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# Regulation and information costs of sovereign distress: Evidence from corporate lending markets

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# Regulation and information costs of sovereign distress: Evidence from corporate lending markets

We examine the effect of sovereign credit impairments on the pricing of syndicated loans following rating downgrades in the borrowing firms' countries of domicile. We find that the sovereign ceiling policies used by credit rating agencies create a disproportionately adverse impact on the bounded firms' borrowing costs relative to other domestic firms following their sovereign's rating downgrade. Rating-based regulatory frictions partially explain our results. On the supply-side, loans carry a higher spread when granted from low-capital banks, non-bank lenders, and banks with high market power. We further document an operating demand-side channel, contingent on borrowers' size, financial constraints, and global diversification. Our results can be attributed to the relative bargaining power between lenders and borrowers: relationship borrowers and non-bank dependent borrowers with alternative financing sources are much less affected.

Keywords: Credit ratings, Sovereign ceiling, Syndicated loan pricing, Rating-based regulation, Firm credit constraints, Bank dependency, Bargaining power.

JEL classification: F34; G21; G24; G28; G32; H63

## 1. Introduction

Sovereign debt impairments carry significant negative consequences for firms domiciled in downgraded countries. In rating the creditworthiness of debt obligors, major credit rating agencies (CRAs) maintain a so-called “sovereign ceiling policy” – whereby domestic firms are unlikely to receive a rating higher than that of their sovereign. Hence, when there is a sovereign downgrade, firms with ratings equal to their sovereign’s become technically “bounded” by the implicit ceiling and they also get downgraded, irrespective of their fundamentals.<sup>1</sup> In this paper, we examine the consequences of sovereign credit rating downgrades for the pricing of syndicated loans to corporate borrowers.

Existing studies show that bounded borrowers cut back on corporate investment and reduce their reliance on credit markets relatively more than firms with ratings below the bound following a sovereign downgrade. Moreover, the bond yields of bounded firms increase significantly more than for otherwise similar (albeit non-bounded) firms (see Almeida, Cunha, Ferreira and Restrepo, 2017). However, an important financing source for non-financial firms are syndicated loans, with a volume of USD 5.4 trillion in 2021.<sup>2</sup> Therefore, an essential, yet unexplored research question is whether the pricing of syndicated loans responds to sovereign downgrades. To the best of our knowledge, this aspect of the impact of CRAs’ sovereign rating actions is not addressed.

To explore this research question, we follow prior studies in employing an identification strategy that exploits the variation in corporate credit ratings that is due to CRAs’ sovereign ceiling policies (see Adelino and Ferreira, 2016; Almeida, Cunha, Ferreira and Restrepo, 2017; To, Wu and Zhang, 2022; Wang and Xie, 2022). As these studies argue, while there is no

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<sup>1</sup> Although rating agencies have moved away from strict enforcement of the sovereign ceiling since the late 1990s, corporate ratings that pierce the ceiling are still not common (see Almeida, Cunha, Ferreira and Restrepo, 2017).

<sup>2</sup> This represents approximately 25% of the total cross-border claims in loans and deposits reported by BIS banks, which amounted to USD 22 trillion (source: Refinitiv Global Syndicated Loans Review, 2022; BIS Locational banking statistics, 2022).

explicit requirement for CRAs to rate a non-sovereign entity at or below the related sovereign, corporate credit ratings rarely exceed those of their sovereigns. By applying this strategy to the syndicated lending market from 1992 to 2020, we show that the sovereign ceiling policy leads to an asymmetric effect on borrowers' cost of credit. Firms with a rating equal to their sovereign before the downgrade are subject to significantly greater increases in loan spreads relative to control firms rated below their sovereign (non-bounded firms). This extra cost is equal to approximately 57 basis points and represents almost USD 7.8 million of additional interest expenses per year for a loan of average size and maturity in our sample. Thus, bounded firms face a significant disadvantage compared to their non-bounded counterparts in the event of a sovereign downgrade.

Our identification strategy has the advantage that non-bounded firms have similar but lower credit quality than bounded firms, and the sovereign downgrade events represent exogenous shocks on corporate credit ratings. Hence, alternative explanations based on changes in firm fundamentals, firm credit risk, or both, are unlikely to explain the discontinuous change in ratings around the sovereign ceiling following the sovereign downgrade event. The exogenous and asymmetric effect of sovereign downgrades on bounded firms' ratings is thus likely to be due to the existence of the sovereign ceiling policy, and not necessarily to changes in firms' fundamentals or the domestic macroeconomic environment.

Several sensitivity tests show that these baseline findings are robust; the following five are noteworthy. First, we use different sets of fixed effects (Jiménez, Ongena, Peydró and Saurina, 2014). These include "bank times year" and "lender's country times year" fixed effects that exclude any alternative supply-side explanations of our findings and control for the time-varying macroeconomic environment in the lender's country. Second, we conduct an event study by examining the evolution of loan spreads within 2-year and 3-year windows surrounding the sovereign downgrade to control for treatment heterogeneity in the presence of

variations in treatment timing (see Baker, Larcker and Wang, 2022). Third, we use a matched sample of bounded and non-bounded firms across different firm-characteristics to remove systematic differences between the treatment and control groups; in a more stringent test, we restrict the sample to borrowers that have received at least one loan before and at least one loan after the sovereign downgrade.

Fourth, we employ matching estimators (nearest-neighbor matching and propensity-score matching) of the average effect of the treatment on the treated (ATT), to address the possibility that the groups being compared in our benchmark specification may have different (pre-treatment) characteristics. Finally, we conduct several placebo tests that ask whether the loan spreads of bounded borrowers increase more during recessions or currency crises that are not accompanied by a shock to the sovereign rating.

We conduct additional analyses to understand the mechanisms leading to this high credit cost for bounded firms. We first examine the effect of rating-based regulation. Basel II capital requirements and other rating-based regulations are typically written around broad rating categories instead of individual ratings. Therefore, some sovereign downgrades are more likely to cause changes in capital requirements applied to financial institutions, which can translate to higher cost of loans to bounded borrowers. We find that downgrade to a new rating bin is only associated with higher spreads for bounded firms if it concerns migration to the non-investment grade category.

This prompts us to consider lenders with different capacities to absorb risk. We first differentiate between strongly and weakly capitalized lenders. In theory, higher capital ratios allow banks to make more loans because they have greater capital buffers against risk-based capital requirements. We find that better-capitalized lenders charge lower loan spreads to bounded borrowers, partially reversing the spread increase after the downgrade. Next, we turn to non-bank lenders, as these have different risk preferences and regulatory constraints to hold

investment grade securities, relative to traditional bank lenders. We show that loans carry a higher spread when granted from non-banks and when they are structured specifically for institutional investors. We further pinpoint the relevance of an additional supply-side effect of the sovereign ceiling on loan spreads, which operates through bank competition. According to this, the entire increase in the spreads of bounded firms post-downgrade is concentrated in loans from banks with high market power.

Our analysis also documents an operating demand-side channel, contingent on certain firm characteristics. Specifically, larger bounded firms face lower spreads following the downgrade event. These firms might possess market power, making an increase in loan spreads by banks less likely, as these firms might seek credit elsewhere more efficiently. Moreover, the spread increase is contained for low-leverage and less-financially constrained firms, which provide a positive signal about their credit quality. Next, we look at the borrowers' level of global diversification. We find that the aggravating effect of downgrades is mitigated mainly for cross-listed firms; similarly, firms with greater reliance on foreign sales are less affected by domestic conditions following the sovereign downgrade, thereby facing lower spreads.

Overall, these findings raise the issue of potential heterogeneity of the results, where bounded firms obtain loans at significantly higher spreads compared to non-bounded firms following the sovereign downgrade. Although rating changes due to the sovereign ceiling do not reveal any new information about the borrowers, lenders may still be able to exploit the downgrade and charge higher spreads. This is consistent with notions of relative bargaining power, such as the lending bank controlling so much of the borrower's funding or dealing with first-time borrowers.

For instance, banks are able to exert monopoly power over bank-dependent borrowers, charging higher rates than those to non-dependent borrowers (Santos and Winton, 2019). We confirm this in our context since spreads increase if the current lead bank provided at least 50%

of the firm's loan financing over the past three years. Moreover, establishing an information-intensive relationship with the lender is important. We find that by borrowing from the same lead lender at least once in the five years before the current loan, firms can recover a significant portion of the initial spread premium compared to first-time borrowers. These benefits to bounded firms further increase with the magnitude of the lending relationship.

Finally, lenders have less bargaining power when borrowers access alternative financing sources. We hypothesize that borrowers with access to the bond market are less likely to be bank dependent, due to more available information on them and because they can draw funds from many well-informed investors (Santos, 2011). Indeed, we find that borrowers with a bond issue in the past three years or with higher ratios of bond financing over loan financing face lower spreads following the downgrade. This is further the case if borrowers can resort to internal financing: firms with higher cash holdings or retained earnings receive lower spreads, partially reversing the initial increase due to the sovereign ceiling rule.

This paper contributes to the literature on the impact of corporate credit rating downgrades on firms' cost of credit. In this regard, it highlights the higher cost of credit faced by bounded firms following a downgrade, especially when resorting to international financing; notably, it identifies the operative mechanisms that drive the higher borrowing costs. The closest papers to ours are possibly those of Adelino and Ferreira (2016), who, in a similar setting examine the lending behaviour of domestic bounded banks after the sovereign downgrade. In contrast, Almeida, Cunha, Ferreira and Restrepo (2017) analyze the real impact on domestic bounded firms. We complement these studies, by investigating the impact of sovereign downgrades and the sovereign ceiling-induced corporate downgrades on the financing costs of bounded firms and evaluate potential supply-side and demand-side explanations.

We present new evidence on the differential impact of sovereign downgrades on the pricing of syndicated loans directed to bounded borrowers relative to non-bounded ones. We



further identify potential avenues for affected firms to alleviate the negative impact stemming from the interaction of sovereign and corporate credit risk, as reflected in the sovereign and corporate downgrades. Concerning this interaction, we point to an overlooked aspect of the sovereign-firm nexus that affects the firm cost of credit and materializes due to the operation of the sovereign ceiling. Prior studies have mainly investigated sovereign credit risk (through sovereign ratings) as determinants of corporate ratings (Borensztein, Cowan and Valenzuela, 2013) or corporate CDS spreads during the European sovereign debt crisis (Bedendo and Colla, 2015; Augustin, Boustanifar, Breckenfelder and Schnitzler, 2018). Our work extends beyond studies examining the impact of sovereign downgrades on the borrowing costs of European firms during the Eurozone crisis (Drago and Gallo, 2017), by identifying the borrower types that are subject to the adverse effects from their country's rating demise.

On the interplay between credit ratings and corporate behaviour, previous studies show that credit ratings affect the cost of capital (Baghai, Servaes and Tamayo, 2014), capital structure decisions (Kisgen, 2006; Kisgen and Strahan, 2010) and real decisions (Lemmon and Roberts, 2010; Harford and Uysal, 2014). However, these are subject to omitted variables concerns because changes in ratings may be correlated with changes in firm fundamentals. Our findings, which support the argument that ratings affect loan financing costs, are likely to be due to changes in ratings instead of changes in fundamentals or crowding-out effects; as such they complement relevant studies that document an impact on corporate investment and performance (Almeida, Cunha, Ferreira and Restrepo, 2017; To, Wu and Zhang, 2022).

Finally, on the regulatory front, we examine how rating-based regulation interacts with sovereign downgrades in shaping bank lending behaviour. Prior research shows the importance of bank capital requirements for credit supply and borrower credit costs in a variety of well-identified settings (as in Aiyar, Calomiris and Wieladek, 2014; Gropp, Mosk, Ongena and Wix, 2018; De Jonghe, Dewachter and Ongena, 2020; Juelsrud and Wold, 2020). We identify the

conditions under which migration to different rating bins affects bank loan supply and the heterogeneity of loan pricing with respect to bank capitalization. Further, we reveal the more conservative response of non-bank lenders, thus contributing to the discussion about differences in lending behaviour between traditional banks and non-banks (see Hanson, Kashyap and Stein, 2011; Irani, Iyer, Meisenzahl and Peydro, 2021).

The paper proceeds as follows: Section 2 discusses the data and empirical methodology, Sections 3 and 4 present the empirical results and main operating mechanisms, while Section 5 concludes. An Internet Appendix provides additional summary statistics and robustness checks.

## **2. Data and empirical model**

We obtain data from various sources. We collect all syndicated loans (at the facility level) over the period 1992 to 2020 from the Refinitiv LPC DealScan database. DealScan contains the most comprehensive historical loan-deal information on the global syndicated loan market. We exclude all loans for which there is no conventional pricing (there is no loan spread data) and this removes some very specialized credit lines. We match our loan data with the long-term foreign-currency credit rating of the borrower's country issued by Standard & Poor's (S&P). The literature reports that S&P's ratings are updated more frequently and generally precede other credit rating agencies (Ismailescu and Kazemi, 2010; Alsakka, ap Gwilym and Vu, 2014; Drago and Gallo, 2017).<sup>3</sup> We further match loans with bank- and firm-specific characteristics from Compustat and macroeconomic and institutional (country-year) variables from several sources (we provide variable definitions and sources in Table A1 of the Appendix). The number of observations for our baseline specifications ranges from 4,216 to 5,272, depending on the

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<sup>3</sup> Credit ratings from S&P, along with ratings from Moody's, are further allowed to be used for determining risk weights under Basel II.

controls and the set of fixed effects used. Our preferred specification includes 5,270 loans, granted by 134 lead lenders headquartered in 14 countries to 431 borrowers from 48 countries.

### 2.1. Empirical model and key variables

To examine whether a bounded firm faces a higher cost of credit following a domestic sovereign downgrade relative to non-bounded firms, we use a regression approach very similar to Adelino and Ferreira (2016), Almeida, Cunha, Ferreira and Restrepo (2017), Berg, Saunders, Steffen and Streitz (2017) and Gande and Saunders (2012):<sup>4</sup>

$$\begin{aligned} \text{Cost of credit}_{lt} = & a_0 + a_1 \text{Bound}_{kt-1} + a_2 \text{Sovereign downgrade}_{kt-1} + \\ & a_3 \text{Bound}_{kt-1} \times \text{Sovereign downgrade}_{kt-1} + a_4 \text{Controls}_{kt} + u_{lt} \quad (1) \end{aligned}$$

where  $\text{Cost of credit}_{lt}$  measures the cost of loan facility  $l$  originated at time  $t$ . The most widely used measure is the all-in spread drawn (*AISD*), denoting the spread over LIBOR, although the recent literature (e.g., Berg, Saunders, Steffen and Streitz, 2017) also highlights the importance of fees and all-in spread undrawn (*AISU*).

*Bound* is a binary variable equal to one if the firm has a credit rating equal to or above the credit rating of its domicile country, and equal to zero if it has a credit rating at most two notches below. *Sovereign downgrade* is a binary variable equal to one for a downgrade in the long-term foreign-currency credit rating of the borrower's country, and zero otherwise. The interaction of the two, i.e.,  $\text{Bound} \times \text{Sovereign downgrade}$ , is in turn equal to one if in the year

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<sup>4</sup> Gande and Saunders (2012) examine a model where the loan amount (or leverage) of firms is regressed on the interaction term between traded syndicated loans (vs. non-traded loans) and the post-trade period. Berg, Saunders, Steffen and Streitz (2017), use a similar model with interaction terms to examine the differential responses of loan spreads and other variables in Europe vs. the U.S. due to foreign lending and other institutional characteristics. Adelino and Ferreira (2016) adopt a DID framework to examine the impact of domestic sovereign downgrades on the domestic bounded banks' lending supply relative to non-bounded banks. Similarly, Almeida, Cunha, Ferreira and Restrepo (2017) examine the real effects of domestic sovereign downgrades on domestic bounded firms compared to non-bounded firms.

of the sovereign downgrade the firm has a credit rating equal to or above the credit rating of its domicile country (Table A2 provides information on sovereign credit rating downgrades and the domestic bounded firms at the time of the sovereign downgrade).<sup>5</sup> The vector  $a_0$  denotes different types of fixed effects, *Controls* is a vector of control variables of dimension  $k$ , and  $u$  is a stochastic disturbance.

Put simply, our identification strategy provides a direct comparison across two states: bounded (treated) firms and non-bounded (control) firms during the domestic sovereign downgrade. The main coefficient of interest is  $a_3$ , which shows the differential effect of *Sovereign downgrade* on the cost of credit between bounded and non-bounded firms. In other words, we obtain identification from the fact that a sovereign downgrade exerts an asymmetric effect on the cost of loans granted to domestic bounded firms relative to control firms below the bound. We expect  $a_3$  to be positive and statistically significant if sovereign ceiling policies matter for determining loan spreads and thus, increase the cost of credit for bounded firms.

To enhance our identification strategy and enable the comparison between the treatment (bounded) and control (non-bounded) groups, the latter includes firms with a credit rating at most two notches below the credit rating of their sovereign.<sup>6</sup> Our key assumption is that the two groups would have followed parallel trends in the absence of the treatment. Differences in the post-treatment period can only be attributed to the treatment (in our context, sovereign downgrades) when this assumption holds. This assumption would be violated if bounded and non-bounded firms had unobservable characteristics that predict greater sensitivity to sovereign

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<sup>5</sup> We identify the lender's and the borrower's country as the country in which the lender and the borrower are located, respectively. Where a loan is provided by the parent bank's foreign affiliate or subsidiary, the lender's country is set as the country of the affiliate/subsidiary. On the same line, for firms receiving loans through their foreign subsidiaries, we set the borrower's country as the country of the affiliate/subsidiary. For example, although Citibank (the parent bank) is headquartered in the US, for loans provided by Citibank International Plc, we set the lender's country as the UK. In sensitivity tests, we further examine cases of cross-border loans where the lending bank has an affiliate/subsidiary in the borrower's country. To accomplish this, we identify all banks' subsidiaries in the borrower's country. Similarly, we examine cases where the borrowing firm has an affiliate/subsidiary in the lender's country, although the number of these subsidiaries is relatively small.

<sup>6</sup> In sensitivity exercises we relax this restriction and include firms with any credit rating below their sovereign's.

debt crises, even in the absence of downgrades. In this difference-in-differences (DID) framework, we ensure that all firms have similar characteristics and fundamentals, that is, in the absence of the treatment, the treatment group would behave similarly to the control group.

Moreover, the coefficients  $a_1$  and  $a_2$  show how the bound indicators and the sovereign downgrade respectively affect the cost of credit for all loans in the sample. If the model is well identified, the interaction term and the control variables should explain (most of) the effect of *Bound* and *Sovereign downgrade* on the cost of credit (i.e.,  $a_1$  and  $a_2$  should be statistically insignificant or weakly significant). In fact, the effect of sovereign downgrades on the cost of loans for the domestic non-bounded firms should be minimal or zero, especially when controlling for other firm- and macro-level factors.

## 2.2 Control variables and fixed effects

We use several control variables at loan, firm, bank, and borrower's country levels. Following the relevant literature (Ivashina, 2009; Almeida, Cunha, Ferreira and Restrepo, 2017; Hasan, Hoi, Wu and Zhang, 2017; Kim, 2019; Delis, Hasan and Ongena, 2020), we control for loan characteristics such as the log of the loan amount, loan maturity (in months), the number of lenders in the syndicate, dummies for the use of collateral, performance-pricing provisions, and covenants. We also use loan type and purpose fixed effects; these are important as loan facilities include credit lines and term loans, which have fundamental differences in their contractual arrangements and pricing (see Berg, Saunders and Steffen, 2016) and their purpose (e.g., corporate purposes, working capital, takeovers or acquisitions, debt repayment, etc.).

We also control for the bank's total assets (*Bank size*) and the bank's return on assets and non-performing loans (*Bank ROA* and *Bank NPLs* respectively). To identify specific supply-side channels, we use variables reflecting the willingness and capacity of banks to supply loans. Thus, we introduce *Bank capital* (the ratio of bank capital over total assets), which

is the most widely used measure of bank agency problems (Holmstrom and Tirole 1997; Dell’Ariccia, Laeven and Marquez, 2014). We further use the Lerner index of the bank (*Bank Lerner index*), as banks operating in a more competitive environment might be less willing to increase the loan spreads, in order not to lose clients (Delis, Kokas and Ongena, 2017).

We also include firm-year variables with the aim to specifically identify the demand-side channels that might affect loan conditions. These variables include size (*Firm size*), return on assets (*Firm ROA*) and the ratio of tangible assets to total assets (*Firm tangibility*). Further, we use leverage (*Firm debt*) to examine the role of capital structure and indebtedness in the relationship between sovereign downgrades and loan pricing decisions. We also employ measures based on cash holdings and retained earnings, as these contain information about expected returns that fluctuate following downgrades, pinpointing to alternative sources of financing investment decisions (Ball, Gerakos, Linnainmaa and Nikolaev, 2020); we complement these, with information about borrower’s activity in the bond market, such as bond issuance and the ratio of bond financing to syndicated loan financing.

To capture the risk of default, we use borrower’s risk-adjusted returns, as measured by the Kaplan-Zingales index (*Firm KZ index*) and an indicator for non-dividend paying firms (Lamont, Polk and Saá-Requejo, 2001; Farre-Mensa and Ljungqvist, 2016). Finally, to measure borrower’s reliance on domestic market vs. foreign market (or the degree of diversification) we use the share of foreign sales to total sales (Li, Qiu and Wan, 2011). Finally, we control for economic development and macroeconomic conditions in the borrower’s country with the GDP growth rate (*GDP growth*) and GDP per capita (*GDP per capita*). Detailed descriptions of these variables are provided in Table A1.

Moreover, we use year, bank, and firm fixed effects. These complement our bank- and firm-level characteristics and allow us to control for possible time-invariant bank- and firm-specific explanations of our findings (such as credit risk and performance), that are not isolated

by our control variables. We further control for changes in the macroeconomic environment in the lender's and borrower's countries, using lender's country and borrower's country fixed effects, respectively. These saturate the effect of *Bound*  $\times$  *Sovereign downgrade* from other country (socioeconomic and political) effects on bank lending;<sup>7</sup> they also control for changes in monetary conditions. Further, we use country-pair fixed effects to capture common characteristics between the lender's and borrower's country-pairs.

In even more stringent specifications, we use bank  $\times$  year fixed effects. These control for time-varying supply (bank)-side explanations of our findings (such as changes in a bank's financial soundness, corporate governance, etc.). The regression still yields results on the main coefficients of interest because there are multiple loan facilities from the same bank within each year. Similarly, lender's country  $\times$  year fixed effects shield our specification from country-year developments in the lenders' countries. Again, we obtain results on the main coefficient of interest because there are multiple loan facilities from the same country within each year.

### 2.3 Summary statistics

Table 1 reports key descriptive statistics. The number of loan facilities in our baseline specification is 5,270. The average *AISD* in our sample is 96.55 basis points, while the average loan amount is USD 1,370 million and the average maturity is 38.38 months (3.2 years). The total number of loans granted to bounded firms is 3,305 and these constitute approximately 62.7% of the full sample. Out of these, 357 loans are granted to 44 bounded firms experiencing a domestic sovereign downgrade; Table A2 presents the complete list of these 44 bounded firms and the year of the sovereign downgrade.

[Insert Table 1 about here]

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<sup>7</sup> These are country factors affecting all banks and firms within a country. Several studies examine such macro effects on international bank lending (e.g., Delis, Hasan and Ongena, 2020; and references therein), and in this study these effects are fully controlled for via the country fixed effects.

Panel A of Table 2 compares the means of the firm-year-level covariates between the 260 treated firm-year observations and the remaining 343 control firm-year observations. Results from the mean-comparison test reveal non-statistically significant differences in the covariates between the two groups. This ensures that there are no distributional differences between the treated and control groups that could affect post-treatment outcomes. This is not surprising since the control group is restricted to firms with a credit rating at most two notches below the bound.

[Insert Table 2 about here]

Our basic premise is that the sovereign ceiling leads to an asymmetric change in corporate ratings following a sovereign downgrade, which is unrelated to firm fundamentals. As such, the sovereign downgrade event should not be accompanied by a deterioration in firm fundamentals. Indeed, Panel B of Table 2 shows that the key accounting characteristics of bounded firms (size, ROA, debt, tangibility) remain largely the same when we move from the pre- to the post-sovereign downgrade period. On the same line, potential differences in the amount, maturity or securitization of loan facilities issued after downgrades may explain any price differential. Panel C of Table 2 presents statistics for key loan terms on all facilities before and after downgrades: with the exception of *AISD*, remaining loan terms exhibit minimal and non-statistically significant differences between the pre- and post-downgrade period.

#### *2.4. Identification*

A major identification challenge relates to the possibility that bounded and non-bounded firms may have different observable characteristics. To address this, our control group includes firms with credit rating which is at most two notches below the credit rating of their sovereign. Importantly, the descriptive analysis in Section 2.3 rejects the presence of any distributional differences between the treatment and control groups that could affect post-treatment outcomes.



Nevertheless, in alternative specifications we restrict the control group to firms with a rating one notch below the bound.

We further account for this by estimating specifications, where we employ a matched sample. Specifically, we match the treatment and control groups according to their credit rating and their fundamentals. In this framework, the set of counterfactuals is restricted to the matched controls (non-bounded firms), meaning that in the absence of sovereign downgrades, the treatment group should behave similarly to the control group: this alleviates remaining concerns that the sovereign ceiling rule does not drive our results.

An additional challenge stems from the fact that a number of bounded firms in our sample are subjected to more than a single sovereign downgrade (treatment) during our examination period. As such, staggered DID regressions may potentially suffer from bias arising from treatment effect heterogeneity (Barrios, 2021; Goodman-Bacon, 2021; Baker, Larcker and Wang, 2022). This bias arises because two-way fixed effects (TWFE) DID regressions may not be appropriate in settings with multiple treatment periods or where homogeneous treatment effects cannot be assumed, unless there is a relatively small percentage of never-treated units.

In our context, this bias is unlikely to arise since from a total of 431 borrowers in our sample, 371 were never subjected to a sovereign downgrade (never-treated units). Nevertheless, to ensure the robustness of our inferences, we employ an event study, where we group all loans in a time window around the sovereign downgrade. We then conduct a DID, where we examine the evolution of loan spreads for bounded firms subjected to a sovereign downgrade (treated firms) relative to those for non-bounded firms (control firms). We conduct this study separately for a  $(-2, +2)$  year window and a  $(-3, +3)$  year window and discuss the results in Section 3.<sup>8</sup>

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<sup>8</sup> Two alternative solutions are provided by the models of Callaway and Sant'Anna (2021) and Sun and Abraham (2021). However, these assume a panel dataset and only one change in the cross-section: since for certain treated firms in Brazil, Greece, Italy, Mexico, Philippines and Turkey we observe more than a single sovereign downgrade,

This approach further enables us to address a third identification challenge, namely that trends related to loan spreads are the same among the treatment and control groups prior to the downgrade event. Panel A of Figure 1 plots the evolution of the coefficient on a time indicator from an event study over a  $(-2, +2)$  window around each sovereign downgrade, conducted separately for the treatment group (bounded borrowers) and the control group (non-bounded borrowers). The spreads of the two groups follow parallel trends before the sovereign downgrade. Furthermore, the spreads rise significantly more for the treatment group in the year after the downgrade (from year +1 onward) than for the control group.

[Insert Figure 1 about here]

Panel B of Figure 1 plots the evolution of the coefficient estimate and standard error on the bound indicator from the regression of *AISD* on the interaction of *Bound* with a time indicator over the two years before and after the sovereign downgrade.<sup>9</sup> We observe a notable increase in the coefficient on *Bound* (and a decrease in the standard error) as we move from the years before the downgrade to the years after. Taken together, these estimates suggest that the parallel trends assumption is reasonable.

Our identification strategy further rests on the fact that sovereign downgrades have a differential effect on corporate ratings for bounded firms (treatment group) and non-bounded firms (control group). In this regard, we expect that treated firms are more affected than otherwise similar firms at the time of a sovereign downgrade through the sovereign ceiling channel. In Table A3 of the Appendix, we present difference-in-differences (DID) estimators

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these models cannot be effectively applied in our context. Moreover, the event study regressions can accommodate multiple fixed effects, which are very important in our analysis.

<sup>9</sup> The event study over the  $(-2, +2)$  window replicates the event study of specification (1) in Table 4 (explained in detail in Section 3.2). To derive the coefficients in Panel A of Figure 1, we estimate specification (1) of Table 4 separately for the treatment group (i.e., when *Bound* is equal to 1) and the control group (i.e., when *Bound* is equal to 0) and replace *Post-downgrade* with a time indicator (ranging from  $-2$  to  $+2$ ). To derive the coefficients in Panel B of Figure 1, we estimate specification (1) of Table 4 for the full sample and replace *Post-downgrade* with a time indicator (ranging from  $-2$  to  $+2$ ).

for borrower credit ratings.<sup>10</sup> Panel A reports the average credit rating for treated and control firms in the year before the sovereign downgrade and in the year of the sovereign downgrade. Not surprisingly, we observe a higher pre-downgrade rating for treated (bounded) firms relative to control (non-bounded) firms: the average treated firm has a rating value of 7 (i.e., A-), while the average control firm has a value of 9 (i.e., BBB).

We find that sovereign downgrades have a stronger effect on the ratings of treated firms, with a reduction of 1.5 notches. In contrast, the ratings of control firms are reduced by only 0.7 notches. The DID estimator is 0.798 and statistically significant at the 1% level, showing that credit ratings decline 0.8 notches more for bounded firms than for otherwise similar firms that are not bounded by the sovereign ceiling. This points to a significant asymmetry in the reaction of ratings between treated and control firms to a sovereign downgrade. We also confirm this in Panel B, where we employ a matched sample across certain firm characteristics (size, ROA, leverage); in fact, the DID estimator is now stronger, reaching -0.9 notches.

### **3. The effect of sovereign ceiling policies on the cost of credit**

#### *3.1. Baseline results*

Table 3 reports our baseline results. We cluster standard errors by firm *and* year to avoid time-varying correlations in the data driving our inferences. In line with our discussion in Section 2, we consider different fixed effects in our model specifications. Column (1) includes the simplest fixed effects, namely those at the year-, bank- and firm-level. In column (2), we introduce lender's and borrower's country effects. These control for macroeconomic developments in the lenders' and borrowers' countries, respectively. We further add loan type and purpose fixed effects in column (3) and borrower's industry and country-pair effects in column (4). In column (5) we introduce lender's country  $\times$  year effects to control for within-year macroeconomic

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<sup>10</sup> We map the credit ratings into 22 numerical values, where 1 corresponds to the highest rating (AAA) and 22 to the lowest (default).

developments in the lender's country. Our last specification (column 6) includes bank  $\times$  year effects to control for time-varying supply-side forces.

[Insert Table 3 about here]

Across all specifications, the coefficient on *Bound* is negative and statistically significant; this is intuitive as these firms have higher ratings relative to non-bounded and thus, face lower borrowing costs under normal conditions. The coefficient on *Sovereign downgrade* is statistically insignificant, which is not surprising as sovereign credit risk should not affect *AISD* unless the borrower is affected (also in line with our priors discussed in Section 2).

We use column (3) as our baseline specification, as the given set of fixed effects captures the impact of sovereign ceiling on loan spreads and we obtain identification from the maximum number of lenders and borrowers in our sample. The main coefficient of interest  $a_3$  shows that a sovereign downgrade increases *AISD* by an average of 56.7 basis points (bps) for bounded firms compared to non-bounded firms. This is a large and economically significant effect, equal to a 58.7% ( $= 56.7 \text{ bps} \div 96.6 \text{ bps}$ ) increase for the average loan in our sample. Given that the average loan size is \$1.37 billion, bounded firms experiencing a sovereign downgrade pay on average approximately USD 7.8 million ( $= \$1.37 \text{ billion} \times 56.7 \text{ basis points}$ ) more per year in interest payments. Considering that the average time to maturity is 3.2 years, this represents approximately USD 25.1 million in extra interest expenses over the loan's duration.<sup>11</sup> Hence, we can infer that the sovereign ceiling rule substantially raises the cost of loans for bounded firms compared to firms below the bound in the event of a sovereign downgrade.

The size and magnitude of the estimated coefficients on the control variables in Table 3 are generally in line with expectations and the earlier works of Bae and Goyal (2009), Ivashina (2009), Cai, Saunders and Steffen (2018), and Delis, Hasan and Ongena (2020). In particular,

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<sup>11</sup> Assuming 3.2 annual payments and LIBOR as the discount rate, the increase in interest expense amounts to USD 23.2 million for an average 12-month LIBOR rate of 3.3% during our sample period (for similar calculations, see Ivashina and Sun, 2011).

loan spreads increase with maturity and collateral, while decrease with loan amount. Unsurprisingly, higher return on firm assets is associated with decreasing *AISD*, while bank characteristics appear immaterial for loan spreads as the effect of supply-side forces is largely controlled for in our specifications. Moreover, none of the borrower's country controls appear significant, as their effect should be picked up by our sovereign downgrade indicator.

In Table A4 of the Appendix we estimate the average difference in loan spreads between bounded and non-bounded borrowers before and after a sovereign downgrade. We further employ matching estimators of the average effect of the treatment on the treated (ATT), to address the possibility that the groups being compared in our benchmark specification may have different (pre-treatment) characteristics. These include a nearest-neighbor matching estimator and a propensity-score matching estimator. The latter matches treatment and control groups on the estimated propensity-score of being bounded, conditional on a set of covariates: these covariates include loan characteristics (loan amount, maturity, collateral, number of lenders, performance provisions, covenants), bank characteristics (size, ROA, NPLs) and firm characteristics (size, ROA, leverage, tangibility).

Both diff-in-diff estimators indicate that bounded firms face lower *AISD* relative to non-bounded firms before the sovereign downgrade (ranging between  $-11.6$  and  $-23.2$  bps). More importantly, bounded firms face higher *AISD* after the downgrade: the coefficient on the ATT estimator is positive and statistically significant, ranging between  $20.3$  and  $98.3$  bps. These results are confirmed for treatment and control groups that are matched across firm characteristics (Panel A), firm and loan characteristics (Panel B) and firm, bank and loan characteristics (Panel C).

Finally, in Tables A5-A7 of the Appendix we confirm our baseline results when we i) replace *Sovereign downgrade* with an indicator for a downgrade in the sovereigns' local currency rating, ii) include different combinations of loan controls and iii) employ an extended

sample, where our group of non-bounded firms now includes borrowers with any credit rating below their sovereign's. We discuss these exercises in more detail in the Appendix.

### 3.2. Treatment heterogeneity

In this section, we address possible issues arising from treatment heterogeneity in the presence of variations in treatment timing in the context of staggered DID models, such as the one estimated so far (see Barrios, 2021; Goodman-Bacon, 2021; Baker, Larcker and Wang, 2022). Specifically, we conduct an event study where we group all loans in a time window around each sovereign downgrade. We then estimate a DID, where we examine the evolution of *AISD* for firms subjected to a downgrade (treated firms) relative to non-bounded ones (control firms).

We report results in Table 4, where we conduct this exercise separately by employing a  $(-2, +2)$  year window and a  $(-3, +3)$  year window (columns 1 and 2 respectively).<sup>12</sup> According to our estimates, the spreads for bounded firms increase in response to sovereign downgrades relative to those for non-bounded (the positive and statistically significant coefficient on *Bound*  $\times$  *Post-downgrade* in either column). Taken together, these results are fully consistent with our baseline, reflecting that treatment heterogeneity is not a concern in our sample.

[Insert Table 4 about here]

In the remaining specifications we replicate columns (1) and (2) by restricting the sample to borrowers that have received at least one loan before and at least one loan after the sovereign downgrade. This effectively controls for the possibility that only certain borrowers will receive loan financing after the downgrade. Results from both specifications confirm the higher cost of credit to bounded borrowers following the downgrade. In fact, this higher cost can be as much as 88.1 bps (column 4), largely exceeding our baseline estimates.

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<sup>12</sup> The sample for this exercise involves the construction of non-overlapping continuous 5-year or 7-year windows for each borrower country, each with a unique sovereign downgrade (countries with multiple downgrades within each window are excluded); this leads to a drop in the number of observations relative to our baseline specification.

### 3.3. Results from a subsample of firms with similar fundamentals

To further remove potential cross-sectional heterogeneity between the treatment and control groups, we employ a subsample of firms with similar fundamentals that are either above the bound or marginally below. We report results from this exercise in Table 5, where we initially consider bounded firms vis à vis firms that are one notch below the bound (column 1). We observe that the effect of sovereign downgrades on bounded firms is even more pronounced than our initial estimates; a rating downgrade increases *AISD* by 80.8 basis points for bounded firms compared to firms just below the bound (the coefficient on the double interaction). This in turn, represents an increase of more than 42% compared to our baseline results.

[Insert Table 5 about here]

In each of the subsequent specifications, we replicate our baseline specification (column 3 of Table 3) by matching the treated and control groups across a range of firm characteristics (size, leverage, and tangibility). Across these specifications, the coefficient on *Bound*  $\times$  *Sovereign downgrade* retains its positive and statistically significant sign, ranging between 66.8 and 86.7 basis points. This effect largely exceeds our baseline estimate, validating the higher cost of credit faced by bounded firms relative to other very similar firms below the bound (and unaffected by the sovereign ceiling effect).

### 3.4. Placebo tests

The use of a matched sample removes the systematic differences between the treatment and control groups. Nevertheless, any differences in loan spreads between bounded and non-bounded firms may not be due to the sovereign ceiling, but rather to other confounding events that happened around the same time as the sovereign rating downgrades. For example, bounded firms may have unobservable characteristics that predict greater sensitivity to sovereign debt

crises, even in the absence of sovereign downgrades. To validate our exclusion restriction, we conduct a series of placebo tests that include recessions, the 2007 to 2009 financial crisis, and currency crises that are not accompanied by sovereign downgrades.

We conduct these tests in Table 6, where we initially examine firms that are one notch below the bound versus firms that are at least two notches below (column 1); next, we interact *Bound* with an indicator if the borrower's country experiences a recession (column 1) the 2007-2009 crisis (column 2) and a currency crisis (column 3). If these unobservable characteristics are not able to explain our results, the coefficient on the interaction of *Bound* with any of the above indicators should not be statistically significant. Indeed, the coefficients across all specifications are below conventional values of statistical significance, suggesting that our results could be safely attributed to the sovereign ceiling.

[Insert Table 6 about here]

### *3.5. Additional results*

Our results are also robust to several additional tests, the results of which we report and discuss in the Appendix. Specifically, we estimate regressions with different macroeconomic controls, different standard error clustering, and different weights based on the number of loans between given bank-firm pairs and country-pairs. Finally, we control for sample selection bias by estimating Heckman regressions.

## **4. Mechanism identification**

Thus far, our analysis points to an asymmetrically higher cost of credit faced by bounded firms relative to non-bounded firms following a sovereign downgrade event in their country. In this section, we identify the channels that drive our results.



#### 4.1. Mechanism identification: Rating-based regulation

Our first test concerns whether rating-based regulatory frictions help explain the effects of downgrades on firms' borrowing costs. Although corporate rating changes resulting from sovereign downgrades do not reveal any new information, the cost of debt may be affected due to rating-based regulatory frictions. Capital requirements and other rating-based regulations are typically written around broad rating categories, not individual ratings.<sup>13</sup> As such, the effect of downgrades on firm cost of credit may be driven by firms with impaired access to markets due to rating-based regulatory and contractual constraints faced by investors or established by law.

To examine this premise, we estimate the interaction of *Bound*  $\times$  *Sovereign downgrade* with an indicator for a sovereign rating migration to a new broad rating category (*RW change*). We rely on the Basel II rating categories to perform this test: AAA to AA<sup>-</sup>, A<sup>+</sup> to A<sup>-</sup>, BBB<sup>+</sup> to BB<sup>-</sup>, and below B<sup>+</sup>. In our sample, about 41% of the firm downgrades induced by the sovereign ceiling cross these rating categories. Estimates from column (1) in Table 7 confirm the higher *AISD* for bounded borrowers (the positive and statistically significant coefficient on the double interaction term); however, the non-statistically significant coefficient on the triple interaction with *RW change* shows that there is no additional penalty for firms downgraded into a new broad rating category.

[Insert Table 7 about here]

In the remaining columns, we differentiate between borrowers downgraded to a new broad rating category within the investment grade range (column 2) and borrowers downgraded from the investment grade to the non-investment grade category (column 3). Arguably, in the latter case, the additional effect – if any – should be stronger since banks may favor (in some

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<sup>13</sup> Under Basel II, credit ratings determine the minimum amount of capital that banks (and other non-banks) maintain as reserves for the risk-weighted assets in their books. The risk-weights for claims on sovereigns (standardised approach) are: AAA to AA<sup>-</sup> (0%), A<sup>+</sup> to A<sup>-</sup> (20%), BBB<sup>+</sup> to BBB<sup>-</sup> (50%), BB<sup>+</sup> to B<sup>-</sup> (100%), and below B<sup>-</sup> (150%).

cases by law) investment grade investments over speculative investments (see Lim, Minton and Weisbach, 2014; Altavilla, Burlon, Giannetti and Holton, 2022).

Indeed, results from column (2) mirror those of column (1): bounded borrowers face higher spreads following the downgrade relative to non-bounded, but they do not face additional costs if they retain their investment grade status (the non-statistically significant coefficient on the triple interaction). On the other hand, borrowers losing their investment grade status face higher spreads over and above those stemming from the sovereign downgrade: about half of the overall increase in *AISD* for bounded borrowers post-downgrade (47.5 bps from an overall effect of 94.9 bps) concerns borrowers migrating to the speculative grade category (the positive and statistically significant coefficients on the double and triple interactions in column 3).

Taken together, estimates from this exercise confirm that regulatory requirements play a non-negligible role in banks' determination of loan spreads for bounded borrowers, but only when they concern migration to a non-investment grade category. However, the effect on loan spreads among downgrades without sizable regulatory consequences remains significant, suggesting that other channels may also play a role. We examine this next.

#### *4.2. Mechanism identification: Supply-side explanations*

In this section, we examine whether the higher spreads for bounded firms relate to lenders' loan supply considerations. We first look at the lenders' capitalization levels, as higher capital ratios imply lower funding and liquidity costs and greater capacity to absorb risk (Flannery and Rangan, 2008; Berger and Bouwman, 2009; Santos and Winton, 2019). Moreover, within the regulation channel, higher capital ratios allow banks to make more loans because they have greater capital buffers against risk-based capital requirements (Berger and Udell, 1994; Thakor, 1996; Chu, Zhang and Zhao, 2019). Taken together, high bank capital makes lenders less risk averse, contributing to lower loan rates (as in Froot and Stein, 1998).

In our context, we expect that better-capitalized lenders will charge lower spreads on loans to bounded borrowers, partially reversing the spread increase after the downgrade. We test this by interacting  $Bound \times Sovereign\ downgrade$  with the lender's capital ratio. Results in column (1) of Table 8, show that the increase in  $AISD$  is lower for firms that borrow from better-capitalized banks. A one standard deviation increase in the bank's capital ratio lowers spreads by 28.5 basis points ( $= -10.08\text{ bps} \times 2.83$ ) or 71.5% of the initial spread charged (the negative and statistically significant coefficient on  $Bound \times Sovereign\ downgrade \times Bank\ capital$ ).

[Insert Table 8 about here]

In column (2) of Table 8, we include the triple interaction with the Lerner index, as banks facing greater competition may provide loans with different terms (Delis, Kokas and Ongena, 2017; Deli, Delis, Hasan and Liu, 2019). Moreover, banks with high market power may exploit the downgrade to charge higher spreads, even if the borrower's downgrade is entirely due to the sovereign ceiling. According to our results, the entire increase in  $AISD$  for bounded firms is concentrated in loans from banks with high market power (the coefficient on  $Bound \times Sovereign\ downgrade \times Bank\ Lerner\ index$  is positive and statistically significant, absorbing the effect of  $Bound \times Sovereign\ downgrade$ ). Hence, greater levels of competition (reflected in lower values of  $Lerner\ index$ ) contribute to lower borrowing costs for bounded firms. This uncovers an additional supply-side effect of the sovereign ceiling on loan spreads, which operates through bank competition.

Our analysis in Section 4.1 provides evidence that migration to a new rating bin does not automatically translate to higher  $AISD$ , unless there is migration to non-investment grade status. This prompts us to examine lenders required to hold investment grade securities, such as insurance companies, pension funds and other institutional investors (non-bank lenders). Non-bank lenders constitute an important source of syndicated credit to most regions and industries; in fact, syndicated loans arranged by non-banks carry a higher spread relative to

those by banks (Grupp, 2015; Fleckenstein, Gopal, Gutiérrez and Hillenbrand, 2020; Aldasoro, Doerr and Zhou, 2022). Hence, we should observe an additional spread premium on loans granted from non-bank lenders. Estimates in column (3) confirm this premise, as approximately half of the generic spread increase faced by bounded borrowers post-downgrade is observed for loans arranged by non-banks (30.1 and 32.2 basis points, respectively).

Moreover, certain loan facilities are arranged by bank lenders and are subsequently sold to institutional investors in the secondary loan market.<sup>14</sup> Given the differences in the risk preferences and regulatory constraints of institutional investors, these loans should be priced higher in the primary market (upon origination) relative to other types of loans.<sup>15</sup> To this end, in column (4), we differentiate between loans specifically structured for institutional investors in the secondary loan market (non-bank loans) and traditional bank loans. We find that non-bank loans carry a higher spread when they are granted to bounded borrowers (the positive and statistically significant coefficient on the triple interaction term).

#### *4.3. Mechanism identification: Demand-side explanations*

Next, we examine potential demand-side explanations of our findings and identify certain firm traits that drive our results. Table 9 includes the interaction of *Bound*  $\times$  *Sovereign downgrade* with various firm characteristics, reflecting size, capital structure and diversification. To ensure that variation in spreads does not stem from within-firm changes in these traits (which is likely endogenous to our bound indicator), all specifications of Table 9 do not include firm fixed effects.

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<sup>14</sup> These are certain loan facilities (Term Loan B or higher), which are typically sold to non-bank investors directly after origination in the secondary loan market (see Fleckenstein, Gopal, Gutiérrez and Hillenbrand, 2020).

<sup>15</sup> As discussed above, institutional investors generally charge a higher spread relative to non-institutional lenders. Unless the loan carries a relatively higher spread in the primary market, institutional investors would be willing to pay less than expected in the secondary market. In this case, the loan will be sold below par in the secondary market, causing sellers (underwriters in the primary market) to incur a loss (Lim, Minton and Weisbach, 2014; Beyhaghi, Nguyen and Wald, 2019; Bruche, Malherbe and Meisenzahl, 2020).

We first examine the role of firm size, as large firms might possess market power; this makes an increase in spreads by banks less likely since these firms might seek credit elsewhere more easily. Indeed, specification (1) reveals that large firms can partially offset the higher spread following the downgrade. Specifically, a one standard deviation increase in firm's total assets saves the firm approximately 14.1 basis points ( $= -5.2 \text{ bps} \times 2.72$ ) or 11.6% of the initial spread charged (coefficient on *Bound*  $\times$  *Sovereign downgrade*  $\times$  *Firm size*).

[Insert Table 9 about here]

Our next specification considers the firm's capital structure decision. Highly leveraged borrowers generally have reduced capacity to take on additional debt, which may result in "substandard" loans and larger loan loss allowances for lenders (Chernenko, Erel and Prilmeier, 2022). Results from column (2) point to a positive relationship between firm indebtedness and *AISD*, as more leveraged firms face higher borrowing costs (the positive and statistically significant triple interaction with *Firm debt*).

Further, we examine the role of financial constraints since financially constrained firms have *ceteris paribus* reduced access to credit (Bruche and González-Aguado, 2010; Behr, Norden, and Noth, 2013). Our measures of financial constraints include the firm's Kaplan-Zingales index (KZ index) and an indicator for non-dividend paying firms (as in Lamont, Polk and Saá-Requejo, 2001; Farre-Mensa and Ljungqvist, 2016). Estimates in column (3) show that the aggravating effect of the sovereign ceiling is concentrated in financially constrained borrowers (with values of KZ index in the bottom tercile of our sample): the coefficient on *Bound*  $\times$  *Sovereign downgrade*  $\times$  *Firm KZ index* is positive and statistically significant, while that on the double interaction is non-significant.

This is also evident in column (4), where we examine non-dividend vs. dividend payers. Results from this specification confirm the generic effect of sovereign downgrades on bounded firms, as the coefficient on *Bound*  $\times$  *Sovereign downgrade* is approximately  $-57.0$  basis points

(similar to our baseline estimates). More importantly, that on the interaction with *Non-dividend payer* is also positive and statistically significant, revealing an additional cost for bounded and financially constrained borrowers after the downgrade event.

In the remaining columns, we examine the degree of borrowers' global diversification. In specification (5), we differentiate between cross-listed and domestically listed firms by interacting *Bound*  $\times$  *Sovereign downgrade* with an indicator of the firm's cross-listing status. Cross-listed firms have global outreach and superior network, which, combined with their effective monitoring, provide them with a comparative advantage that may render them less sensitive to domestic downgrades (Hillman and Wan, 2005; Lang, Raedy and Wilson, 2006; Shi, Magnan and Kim, 2012). Results from column (5), confirm this premise, as the effect of *Bound*  $\times$  *Sovereign downgrade* on *AISD* is somewhat mitigated for cross-listed bounded firms: the latter save approximately 49.4 basis points compared to domestically listed bounded firms (the negative and statistically significant coefficient on triple interaction term).

Firms relying on foreign operations generally receive more favorable valuation from creditors than purely domestic firms and further face lower loan rates (Li, Qiu and Wan, 2011). Given this, column (6) considers the firm's ratio of foreign sales to total sales, hypothesizing that bounded firms who depend more on foreign operations are less affected by downgrades. Indeed, the negative and statistically significant coefficient on the triple interaction suggests that more diversified firms partially reverse the increase in loan spreads after the downgrade.

#### *4.4. Mechanism identification: Bank dependency and alternative financing sources*

In this section, we examine alternative explanations related to borrowers' relative bargaining power, as reflected in the extent of bank dependency, the existence of lending relationships and the use of alternative financing sources. Banks have the ability to exert monopoly power over bank-dependent borrowers, charging higher rates than those charged to non-dependent

borrowers (Santos and Winton, 2019). Therefore, loans to bank-dependent bounded borrowers may carry a higher spread following the downgrade than non-dependent borrowers.

We test this in column (1) of Table 10, where we interact *Bound*  $\times$  *Sovereign downgrade* with an indicator for bank dependency (a binary variable equal to one if the current lead bank made at least 50% of the firm's total loan amounts over the past three years, and zero otherwise). We observe that bank-dependent bounded borrowers face an additional spread increase of approximately 41.7 bps. In contrast, firms that are not bank-dependent reverse by almost 80.0% the initial spread increase due to the downgrade (-41.7 and 52.2 bps, respectively).

[Insert Table 10 about here]

Further, we employ variables reflecting the existence and magnitude of a prior lending relationship between the given bank-firm pair over the previous 5-year period (Bharath, Dahiya, Saunders and Srinivasan, 2009). Prior lending relationships allow lenders to acquire valuable information about the borrowing firm's operations and credit risk. It is reasonable to expect that bounded firms with prior lending ties with their banks might be able to offset the higher loan spreads following the downgrade. Our estimates in columns (2) and (3) confirm this premise, as relationship bounded borrowers obtain loans at more competitive rates relative to non-relationship borrowers.

In the remaining columns, we consider indicators for the existence of alternative financing sources. In columns (4) and (5), we measure borrowers' access and reliance on the bond market. Initially, we employ an indicator of whether the borrower issued a bond over the past three years (column 4) and the ratio of bond-to-loan financing over the same period (column 5). Estimates from column (4) reveal that bounded borrowers with at least one bond issuance reverse more than 44% of the generic spread increase following the downgrade (43.8 and 98.7 bps, respectively). We obtain similar results when we consider the degree of reliance on bond financing: a one standard deviation increase in the firm's amount of bond financing

over loan financing lowers spreads by approximately 24.5 basis points ( $= -79.08 \text{ bps} \times 0.31$ ) or 42.5% of the initial spread charged (the negative and statistically significant coefficient on *Bound*  $\times$  *Sovereign downgrade*  $\times$  *Bond-to-loan ratio*).

Finally, we consider borrowers' ability to resort to internal financing. We construct indicators for firms being above and below our sample mean in terms of cash holdings and retained earnings (columns 6 and 7, respectively). We observe that bounded firms with high cash holdings and retained earnings partially reverse the increased borrowing costs after the downgrade (the negative and statistically significant coefficient on either triple interaction). This finding is intuitive since reliance on own funds limits the need for external financing.

## 5. Conclusion

We examine the impact of sovereign downgrades on syndicated loan pricing by taking advantage of the heterogeneous variations in corporate credit ratings induced by the sovereign ceiling policies of rating agencies. Our results suggest that firms with ratings at the sovereign bound are subject to significantly higher borrowing costs than otherwise similar firms whose ratings are below the bound following a sovereign downgrade. According to our baseline findings, loans to these firms are priced at approximately 57 basis points higher than the corresponding spread to non-bounded firms. These results are robust to several changes in the baseline specification and alternative estimation methods. We calculate the additional cost for the average loan size and maturity to be approximately USD 7.8 million annually.

We further investigate the mechanisms for this asymmetric increase in loan spreads. We find that rating-based regulatory frictions partially explain our results. Given this, we focus on lenders with different capacities to absorb risk. Among them, better-capitalized banks charge lower spreads to bounded borrowers, partially reversing the spread increase after the downgrade. This is also the case for traditional banks, as these have different risk preferences



and no regulatory constraints to hold speculative grade securities relative to institutional (non-bank) lenders. Moreover, we pinpoint the role of bank competition, as the entire increase in the spreads of bounded firms is concentrated in loans from banks with high market power.

We also document an operating demand-side channel, which is contingent on certain firm characteristics. Specifically, the aggravating effect of downgrades is mitigated for larger, low-leverage and non-financially constrained bounded firms. Global diversification is an additional moderating factor, as cross-listed firms and firms with greater reliance on foreign sales face lower spreads following the downgrade event.

Our findings unambiguously show that sovereign credit impairments adversely affect the cost of loans for bounded firms. We attribute this to the relative bargaining power between lenders and borrowers. In this regard, relationship borrowers receive loans at lower rates than first-time borrowers. This is also evident for non-bank-dependent borrowers with access to alternative financing, either external (bond market) or internal (cash holdings or retained earnings). Future research in this area could focus on whether sovereign default risk spillovers are further reflected in the bounded firms' stock price.

## References

- Adelino, M. and Ferreira, A. (2016). Bank ratings and lending supply: Evidence from sovereign downgrades. *The Review of Financial Studies* 29(7), 1709-1746.
- Aiyar, S., Calomiris, C. W., Hooley, J., Korniyenko, Y. and Wieladek, T. (2014). The international transmission of bank capital requirements: Evidence from the UK. *Journal of Financial Economics*, 113(3), 368-382.
- Aldasoro, I., Doerr, S. and Zhou, H. (2022). Non-bank lenders in the syndicated loan market. *BIS Quarterly Review*, 15.
- Almeida, H., Cunha, I., Ferreira, M. A. and Restrepo, F. (2017). The real effects of credit ratings: The sovereign ceiling channel. *The Journal of Finance*, 72(1), 249-290.
- Alsakka, R., ap Gwilym, O. and Vu, T. N. (2014). The sovereign-bank rating channel and rating agencies' downgrades during the European debt crisis. *Journal of International Money and Finance*, 49, 235-257.
- Altavilla, C., Burlon, L., Giannetti, M. and Holton, S. (2022). Is there a zero lower bound? The effects of negative policy rates on banks and firms. *Journal of Financial Economics*, 144(3), 885-907.
- Augustin, P., Boustanifar, H., Breckenfelder, J. and Schnitzler, J. (2018). Sovereign to corporate risk spillovers. *Journal of Money, Credit and Banking*, 50(5), 857-891.
- Bae, K.H. and Goyal, V.K. (2009). Creditor rights, enforcement, and bank loans. *The Journal of Finance* 64, 823-860.
- Baghai, R. P., Servaes, H. and Tamayo, A. (2014). Have rating agencies become more conservative? Implications for capital structure and debt pricing. *The Journal of Finance*, 69(5), 1961-2005.
- Baker, A. C., Larcker, D. F. and Wang, C. C. (2022). How much should we trust staggered difference-in-differences estimates?. *Journal of Financial Economics*, 144(2), 370-395.
- Ball, R., Gerakos, J., Linnainmaa, J. T. and Nikolaev, V. (2020). Earnings, retained earnings, and book-to-market in the cross section of expected returns. *Journal of Financial Economics*, 135(1), 231-254.
- Barrios, J. M. (2021). Staggeringly problematic: A primer on staggered DiD for accounting researchers. Available at SSRN 3794859.
- Bedendo, M. and Colla, P. (2015). Sovereign and corporate credit risk: Evidence from the Eurozone. *Journal of Corporate Finance*, 33, 34-52.
- Behr, P., Norden, L. and Noth, F. (2013). Financial constraints of private firms and bank lending behavior. *Journal of Banking and Finance*, 37(9), 3472-3485.
- Berg, T., Saunders, A. and Steffen, S. (2016). The total cost of corporate borrowing in the loan market: Don't ignore the fees. *The Journal of Finance* 71, 1357-1392.
- Berg, T., Saunders, A., Steffen, S. and Streit, D., (2017). Mind the gap: The difference between US and European loan rates. *The Review of Financial Studies* 30, 948-987.
- Berger, A. N. and Bouwman, C. H. (2009). Bank liquidity creation. *The Review of Financial Studies*, 22(9), 3779-3837.
- Berger, A. N. and Udell, G. F. (1994). Did risk-based capital allocate bank credit and cause a "credit crunch" in the United States?. *Journal of Money, Credit and Banking*, 26(3), 585-628.
- Beyhaghi, M., Nguyen, C. and Wald, J. K. (2019). Institutional investors and loan dynamics: Evidence from loan renegotiations. *Journal of Corporate Finance*, 56, 482-505.
- Bharath, S.T., Dahiya, S., Saunders, A. and Srinivasan, A. (2009). Lending relationships and loan contract terms. *The Review of Financial Studies* 24, 1141-1203.
- BIS, 2022. Locational banking statistics – Bank for International Settlements.

- Borensztein, E., Cowan, K. and Valenzuela, P. (2013). Sovereign ceilings “lite”? The impact of sovereign ratings on corporate ratings. *Journal of Banking and Finance*, 37(11), 4014-4024.
- Bruche, M. and González-Aguado, C. (2010). Recovery rates, default probabilities, and the credit cycle. *Journal of Banking and Finance*, 34(4), 754-764.
- Bruche, M., Malherbe, F. and Meisenzahl, R. R. (2020). Pipeline risk in leveraged loan syndication. *The Review of Financial Studies*, 33(12), 5660-5705.
- Cai, J., Eidam, F., Saunders, A. and Steffen, S. (2018). Syndication, interconnectedness, and systemic risk. *Journal of Financial Stability*, 34, 105-120.
- Callaway, B. and Sant’Anna, P. H. C. (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics*, 225(2), 200-230.
- Chernenko, S., Erel, I. and Prilmeier, R. (2022). Why do firms borrow directly from nonbanks?. *The Review of Financial Studies*, 35(11), 4902-4947.
- Chu, Y., Zhang, D. and Zhao, Y. E. (2019). Bank capital and lending: Evidence from syndicated loans. *Journal of Financial and Quantitative Analysis*, 54(2), 667-694.
- De Jonghe, O., Dewachter, H. and Ongena, S. (2020). Bank capital (requirements) and credit supply: Evidence from pillar 2 decisions. *Journal of Corporate Finance*, 60, 101518.
- Deli, Y. D., Delis, M. D., Hasan, I. and Liu, L. (2019). Enforcement of banking regulation and the cost of borrowing. *Journal of Banking and Finance*, 101, C, 147-160.
- Delis, M.D., Hasan, I. and Ongena, S. (2020). Democracy and credit. *Journal of Financial Economics*, 136, 571-596.
- Delis, M. D., Kokas, S. and Ongena, S. (2017). Bank market power and firm performance. *Review of Finance*, 21(1), 299-326.
- Dell’Ariccia, G., Laeven, L. and Marquez, R. (2014). Real interest rates, leverage, and bank risk-taking. *Journal of Economic Theory*, 149, 65-99.
- Drago, D. and Gallo, R. (2017). The impact of sovereign rating changes on European syndicated loan spreads: The role of the rating-based regulation. *Journal of International Money and Finance*, 73, 213-231.
- Farre-Mensa, J. and Ljungqvist, A. (2016). Do measures of financial constraints measure financial constraints?. *The Review of Financial Studies*, 29(2), 271-308.
- Flannery, M. J. and Rangan, K. P. (2008). What caused the bank capital build-up of the 1990s?. *Review of Finance*, 12(2), 391-429.
- Fleckenstein, Q., Gopal, M., Gutierrez, G. and Hillenbrand, S. (2020). Nonbank lending and credit cyclicity. Available at: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3629232](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3629232).
- Froot, K. A. and Stein, J. C. (1998). Risk management, capital budgeting, and capital structure policy for financial institutions: an integrated approach. *Journal of Financial Economics*, 47(1), 55-82.
- Gande, A. and Saunders, A. (2012). Are banks still special when there is a secondary market for loans?. *The Journal of Finance*, 67(5), 1649-1684.
- Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics*, 225(2), 254-277.
- Grupp, M. (2015). Taking the lead: when non-banks arrange syndicated loans. Available at: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2602196](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2602196).
- Gropp, R., Mosk, T., Ongena, S. and Wix, C. (2019). Banks response to higher capital requirements: Evidence from a quasi-natural experiment. *The Review of Financial Studies*, 32(1), 266-299.
- Hanson, S. G., Kashyap, A. K. and Stein, J. C. (2011). A macroprudential approach to financial regulation. *Journal of Economic Perspectives*, 25(1), 3-28.
- Harford, J. and Uysal, V. B. (2014). Bond market access and investment. *Journal of Financial Economics*, 112(2), 147-163.

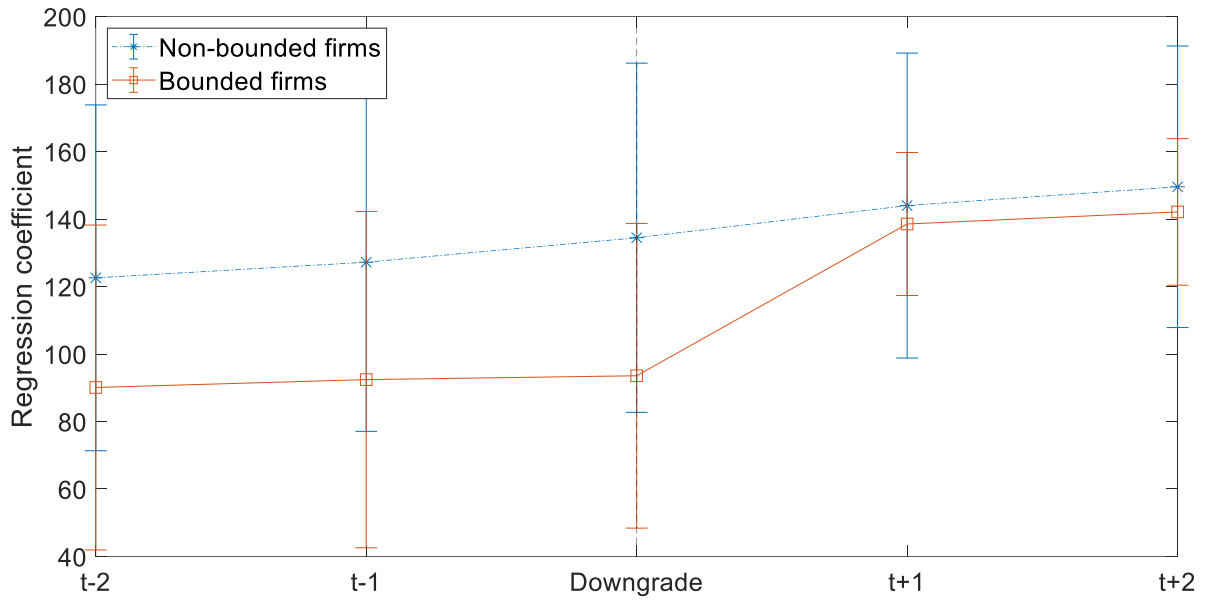
- Hasan, I., Hoi, C. K., Wu, Q. and Zhang, H. (2017). Social capital and debt contracting: Evidence from bank loans and public bonds. *Journal of Financial and Quantitative Analysis*, 52(3), 1017-1047.
- Hillman, A. J. and Wan, W. P. (2005). The determinants of MNE subsidiaries' political strategies: Evidence of institutional duality. *Journal of International Business Studies*, 36(3), 322-340.
- Holmstrom, B. and Tirole, J. (1997). Financial intermediation, loanable funds, and the real sector. *The Quarterly Journal of Economics*, 112(3), 663-691.
- Irani, R. M., Iyer, R., Meisenzahl, R. R. and Peydro, J. L. (2021). The rise of shadow banking: Evidence from capital regulation. *The Review of Financial Studies*, 34(5), 2181-2235.
- Ismailescu, I. and Kazemi, H. (2010). The reaction of emerging market credit default swap spreads to sovereign credit rating changes. *Journal of Banking and Finance*, 34(12), 2861-2873.
- Ivashina, V. (2009). Asymmetric information effects on loan spreads. *Journal of Financial Economics*, 92(2), 300-319.
- Ivashina, V. and Sun, Z. (2011). Institutional stock trading on loan market information. *Journal of Financial Economics* 100, 284-303.
- Juelsrud, R. E. and Wold, E. G. (2020). Risk-weighted capital requirements and portfolio rebalancing. *Journal of Financial Intermediation*, 41, 100806.
- Jiménez, G., Ongena, S., Peydró, J. L. and Saurina, J. (2014). Hazardous Times for Monetary Policy: What Do Twenty-Three Million Bank Loans Say About the Effects of Monetary Policy on Credit Risk-Taking?. *Econometrica*, 82(2), 463-505.
- Kim, O. S. (2019). Does Political Uncertainty Increase External Financing Costs? Measuring the Electoral Premium in Syndicated Lending. *Journal of Financial and Quantitative Analysis*, 1-54.
- Kisgen, D. J. (2009). Do firms target credit ratings or leverage levels?. *Journal of Financial and Quantitative Analysis*, 44(6), 1323-1344.
- Kisgen, D. J. and Strahan, P. E. (2010). Do regulations based on credit ratings affect a firm's cost of capital?. *The Review of Financial Studies*, 23(12), 4324-4347.
- Lamont, O., Polk, C. and Saá-Requejo, J. (2001). Financial constraints and stock returns. *The Review of Financial Studies*, 14(2), 529-554.
- Lang, M., Raedy, J. S. and Wilson, W. (2006). Earnings management and cross listing: Are reconciled earnings comparable to US earnings?. *Journal of Accounting and Economics*, 42(1-2), 255-283.
- Lemmon, M. and Roberts, M. R. (2010). The response of corporate financing and investment to changes in the supply of credit. *Journal of Financial and Quantitative Analysis*, 45(3), 555-587.
- Li, S., Qiu, J. and Wan, C. (2011). Corporate globalization and bank lending. *Journal of International Business Studies*, 42(8), 1016-1042.
- Lim, J., Minton, B. A. and Weisbach, M. S. (2014). Syndicated loan spreads and the composition of the syndicate. *Journal of Financial Economics*, 111(1), 45-69.
- Refinitiv, 2022. Refinitiv Global Syndicated Loans Review. First Half 2022 Managing Underwriters.
- Santos, J. A. (2011). Bank corporate loan pricing following the subprime crisis. *The Review of Financial Studies*, 24(6), 1916-1943.
- Santos, J. A. and Winton, A. (2019). Bank capital, borrower power, and loan rates. *The Review of Financial Studies*, 32(11), 4501-4541.
- Shi, Y., Magnan, M. and Kim, J. B. (2012). Do countries matter for voluntary disclosure? Evidence from cross-listed firms in the US. *Journal of International Business Studies*, 43(2), 143-165.

- Sun, L. and Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*, 225(2), 175-199.
- Thakor, A. V. (1996). Capital requirements, monetary policy, and aggregate bank lending: theory and empirical evidence. *The Journal of Finance*, 51(1), 279-324.
- To, T., Wu, E. and Zhang, L. (2022). Mind the sovereign ceiling on corporate performance. *Journal of Corporate Finance*, 75, 102253.
- Wang, D. S. and Xie, W. (2022). Credit Ratings and Corporate Information Production: Evidence from Sovereign Downgrades. *Journal of Financial and Quantitative Analysis*, 57(4), 1591-1620.

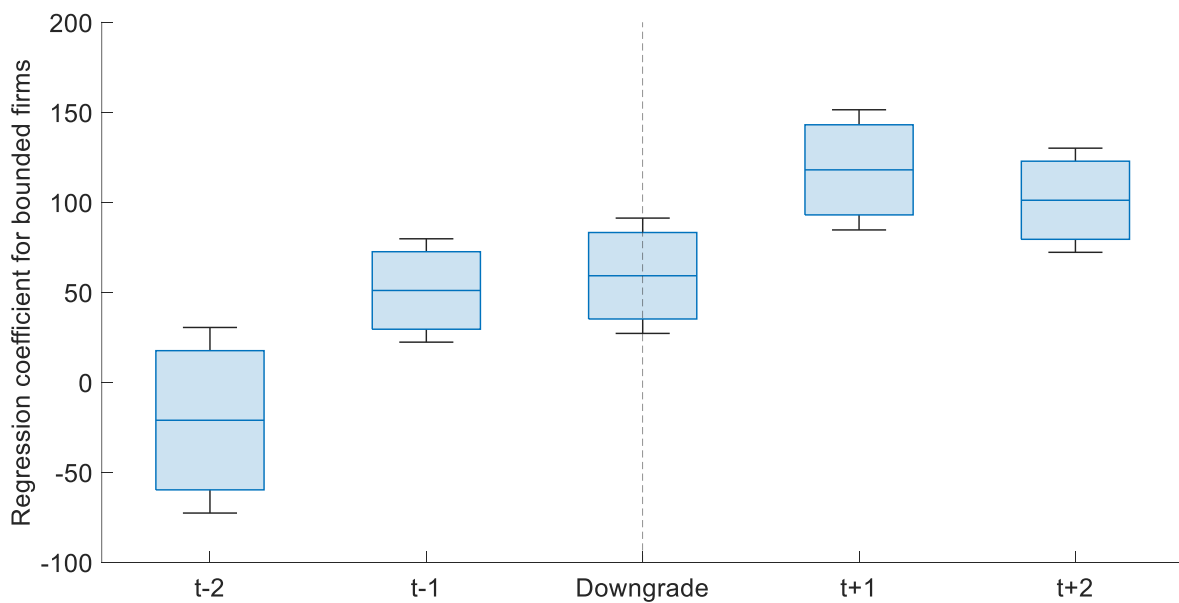
**Figure 1. Regression coefficients from event study**

The figure reports the regression coefficients and standard errors from an event study with a  $(-2, +2)$  window around each sovereign downgrade. The dependent variable is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee. Estimation method is OLS with standard errors clustered by firm. The control variables and fixed effects are the control variables and fixed effects respectively of specification (1) of Table 4. Panel A reports the regression coefficients, where the event study is conducted separately for the subsample of bounded firms and for the subsample of non-bounded firms. The subsample of bounded firms includes borrowers with credit rating equal to or above the borrowers' country credit rating in the year before the loan facility's origination year and the subsample of non-bounded firms includes borrowers with credit rating at most two notches below the borrowers' country credit rating in the year before the loan facility's origination year. Panel B reports the coefficients on *Bound* from an event study with a  $(-2, +2)$  window around each sovereign downgrade. *Bound* is a binary variable equal to one if the borrower's credit rating is equal to or above the borrower's country credit rating in the year before the loan facility's origination year and equal to zero if the borrower's credit rating is at most two notches below. The regression coefficient (average spread in basis points) is depicted on the Y-axis and the corresponding year is depicted on the X-axis.

**Panel A**



**Panel B**



**Table 1. Summary statistics**

The table reports summary statistics (number of observations, mean, standard deviation, minimum and maximum values) for all variables used in the estimations of the main text. All variables are defined in Table A1.

	Obs.	Mean	Std. dev.	Min.	Max.
AISD	5,270	96.55	88.90	-1.00	703.00
AISU	1,325	16.37	21.52	0.75	180.00
Sovereign downgrade	5,270	0.10	0.29	0.00	1.00
Sovereign downgrade lc	5,190	0.13	0.34	0.00	1.00
Bound	5,270	0.63	0.48	0.00	1.00
Loan amount	5,270	20.14	1.37	14.51	24.15
Loan amount (USD million)	5,270	1,370.00	2,490.00	2.00	30,900.00
Maturity	5,270	38.38	26.82	3.00	234.00
Collateral	5,270	0.19	0.39	0.00	1.00
Number of lenders	5,270	19.08	12.71	1.00	68.00
Performance provisions	5,270	0.08	0.27	0.00	1.00
General covenants	5,270	0.11	0.45	0.00	4.00
Bank size	5,270	14.05	0.77	10.42	15.14
Bank ROA	5,270	0.42	0.44	-0.98	2.91
Bank NPLs	5,270	0.65	0.82	0.00	5.52
Bank capital	3,969	14.18	2.83	8.53	31.9
Firm size	5,270	12.41	2.72	5.00	24.49
Firm ROA	5,270	7.82	5.75	-25.55	36.28
Firm debt	5,270	19.38	13.20	0.00	81.82
Firm tangibility	5,270	27.47	26.10	0.00	95.61
Firm foreign sales	4,966	0.10	0.24	0.00	1.00
Relationship lending number	5,270	0.13	0.26	0.00	1.00
Bond-to-loan ratio	5,270	0.06	0.31	0.00	4.48
GDP growth	5,270	4.15	3.63	-7.80	25.16
GDP per capita	5,270	26,122.55	15,921.38	2,792.31	119,973.60

**Table 2. Summary statistics for bounded firms vs. non-bounded firms**

The table reports summary statistics for key firm characteristics and loan terms distinguishing between bounded and non-bounded borrowers and pre- and post-downgrade periods. All variables are defined in Table A1. Panel A reports the mean value of firm characteristics for the group of bounded firms (i.e., firms with a credit rating equal to or above their sovereign's rating) and for the group of non-bounded firms (i.e., firms with a credit rating at most two notches below their sovereign's rating) and the results from the mean-comparison test for differences in the mean between observations for the two groups (260 and 343 firm-year observations respectively). Panel B reports the mean value of firm characteristics for bounded firms before and after sovereign downgrades and the results from the mean-comparison test for differences in the mean between observations for the two periods (317 and 26 firm-year observations respectively). Panel C reports the mean value of terms on all loan facilities before and after sovereign downgrades and the results from the mean-comparison test for differences in the mean between observations for the two periods (4,764 and 506 loan-level observations respectively). The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Bounded vs. non-bounded firms

	Bounded	Non-bounded	Mean-comparison test	
			Mean diff.	Std. error
Firm size	12.02	11.84	0.18	0.12
Firm ROA	9.20	9.63	-0.43	0.55
Firm debt	19.94	19.65	0.29	1.21
Firm tangibility	31.77	33.57	-1.80	2.10

Panel B: Bounded firms before and after sovereign downgrades

	Pre-downgrade	Post-downgrade	Mean-comparison test	
			Mean diff.	Std. error
Firm size	12.03	11.89	0.14	0.75
Firm ROA	9.47	5.96	3.50	1.34
Firm debt	19.52	25.07	-5.55*	2.90
Firm tangibility	31.40	36.29	-4.90	5.08

Panel C: Loan facilities before and after sovereign downgrades

	Pre-downgrade	Post-downgrade	Mean-comparison test	
			Mean diff.	Std. error
AISD	94.14	138.05	-43.91***	5.62
Loan amount	20.08	20.71	-0.64	0.36
Maturity	38.07	41.26	-3.19	1.15
Collateral	0.19	0.26	-0.08	0.05
Number of lenders	19.16	18.32	0.84	0.51
Performance provisions	0.08	0.13	-0.05	0.08
General covenants	0.08	0.03	0.04	0.03



**Table 3. Baseline results with different fixed effects**

The table reports coefficients and t-statistics [in brackets]. The dependent variable is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm *and* year. Each specification includes a different set of fixed effects, as given in the lower part of the table. The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Bound	-14.039*	-13.019*	-13.281*	-15.611**	-15.951***	-8.513
	[-1.862]	[-1.749]	[-2.016]	[-2.423]	[-2.897]	[-1.487]
Sovereign downgrade	-12.394	-9.623	-5.495	1.979	-5.897	-12.425
	[-0.758]	[-0.538]	[-0.367]	[0.131]	[-0.421]	[-0.769]
Bound × Sovereign downgrade	60.292**	56.573**	56.761**	49.804**	37.134**	41.906**
	[2.539]	[2.222]	[2.555]	[2.520]	[2.374]	[2.201]
Loan amount	-16.946***	-12.655***	-10.770***	-9.348***	-8.571***	-8.460***
	[-4.504]	[-4.279]	[-3.875]	[-3.037]	[-3.038]	[-3.218]
Maturity	0.428***	0.367***	0.278**	0.304***	0.220**	0.203**
	[3.933]	[4.066]	[2.717]	[2.889]	[2.541]	[2.683]
Collateral	26.917***	23.471***	16.269**	15.798**	12.949**	14.999***
	[4.361]	[3.566]	[2.779]	[2.579]	[2.447]	[2.973]
Number of lenders	0.128	0.089	0.178	0.113	0.018	-0.041
	[0.487]	[0.337]	[0.619]	[0.350]	[0.058]	[-0.128]
Performance provisions	10.930	8.225	6.945	6.769	8.445	11.692
	[0.792]	[0.592]	[0.564]	[0.538]	[0.695]	[0.918]
General covenants	16.072	11.834	13.298	18.506	17.486	20.431
	[1.328]	[0.995]	[1.176]	[1.492]	[1.255]	[1.153]
Bank size	4.655	2.061	0.274	-0.139	1.732	
	[0.830]	[0.525]	[0.075]	[-0.034]	[0.299]	
Bank ROA	0.188	0.043	-0.084	-0.494	3.909	
	[0.074]	[0.018]	[-0.044]	[-0.178]	[1.093]	
Bank NPLs	-1.990	-1.999	-1.822	-1.487	2.163	
	[-1.605]	[-1.616]	[-1.545]	[-0.926]	[1.179]	
Firm size	1.555**	1.654**	1.490	1.354	1.106	1.324*
	[2.143]	[2.272]	[1.621]	[1.507]	[1.434]	[1.719]
Firm ROA	-2.902***	-2.553***	-2.434***	-2.502***	-2.302**	-2.811**
	[-3.966]	[-3.445]	[-3.057]	[-2.892]	[-2.614]	[-2.661]
Firm debt	0.135	0.073	0.180	0.382	0.204	0.591
	[0.344]	[0.173]	[0.393]	[0.820]	[0.439]	[1.395]
Firm tangibility	0.410	0.494	0.550	0.601	0.673	0.496
	[0.693]	[0.799]	[0.910]	[0.879]	[1.222]	[0.852]
GDP growth	-1.404	-1.673	-1.883	-1.267	-1.246	-1.358
	[-1.043]	[-1.265]	[-1.604]	[-1.106]	[-1.362]	[-1.241]
GDP per capita	-0.001	-0.000	-0.000	0.000	-0.001	-0.001
	[-1.344]	[-0.029]	[-0.167]	[0.036]	[-0.611]	[-0.476]
Constant	382.209***	299.979**	295.695**	253.598*	258.465*	272.780**
	[3.553]	[2.442]	[2.548]	[2.003]	[1.869]	[2.673]
Observations	5,272	5,271	5,270	4,556	4,375	4,216
Adj. R-squared	0.712	0.740	0.774	0.765	0.774	0.772
Year effects	Y	Y	Y	Y	N	N
Bank effects	Y	Y	Y	Y	Y	N
Firm effects	Y	Y	Y	Y	Y	Y
Lender's country effects	N	Y	Y	Y	Y	Y
Borrower's country effects	N	Y	Y	Y	Y	Y
Loan type and purpose effects	N	N	Y	Y	Y	Y
Industry effects	N	N	N	Y	Y	Y
Country-pair effects	N	N	N	Y	Y	Y
Lender's country × year effects	N	N	N	N	Y	Y
Bank × year effects	N	N	N	N	N	Y

**Table 4. DID event study**

The table reports estimates from an event study, with different time windows around each sovereign downgrade event. The dependent variable is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee and all variables are defined in Table A1. The estimation method is OLS with standard errors clustered by firm. Specification (1) reports estimates from an event study with a (-2, +2) window around each sovereign downgrade. *Post-downgrade* is a binary variable equal to one for the period after the sovereign downgrade [i.e., when the window assumes values of +1 (the year after the sovereign downgrade) or +2 (two years after the downgrade)], and zero otherwise. Specification (2) replicates the event study in specification (1) with a (-3, +3) window. Specifications (3) and (4) replicate specifications (1) and (2) respectively for the subsample of borrowers that received at least one loan before the sovereign downgrade and at least one loan after the sovereign downgrade. All specifications include, bank, firm, lender's country, borrower's country, loan type and loan purpose fixed effects. The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) (-2, +2) window	(2) (-3, +3) window	(3) (-2, +2) window	(4) (-3, +3) window
Bound	16.771 [0.682]	-14.122 [-0.901]	-32.708** [-2.625]	-27.011** [-2.372]
Post-downgrade	-22.768 [-1.222]	-25.082 [-1.306]	-43.264*** [-3.349]	-51.938*** [-3.642]
Bound × Post-downgrade	45.490** [2.026]	116.670*** [3.168]	41.942*** [2.919]	88.092** [2.246]
Loan amount	-15.769*** [-2.939]	-17.228*** [-3.097]	-5.852 [-1.349]	-5.742 [-1.152]
Maturity	0.400 [1.517]	0.114 [0.370]	0.513* [1.892]	-0.155 [-0.218]
Collateral	32.623* [1.862]	2.214 [0.072]	20.210 [1.660]	62.113 [1.465]
Number of lenders	0.105 [0.181]	-0.373 [-0.486]	0.136 [0.311]	-1.156 [-0.855]
Performance provisions	-57.001 [-0.919]	-37.449 [-0.776]	-26.869 [-0.911]	-8.317 [-0.236]
General covenants	21.695 [0.875]	120.430* [1.944]	3.845 [0.535]	-53.617 [-1.586]
Bank size	11.560 [0.991]	10.620 [1.197]	21.197** [2.478]	7.064 [0.946]
Bank ROA	-20.222*** [-2.865]	-0.140 [-0.017]	-22.226*** [-3.700]	8.274 [0.637]
Bank NPLs	-1.359 [-0.425]	-2.186 [-0.836]	-5.075** [-2.622]	0.290 [0.074]
Firm size	5.108 [0.906]	0.390 [0.064]	1.224 [0.405]	-7.662** [-2.298]
Firm ROA	-3.838* [-1.698]	-3.721 [-1.340]	-2.935 [-1.182]	-1.833 [-0.361]
Firm debt	-0.515 [-0.372]	0.618 [0.557]	-0.518 [-0.526]	-0.857** [-2.404]
Firm tangibility	-0.692 [-0.688]	0.503 [0.346]	-0.943* [-1.952]	4.008* [1.749]
GDP growth	-10.197*** [-3.881]	-9.994*** [-4.454]	-4.577** [-2.030]	-7.208 [-1.442]
GDP per capita	0.005 [1.427]	-0.002 [-0.468]	0.008*** [2.897]	0.012** [2.506]
Constant	120.714 [0.767]	382.026* [1.879]	-199.207* [-1.780]	-236.004* [-1.913]
Observations	1,264	970	801	329
Adjusted R-squared	0.697	0.747	0.787	0.731
Fixed effects	Y	Y	Y	Y

**Table 5. Matched samples**

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is a number of different matched samples based on borrower characteristics. The dependent variable is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee and all variables are defined in Table A1. The estimation method is OLS with standard errors clustered by firm *and* year. In all specifications the control group (i.e., when *Bound* is equal to zero) includes all borrowers with credit rating exactly one notch below the borrower's country credit rating in the year before the loan facility's origination year. Specification (1) estimates the baseline specification (column 3 of Table 3) restricting the control group of non-bounded firms to those with credit rating one notch below the borrower's country credit rating in the year before the loan facility's origination year. Specification (2) replicates specification (1) by limiting the sample to borrowers with similar values of *Firm size* (within one standard deviation of the sample mean). Specification (3) replicates specification (1) by limiting the sample to borrowers with similar values of *Firm size* and *Firm debt*. Specification (4) replicates specification (1) by limiting the sample to borrowers with similar values of *Firm size*, *Firm debt* and *Firm tangibility*. All specifications include year, bank, firm, lender's country, borrower's country, loan type and purpose fixed effects. The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	Matched sample			
	(1) Bounded vs. 1 notch below	(2) Size	(3) Size and debt	(4) Size, debt and tangibility
Bound	-11.113 [-1.367]	-4.652 [-0.505]	-0.359 [-0.022]	-0.924 [-0.076]
Sovereign downgrade	-31.795 [-1.512]	-38.836 [-1.397]	-46.890 [-1.396]	-18.881 [-0.522]
Bound × Sovereign downgrade	80.772*** [3.415]	80.733*** [3.233]	86.738*** [2.862]	66.747* [1.727]
Loan amount	-9.303*** [-3.001]	-9.500*** [-2.968]	-4.506 [-1.312]	-11.390** [-2.542]
Maturity	0.392*** [2.972]	0.264* [1.718]	0.434*** [2.867]	0.435 [1.462]
Collateral	16.494*** [2.949]	11.111** [2.070]	10.981*** [3.442]	35.430*** [3.354]
Number of lenders	0.184 [0.548]	0.183 [0.542]	0.067 [0.186]	0.011 [0.032]
Performance provisions	3.120 [0.321]	16.412 [1.532]	15.114 [1.281]	4.589 [0.562]
General covenants	8.453 [0.739]	5.475 [0.425]	-6.913 [-0.466]	6.670 [0.522]
Bank size	-3.159 [-0.908]	-2.073 [-0.497]	-1.299 [-0.297]	2.903 [0.409]
Bank ROA	2.743 [1.274]	1.984 [0.802]	3.169 [0.969]	0.554 [0.273]
Bank NPLs	-1.906 [-1.332]	-2.875* [-1.946]	-3.291 [-1.486]	0.069 [0.037]
Firm size	1.242 [1.247]	10.674** [2.435]	10.229** [2.200]	14.782 [0.958]
Firm ROA	-1.879** [-2.486]	-1.252** [-2.161]	-0.862 [-0.857]	-0.967 [-1.357]
Firm debt	0.533 [1.269]	0.349 [0.849]	-0.086 [-0.180]	-1.298* [-1.797]
Firm tangibility	0.283 [0.456]	0.184 [0.348]	-0.244 [-0.451]	-0.719 [-0.627]
GDP growth	-2.727* [-1.960]	-3.095* [-1.839]	-2.497 [-1.441]	-0.717 [-0.537]
GDP per capita	0.001 [0.413]	-0.004 [-1.583]	-0.005 [-1.339]	0.002 [0.519]
Constant	284.360** [2.396]	278.888** [2.109]	200.181 [1.360]	95.899 [0.511]
Observations	4,068	3,146	2,382	1,330
Adj. R-squared	0.781	0.786	0.781	0.867
Fixed effects	Y	Y	Y	Y

**Table 6. Placebo tests**

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is a number of different placebo tests. The dependent variable is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee and all variables are defined in Table A1. The estimation method is OLS with standard errors clustered by firm *and* year. In specification (1), the treatment group (i.e., when *Bound* is equal to one) includes all borrowers with credit rating one notch below the borrower's country credit rating in the year before the loan facility's origination year and the control group (i.e., when *Bound* is equal to zero) includes all borrowers with credit rating at least two notches below. In specifications (2)-(4), the treatment group (i.e., when *Bound* is equal to one) includes all borrowers with credit rating equal to or above the borrower's country credit rating in the year before the loan facility's origination year and the control group (i.e., when *Bound* is equal to zero) includes all borrowers with credit rating at most two notches below. In specification (2), *Sovereign downgrade* is replaced by *Recession*, i.e., a binary variable equal to one if the borrower's country experiences a recession (that is not accompanied by a sovereign downgrade), and otherwise zero. In specification (3), *Sovereign downgrade* is replaced by *Crisis*, i.e., a binary variable equal to one for the 2007-2009 financial crisis, and otherwise zero (countries downgraded during the crisis are excluded). In specification (4), *Sovereign downgrade* is replaced by *Currency crisis*, i.e., a binary variable equal to one if the borrower's country experiences a currency crisis (that is not accompanied by a sovereign downgrade), and otherwise zero. All specifications include bank, firm, lender's country, borrower's country, loan type and purpose fixed effects. Specifications (1) and (2) additionally include year effects. The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) 1 notch below vs. at least 2 notches below	(2) Recession	(3) 2007-2009 crisis	(4) Currency crisis
Bound	-5.234 [-0.474]	-6.734 [-1.095]	-4.198 [-0.404]	-8.696 [-0.761]
Sovereign downgrade	-23.301 [-0.659]			
Bound × Sovereign downgrade	7.199 [0.188]			
Recession		-32.845** [-2.266]		
Bound × Recession		14.957 [0.837]		
Crisis			-5.371 [-0.170]	
Bound × Crisis			-22.798 [-0.888]	
Currency crisis				-1.731 [-0.132]
Bound × Currency crisis				14.678 [0.805]
Observations	1,952	5,270	5,270	5,095
Adj. R-squared	0.828	0.767	0.700	0.701
Controls	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y

**Table 7. Rating-based regulation**

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the interaction of the bound and sovereign downgrade indicators with indicators for sovereign rating migration to a new broad rating category, defined by Basel II capital requirement rules, as a consequence of a downgrade. The dependent variable is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm and year. In specification (1), *Bound*  $\times$  *Sovereign downgrade* is interacted with *RW change*, i.e., a binary variable equal to one for a sovereign rating migration to a new broad rating category, and equal to zero for a sovereign rating migration within the same broad rating category. Specification (2) replicates specification (1) for broad rating categories within the investment grade category (i.e., with credit rating from AAA+ to BBB-). In specification (3), *Bound*  $\times$  *Sovereign downgrade* is interacted with *RW change (to non-invest. grade)*, i.e., a binary variable equal to one for a sovereign rating migration from the investment grade category to the non-investment grade category (i.e., with credit rating below BBB-). All specifications include year, bank, firm, lender's country, borrower's country, loan type and purpose fixed effects. The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)
Bound	-11.794* [-1.725]	-13.142* [-2.057]	-13.798** [-2.192]
Sovereign downgrade	-12.506 [-0.689]	-7.676 [-0.526]	-8.751 [-0.589]
Bound $\times$ Sovereign downgrade	57.273** [2.423]	76.150** [2.709]	47.373** [2.219]
Bound $\times$ Sovereign downgrade $\times$ RW change	-2.438 [-0.051]		
Bound $\times$ Sovereign downgrade $\times$ RW change (within invest. grade)		-29.298 [-1.126]	
Bound $\times$ Sovereign downgrade $\times$ RW change (to non-invest. grade)			47.531** [2.147]
Observations	5,270	5,270	5,270
Adj. R-squared	0.776	0.774	0.775
Full set of controls	Y	Y	Y
Fixed effects	Y	Y	Y

**Table 8. Supply-side explanations**

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the interaction of the bound and sovereign downgrade indicators with indicators for lender's capital adequacy and investor types. The dependent variable is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm and year. In specification (1), *Bound* × *Sovereign downgrade* is interacted with *Bank capital*, i.e., the ratio of capital to total bank loans. In specification (2), *Bound* × *Sovereign downgrade* is interacted with *Bank Lerner index*, i.e., the Lerner index of the bank. In specification (3), *Bound* × *Sovereign downgrade* is interacted with *Non-bank lead arranger*, i.e., a binary variable equal to one if the lead arranger is a non-bank lender, and zero otherwise. In specification (4), *Bound* × *Sovereign downgrade* is interacted with *Non-bank loan*, i.e., a binary variable equal to one if the loan facility is a Term Loan B or higher, and zero otherwise. All specifications include year, bank, firm, lender's country, borrower's country, loan type and purpose fixed effects. The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
Bound	-14.254** [-2.395]	-17.502** [-2.236]	-18.373* [-2.015]	-13.473* [-2.043]
Sovereign downgrade	7.520 [0.479]	3.163 [0.186]	-7.181 [-0.773]	-5.382 [-0.363]
Bound × Sovereign downgrade	39.870* [2.130]	36.540 [1.510]	30.121** [2.511]	54.135** [2.424]
Bound × Sovereign downgrade × Bank capital	-10.080** [-2.473]			
Bound × Sovereign downgrade × Bank Lerner index		65.432** [2.121]		
Bound × Sovereign downgrade × Non-bank lead arranger			32.189** [2.374]	
Bound × Sovereign downgrade × Non-bank loan				74.671*** [3.322]
Observations	3,969	4,890	5,270	5,270
Adj. R-squared	0.782	0.760	0.774	0.774
Full set of controls	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y

**Table 9. Borrower's fundamentals**

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the interaction of the bound and sovereign downgrade indicators with different firm-level characteristics to examine the importance of borrower's fundamentals. The dependent variable is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm and year. In specification (1), *Bound*  $\times$  *Sovereign downgrade* is interacted with *Firm size*, i.e., the log of total firm assets. In specification (2), *Bound*  $\times$  *Sovereign downgrade* is interacted with *Firm debt*, i.e., the ratio of firm debt to total assets. In specification (3), *Bound*  $\times$  *Sovereign downgrade* is interacted with *Firm KZ index*, i.e., a binary variable equal to one if the firm's Kaplan-Zingales index is in the top tercile of our sample and equal to zero if it is in the bottom tercile. In specification (4), *Bound*  $\times$  *Sovereign downgrade* is interacted with *Non-dividend payer*, i.e., a binary variable equal to one if the firm has a history of zero dividends on common stock going as far back as 1993, and zero otherwise. In specification (5), *Bound*  $\times$  *Sovereign downgrade* is interacted with *Cross-listed*, i.e., a binary variable equal to one if the borrower's common shares are listed on two or more stock exchanges, and zero otherwise. In specification (6), *Bound*  $\times$  *Sovereign downgrade* is interacted with *Firm foreign sales*, i.e., the ratio of the borrower's foreign sales to total sales. All specifications include year, bank, lender's country, borrower's country, loan type and purpose fixed effects. The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Bound	-13.355*	-13.246*	-16.882**	-16.725**	-14.328**	-9.898
	[-1.999]	[-2.042]	[-2.384]	[-2.379]	[-2.187]	[-1.167]
Sovereign downgrade	-4.513	-6.094	16.276	-3.999	-9.305	-3.304
	[-0.303]	[-0.409]	[0.597]	[-0.312]	[-0.618]	[-0.203]
Bound $\times$ Sovereign downgrade	122.359***	75.298**	5.248	56.966***	85.761**	54.443**
	[3.137]	[2.260]	[0.188]	[2.816]	[2.755]	[2.241]
Bound $\times$ Sovereign downgrade $\times$ Firm size	-5.182**					
	[-2.762]					
Bound $\times$ Sovereign downgrade $\times$ Firm debt		3.019**				
		[2.182]				
Bound $\times$ Sovereign downgrade $\times$ Firm KZ index			120.106***			
			[4.187]			
Bound $\times$ Sovereign downgrade $\times$ Non-dividend payer				94.479***		
				[3.028]		
Bound $\times$ Sovereign downgrade $\times$ Cross-listed					-49.393*	
					[-1.785]	
Bound $\times$ Sovereign downgrade $\times$ Firm foreign sales						-81.482***
						[-3.388]
Observations	5,270	5,270	2,874	4,524	5,267	4,966
Adj. R-squared	0.775	0.774	0.713	0.768	0.776	0.774
Full set of controls	Y	Y	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y	Y	Y

**Table 10. Bank dependency and alternative financing sources**

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the interaction of the bound and sovereign downgrade indicators with indicators for borrowers' bank dependency and alternative sources of financing. The dependent variable is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm and year. In specification (1), *Bound*  $\times$  *Sovereign downgrade* is interacted with *Bank dependency*, i.e., a binary variable equal to one if the current lead bank made at least 50% of the firm's total loan amounts over the past three years, and zero otherwise. In specification (2), *Bound*  $\times$  *Sovereign downgrade* is interacted with *Relationship lending*, i.e., a binary variable equal to one for a prior lending relationship between the lender and the borrower during the previous 5-year period, and zero otherwise. In specification (3), *Bound*  $\times$  *Sovereign downgrade* is interacted with *Relationship lending number*, i.e., the ratio of the number of prior loans between the lender and the borrower during the previous 5-year period to the total number of loans received by the borrower during the same period. In specification (4), *Bound*  $\times$  *Sovereign downgrade* is interacted with *Bond issue*, i.e., a binary variable equal to one if the firm issues a bond over the past three years, and zero otherwise. In specification (5), *Bound*  $\times$  *Sovereign downgrade* is interacted with *Bond-to-loan ratio*, i.e., the ratio of the firm's total amount of bond financing over the past three years over the total amount of syndicated loan financing over the same period. In specification (6), *Bound*  $\times$  *Sovereign downgrade* is interacted with *High firm cash*, i.e., a binary variable equal to one if the firm's cash holdings (as a share of total assets) is above the sample mean, and zero otherwise. In specification (7), *Bound*  $\times$  *Sovereign downgrade* is interacted with *High firm retained earnings*, i.e., a binary variable equal to one if the firm's retained earnings (as a share of common equity) is above the sample mean, and zero otherwise. All specifications include year, bank, firm, lender's country, borrower's country, loan type and purpose fixed effects. The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bound	-13.396*	-13.668**	-14.348**	-13.391*	-13.297*	-13.890**	-13.654*
	[-2.013]	[-2.099]	[-2.190]	[-1.971]	[-2.023]	[-2.188]	[-2.058]
Sovereign downgrade	-5.400	-6.816	-6.187	-5.403	-5.566	-6.326	-6.758
	[-0.362]	[-0.467]	[-0.407]	[-0.359]	[-0.370]	[-0.422]	[-0.462]
Bound $\times$ Sovereign downgrade	52.205**	76.328***	66.138***	98.771***	57.619**	80.409***	78.088**
	[2.372]	[3.419]	[2.857]	[6.262]	[2.570]	[3.376]	[2.768]
Bound $\times$ Sovereign downgrade $\times$ Bank dependency	41.716**						
	[2.570]						
Bound $\times$ Sovereign downgrade $\times$ Relationship lending		-29.149**					
		[-2.565]					
Bound $\times$ Sovereign downgrade $\times$ Relationship lending number			-56.778***				
			[-3.305]				
Bound $\times$ Sovereign downgrade $\times$ Bond issue				-43.824***			
				[-4.937]			
Bound $\times$ Sovereign downgrade $\times$ Bond-to-loan ratio					-79.082**		
					[-2.280]		
Bound $\times$ Sovereign downgrade $\times$ High firm cash						-52.615**	
						[-2.637]	
Bound $\times$ Sovereign downgrade $\times$ High firm retained earnings							-45.715*
							[-1.739]
Observations	5,270	5,270	5,270	5,270	5,270	5,270	5,187
Adj. R-squared	0.775	0.775	0.775	0.774	0.774	0.776	0.768
Full set of controls	Y	Y	Y	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y	Y	Y	Y



Internet Appendix  
Regulation and information costs of sovereign distress:  
Evidence from corporate lending markets

**Abstract**

This Appendix is intended for internet use only. The first section includes the definitions of variables employed. The second section includes information on the construction of the sample. The third section includes the discussion of additional results and robustness checks.

**Table A1. Variable definitions and sources**

Variable	Description	Source
<i>A. Dependent variables in main specifications</i>		
AISD	All-in spread drawn, defined as the sum of the spread over LIBOR plus any facility fee.	DealScan
AISU	All-in spread undrawn, defined as the sum of the facility fee and the commitment fee.	DealScan
<i>B. Main explanatory variables: Bounded firms</i>		
Bound	A binary variable equal to one if the borrower's credit rating is equal to or above the borrower's country credit rating in the year before the loan facility's origination year and equal to zero if the borrower's credit rating is at most two notches below.	S&P Credit Ratings
<i>C. Explanatory variables: Sovereign downgrade</i>		
Sovereign downgrade	A binary variable equal to one if the sovereign's long-term foreign-currency credit rating is downgraded in the year before the loan facility's origination year, and zero otherwise. <i>Sovereign downgrade lc</i> is the equivalent variable for local-currency credit ratings.	S&P Credit Ratings
Short-term downgrade	A binary variable equal to one if the sovereign's short-term foreign-currency credit rating is downgraded in the year before the loan facility's origination year, and zero otherwise.	S&P Credit Ratings
Outlook downgrade	A binary variable equal to one if the outlook on the sovereign's long-term foreign-currency credit rating is downgraded in the year before the loan facility's origination year, and zero otherwise.	S&P Credit Ratings
RW change	A binary variable equal to one for a sovereign rating migration to a new broad rating category, and equal to zero for a sovereign rating migration within the same broad rating category. <i>RW change (within invest. grade)</i> is the equivalent variable for migration to broad rating categories within the investment grade category (i.e., with credit rating from AAA+ to BBB-). <i>RW change (to non-invest. grade)</i> is the equivalent variable for migration from the investment grade category to the non-investment grade category (i.e., with credit rating below BBB-).	S&P Credit Ratings
<i>D. Explanatory variables: Loan characteristics</i>		
Loan amount	Log of the loan facility amount in USD.	DealScan
Maturity	Loan duration in months.	DealScan
Collateral	A binary variable equal to one if the loan is secured with collateral, and zero otherwise.	DealScan
Number of lenders	The number of banks involved in the syndicated loan.	DealScan
Performance provisions	A binary variable equal to one if the loan has performance pricing provisions, and zero otherwise.	DealScan
General covenants	A binary variable equal to one if the loan has covenants, and zero otherwise.	DealScan
Loan type	A series of binary variables indicating loan type (e.g., term loans, revolvers, etc.).	DealScan
Loan purpose	A series of binary variables indicating loan purpose (e.g., corporate purpose, debt repayment, etc.)	DealScan
Relationship lending	A binary variable equal to one for a prior loan facility between the lender and the borrower in the 5-year period before the loan facility's origination year, and zero otherwise.	DealScan
Relationship lending number	The ratio of the number of prior loan facilities between the lender and the borrower in the 5-year period before the loan facility's origination year to the total number of loans received by the borrower during the same period.	DealScan
<i>E. Explanatory variables: Lender characteristics</i>		
Bank size	The log of total bank assets.	Compustat
Bank ROA	The return on total bank assets.	Compustat
Bank NPLs	The ratio of non-performing loans to total bank loans.	Compustat

Bank capital	The ratio of capital to total bank loans.	Compustat
Bank Lerner index	The Lerner index of the bank, which equals $(p-mc/p)$ , where $p$ is the average lending rate given by each bank in each year and $mc$ is the marginal cost of producing bank output (also at the bank-year). We proxy the lending rate from the ratio of interest income to total commercial loans and we estimate the marginal cost from the non-parametric estimation of a cost function.	Compustat and own estimations
Non-bank lead arranger	A binary variable equal to one if the lead arranger is a non-bank lender, and zero otherwise.	DealScan
Non-bank loan	A binary variable equal to one if the loan facility is a Term Loan B or higher, and zero otherwise.	DealScan

F. *Explanatory variables: Borrower characteristics*

Firm size	The log of total firm assets.	Compustat
Firm ROA	The return on total firm assets.	Compustat
Firm debt	The ratio of firm debt to total assets.	Compustat
Firm equity	The log of firm equity capital.	Compustat
High firm cash	A binary variable equal to one if the firm's cash holdings (as a share of total assets) is above the sample mean, and zero otherwise.	Compustat
High firm retained earnings	A binary variable equal to one if the firm's retained earnings (as a share of common equity) is above the sample mean, and zero otherwise.	Compustat
Firm KZ index	A binary variable equal to one if the firm's Kaplan-Zingales index is in the top tercile of our sample and equal to zero if it is in the bottom tercile. The index is constructed following Lamont, Polk and Saá-Requejo (2001) and Farre-Mensa and Ljungqvist (2016).	Compustat
Non-dividend payer	A binary variable equal to one if the firm has a history of zero dividends on common stock going as far back as 1993 (the first year of our sample), and zero otherwise.	Compustat
Firm foreign sales	The ratio of foreign sales to total firm sales.	Compustat
Cross-listed	A binary variable equal to one if the firm's common shares are listed on one or more foreign stock exchanges in addition to the firm's domestic stock exchange, and zero otherwise.	Compustat; Firm disclosures
Bank dependency	A binary variable equal to one if the current lead bank made at least 50% of the firm's total loan amounts over the past three years, and zero otherwise.	DealScan
Bond issue	A binary equal to one if the firm issued a bond over the past three years, and zero otherwise.	SDC
Bond-to-loan ratio	The ratio of the firm's total amount of bond financing over the past three years over the total amount of syndicated loan financing over the same period.	DealScan; SDC

G. *Explanatory variables: Borrower's country characteristics*

GDP growth	The difference in annual GDP growth rate (%) between the lender's country and the borrower's country.	WDI
GDP per capita	The difference in annual GDP per capita in constant prices between the lender's country and the borrower's country.	WDI

**Table A2. Sovereign downgrades and bounded firms affected**

The table presents the sovereign downgrade events for the borrower countries in our sample and the bounded firms affected.

Country	Year of Downgrade	Bounded firms affected
Mexico	1995	Grupo Televisa
Mexico	1995	Coca-Cola FEMSA SA
Turkey	1996	Turk Ekonomi Bankasi AS [TEB]
Turkey	1996	Turkiye Is Bankasi AS [Isbank]
Turkey	2001	Turkiye Garanti Bankasi AS
Turkey	2001	Finansbank AS [Turkey]
Turkey	2001	Turkiye Is Bankasi AS [Isbank]
Brazil	2002	Companhia Siderurgica Nacional LLC [CSN]
Brazil	2002	BASF SA
Japan	2002	Tokyo Electric Power Co Inc
Japan	2002	Ajinomoto Co Inc
Japan	2002	Abbott Japan Co Ltd
Philippines	2003	San Miguel Corp
Philippines	2003	Globe Telecom Inc
Greece	2004	Coca-Cola Hellenic Bottling Co SA (CCHBC)
Philippines	2005	San Miguel Corp
Argentina	2008	Pan American Energy
Russia	2008	Severneftegazprom OAO
Russia	2008	Sakhalin II Project
Mexico	2009	PMI Trading Ltd
Mexico	2009	Grupo Bimbo
Mexico	2009	Petroleos Mexicanos (Pemex)
Ireland	2010	Accenture
Greece	2011	Titan Cement Co SA
Greece	2011	Coca-Cola Hellenic Bottling Co SA (CCHBC)
Italy	2011	SNAM Rete Gas SpA
USA	2011	Momentive Performance Materials Inc
USA	2011	WW Grainger Inc
USA	2011	NetJets Inc
Italy	2012	SNAM Rete Gas SpA
Spain	2012	Gas Natural SDG SA
Spain	2012	Amadeus IT Group SA
Spain	2012	Iberdrola SA
Spain	2012	Enagas SA
Italy	2013	Enel SpA
Italy	2013	Luxottica Group SpA
Italy	2013	Terna SpA [Trasmissione Elettricit� Rete Nazionale]
Argentina	2014	Pan American Energy
Brazil	2014	Vale SA
Brazil	2014	Fibria Celulose SA
Brazil	2014	Gerdau
Ghana	2014	Kosmos Energy Ghana HC
Italy	2014	Enel SpA
Italy	2014	Exor SpA
Italy	2014	Saipem SpA
Italy	2014	Terna SpA [Trasmissione Elettricit� Rete Nazionale]
South Africa	2014	Investec Bank Ltd [South Africa]
South Africa	2014	Naspers Ltd
Bahrain	2015	Bahrain Steel B.S.C.C. EC
Brazil	2016	Fibria Celulose SA
Turkey	2016	Turkiye Garanti Bankasi AS
Turkey	2016	Yapi ve Kredi Bankasi AS [YKB]
Turkey	2016	Turkiye Is Bankasi AS [Isbank]
Turkey	2016	Turkiye Sinai Kalkinma Bankasi AS [TSKB]
Mexico	1995	Grupo Televisa

Mexico	1995	Coca-Cola FEMSA SA
Turkey	1996	Turk Ekonomi Bankasi AS [TEB]
Turkey	1996	Turkiye Is Bankasi AS [Isbank]
Turkey	2001	Turkiye Garanti Bankasi AS
Turkey	2001	Finansbank AS [Turkey]
Turkey	2001	Turkiye Is Bankasi AS [Isbank]
Brazil	2002	Companhia Siderurgica Nacional LLC [CSN]
Brazil	2002	BASF SA
Japan	2002	Tokyo Electric Power Co Inc
Japan	2002	Ajinomoto Co Inc
Japan	2002	Abbott Japan Co Ltd
Philippines	2003	San Miguel Corp
Philippines	2003	Globe Telecom Inc
Greece	2004	Coca-Cola Hellenic Bottling Co SA (CCHBC)
Philippines	2005	San Miguel Corp
Argentina	2008	Pan American Energy
Russia	2008	Severneftegazprom OAO
Russia	2008	Sakhalin II Project
Mexico	2009	PMI Trading Ltd
Mexico	2009	Grupo Bimbo
Mexico	2009	Petroleos Mexicanos (Pemex)
Ireland	2010	Accenture
Greece	2011	Titan Cement Co SA
Greece	2011	Coca-Cola Hellenic Bottling Co SA (CCHBC)
Italy	2011	SNAM Rete Gas SpA
USA	2011	Momentive Performance Materials Inc
USA	2011	WW Grainger Inc
USA	2011	NetJets Inc
Italy	2012	SNAM Rete Gas SpA
Spain	2012	Gas Natural SDG SA
Spain	2012	Amadeus IT Group SA
Spain	2012	Iberdrola SA
Spain	2012	Enagas SA
Italy	2013	Enel SpA
Italy	2013	Luxottica Group SpA
Italy	2013	Terna SpA [Trasmissione Elettricit� Rete Nazionale]
Argentina	2014	Pan American Energy
Brazil	2014	Vale SA
Brazil	2014	Fibria Celulose SA
Brazil	2014	Gerdau
Ghana	2014	Kosmos Energy Ghana HC
Italy	2014	Enel SpA
Italy	2014	Exor SpA
Italy	2014	Saipem SpA
Italy	2014	Terna SpA [Trasmissione Elettricit� Rete Nazionale]
South Africa	2014	Investec Bank Ltd [South Africa]
South Africa	2014	Naspers Ltd
Bahrain	2015	Bahrain Steel B.S.C.C. EC
Brazil	2016	Fibria Celulose SA
Turkey	2016	Turkiye Garanti Bankasi AS
Turkey	2016	Yapi ve Kredi Bankasi AS [YKB]
Turkey	2016	Turkiye Is Bankasi AS [Isbank]
Turkey	2016	Turkiye Sinai Kalkinma Bankasi AS [TSKB]
<b>Total</b>	<b>15</b>	<b>16</b>
		<b>44</b>

**Table A3. Difference-in-Differences in firm credit ratings around sovereign downgrades**

The table reports coefficients and t-statistics [in brackets] with robust standard errors by firm from the estimation of Difference-in-Differences treatment effects for corporate credit ratings before and during sovereign downgrades. The estimation is conducted at the firm-year-level and includes borrowers from the loan-level sample. The dependent variable is *Firm credit rating*, i.e., the firm's credit rating converted to a numerical scale (from 1 to 22) with 1 corresponding to the highest rating (AAA) and 22 to the lowest (default) and all variables are defined in Table A1. *Treated firms (bound)* includes borrowers with credit rating equal to or above the borrower's country credit rating and *Control firms (non-bound)* includes borrowers with credit rating below the borrower's country credit rating. Panel A presents estimates from a sample of 101 treated and control observations and Panel B from a matched sample of 99 treated and control observations based on *Firm size*, *Firm ROA* and *Firm debt*. The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) Year before downgrade	(2) Year of downgrade	(3) Difference
<u>Panel A: Full sample</u>			
Treated firms (bound)	7.140*** [5.831]	8.651*** [3.951]	1.511*** [2.694]
Control firms (non-bound)	9.216*** [9.587]	9.929*** [8.319]	0.713 [1.265]
Difference	-2.076*** [-6.592]	-1.278*** [-7.618]	
Difference-in-Differences			0.798*** [3.015]
<u>Panel B: Matched sample across firm characteristics</u>			
Treated firms (bound)	7.152*** [5.514]	8.741*** [4.105]	1.589*** [-3.154]
Control firms (non-bound)	9.193*** [8.937]	9.895*** [8.743]	0.702*** [-1.177]
Difference	-2.041*** [6.195]	-1.154*** [7.145]	
Difference-in-Differences			0.887*** [3.253]

**Table A4. Loan spreads for bounded vs. non-bounded firms: Matching estimator**

The table reports coefficients and t-statistics [in brackets] with robust standard errors from the estimation of the average difference in loan spreads between bounded and non-bounded borrowers before and after a sovereign downgrade. The estimation concerns the average treatment effect on the treated using a nearest-neighbor matching estimator as well as a propensity-score matching estimator. The dependent variable is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee. The nearest-neighbor estimator matches on the Mahalanobis metric, which is based on the inverse of the full covariance matrix of the covariates. The propensity-score estimator matches on the estimated propensity-score of being bounded, conditional on a set of covariates using a logit model. The employed covariates include loan characteristics (*Loan amount, Maturity, Collateral, Number of lenders, Performance provisions, General covenants*), lender characteristics (*Bank size, Bank ROA, Bank NPLs*) and borrower characteristics (*Firm size, Firm ROA, Firm debt, Firm tangibility*). In Panel A, matching is performed on borrower characteristics, in Panel B on loan and borrower characteristics and in Panel C on loan, lender and borrower characteristics.  $\Delta AISD$  denotes the average treatment effect on the treated (ATT). The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	Nearest-neighbor		Propensity-score	
	(1) Before downgrade	(2) After downgrade	(1) Before downgrade	(2) After downgrade
<u>Panel A: Matched sample across firm characteristics</u>				
$\Delta AISD$	-21.864*** [-3.767]	28.644*** [2.579]	-11.577** [-2.242]	27.957*** [2.672]
Number of observations	4,764	506	4,764	506
<u>Panel B: Matched sample across loan and firm characteristics</u>				
$\Delta AISD$	-21.199*** [-6.198]	20.339** [2.128]	-23.163*** [-4.441]	49.418*** [2.725]
Number of observations	4,764	506	4,764	506
<u>Panel C: Matched sample across loan, bank and firm characteristics</u>				
$\Delta AISD$	-22.850*** [-6.773]	37.579*** [4.351]	-13.897*** [-3.885]	98.519*** [8.447]
Number of observations	4,764	506	4,764	506

## Additional results

This section includes the discussion of additional results and robustness checks. In Table A5 of the Appendix, we replicate the estimations of Table 3 by replacing *Sovereign downgrade* with its local-currency counterpart (*Sovereign downgrade lc*). Results across all specifications mirror those of Table 3 for all variables of interest. Non-surprisingly, the results are similar considering the strong positive correlation between the two types of credit ratings, as foreign-currency rating downgrades are almost always accompanied by local-currency downgrades. The marginally weaker coefficient on our interaction term, which now ranges from 52.6 to 55.4 bps might be attributed to the fact that insurance on sovereign debt is mostly denominated in foreign currency, thereby inducing greater sensitivity to foreign-currency rating changes relative to rating changes in local currency.

In Table A6, we examine the sensitivity of our estimates to the “bad controls” problem, by interchangeably excluding loan-level control variables from our specifications. We initially omit all loan controls (column 1) and sequentially introduce a different combination of non-price terms (*Loan amount, Maturity, Collateral, Number of lenders, Performance provisions, General covenants*) in columns (2)-(4). Irrespective of the specification used, the coefficient on the interaction term remains consistently positive and statistically significant pointing to higher cost of credit for bounded firms relative to non-bounded ones. Moreover, in Table A7 we replicate the specifications of Table 3 for an extended sample, where we relax our restriction that the borrower’s credit rating is at most two notches below its sovereign’s. The extended group of non-bounded firms now includes borrowers with any rating below the rating of their sovereign. Results from this exercise are very similar to our baseline.

In Appendix Table A8, we confirm the insensitivity of our inferences to the type of standard error clustering used. In this respect, we initially cluster standard errors by loan *and* year, and loan *and* firm (column 1 and 2 respectively). Given, the multi-country nature of our



dataset, we consequently cluster errors by borrower's country *and* year (column 3), and by borrower's country *and* firm (column 4). Our last specification adopts a more demanding clustering, as standard errors are clustered by borrower's country *and* firm *and* year. Across all specifications, estimates remain almost identical to our baseline results.

Thus far, we assume that all loans enter the model with equal weights. Normally, the fixed effects in Table 3 provide a safeguard against cross-country variations. We nevertheless acknowledge that our empirical specification might leave the analysis open to the critique that countries receiving either more or fewer loans may affect our results disproportionately. To this end, we re-estimate our preferred specification using several different weights based on the country-year number of loans. We retain the same set of fixed effects and report results from this exercise in Table A9. Across all specifications, and irrespective of the type or frequency of the chosen weight, the coefficient on *Bound*  $\times$  *Sovereign downgrade* retains its positive and statistically significant value. As for the coefficients on the set of loan- and bank-level controls, these are in line with those suggested by our baseline regressions.

Thus far our results could be subject to a sample-selection bias, in the sense that the variables driving our findings might further determine the firm's decision to receive a loan from a particular bank. It may be, for instance, that the impact of sovereign ceiling on loan contracting is due to affected (bounded) firms being the ones more likely to request a loan. To eliminate this potential selection bias, we follow Dass and Massa (2011) and employ Heckman's (1979) two-stage model to calculate the probability that a firm enters into a loan deal. In the first stage, we run a probit model to estimate the firm's loan-taking decision. During this stage, our loan sample is extended and includes all syndicated loan facilities available in Dealscan. We calculate Heckman's lambda (inverse mills ratio) and include it as an additional control variable in the second-stage OLS estimation of specifications (1)-(3) of Table A10.

In line with Dass and Massa (2011), we assume that the borrower's decision to get a syndicated loan is a function of the main determinants of the decision to borrow in general. Consequently, our probit regression is augmented with a set of loan-, bank-, and firm-level characteristics; a set of weights for the number, origin, and direction of loans made in a given year; and year, bank, firm, lender's and borrower's country dummies. Our set of annual weights include the number of loans made by a given bank (*Bank loans*), the number of loans to a given firm (*Firm loans*), and the number of loans between a given bank-firm pair (*Bank-firm loans*).

We present results in columns (1)-(3) of Table A10 (Panels A and B). Probit estimates (Panel A), indicate that the higher the firm's size and return on assets and the lower the leverage, the more likely is the completion of a syndicated loan deal. Loans of a greater amount and shorter maturity are more likely to be granted, particularly when they include many lenders, are secured, and carry pricing provisions and covenants. Importantly, estimates from the second-stage regressions (Panel B) confirm the asymmetrically strong positive impact of the sovereign ceiling on *AISD* (as reflected in the coefficient on *Bound*  $\times$  *Sovereign downgrade*).

Next, we control for differences stemming from the macroeconomic and institutional environment in the borrower's country, as these factors are known to also influence lending decisions (see, e.g., Delis, Hasan and Ongena, 2020). We include certain macroeconomic and institutional controls (debt-to-GDP ratio, inflation dynamics, prevalence of democratic institutions, economic freedom, real interest rate) and a measure of global uncertainty (stock market volatility). In theory, the slow-moving nature of these variables should cause them to correlate strongly with the borrower's country and country-pair fixed effects employed in Table 3. Due to their high pair-wise correlations, we do not employ all variables simultaneously. Results from this exercise remain very similar to our baseline (Table A11).

Finally, Table A12 considers the effect of sovereign ceiling on other loan characteristics. We sequentially estimate our baseline specification with each of the remaining loan terms as

dependent variables (and including *AISD* in our set of control variables). Given the role of loan fees in the syndicated loan contract (see Berg, Saunders and Steffen, 2016), in column (1) we replace *AISD* as the dependent variable with the commitment plus facility fees, defined as all-in spread undrawn (*AISU*).<sup>16</sup> The positive and statistically significant coefficient on the interaction term suggests that the sovereign ceiling rule is further reflected on the spread of the undrawn portion of the loan. We subsequently examine other non-price terms. Estimates in columns (2)-(6) reveal no effect on the amount, maturity, security and composition of loans, as the coefficients on *Bound*  $\times$  *Sovereign downgrade* are not statistically significant.

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<sup>16</sup> A constraining factor of the global DealScan database is that the reporting of fees is limited, either because loan deals do not include specifications for undrawn funds or simply due to missing information.

## References

- Dass, N. and Massa, M. (2011). The impact of a strong bank-firm relationship on the borrowing firm. *The Review of Financial Studies*, 24(4), 1204-1260.
- Farre-Mensa, J. and Ljungqvist, A. (2016). Do measures of financial constraints measure financial constraints?. *The Review of Financial Studies*, 29(2), 271-308.
- Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica* 47, 153–61.
- Lamont, O., Polk, C. and Saá-Requejo, J. (2001). Financial constraints and stock returns. *The Review of Financial Studies*, 14(2), 529-554.

**Table A5. Baseline results with different fixed effects (local-currency ratings)**

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the replacement of foreign-currency ratings with local-currency ratings. The dependent variable is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm *and* year. Each specification includes a different set of fixed effects, as given in the lower part of the table. In all specifications *Sovereign downgrade lc* is a binary variable equal to one if the sovereign's local-currency credit rating is downgraded in the year before the loan facility's origination year, and zero otherwise. The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Bound	-13.621 [-1.582]	-13.067 [-1.500]	-13.559* [-1.861]	-14.043* [-1.939]	-13.377** [-2.211]	-5.897 [-0.864]
Sovereign downgrade lc	-11.454 [-1.149]	-9.396 [-0.830]	-10.321 [-1.187]	-2.716 [-0.315]	-3.640 [-0.375]	-4.567 [-0.454]
Bound × Sovereign downgrade lc	41.359** [2.097]	42.705* [2.043]	45.285** [2.449]	38.683** [2.209]	37.138** [2.388]	37.041** [2.314]
Loan amount	-16.763*** [-4.375]	-12.207*** [-4.113]	-10.145*** [-3.657]	-8.578** [-2.759]	-7.711** [-2.695]	-7.597*** [-2.871]
Maturity	0.443*** [4.147]	0.368*** [3.930]	0.252** [2.464]	0.295*** [2.820]	0.201** [2.426]	0.185** [2.627]
Collateral	27.410*** [4.344]	23.628*** [3.689]	16.648*** [2.875]	15.349** [2.477]	11.792** [2.307]	13.473** [2.689]
Number of lenders	0.175 [0.692]	0.147 [0.604]	0.226 [0.844]	0.178 [0.600]	0.083 [0.283]	0.035 [0.114]
Performance provisions	9.479 [0.673]	8.243 [0.582]	8.152 [0.655]	8.436 [0.665]	8.960 [0.714]	11.410 [0.872]
General covenants	15.101 [1.177]	10.970 [0.864]	12.456 [1.019]	17.432 [1.288]	19.295 [1.281]	23.437 [1.197]
Bank size	4.614 [0.791]	1.299 [0.285]	-0.295 [-0.068]	-1.067 [-0.236]	-0.809 [-0.138]	
Bank ROA	0.784 [0.290]	0.306 [0.122]	0.298 [0.139]	-0.061 [-0.022]	5.065 [1.624]	
Bank NPLs	-2.512** [-2.272]	-2.501** [-2.306]	-2.240* [-1.834]	-1.807 [-1.094]	1.171 [0.680]	
Firm size	1.560* [1.975]	1.671** [2.310]	1.604* [1.849]	1.424 [1.605]	1.041 [1.391]	1.066 [1.422]
Firm ROA	-2.887*** [-4.217]	-2.507*** [-3.654]	-2.416*** [-3.147]	-2.485*** [-2.984]	-2.427*** [-2.879]	-2.902** [-2.806]
Firm debt	0.199 [0.490]	0.140 [0.326]	0.219 [0.466]	0.393 [0.801]	0.199 [0.440]	0.565 [1.369]
Firm tangibility	0.344 [0.563]	0.405 [0.644]	0.429 [0.700]	0.454 [0.656]	0.602 [1.091]	0.483 [0.825]
GDP growth	-1.460 [-1.063]	-1.870 [-1.309]	-2.110 [-1.680]	-1.317 [-1.008]	-1.380 [-1.366]	-1.488 [-1.231]
GDP per capita	-0.001 [-1.517]	-0.000 [-0.056]	-0.001 [-0.325]	-0.000 [-0.089]	-0.002 [-0.766]	-0.002 [-0.593]
Constant	384.258*** [3.422]	305.286** [2.317]	304.416** [2.444]	262.135* [1.923]	294.582* [2.058]	269.539** [2.556]
Observations	5,190	5,189	5,188	4,477	4,301	4,155
Adj. R-squared	0.713	0.739	0.774	0.767	0.778	0.774
Year effects	Y	Y	Y	Y	N	N
Bank effects	Y	Y	Y	Y	Y	N
Firm effects	Y	Y	Y	Y	Y	Y
Lender's country effects	N	Y	Y	Y	Y	Y
Borrower's country effects	N	Y	Y	Y	Y	Y
Loan type and purpose effects	N	N	Y	Y	Y	Y
Industry effects	N	N	N	Y	Y	Y
Country-pair effects	N	N	N	Y	Y	Y
Lender's country × year effects	N	N	N	N	Y	Y
Bank × year effects	N	N	N	N	N	Y

**Table A6. Different loan controls**

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the sequential inclusion / exclusion of different loan characteristics as control variables. The dependent variable is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm and year. Different specifications include different loan controls to show that the estimates on the term *Bound*  $\times$  *Sovereign downgrade* are not overly sensitive to the loan controls used. All specifications include year, bank, firm, lender's country, borrower's country, loan type and purpose fixed effects. The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
Bound	-14.048** [-2.140]	-13.583** [-2.099]	-13.817** [-2.111]	-13.501* [-2.017]
Sovereign downgrade	-4.659 [-0.285]	-6.843 [-0.434]	-4.466 [-0.289]	-4.877 [-0.333]
Bound $\times$ Sovereign downgrade	58.263** [2.394]	56.748** [2.417]	58.810** [2.536]	56.489** [2.567]
Loan amount			-10.842*** [-3.754]	-10.730*** [-3.822]
Maturity			0.279** [2.662]	0.290*** [2.881]
Collateral		19.398** [2.691]		16.269*** [2.879]
Number of lenders		-0.082 [-0.288]		0.208 [0.701]
Performance provisions		8.366 [0.684]	7.080 [0.577]	
General covenants		13.446 [1.168]	13.949 [1.184]	
Bank size	1.434 [0.435]	0.203 [0.057]	0.777 [0.217]	0.623 [0.182]
Bank ROA	0.362 [0.167]	-0.127 [-0.060]	-0.128 [-0.067]	0.356 [0.204]
Bank NPLs	-1.729 [-1.481]	-1.852 [-1.686]	-1.922 [-1.581]	-1.583 [-1.300]
Firm size	1.005 [1.148]	1.568 [1.699]	1.159 [1.342]	1.394 [1.506]
Firm ROA	-2.116** [-2.677]	-2.208** [-2.736]	-2.385*** [-2.975]	-2.370*** [-3.064]
Firm debt	0.317 [0.668]	0.260 [0.553]	0.224 [0.484]	0.184 [0.402]
Firm tangibility	0.493 [0.812]	0.512 [0.865]	0.541 [0.867]	0.526 [0.860]
GDP growth	-1.893* [-1.752]	-2.016* [-1.754]	-1.782 [-1.570]	-1.847 [-1.552]
GDP per capita	-0.000 [-0.052]	-0.001 [-0.268]	0.000 [0.007]	-0.000 [-0.164]
Constant	77.643 [0.998]	98.015 [1.152]	290.158** [2.517]	291.234** [2.590]
Observations	5,270	5,270	5,270	5,270
Adj. R-squared	0.760	0.764	0.771	0.773
Fixed effects	Y	Y	Y	Y

**Table A7. Results from extended sample**

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the consideration of an extended sample, where the group of non-bounded firms includes borrowers with any credit rating below the credit rating of their sovereign. The dependent variable is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm *and* year. Each specification includes a different set of fixed effects, as given in the lower part of the table. In all specifications we relax the requirement that non-bounded borrowers must have a credit rating at most two notches below the credit rating of their sovereign and we include all borrowers with a credit rating below their sovereign's. The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Bound	-12.557 [-1.356]	-20.099** [-2.217]	-10.296 [-1.237]	-7.116 [-1.037]	-5.700 [-0.885]	-3.634 [-0.558]
Sovereign downgrade	12.157 [1.191]	9.223 [0.873]	11.072 [1.136]	10.611 [1.011]	12.786 [1.318]	13.450 [1.362]
Bound × Sovereign downgrade	43.687*** [4.073]	41.899*** [3.586]	42.664*** [4.325]	41.478*** [4.007]	35.042*** [2.907]	34.322*** [3.093]
Loan amount	-12.687*** [-7.636]	-11.858*** [-6.795]	-11.679*** [-7.462]	-12.483*** [-8.808]	-12.365*** [-8.162]	-11.862*** [-7.832]
Maturity	0.274*** [4.528]	0.291*** [5.389]	0.116** [2.441]	0.109* [2.044]	0.104* [1.894]	0.106* [1.997]
Collateral	55.348*** [12.493]	54.167*** [11.833]	38.209*** [9.200]	42.887*** [9.607]	43.589*** [9.529]	42.190*** [9.338]
Number of lenders	-1.094*** [-5.290]	-1.011*** [-5.572]	-0.865*** [-5.922]	-0.846*** [-5.550]	-0.864*** [-5.427]	-0.844*** [-5.199]
Performance provisions	-21.687*** [-5.344]	-21.898*** [-5.394]	-19.676*** [-5.966]	-18.613*** [-5.377]	-18.826*** [-5.182]	-17.865*** [-5.199]
General covenants	-5.961 [-1.410]	-6.784 [-1.610]	-3.532 [-1.010]	-2.400 [-0.627]	-2.089 [-0.488]	-2.763 [-0.715]
Bank size	-8.008** [-2.697]	-8.475*** [-3.248]	-10.417*** [-4.768]	-10.778*** [-4.138]	-8.693*** [-3.108]	
Bank ROA	-0.385 [-0.247]	0.134 [0.083]	-0.445 [-0.324]	-0.359 [-0.225]	1.671 [0.910]	
Bank NPLs	1.289 [0.772]	0.802 [0.551]	-0.651 [-0.462]	-0.472 [-0.340]	-0.339 [-0.202]	
Firm size	-0.341 [-0.164]	-0.552 [-0.286]	0.271 [0.206]	1.022 [0.948]	1.212 [1.066]	0.710 [0.556]
Firm ROA	-1.384*** [-3.979]	-1.384*** [-4.044]	-1.297*** [-4.042]	-1.340*** [-3.779]	-1.323*** [-3.573]	-1.276*** [-3.471]
Firm debt	0.387*** [4.198]	0.384*** [4.183]	0.663*** [7.625]	0.617*** [6.579]	0.618*** [6.222]	0.619*** [6.086]
Firm tangibility	0.173 [0.934]	0.204 [1.127]	0.043 [0.281]	0.030 [0.202]	-0.019 [-0.124]	-0.025 [-0.170]
GDP growth	-1.034 [-0.954]	-1.208 [-0.897]	-1.241 [-1.042]	-0.957 [-0.730]	-0.653 [-0.516]	-0.972 [-0.751]
GDP per capita	0.001 [1.425]	-0.002 [-1.413]	-0.003*** [-2.926]	-0.003*** [-2.892]	-0.003** [-2.590]	-0.003** [-2.415]
Constant	501.155*** [9.775]	600.748*** [8.534]	671.196*** [10.809]	693.958*** [10.025]	649.908*** [9.324]	526.016*** [7.098]
Observations	63,277	63,276	63,275	52,269	49,136	48,699
Adj. R-squared	0.650	0.657	0.696	0.691	0.698	0.709
Year effects	Y	Y	Y	Y	N	N
Bank effects	Y	Y	Y	Y	Y	N
Firm effects	Y	Y	Y	Y	Y	Y
Lender's country effects	N	Y	Y	Y	Y	Y
Borrower's country effects	N	Y	Y	Y	Y	Y
Loan type and purpose effects	N	N	Y	Y	Y	Y
Industry effects	N	N	N	Y	Y	Y
Country-pair effects	N	N	N	Y	Y	Y

Lender's country × year effects	N	N	N	N	Y	Y
Bank × year effects	N	N	N	N	N	Y

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**Table A8. Different clustering of standard errors**

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the consideration of different types of clustering of standard errors. The dependent variable is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee and all variables are defined in Table A1. Estimation method is OLS. The lower part of the table denotes the type of standard error clustering (C refers to borrower's country, F refers to firm, L refers to loan, and Y refers to year). All specifications include year, bank, firm, lender's country, borrower's country, loan type and purpose fixed effects. The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)
Bound	-13.281* [-1.908]	-13.281** [-2.309]	-13.281* [-1.772]	-13.281* [-1.818]	-13.281* [-1.799]
Sovereign downgrade	-5.495 [-0.478]	-5.495 [-0.255]	-5.495 [-0.289]	-5.495 [-0.220]	-5.495 [-0.298]
Bound × Sovereign downgrade	56.761** [2.758]	56.761** [2.413]	56.761** [2.201]	56.761** [2.194]	56.761** [2.263]
Loan amount	-10.770*** [-4.555]	-10.770*** [-4.112]	-10.770*** [-3.366]	-10.770*** [-3.702]	-10.770*** [-3.482]
Maturity	0.278*** [2.815]	0.278*** [2.777]	0.278*** [2.826]	0.278*** [2.743]	0.278*** [2.892]
Collateral	16.269*** [3.160]	16.269*** [2.665]	16.269** [2.351]	16.269*** [2.852]	16.269** [2.419]
Number of lenders	0.178 [0.774]	0.178 [0.675]	0.178 [0.862]	0.178 [1.554]	0.178 [0.892]
Performance provisions	6.945 [0.650]	6.945 [0.643]	6.945 [0.595]	6.945 [0.794]	6.945 [0.611]
General covenants	13.298 [1.173]	13.298 [1.571]	13.298 [1.366]	13.298* [1.696]	13.298 [1.410]
Bank size	0.274 [0.073]	0.274 [0.079]	0.274 [0.079]	0.274 [0.085]	0.274 [0.082]
Bank ROA	-0.084 [-0.045]	-0.084 [-0.040]	-0.084 [-0.042]	-0.084 [-0.044]	-0.084 [-0.042]
Bank NPLs	-1.822* [-1.976]	-1.822 [-1.133]	-1.822 [-1.005]	-1.822 [-1.132]	-1.822 [-1.039]
Firm size	1.490 [1.599]	1.490** [2.135]	1.490 [1.373]	1.490 [1.575]	1.490 [1.414]
Firm ROA	-2.434*** [-3.353]	-2.434*** [-3.270]	-2.434*** [-3.211]	-2.434*** [-3.772]	-2.434*** [-3.334]
Firm debt	0.180 [0.411]	0.180 [0.497]	0.180 [0.377]	0.180 [0.546]	0.180 [0.388]
Firm tangibility	0.550 [1.114]	0.550 [0.990]	0.550 [1.024]	0.550 [1.198]	0.550 [1.054]
GDP growth	-1.883 [-1.656]	-1.883* [-1.723]	-1.883 [-1.499]	-1.883* [-1.685]	-1.883 [-1.539]
GDP per capita	-0.000 [-0.172]	-0.000 [-0.225]	-0.000 [-0.181]	-0.000 [-0.254]	-0.000 [-0.186]
Constant	295.695** [2.647]	295.695*** [3.180]	295.695** [2.574]	295.695*** [3.173]	295.695** [2.658]
Observations	5,270	5,270	5,270	5,270	5,270
Adj. R-squared	0.774	0.773	0.773	0.773	0.773
Fixed effects	Y	Y	Y	Y	Y
Clustering	L&Y	L&F	C&Y	C&F	C&F&Y

**Table A9. Weighted least squares**

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the consideration of different weights based on the number of loans between given bank-firm pairs and country-pairs. The dependent variable is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee and all variables are defined in Table A1. Estimation method is weighted least squares with standard errors clustered by firm *and* year. In specification (1), we weight by the number of loans between the lender's country and the borrower's country to the total number of loans in our sample. In specification (2), we employ the weight of specification (1) at the yearly frequency. In specification (3), we weight by the number of loans between the lender and the borrower's country to the total number of loans in our sample. In specification (4), we employ the weight of specification (3) at the yearly frequency. In specification (5), we weight by the number of loans between the lender and the borrower to the total number of loans in our sample. In specification (6), we employ the weight of specification (5) at the yearly frequency. All specifications include year, bank, firm, lender's country, borrower's country, loan type and purpose fixed effects. The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Bound	-13.262* [-2.003]	-13.251* [-2.033]	-13.258* [-2.000]	-13.199* [-2.019]	-13.252* [-2.021]	-13.331* [-2.037]
Sovereign downgrade	-5.522 [-0.369]	-5.762 [-0.378]	-5.439 [-0.360]	-5.232 [-0.345]	-5.503 [-0.364]	-5.544 [-0.370]
Bound × Sovereign downgrade	56.792** [2.558]	56.610** [2.514]	56.730** [2.548]	56.808** [2.524]	56.776** [2.540]	56.879** [2.563]
Loan amount	-10.788*** [-3.889]	-10.884*** [-3.955]	-10.775*** [-3.880]	-10.813*** [-3.905]	-10.736*** [-3.823]	-10.809*** [-3.893]
Maturity	0.278** [2.716]	0.281** [2.748]	0.278** [2.714]	0.283** [2.758]	0.276** [2.694]	0.277** [2.720]
Collateral	16.246** [2.778]	16.104** [2.746]	16.246** [2.774]	16.175** [2.763]	16.319*** [2.789]	16.309*** [2.791]
Number of lenders	0.179 [0.622]	0.196 [0.700]	0.177 [0.616]	0.178 [0.625]	0.190 [0.664]	0.181 [0.631]
Performance provisions	6.909 [0.562]	6.845 [0.557]	6.850 [0.555]	6.812 [0.555]	6.903 [0.562]	7.018 [0.572]
General covenants	13.273 [1.172]	13.283 [1.179]	13.316 [1.178]	13.911 [1.248]	13.279 [1.173]	13.277 [1.171]
Bank size	0.243 [0.067]	0.775 [0.202]	0.354 [0.095]	0.474 [0.128]	0.702 [0.190]	0.306 [0.082]
Bank ROA	-0.031 [-0.016]	-0.029 [-0.016]	0.005 [0.002]	0.158 [0.082]	-0.070 [-0.037]	-0.103 [-0.054]
Bank NPLs	-1.823 [-1.535]	-1.846 [-1.541]	-1.869 [-1.538]	-1.925 [-1.631]	-1.866 [-1.571]	-1.822 [-1.539]
Firm size	1.488 [1.606]	1.350 [1.450]	1.488 [1.626]	1.397 [1.546]	1.442 [1.568]	1.478 [1.614]
Firm ROA	-2.429*** [-3.034]	-2.417*** [-2.999]	-2.430*** [-3.039]	-2.415*** [-3.026]	-2.432*** [-3.059]	-2.432*** [-3.041]
Firm debt	0.179 [0.392]	0.164 [0.361]	0.176 [0.386]	0.172 [0.376]	0.177 [0.388]	0.177 [0.390]
Firm tangibility	0.550 [0.910]	0.562 [0.929]	0.551 [0.915]	0.541 [0.909]	0.554 [0.927]	0.547 [0.905]
GDP growth	-1.880 [-1.607]	-1.898 [-1.628]	-1.883 [-1.604]	-1.941 [-1.647]	-1.910 [-1.630]	-1.899 [-1.596]
GDP per capita	-0.000 [-0.171]	-0.001 [-0.256]	-0.000 [-0.159]	-0.000 [-0.212]	-0.000 [-0.167]	-0.000 [-0.175]
Constant	297.314** [2.576]	299.914** [2.557]	294.989** [2.538]	299.800** [2.580]	291.196** [2.509]	297.227** [2.565]
Observations	5,270	5,270	5,270	5,270	5,270	5,270
Adj. R-squared	0.774	0.774	0.774	0.774	0.774	0.774
Fixed effects	Y	Y	Y	Y	Y	Y

**Table A10. Heckman sample-selection model**

The table reports coefficients and t-statistics [in brackets] from Heckman's (1979) sample-selection model. The distinguishing feature is the estimation of Heckman regressions to control for the probability of a borrower borrowing from the given lender. The dependent variable is in the second line of each panel and all variables are defined in Table A1. Estimation method in Panel A is maximum likelihood and in Panel B is OLS with standard errors clustered by firm *and* year. Panel A reports the estimates from the first-stage probit model to estimate the determinants of the firm's loan-taking decision. The dependent variable in all specifications of Panel A is *Loan deal*, i.e., a binary variable equal to 1 if the given borrower receives a loan from the given lender, and zero otherwise. Panel B reports the estimates from the second-stage OLS regression for the effect of sovereign ceiling on loan spreads. The dependent variable in all specifications of Panel B is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee. Each of the specification in Panel B includes the inverse mills ratio (*Lambda*) from the corresponding specification in Panel A. All specifications in Panel A include year, bank firm, lender's country and borrower's country dummies. All specifications in Panel B include year, bank, firm, lender's country, borrower's country, loan type and purpose fixed effects. The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: The loan-taking decision by the firm

	(1)	(2)	(3)
	Loan deal	Loan deal	Loan deal
Firm size	0.033*** [5.831]	0.045* [1.951]	0.038* [1.694]
Firm ROA	0.025*** [9.587]	0.025*** [8.319]	0.023*** [7.865]
Firm debt	0.007*** [6.592]	0.008*** [7.618]	0.006*** [5.778]
Firm tangibility	0.003*** [4.823]	0.001 [1.435]	0.001 [1.015]
Firm equity		0.079*** [3.488]	0.074*** [3.271]
Loan amount	0.055*** [5.465]	0.033*** [3.078]	0.011 [0.972]
Maturity	-0.004*** [-9.062]	-0.004*** [-9.622]	-0.004*** [-9.907]
Collateral	0.559*** [13.241]	0.597*** [13.964]	0.567*** [13.333]
Number of lenders	0.036*** [25.594]	0.038*** [26.178]	0.036*** [25.362]
Performance provisions	0.683*** [10.348]	0.686*** [10.344]	0.694*** [10.499]
General covenants	0.338*** [5.512]	0.293*** [4.675]	0.284*** [4.537]
Bank size	0.309*** [22.705]	0.301*** [21.988]	0.296*** [21.715]
Bank ROA	0.653*** [18.953]	0.662*** [19.073]	0.673*** [19.199]
Bank NPLs	0.292*** [15.499]	0.292*** [15.230]	0.304*** [15.713]
Bank loans	-1.163** [-2.397]		
Firm loans		-2.562*** [-4.961]	
Bank-firm loans			-496.259*** [-10.511]
Constant	39.896*** [6.359]	30.767*** [4.797]	34.910*** [5.524]
Observations	12,432	12,301	12,301

Panel B: The effect of Bound  $\times$  Sovereign downgrade on loan spreads

	(1)	(2)	(3)
	AISD	AISD	AISD
Bound	-13.199*	-13.591**	-13.638**
	[-2.009]	[-2.146]	[-2.169]
Sovereign downgrade	-5.874	-6.712	-6.713
	[-0.373]	[-0.419]	[-0.429]
Bound $\times$ Sovereign downgrade	57.254**	62.153**	62.171**
	[2.573]	[2.708]	[2.720]
Loan amount	-10.394***	-10.418***	-10.529***
	[-3.654]	[-3.616]	[-3.688]
Maturity	0.252**	0.255**	0.254**
	[2.493]	[2.439]	[2.468]
Collateral	18.867***	18.376***	18.258***
	[2.956]	[2.802]	[2.833]
Number of lenders	0.337	0.317	0.311
	[1.320]	[1.104]	[1.103]
Performance provisions	10.353	10.400	10.512
	[0.744]	[0.771]	[0.788]
General covenants	15.075	14.790	14.800
	[1.311]	[1.269]	[1.272]
Bank size	1.949	0.726	0.664
	[0.613]	[0.220]	[0.198]
Bank ROA	3.884	2.770	2.782
	[1.330]	[1.038]	[1.027]
Bank NPLs	-0.314	-0.068	-0.027
	[-0.188]	[-0.041]	[-0.016]
Firm size	1.636*	1.639*	1.638
	[1.818]	[1.720]	[1.706]
Firm ROA	-2.288***	-2.478**	-2.485**
	[-2.876]	[-2.689]	[-2.706]
Firm debt	0.219	0.068	0.059
	[0.492]	[0.158]	[0.136]
Firm tangibility	0.565	0.624	0.622
	[0.927]	[0.941]	[0.937]
GDP growth	-1.901	-1.867	-1.852
	[-1.617]	[-1.611]	[-1.580]
GDP per capita	-0.000	-0.000	-0.000
	[-0.150]	[-0.067]	[-0.071]
Lambda	10.576	8.686	8.759
	[1.336]	[1.256]	[1.275]
Constant	247.061**	265.607**	269.437**
	[2.391]	[2.397]	[2.421]
Observations	5,270	5,198	5,198
Adj. R-squared	0.774	0.775	0.775

**Table A11. Different macro-controls**

This table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the inclusion of different macroeconomic characteristics as control variables. The dependent variable is the all-in spread drawn (*AISD*), defined as the sum of the spread over LIBOR plus any facility fee and all variables are defined in Table A1. The estimation method is OLS with standard errors clustered by firm *and* year. Each specification includes a different set of macro-level controls. All specifications include year, bank, firm, lender's country, borrower's country, loan type and purpose fixed effects. The \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)
Bound	-13.438** [-2.069]	-13.204* [-2.030]	-7.511 [-1.012]	-13.056* [-1.772]	-13.806* [-1.923]
Sovereign downgrade	-1.734 [-0.095]	-12.063 [-0.865]	-62.393** [-2.398]	-10.971 [-0.591]	-13.446 [-0.794]
Bound × Sovereign downgrade	59.594** [2.748]	60.221*** [2.868]	96.309** [2.745]	46.690** [2.485]	51.750** [2.273]
Loan amount	-10.802*** [-3.956]	-10.633*** [-3.752]	-10.810*** [-3.166]	-11.269*** [-4.042]	-11.230*** [-4.187]
Maturity	0.282** [2.614]	0.282** [2.758]	0.011 [0.074]	0.161 [1.303]	0.275** [2.538]
Collateral	15.957** [2.733]	16.362*** [2.818]	10.838 [1.400]	24.166** [2.441]	14.651** [2.565]
Number of lenders	0.181 [0.631]	0.176 [0.642]	-0.006 [-0.015]	0.110 [0.318]	0.092 [0.312]
Performance provisions	8.092 [0.636]	6.178 [0.507]	15.091 [1.025]	4.526 [0.339]	6.813 [0.547]
General covenants	13.768 [1.187]	13.851 [1.194]	11.612 [0.884]	16.328 [1.225]	15.356 [1.279]
GDP growth	-2.242* [-1.842]	-1.836 [-1.525]	-0.291 [-0.247]	-1.377 [-0.753]	-1.614 [-1.343]
GDP per capita	-0.001 [-0.493]	-0.001 [-0.392]	0.000 [0.073]	-0.001 [-0.383]	-0.002 [-1.347]
Short-term downgrade	-16.905 [-0.787]				
Outlook downgrade		11.172** [2.568]			
Debt-to-GDP			-0.127 [-0.358]		
Inflation			0.786 [1.699]		
Trade balance				-0.000 [-0.292]	
Real rate				2.496** [2.306]	
Polity					-5.840*** [-4.492]
Economic freedom					-1.861** [-2.386]
VIX					-0.103 [-0.204]
Constant	313.492** [2.785]	298.110** [2.643]	242.462 [1.284]	283.377 [1.635]	507.664*** [4.041]
Observations	5,244	5,270	3,343	2,619	5,023
Adj. R-squared	0.777	0.775	0.791	0.792	0.777
Bank and firm controls	Y	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y	Y

**Table A12. Other loan characteristics**

The table reports coefficients and t-statistics [in brackets]. The distinguishing feature is the inclusion of different loan characteristics as dependent variables. The dependent variable is denoted in the second line of the table and all variables are defined in Table A1. Estimation method is OLS with standard errors clustered by firm *and* year. In specification (1), the dependent variable is the all-in spread undrawn (*AISU*), defined as the sum of the facility fee and the commitment fee. In specification (2), the dependent variable is *Loan amount*, defined as the log of the loan facility amount in USD. In specification (3), the dependent variable is *Maturity*, defined as the loan duration in months. In specification (4), the dependent variable is *Collateral*, i.e., a binary variable equal to one if the loan is secured with collateral, and zero otherwise. In specification (5), the dependent variable is *Number of lenders*, i.e., the number of banks involved in the syndicated loan. In specification (6), the dependent variable is *General covenants*, i.e., a binary variable equal to one if the loan has covenants, and zero otherwise. All specifications include year, bank, firm, lender's country, borrower's country, loan type and purpose fixed effects. The \*, \*\*, and \*\*\* marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1) AISU	(2) Loan amount	(3) Maturity	(4) Collateral	(5) Number of lenders	(6) General covenants
Bound	4.186 [1.691]	-0.043 [-0.430]	-0.705 [-0.386]	-0.007 [-0.204]	-1.429 [-1.480]	-0.002 [-0.140]
Sovereign downgrade	-2.905 [-0.802]	-0.016 [-0.120]	-4.437 [-0.921]	0.079 [1.153]	-1.182 [-0.564]	-0.037 [-1.081]
Bound × Sovereign downgrade	8.149* [1.812]	0.026 [0.133]	-7.537 [-1.386]	0.064 [0.831]	1.970 [0.836]	0.041 [1.029]
AISD	0.109** [2.657]	-0.003*** [-3.530]	0.033** [2.302]	0.001*** [3.159]	0.006 [0.579]	0.000 [1.416]
Loan amount	-0.083 [-0.127]		-0.047 [-0.077]	-0.028* [-1.857]	2.673*** [5.838]	0.006 [0.656]
Maturity	0.050*** [2.907]	-0.000 [-0.076]		-0.000 [-0.147]	-0.001 [-0.078]	0.000 [0.845]
Collateral	1.485 [0.599]	-0.223 [-1.621]	-0.325 [-0.151]		0.665 [0.299]	0.008 [0.304]
Number of lenders	0.152* [1.999]	0.024*** [3.621]	-0.004 [-0.082]	0.001 [0.302]		0.001 [1.010]
Performance provisions	-0.160 [-0.073]	0.009 [0.081]	4.200 [1.615]	-0.039 [-1.290]	3.703*** [3.755]	0.146*** [3.691]
General covenants	2.449 [0.743]	0.095 [0.647]	2.184 [0.879]	0.017 [0.304]	1.208 [1.029]	
Constant	3.751 [0.119]	19.917*** [16.841]	46.513** [2.359]	-0.274 [-0.501]	-21.719 [-0.927]	-0.104 [-0.228]
Observations	1,301	5,270	5,270	5,270	5,270	5,270
Adj. R-squared	0.923	0.733	0.709	0.589	0.648	0.572
Bank, firm, and macro controls	Y	Y	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y	Y	Y