Total Assets)* and *Foreign Sales (fraction of Total Sales)* variables. Panel C presents a horse race regression that controls for a firm’s exposure to two different foreign country fundamentals: *Ln(GDP)* and *Stock Market Volatility*. In Panel D, we examine the crisis interaction effect. For a more complete description of each variable, see our data Section 4, together with Appendix B,C, and E.

Panel A. Firm-Sovereign CDS Difference and Exposure to Foreign Country Institutions

	<i>Dependent Variable: CDS Spread Difference = Firm CDS Spread – Sovereign CDS Spread</i>											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Firm Fundamentals & Liquidity Effects</i>												
Ln(Market Capitalization)	-96.74*** (-3.82)	-92.12*** (-3.68)	-90.45*** (-3.66)	-91.44*** (-3.66)	-92.12*** (-3.67)	-91.28*** (-3.61)	-84.00*** (-3.37)	-95.03*** (-3.77)	-85.72*** (-3.28)	-83.99*** (-3.25)	-81.85*** (-3.21)	-83.94*** (-3.25)
Leverage	307.9*** (7.84)	303.7*** (7.48)	305.4*** (7.50)	304.9*** (7.50)	307.1*** (7.48)	315.5*** (7.38)	305.3*** (8.01)	305.2*** (8.00)	302.2*** (7.33)	301.3*** (7.31)	302.8*** (7.32)	303.1*** (7.36)
Short-term Debt Fraction	32.77* (1.80)	34.41* (1.83)	36.09* (1.87)	34.31* (1.81)	31.51* (1.70)	36.19* (1.73)	26.07* (1.79)	23.78* (1.89)	39.00* (1.84)	38.53* (1.85)	39.89* (1.88)	38.42* (1.83)
Cash Flow to Assets	-50.44 (-0.40)	-34.47 (-0.26)	-31.22 (-0.23)	-30.64 (-0.23)	-38.24 (-0.29)	-24.10 (-0.17)	-77.86 (-0.66)	-76.14 (-0.64)	-25.69 (-0.18)	-35.19 (-0.25)	-31.38 (-0.22)	-32.17 (-0.24)
Stock Return Volatility	749.45*** (10.36)	755.06*** (10.03)	755.55*** (10.02)	754.74*** (10.04)	755.51*** (10.02)	754.97*** (9.63)	718.56*** (10.34)	714.92*** (10.31)	768.93*** (9.95)	766.63*** (9.94)	767.75*** (9.92)	765.89*** (9.96)
Firm CDS Depth	-1.929*** (-2.95)	-1.691** (-2.51)	-1.808*** (-2.67)	-1.866*** (-2.76)	-1.881*** (-2.72)	-1.869*** (-2.63)	-1.748*** (-2.66)	-1.898*** (-2.88)	-1.506** (-2.18)	-1.513** (-2.20)	-1.645** (-2.37)	-1.705** (-2.47)
Sovereign CDS Depth	3.399* (1.74)	3.937** (1.99)	3.756* (1.88)	3.892** (1.96)	3.866* (1.93)	3.611* (1.71)	3.197 (1.62)	3.084 (1.56)	4.470** (2.12)	4.544** (2.17)	4.603** (2.19)	4.590** (2.19)
<i>Property Rights Protection</i>												
Scaled Exposure: Property Rights	-12.09** (-2.34)								-12.26** (-2.21)			
Scaled Exposure: Rule of Law		-9.015*** (-2.72)								-9.224** (-2.43)		
Scaled Exposure: Repudiation Risk			-13.09*** (-2.92)								-12.67*** (-2.69)	
Scaled Exposure: Expropriation Risk				-12.21*** (-3.22)								-11.59*** (-2.91)

Table 4, Panel A – Continued

Dependent Variable: CDS Spread Difference = Firm CDS Spread – Sovereign CDS Spread

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Creditor Rights Protection</i>												
Scaled Exposure: Creditor Rights Protection					-2.413*				-2.292*	-2.483*	-1.042	-0.784
					(-1.69)				(-1.68)	(-1.65)	(-1.30)	(1.22)
Scaled Exposure: Ln(Contract Enforcement Days)						9.220**						
						(1.97)						
<i>Disclosure Requirements</i>												
Extra Disclosure: Number of Items Reported							-13.36***		-12.18***	-12.17***	-11.18***	-11.19***
							(-5.30)		(-4.58)	(-4.53)	(-4.09)	(-4.36)
Extra Disclosure: Frequency and Count								-12.77**				
								(-2.46)				
Cluster												
Fixed Effects												
Observations	10979	10466	10381	10469	10440	10051	11608	11614	10079	10140	10068	10158
Adjusted R ²	0.252	0.248	0.249	0.247	0.246	0.241	0.247	0.247	0.249	0.248	0.249	0.248

T-statistics are provided in parenthesis, and statistical significance is indicated by *, **, *** for 10%, 5% and 1%, respectively.

Panel B. Firm-Sovereign CDS Difference and Exposure to Foreign Country Institutions (with Aggregate Foreign Assets/Sales)

Dependent Variable: CDS Spread Difference = Firm CDS Spread – Sovereign CDS Spread

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Firm Fundamentals & Liquidity Effects</i>												
Ln(Market Capitalization)	-77.45*** (-4.20)	-73.06*** (-4.04)	-71.75*** (-4.00)	-72.46*** (-4.01)	-73.40*** (-4.04)	-73.14*** (-3.97)	-66.72*** (-3.60)	-77.46*** (-4.12)	-65.86*** (-3.46)	-64.49*** (-3.43)	-62.83*** (-3.38)	-64.43*** (-3.42)
Leverage	321.8*** (8.66)	317.8*** (8.28)	319.3*** (8.29)	319.5*** (8.33)	320.8*** (8.26)	329.2*** (8.17)	317.6*** (8.77)	316.9*** (8.74)	317.9*** (8.16)	316.8*** (8.13)	318.0*** (8.14)	319.1*** (8.20)
Short-term Debt Fraction	26.40* (1.84)	27.58* (1.86)	28.49* (1.89)	27.33* (1.84)	25.66** (1.98)	30.89* (1.84)	21.34* (1.89)	19.38* (1.81)	31.35* (1.86)	30.93* (1.86)	31.89* (1.89)	30.77* (1.84)
Cash Flow to Assets	-140.5 (-1.25)	-132.5 (-1.12)	-129.1 (-1.07)	-128.2 (-1.09)	-137.8 (-1.19)	-132.6 (-1.09)	-168.8 (-1.61)	-165.9 (-1.58)	-124.2 (-1.01)	-134.5 (-1.10)	-131.4 (-1.06)	-130.8 (-1.08)
Stock Return Volatility	770.86*** (10.77)	777.89*** (10.43)	777.89*** (10.41)	777.79*** (10.45)	778.88*** (10.45)	783.51*** (10.07)	740.62*** (10.77)	739.28*** (10.76)	788.28*** (10.34)	785.85*** (10.31)	786.75*** (10.29)	785.24*** (10.35)
Firm CDS Depth	-1.895*** (-2.90)	-1.654** (-2.45)	-1.783*** (-2.63)	-1.816*** (-2.70)	-1.827*** (-2.66)	-1.776** (-2.52)	-1.686*** (-2.58)	-1.809*** (-2.76)	-1.521** (-2.21)	-1.522** (-2.22)	-1.658** (-2.39)	-1.698** (-2.47)
Sovereign CDS Depth	3.662* (1.90)	4.127** (2.11)	3.984** (2.02)	4.195** (2.15)	3.969** (2.00)	3.859* (1.85)	3.378* (1.73)	3.301* (1.69)	4.704** (2.26)	4.738** (2.30)	4.815** (2.32)	4.875** (2.37)
<i>International Presence</i>												
Foreign Assets (fraction of Total Assets)	-0.555 (-0.86)	-0.665 (-0.96)	-0.794 (-1.18)	-0.541 (-0.80)	-0.101 (-1.51)	-0.802** (-2.27)	-0.329 (-0.66)	-0.406 (-0.75)	-0.682 (-1.06)	-0.754 (-1.13)	-0.998* (-1.71)	-0.606 (-0.89)
Foreign Sales (fraction of Total Sales)	-0.227 (-0.89)	-0.271 (-0.99)	-0.325 (-1.21)	-0.221 (-0.82)	-0.471 (-1.59)	-0.309** (-2.20)	0.135 (-0.68)	-0.167 (-0.77)	-0.324 (-1.14)	-0.357 (-1.21)	-0.470* (-1.81)	-0.289 (-0.95)
<i>Property Rights Protection</i>												
Scaled Exposure: Property Rights	-10.84** (-2.11)								-10.77** (-2.46)			
Scaled Exposure: Rule of Law		-7.295** (-2.30)								-7.412** (-2.04)		
Scaled Exposure: Repudiation Risk			-10.80** (-2.57)								-10.48** (-2.37)	
Scaled Exposure: Expropriation Risk				-9.900*** (-2.80)								-9.348** (-2.51)
<i>Creditor Rights Protection</i>												
Scaled Exposure: Creditor Rights Protection					3.118* (1.90)				-0.213* (-1.76)	-1.588* (-1.72)	-1.131 (-1.63)	-1.286 (-1.56)
Scaled Exposure: Ln(Contract Enforcement Days)						7.728* (1.72)						
<i>Disclosure Requirements</i>												
Extra Disclosure: Number of Items Reported							-12.67*** (-5.04)		-11.47*** (-4.37)	-11.44*** (-4.35)	-10.51*** (-3.90)	-10.59*** (-4.16)
Extra Disclosure: Frequency and Count								-12.08** (-2.39)				
Cluster												
Fixed Effects												
Observations	10979	10466	10381	10469	10440	10051	11608	11614	10079	10140	10068	10158
Adjusted R ²	0.253	0.250	0.251	0.249	0.248	0.244	0.250	0.250	0.250	0.249	0.251	0.249

T-statistics are provided in parenthesis, and statistical significance is indicated by *, **, *** for 10%, 5% and 1%, respectively.

Panel C. Firm-Sovereign CDS Difference and Exposure to Foreign Country Institutions (with Foreign Fundamentals)

Dependent Variable: CDS Spread Difference = Firm CDS Spread – Sovereign CDS Spread

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>Foreign Country Fundamentals</i>										
Scaled Exposure: Ln(GDP)	-3.140** (-2.39)	-5.721 (-1.60)	-5.395 (-1.59)	-5.015 (-1.51)	-7.306 (-1.54)					
Scaled Exposure: Stock Market Volatility						3.141** (1.99)	1.195 (1.29)	2.742 (1.39)	3.443 (1.20)	0.192 (1.15)
<i>Property Rights Protection</i>										
Scaled Exposure: Property Rights		-13.88** (-2.14)					-12.51** (-2.14)			
Scaled Exposure: Rule of Law			-10.43** (-2.24)					-8.420** (-2.13)		
Scaled Exposure: Repudiation Risk				-13.14** (-2.43)					-11.89** (-2.40)	
Scaled Exposure: Expropriation Risk					-14.58*** (-2.89)					-11.68*** (-2.94)
<i>Creditor Rights Protection</i>										
Scaled Exposure: Creditor Rights Protection		-3.396 (-1.60)	-1.819 (-1.45)	-2.454 (-1.58)	-1.635 (-1.43)		-1.117 (-1.31)	-2.856* (-1.74)	-2.220 (-1.46)	-2.579* (-1.75)
<i>Disclosure Requirements</i>										
Extra Disclosure: Number of Items Reported		-12.68*** (-4.66)	-12.64*** (-4.58)	-11.70*** (-4.20)	-11.57*** (-4.42)		-12.69*** (-4.68)	-12.69*** (-4.63)	-11.72*** (-4.21)	-11.69*** (-4.48)
Cluster						Firm				
Controls						Ln(Market Capitalization), Leverage, Short-term Debt Fraction, Cash Flow to Assets, Stock Return Volatility, CDS Depth, Sovereign CDS Depth				
Fixed Effects						Year, Country, Industry, CDS Restructuring Type, CDS Currency				
Observations	10964	9843	9893	9832	9910	11088	9915	9978	9907	10002
Adjusted R ²	0.251	0.261	0.262	0.259	0.263	0.249	0.259	0.259	0.263	0.263

T-statistics are provided in parenthesis, and statistical significance is indicated by *, **, *** for 10%, 5% and 1%, respectively.

Panel D. Firm-Sovereign CDS Difference and Exposure to Foreign Country Institutions (with Crisis Period Interactions)

Dependent Variable: CDS Spread Difference (= Firm CDS Spread – Sovereign CDS Spread)

	(1)	(2)	(3)	(4)
<i>Property Rights Protection</i>				
Scaled Exposure: Property Rights	-9.429** (-2.11)			
Crisis × Scaled Exposure: Property Rights	-4.521* (-1.76)			
Scaled Exposure: Rule of Law		-3.938** (-2.20)		
Crisis × Scaled Exposure: Rule of Law		-8.877** (-2.19)		
Scaled Exposure: Repudiation Risk			-8.178** (-2.30)	
Crisis × Scaled Exposure: Repudiation Risk			-7.659* (-1.86)	
Scaled Exposure: Expropriation Risk				-10.34*** (-2.64)
Crisis × Scaled Exposure: Expropriation Risk				-5.521* (-1.93)
<i>Creditor Rights Protection</i>				
Scaled Exposure: Creditor Rights	-3.153* (-1.76)	-3.891* (-1.78)	-2.722* (-1.69)	-1.210* (-1.79)
Crisis × Scaled Exposure: Creditor Rights	4.347 (0.88)	2.082 (0.42)	5.950 (0.12)	2.862 (0.62)
<i>Disclosure Requirements</i>				
Extra Disclosure: Number of Items Reported	-2.501 (-1.43)	-2.246 (-1.45)	-3.232 (-1.05)	-1.755 (-1.61)
Crisis × Extra Disclosure: No. of Items Reported	-28.61*** (-5.80)	-28.00*** (-5.65)	-28.27*** (-5.70)	-25.45*** (-6.02)
Cluster			Firm	
Controls	Ln(Market Capitalization), Leverage, Short-term Debt Fraction, Cash Flow to Assets, Stock Return Volatility, CDS Depth, Sovereign CDS Depth			
Fixed Effects	Year, Country, Industry, CDS Restructuring Type, CDS Currency			
Observations	10079	10140	10068	10158
Adjusted R ²	0.251	0.249	0.250	0.249

T-statistics are provided in parenthesis, and statistical significance is indicated by *, **, *** for 10%, 5% and 1%, respectively

Table 5

Firm-Sovereign S&P Credit Rating Difference

Panel A and Panel B of this table present regressions on *S&P Credit Rating Difference*, which is defined as the firm's S&P credit rating minus the S&P credit rating of the firm's home country (at the +/- sub-notch level). The S&P credit rating is converted into a numeric scale in which a higher number corresponds to a higher credit quality. This table includes 1,374 companies in 43 countries over the years 2004-2011. The crisis period is defined as the years 2008-2011. The panel regressions are at yearly intervals and utilize standard errors that are clustered at the firm level. Panel A includes tests that measure the impact of rudimentary international presence variables as well as the scaled exposures on the macroeconomic fundamentals of the foreign countries in which a firm has assets. Panel B explores our main scaled exposure variables on property rights and creditor rights protection, together with extra disclosure variables. Panel C presents the robustness of the *Firm-Sovereign CDS Difference* regression to the inclusion of *S&P Credit Rating Difference* on the RHS of the regression.

Panel A. Firm S&P Credit Rating Difference and International Exposure

<i>Dependent Variable: S&P Credit Rating Difference (= Firm S&P Credit Rating – Sovereign S&P Credit Rating)</i>						
	(1)	(2)	(3)	(4)	(5)	(6)
<i>International Presence</i>						
Number of Stock Exchanges	0.609*** (7.23)					
Crisis × Number of Stock Exchanges	0.0302 (0.63)					
Number of Geographic Segments		0.0411 (1.26)				
Crisis × Number of Geographic Segments		0.0574** (2.46)				
Foreign Assets (fraction of Total Assets)			0.243 (0.88)			
Crisis × Foreign Assets (fraction of Total Assets)			0.0872 (0.39)			
Foreign Sales (fraction of Total Sales)				0.0703 (0.29)		
Crisis × Foreign Sales (fraction of Total Sales)				0.481*** (2.61)		
<i>Fundamentals</i>						
Scaled Exposure: Ln(GDP)					-0.0763 (-0.97)	
Crisis × Scaled Exposure: Ln(GDP)					0.00786 (0.11)	
Scaled Exposure: Stock Market Volatility						0.0347 (0.48)
Crisis × Scaled Exposure: Stock Market Volatility						-0.00041 (-0.01)
Cluster						
Controls	Firm					
	Ln(Market Capitalization), Leverage, Short-term Debt Fraction, Cash Flow to Assets, Stock Return Volatility					
Fixed Effects	Year, Country, Industry					
Observations	6915	6545	6953	6953	6434	6446
Adjusted R^2	0.620	0.606	0.611	0.611	0.574	0.575

T-statistics are provided in parenthesis, and statistical significance is indicated by *, **, *** for 10%, 5% and 1%, respectively.

Panel B. Firm S&P Credit Rating Difference and Scaled Exposure to Foreign Institutions

Dependent Variable: S&P Credit Rating Difference (= Firm S&P Credit Rating – Sovereign S&P Credit Rating)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
<i>Property Rights Protection</i>									
Scaled Exposure: Property Rights	0.0286								
	(0.92)								
Crisis × Scaled Exposure: Property Rights	-0.0152								
	(-0.44)								
Scaled Exposure: Rule of Law		0.00207							
		(0.05)							
Crisis × Scaled Exposure: Rule of Law		-0.0229							
		(-0.54)							
Scaled Exposure: Repudiation Risk			0.00795						
			(0.18)						
Crisis × Scaled Exposure: Repudiation Risk			-0.0390						
			(-0.90)						
Scaled Exposure: Expropriation Risk				0.0352					
				(0.53)					
Crisis × Scaled Exposure: Expropriation Risk				-0.0680					
				(-1.09)					
<i>Creditor Rights Protection</i>									
Scaled Exposure: Creditor Rights					0.0101				
					(1.17)				
Crisis × Scaled Exposure: Creditor Rights					0.150**				
					(2.12)				
Scaled Exposure: Ln(Contract Enforcement Days)						0.0971*			
						(1.77)			
Crisis × Scaled Exposure: Ln(Contract Enf. Days)						-0.0254			
						(-0.44)			
<i>Disclosure Requirements</i>									
Extra Disclosure: Number of Items Reported							-0.0269		
							(-0.08)		
Crisis × Extra Disclosure: No. of Items Reported							0.00374		
							(0.59)		
Extra Disclosure: Frequency and Count								-0.260	
								(-0.33)	
Crisis × Extra Disclosure: Frequency and Count								0.00893**	
								(2.06)	
<i>Cluster Controls</i>									
				Firm					
				Ln(Market Capitalization), Leverage, Short-term Debt Fraction,					
				Cash Flow to Assets, Stock Return Volatility					
				Year, Country Industry					
Fixed Effects									
Observations	6266	5499	5499	5502	5523	5520	6552	6552	
Adjusted R ²	0.576	0.584	0.594	0.611	0.623	0.620	0.615	0.589	

T-statistics are provided in parenthesis, and statistical significance is indicated by *, **, *** for 10%, 5% and 1%, respectively.

Panel C. Robustness: *Firm-Sovereign CDS Difference* Regression with *S&P Credit Rating Difference*

	<i>Dependent Variable: CDS Difference (= Firm CDS Spread – Sovereign CDS Spread)</i>							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Information contained in S&P Credit Rating</i>								
S&P Credit Rating Difference	-37.6*** (-9.61)	-38.5*** (-10.54)	-38.6*** (-10.54)	-38.4*** (-10.55)	-39.1*** (-10.13)	-38.7*** (-10.49)	-38.8*** (-9.71)	-39.1*** (-9.70)
<i>Property Rights Protection</i>								
Scaled Exposure: Property Rights	-1.30 (-1.30)							
Crisis × Scaled Exposure: Property Rights	-7.88** (-2.23)							
Scaled Exposure: Rule of Law		-2.07 (-0.91)						
Crisis × Scaled Exposure: Rule of Law		-8.02*** (-2.79)						
Scaled Exposure: Repudiation Risk			-1.18 (-1.53)					
Crisis × Scaled Exposure: Repudiation Risk			-7.78* (-2.57)					
Scaled Exposure: Expropriation Risk				-1.75 (-1.46)				
Crisis × Scaled Exposure: Expropriation Risk				-7.20** (-1.99)				
<i>Creditor Rights Protection</i>								
Scaled Exposure: Creditor Rights					-4.41 (-1.27)			
Crisis × Scaled Exposure: Creditor Rights					-7.53 (-0.85)			
Scaled Exposure: Ln(Contract Enf. Days)						2.53* (1.69)		
Crisis × Scaled Exposure: Ln(Cont. Enf. Days)						1.18 (0.15)		
<i>Disclosure Requirements</i>								
Extra Disclosure: Number of Items Reported							6.76 (0.14)	
Crisis × Extra Disclosure: No. of Items Reported							-1.79** (-2.01)	
Extra Disclosure: Frequency and Count								-60.1 (-0.86)
Crisis × Extra Disclosure: Frequency and Count								-0.670 (-0.71)
<i>Cluster Controls</i>								
					Firm			
					Ln(Market Capitalization), Leverage, Short-term Debt Fraction, Cash Flow to Assets, Stock Return Volatility			
Fixed Effects					Year, Country Industry			
Observations	6266	5499	5499	5502	5523	5520	6652	6652
Adjusted R ²	0.483	0.475	0.464	0.468	0.453	0.455	0.470	0.468

T-statistics are provided in parenthesis, and statistical significance is indicated by *, **, *** for 10%, 5% and 1%, respectively.

Table 6

CDS Sovereign Ceiling Violations and Multinational Firms

This table presents probit regressions on three variations of the firm violator dummy variable, which is equal to one if a firm was a sovereign ceiling violator in a given year. The first is called the “Simple Method” and is used in models (1)-(4). It flags a firm as a violator in a given year if the firm’s CDS spread fell below its sovereign CDS spread in at least one day during the year. The second, called the “Mean Method”, is used in models (5)-(8) and flags a firm as a violator in a given year if the annual mean of a firm’s CDS spread is less than the annual mean of its sovereign CDS spread. The last set of regressions, shown in models (9)-(12), are ordered probit regressions on the “Violator Buckets” variable, which measures the severity of the sovereign ceiling violation. The buckets are defined each year, and a value of zero indicates no violation. All these *Firm Violator Dummy* variables are transaction cost adjusted. See Appendix C for the details of this transaction cost adjustment procedure. In this table, we exclusively focus on the crisis period, 2008-2011, where the sovereign ceiling violations are more frequent than the pre-crisis period.

	<i>Firm Violator Dummy (Simple Method)</i>				<i>Firm Violator Dummy (Mean Method)</i>				<i>Firm Violator Buckets (0,1,2,3)</i>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Property Rights Protection</i>												
Scaled Exposure: Property Rights	0.0515** (1.99)				0.0551** (2.34)				0.0510** (1.97)			
Scaled Exposure: Rule of Law		0.0234** (2.24)				0.0368** (2.11)				0.0245** (2.01)		
Scaled Exposure: Repudiation Risk			0.0230** (1.99)				0.0644** (2.14)				0.0133* (1.88)	
Scaled Exposure: Expropriation Risk				0.0438* (1.81)				0.0188* (1.76)				0.0110* (1.84)
<i>Creditor Rights Protection</i>												
Scaled Exposure: Creditor Rights	0.0335* (1.68)	0.0444* (1.79)	0.0436 (1.63)	0.0421 (1.64)	0.0657* (1.74)	0.0624* (1.72)	0.0775* (1.75)	0.0708* (1.73)	0.0429 (1.62)	0.0529 (1.61)	0.0521* (1.73)	0.0376* (1.75)
<i>Disclosure Requirements</i>												
Extra Disclosure: No. of Items Reported	0.0308** (2.12)	0.0337** (2.20)	0.0306** (2.08)	0.0372** (2.34)	0.0144* (1.94)	0.0249* (1.86)	0.0107** (2.03)	0.0222* (1.92)	0.0307** (2.17)	0.0404** (2.22)	0.0336** (2.25)	0.0259** (2.03)
Cluster	Firm											
Controls	Ln(Market Capitalization), Leverage, Short-term Debt Fraction, Cash Flow to Assets, Stock Return Volatility, CDS Depth, Sov. CDS Depth											
Fixed Effects	Year, Country, Industry, CDS Restructuring Type, CDS Currency											
Observations	5173	5197	5152	5207	5002	5007	4969	5025	5173	5197	5152	5207
Pseudo R ²	0.303	0.305	0.306	0.302	0.386	0.384	0.386	0.384	0.231	0.232	0.233	0.240

T-statistics are provided in parenthesis, and statistical significance is indicated by *, **, *** for 10%, 5% and 1%, respectively.

Table 7

CDS versus S&P Rating: Lead/Lag Predictions in Sovereign Ceiling Violations (SCVs)

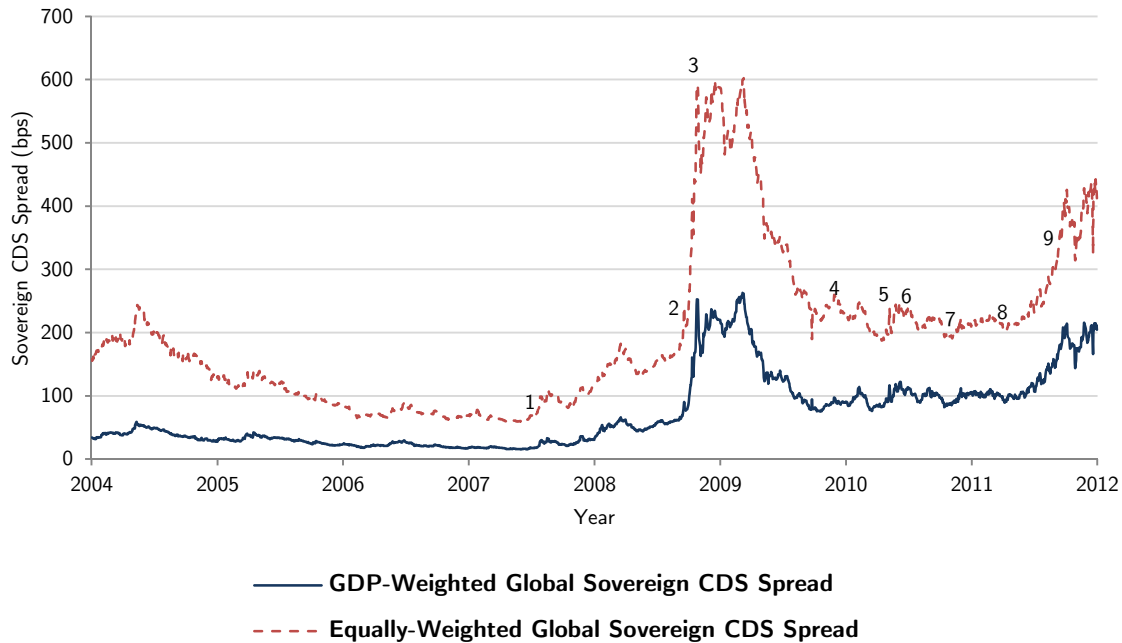
This table provides results on SCV directional predictability from SCVs in the CDS market to SCVs in S&P credit rating and vice versa. Columns (1)-(2) are probit regressions in which the binary dependent variable is equal to one when the firm *becomes* an SCV in its S&P rating. Columns (3)-(4) are probit regressions in which the binary dependent variable is equal to one when the firm *becomes* a CDS SCV (using the “mean method”, see appendix). Column (5) is a multinomial logit regression in which the dependent variable is equal to one when the firm *becomes* an S&P SCV, negative one when the firm *stops being* an S&P SCV, and zero otherwise (base case). Column (6) is a multinomial logit regression in which the dependent variable is equal to one when the firm *becomes* a CDS SCV, negative one when the firm *stops being* a CDS SCV, and zero otherwise (base case). Column (7) and (8) are ordered probit regressions in which the dependent variable is equal to the change in violation status with respect to the firm’s S&P rating and CDS spread, respectively. In all columns, the independent variables are 1-year and 2-year lags of the change in the firm’s violation status with respect to the firm’s CDS spread (Δ CDS Violation) and S&P rating (Δ S&P Violation). These independent variables have the following three values: 1) one when the firm *becomes* a violator, 2) negative one when the firm *stops being* a violator and 3) zero otherwise. Additional firm-level time-varying controls and various fixed effect dummies are also included in these regressions as noted in the table. Data are annual and cover the years 2004-2011. CDS data are provided by Markit. S&P ratings are acquired from Thomson One and Worldscope.

	<i>Becomes an S&P Violator</i> (Δ S&P Violation = 1, 0)		<i>Becomes a CDS Violator</i> (Δ CDS Violation = 1, 0)		<i>Become S&P Viol</i> ($\Delta = 1$)	<i>Stop S&P Viol</i> ($\Delta = -1$)	<i>Become CDS Viol</i> ($\Delta = 1$)	<i>Stop CDS Viol</i> ($\Delta = -1$)	<i>Change in S&P Viol</i> ($\Delta = 1,0,-1$)	<i>Change in CDS Viol</i> ($\Delta = 1,0,-1$)
	(1) Probit	(2) Probit	(3) Probit	(4) Probit	(5) Multinomial Logit		(6) Multinomial Logit		(7) Ordered Probit	(8) Ordered Probit
1 Year Lag:	1.249***	2.109***		-1.702***	3.011***	-2.984***	-2.489***	8.537	1.462***	-3.123***
Δ CDS Violation	(3.03)	(3.48)		(-5.94)	(3.51)	(-3.07)	(-4.93)	(0.83)	(6.26)	(-6.33)
2 Year Lag:	1.990***	3.226***		-0.370**	4.133***	-2.424*	-0.719	8.721	1.186	-2.297***
Δ CDS Violation	(3.53)	(4.29)		(-2.08)	(4.26)	(-1.78)	(-1.58)	(0.85)	(1.57)	(-5.91)
1 Year Lag:		-4.202***	-0.264	-0.273	-4.368***	21.64	-0.883	12.97	0.286	-0.771
Δ S&P Violation		(-4.26)	(-0.56)	(-0.57)	(-3.18)	(0.02)	(-0.74)	(0.03)	(1.16)	(-1.25)
2 Year Lag:		0.262	-0.664	-0.762	0.0996	0.450	0.547	4.227	0.148	0.0277
Δ S&P Violation		(0.48)	(-1.40)	(-1.57)	(0.03)	(0.10)	(0.40)	(0.85)	(0.43)	(0.05)
Cluster	Firm									
Controls	Ln(Market Cap), Leverage, Short-term Debt Fraction, Cash Flow to Assets, Stock Return Volatility									
Fixed Effects	Industry, Region, Crisis Period, Restructuring Type									
Observations	4301	4201	4375	4375	4386		4228		4386	4228
Pseudo R ²	0.537	0.652	0.150	0.185	0.378		0.266		0.331	0.236

T-statistics are provided in parenthesis, and statistical significance is indicated by *, **, *** for 10%, 5% and 1%, respectively.

Figure 1: Global Sovereign CDS Spread

This figure presents the time series of the GDP-weighted and equally-weighted mean of global 5-year sovereign CDS daily spreads (in basis points) of 54 countries over the years 2004-2011. CDS data are provided by Markit. Numbers are placed on the graph to mark important events and outline the initial rising credit risk of the financial sector, government bailouts that followed, and the concurrent increase in sovereign credit risk across the globe.³³



- 1 July 31, 2007. Bear Stearns liquidates hedge funds.
- 2 September 15, 2008. Lehman Bros. files for Ch. 11 bankruptcy.
- 3 October 3, 2008. US congress passes Troubled Asset Relief Fund (TARP).
- 4 December 16, 2009. S&P cuts Greece's credit rating.
- 5 April 27-28, 2010. S&P cuts credit rating of Greece, Portugal and Spain.
- 6 May 2-9, 2010. Greece accepts bailout; European Financial Stability Facility (EFSF) created.
- 7 November 28, 2010. Spain accepts bailout.
- 8 May 17, 2011. Portugal accepts bailout.
- 9 September 18 – October 13, 2011. S&P cuts credit rating of Spain, Italy, and 24 Italian banks.

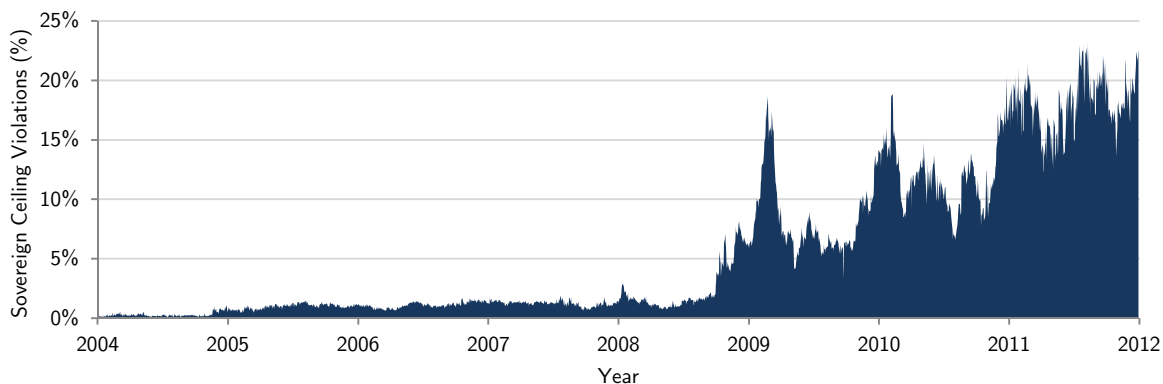
³³ For a more complete timeline of the recent financial crisis, visit <http://timeline.stlouisfed.org>.

Figure 2: Global Sovereign Ceiling Violations (SCVs) in the CDS Market

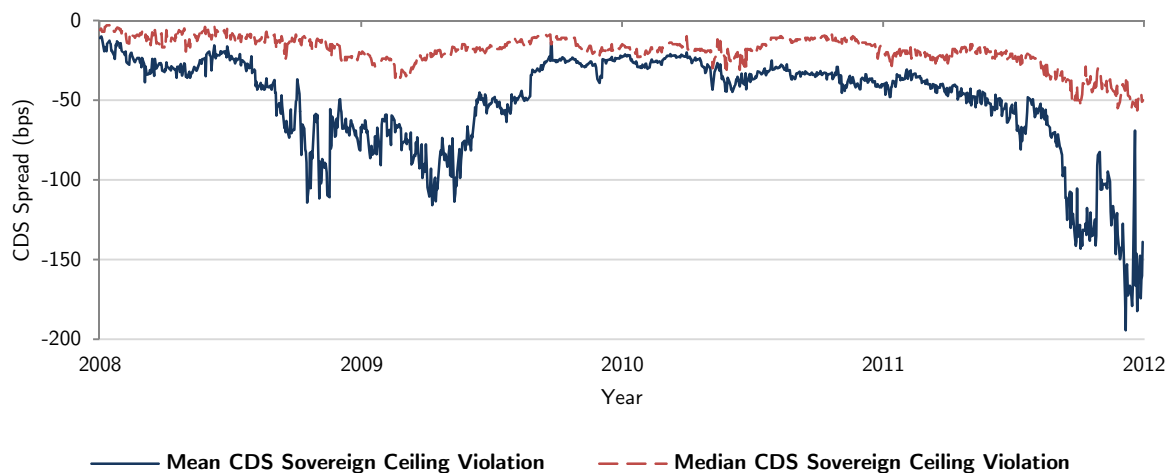
In Panel A, the top figure presents the daily frequency of global sovereign ceiling violations (SCVs) in the credit default swap (CDS) market as measured by the percentage of 5-year CDS contracts that are classified as SCVs using the “simple method” (i.e., the firm CDS daily spread is less than that of its sovereign counterpart with equal contractual terms). CDS spread data are retrieved from Markit and include 2,364 firms in 54 countries over 2004-2011. The bottom figure of Panel A presents the daily magnitude of SCVs in the global CDS market during the 2008-2011 crisis period using the mean and median of the *Firm-Sovereign CDS Difference* (firm CDS spread minus sovereign CDS spread), which are computed each day using observations that are classified as SCVs using the “simple method.” In Panel B, the top and bottom figures compare the quantity of sovereign ceiling violations (SCVs) in the 5-year credit default swap (CDS) market in countries with strong and weak institutions during the pre-crisis period (top) and the crisis period (bottom), respectively. We have three categories of institutional variables: property rights protection (*Property Rights, Rule of Law, Repudiation Risk, Expropriation Risk*), creditor rights protection (*Creditor Rights, Ln(Contract Enforcement Days)*), and disclosure requirements (*Number of Items Reported, Frequency and Count*). See variable descriptions in Appendix E for more information on the institutional variables. For each institutional variable, we divide countries into two groups: top 50% (strong) and bottom 50% (weak). We then compute the SCVs in each group in each year as a percentage of all firm-year observations in the group. To determine whether a firm is a sovereign ceiling violator in a given year, we use the “mean method,” which flags a firm as a violator in the given year if its annual average 5-year CDS daily spread is lower than that of its home country. We adjust for transaction costs by including bid-ask components for each country in each year. See Appendix C for more details of the “mean method” procedure.

Panel A. Daily Patterns of SCVs in the CDS Market

Global SCVs in the CDS Market, Transaction-cost unadjusted (Percentage of all contracts)

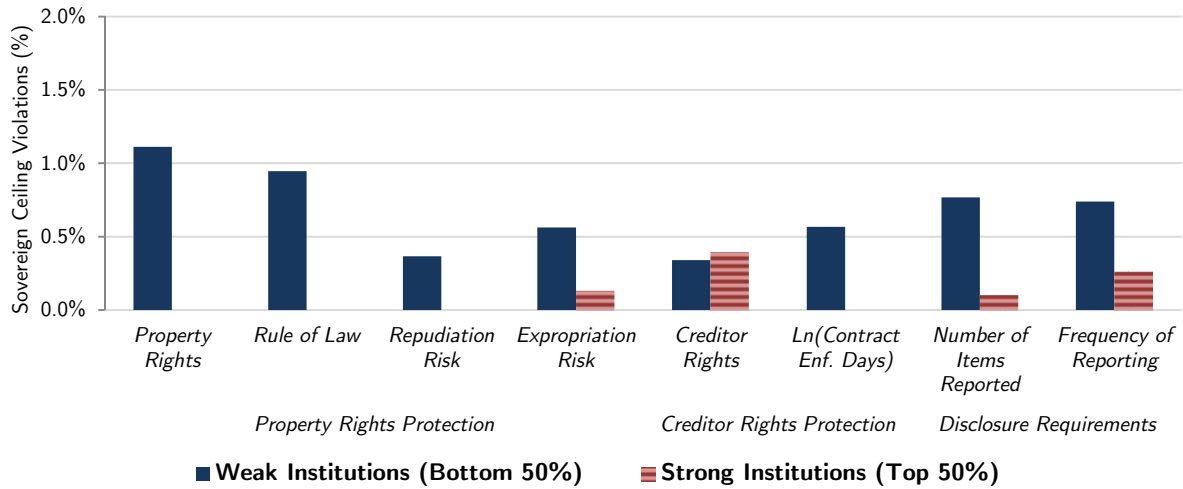


Magnitude of Global SCVs in the CDS Market during the Crisis Period (Mean and median of all SCVs)



**Panel B. Cross-country Patterns of Annual SCVs in the CDS Market Before/After the Crisis
(Transaction-cost Adjusted)**

Pre-Crisis (2004-2007)



Crisis (2008-2011)

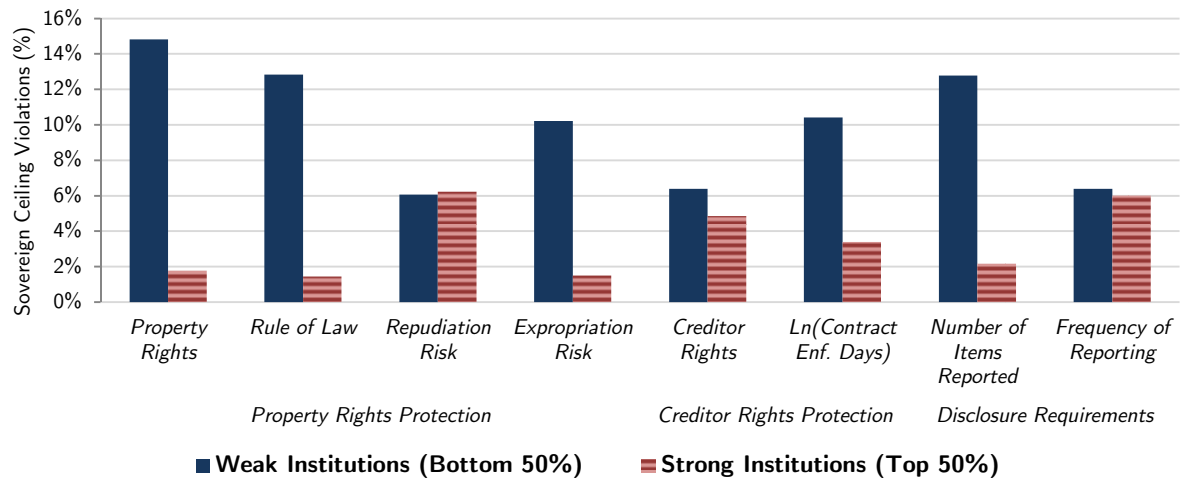
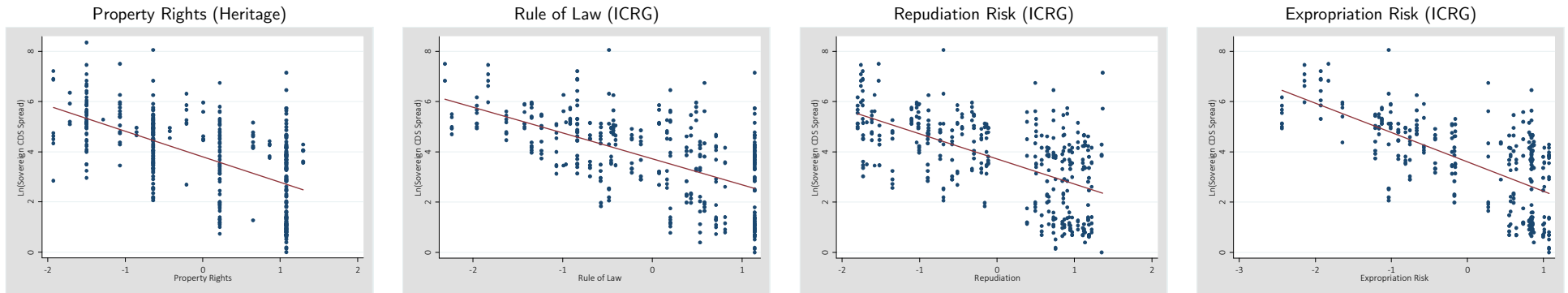


Figure 3

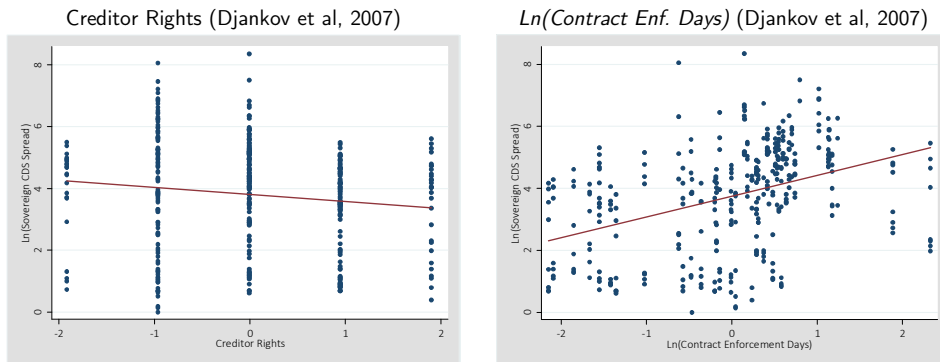
Sovereign CDS Spreads and Country Institutional Characteristics

This figure presents scatterplots between the natural log of the annualized average 5-year sovereign CDS daily spreads (in basis points (bps)) and various country institutional characteristics. Panel A, Panel B, and Panel C examine three distinct categories of institutional variables: Property Rights Protection, Creditor Rights Protection, and Disclosure Requirements. Each plot contains country-year observations. All institutional variables are standardized. Large values indicate high institutional strength ($\ln(\text{Contract Enforcement Days})$ being the only exception). CDS spreads are provided by Markit and include 54 countries over 2004-2011.

Panel A. Property Rights Protection



Panel B. Creditor Rights Protection



Panel C. Disclosure Requirements

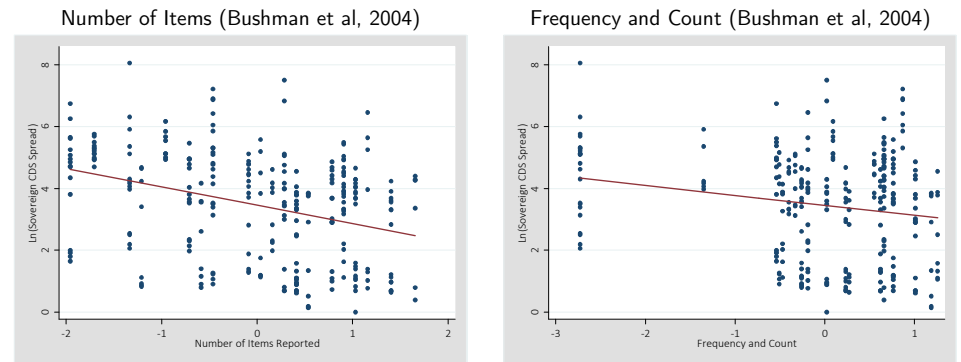


Figure 4: Sovereign Ceiling Violations (SCVs): CDS Precedes S&P Ratings

This figure provides a time line depicting the dynamic relation between first time SCVs based on S&P credit ratings (CDS spreads) at event year t and the percentage of those SCVs that were SCVs in the CDS market (S&P credit ratings) 2-years prior, 1-year prior, and at event year t . The bar graph shows the percentage of firms at points in time that are SCVs in the CDS market prior to becoming an S&P credit rating SCV (and vice-versa). The x-axis marks the years preceding the beginning of the SCV event at year t . The beginning of the SCV is defined as the first year in our sample in which the firm starts to violate the sovereign ceiling rule. The y-axis marks the % of firms that are violators at year $t-2$, $t-1$ and t . For example, 40.27% of firms that experience an S&P SCV at year t have already seen a CDS SCV two years prior. On the other hand, only 0.95% of firms that experience a CDS SCV have already seen an S&P SCV two years prior. CDS data are provided by Markit. S&P ratings are available through Thomson One and Datastream. A CDS SCV is defined using the “mean method”, which flags a firm as a violator if the average difference between the firm CDS spread and the sovereign CDS spread throughout the year is negative.

