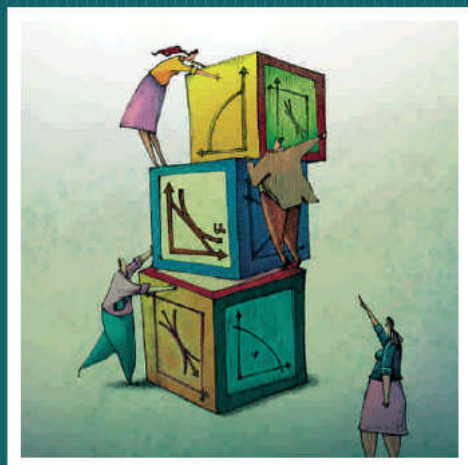


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Nº 299 **SOVEREIGN CEILINGS “LITE”? THE IMPACT OF SOVEREIGN RATINGS
ON CORPORATE RATINGS**

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Sovereign Ceilings “Lite”? The Impact of Sovereign Ratings on Corporate Ratings

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ABSTRACT

Although credit rating agencies have gradually moved away from a policy of never rating a corporation above the sovereign (the ‘sovereign ceiling’), it appears that sovereign credit ratings remain a significant determinant of corporate credit ratings. We examine this link using data for advanced and emerging economies over the period of 1995-2009. Our main result is that a sovereign ceiling continues to affect the rating of corporations. This effect is robust to a broad range of alternative specifications.

JEL CODE: G1; G2; G3

KEYWORDS: CREDIT RISK; SOVEREIGN RISK; CREDIT RATINGS; SOVEREIGN CEILING

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Until 1997, Standard & Poor's (S&P) never granted credit ratings to private companies that were higher than the ratings given to the debt issues by the sovereign, a policy that was termed the 'sovereign ceiling.' S&P first relaxed the policy in three dollarized economies: Argentina, Panama, and Uruguay. The reasoning was that in a highly (or fully) dollarized economy, the government would be less likely to impose capital controls in the event of a sovereign default, and the credit rating of private issuers would not be affected by a potential sovereign default (Standard & Poor's (1997)). Although the credit rating agencies have gradually relaxed the sovereign ceiling policy and some private-sector borrowers receive credit ratings higher than those of the governments of their countries, the rating agencies recognize that the sovereign rating is still an important consideration in determining private ratings.

In this paper, we use a new dataset of corporate and sovereign credit ratings over the period of 1995-2009 to investigate whether a *de facto* sovereign ceiling policy has persisted since its relaxation in 1997. Our results are consistent with a sovereign ceiling 'lite' policy or ceiling that is not an absolute constraint, but a limitation that tends to decrease corporate ratings when these ratings are likely to be above the sovereign rating. We find a positive impact of sovereign credit ratings on corporate credit ratings, which is significant even after controlling for firm-level financial indicators of creditworthiness and macroeconomic conditions in the country. This effect is robust to different samples, to including firm- and time-fixed effects and to instrumenting for sovereign credit ratings. The influence of sovereign credit ratings on corporate credit ratings is stronger for firms in emerging economies and firms producing non-tradable goods that have cash flows in domestic currency. In addition, we report a non-parametric analysis and a powerful set of asymmetries and non-linear effects that are consistent with a sovereign ceiling lite policy.

Although a sovereign ceiling policy usually has a greater effect on firms in emerging economies where the sovereign rating is relatively low, the debt crisis in Europe has also highlighted the importance of considering sovereign risk as a significant factor in the pricing of corporate debt in advanced economies that are under distress.¹ Therefore, a sovereign ceiling constitutes a potential source of negative externality for the private sector in both emerging economies and distressed advanced economies. In the short term, governments need to be aware of the potential effects of rating announcements on private debt. In the medium term, they should factor these externalities into their decisions on external borrowing.

Despite a rich body of research on the link between sovereign and corporate credit risk, there has not been an explicit test for the existence of a *de facto* sovereign ceiling policy in credit ratings for the period post-1997. Using a dataset covering the period from 1990 to 1999, Ferri, Lui and Majnoni (2001) find a significant positive correlation between the changes in private credit ratings and the changes in sovereign credit ratings, although they do not control for firm-level and country-level variables. This correlation is higher in emerging economies and for rating downgrades. Ferri and Liu (2002) show, using credit ratings for the period from 1997 to 1999, that sovereign ratings have a significant effect on private ratings in emerging market economies even after controlling for firm-level financial indicators, which were specified in a weighted average aggregate form. However, this indicator of creditworthiness at the firm level was generally statistically insignificant. Durbin and Ng (2005) explore whether a sovereign ceiling policy was reflected in corporate bond spreads. They find

¹ On January 13, 2012, S&P lowered the long-term ratings on Cyprus (from BBB to BB+), Italy (from A to BBB+), Portugal (from BBB- to BB), Spain (from AA- to A), Austria (from AAA to AA+), France (from AAA to AA+), Malta (from A to A-), Slovakia (from A+ to A), and Slovenia (from AA- to A+). Thus, the sovereign ratings of several advanced European countries moved to levels at which the sovereign ceiling may imply a significant burden on the private sector.

that, in many cases, corporate bonds traded at spreads that were narrower than those of the sovereign and that this happened more often for firms with high export earnings or an ownership link with either a foreign corporation or the home government. Cavallo and Valenzuela (2010) show that sovereign bond spreads in emerging economies increase corporate bond spreads, even after controlling for firm-level performance indicators and country-specific macroeconomic conditions.

This paper contributes to the literature on corporate credit ratings in two ways. First, it explicitly explores the sovereign ceiling policy using credit rating data that cover a long period after the relaxation of this policy by S&P in 1997. This paper presents a nonparametric test and a set of asymmetries and non-linear effects on the sovereign-private rating correlation, which help to characterize the influence of the sovereign ceiling in a lite version. Second, this paper comprehensively examines the determinants of corporate credit ratings. It simultaneously controls for firm-level financial variables and macroeconomic conditions in the country when estimating the impact of sovereign ratings on private firms' ratings. In contrast to Ferri and Liu (2002), firm-level variables are included in the regressions individually rather than as an aggregate to use the explanatory power of these variables more efficiently.

Because of the role of credit ratings in financial markets, knowledge of their main determinants, including the sovereign ceiling policy, has important implications for investors and firm managers. Credit ratings are one of the main determinants of corporate bond spreads (Campbell and Taksler (2003) and Covitz and Downing (2007)). In addition, credit ratings categories impose different costs on the firm. For example, as Kisgen (2006) argues, "A firm's rating affects operations of the firms, access to other financial markets such as commercial paper, disclosure requirement for bonds..., and bond covenants, which can contain ratings triggers whereby a ratings change can result in changes in coupon rates or a forced repurchase of the bond." Finally, credit ratings matter in a

number of other contexts. For example, some regulations concerning investments in bonds depend upon credit ratings and affect not only the pool of international investors that firms can access but also their cost of debt capital (Kisgen and Strahan (2010)).

This paper is organized as follows: Section I provides some background information about sovereign and corporate credit ratings and the sovereign ceiling. Section II describes our dataset. Section III reports the empirical methodology and our main results. Section IV concludes this paper.

I. Sovereign and Corporate Credit Ratings and the Sovereign Ceiling

There are at least three reasons to expect a positive correlation between sovereign and corporate credit ratings. The first reason relates to the country-specific macro-level vulnerabilities that make both forms of debt risky. Exposure to large external shocks (via terms of trade, for example) is one such source of vulnerability. Increasing the variance of profits for firms and the tax receipts for governments with higher macro-level volatility increases the probability of default. Note that this macro-level vulnerability introduces an unconditional positive correlation between the probabilities of default by a government and a private corporation. However, despite this correlation, there is no reason why private debt should be riskier on average than government debt.

The second reason for a positive correlation is the ‘spillover’ effect from the sovereign default to private debtors. A sovereign in default may undertake measures that directly affect the private sector’s ability to repay. Inflationary financing and tax increases are both examples of spillovers. Sovereign default may also have a direct impact on private-sector solvency and liquidity by generating a credit crunch in both domestic and international financial markets as agents exposed to

sovereign debt react to the direct effects of the sovereign default on their net worth.² This spillover effect generates a positive correlation between the probabilities of sovereign and corporate default; firms in countries with riskier governments, *ceteris paribus*, should be more risky than their counterparts in countries with safer government debt. Despite this correlation, there is no reason *a priori* why a firm may not have a lower default risk and, hence, a better rating than its sovereign.

The final reason for the positive correlation between corporate and sovereign credit ratings is the imposition of direct capital controls or other administrative measures that effectively prevent private borrowers from servicing their external obligations when the sovereign reaches a situation of default or near-default. If the sovereign defaults, the private sector must also default on the external debt because it cannot access the dollars it needs and/or get them out of the country. Imposing these restrictions implies that private debt will always be riskier than sovereign debt.³

The first and second reasons imply a positive *correlation* between corporate and sovereign credit ratings, but no sovereign ceiling. On average, firms in countries with riskier governments will be riskier, but there is no reason why they could not have a higher rating than the government does. The third reason, by contrast, provides a rationale for a sovereign ceiling.

Figure 1 illustrates the sovereign ceiling and the relationship between corporate and sovereign credit ratings granted by S&P. These ratings are mapped onto 21 numerical categories, with 21 corresponding to the highest rating (AAA) and 1 to the lowest rating (D) (Appendix 1). Whereas

² The issue of contagion ‘via Wall Street’ has received considerable attention recently (Calvo (2005)). Recent research on institutional determinants of contagion confirms this view by linking financial contagion to characteristics of developed economy markets and investors. Private-sector borrowing may be contaminated by a sovereign default if they both belong to a particular asset class (Rigobon (2001)) or share a set of overexposed mutual funds (Borensztein and Gelos (2003)).

³ Prati et al. (2012) find a strong positive effect of capital account liberalization on corporate credit ratings. They also find that liberalizing the capital account benefits significantly more those firms with more limited foreign currency access, namely, those producing non-tradables.

Figure 1a shows that corporate ratings never exceeded the sovereign level until 1996, Figure 1b shows that a small number of corporate credit ratings started to pierce the sovereign ceiling after 1997. In the period after 1997, 81 percent of the corporations received a rating lower than the sovereign, 13 percent received the same rating and just 6 percent received a rating higher than the sovereign. Figures 1c and 1d divide the sample into emerging and developed economies, respectively. It is clear from these figures that a sovereign ceiling is much more significant for firms in emerging economies where the sovereign ratings are relatively low. The fraction of firms that received the same rating as their sovereign was larger in emerging countries than in developed countries.

[Insert Figure 1 about here.]

II. Sample Characteristics and Data Description

This section presents the data that we use to explore whether a sovereign ceiling policy persisted since S&P relaxed this policy in 1997. The dataset contains corporate and sovereign credit ratings and accounting variables for every publicly traded non-financial firm with an S&P foreign-currency credit rating available from Bloomberg in June 2005 (except firms that were located in countries with a time-invariant sovereign foreign-currency credit rating of AAA during the whole period under study).⁴ The following countries were excluded from the dataset: Austria, Germany, France,

⁴ The dataset used in this paper was constructed in June 2005 and updated in June 2009. Therefore, it does not include firms that were granted a credit rating for the first time after June 2005. To reduce concerns with sample selection bias, we replicate all our specifications using firm fixed effects.

the United Kingdom, Liechtenstein, Luxemburg, the Netherlands, Norway and the United States. Table I presents the descriptive statistics for the main variables that we used in this work.

[Insert Table I about here.]

To reduce the potential for errors in data coding, we eliminated all firm/year observations where accounting variables exceeded the sample mean by more than six standard deviations (about one percent of the total sample). The final sample is an unbalanced panel of 478 non-financial corporations from 29 countries, including 14 developed and 15 emerging economies.⁵ Thus, our dataset is representative of the whole universe of publicly traded firms that are located in less developed economies and issued corporate bonds. Our sample size is similar to those of other studies using comprehensive corporate credit rating data (e.g., Ferri, Liu and Majnoni (2001)).

A. Foreign-Currency Corporate Credit Ratings

Our main dependent variable is the foreign-currency long-term corporate credit rating issued by S&P. We only use these ratings to avoid inconsistencies that arise from different types of debt issues. Moreover, international debt issues tend to be denominated in foreign currency (Eichengreen, Hausmann, and Panizza (2001); Gozzi et al. (2012)).

Standard and Poor's (2001a) defines a Foreign Currency Credit Rating as "current opinion of a obligor's overall capacity to meet its foreign-currency-denominated financial obligations. It may take

⁵ The countries included in our final sample are: Argentina, Australia, Belgium, Brazil, Canada, Chile, China, Colombia, the Czech Republic, Denmark, Finland, Hungary, India, Indonesia, Ireland, Italy, Japan, Lithuania, Malaysia, Mexico, New Zealand, Peru, the Philippines, Poland, Portugal, Spain, Sweden, Taiwan and Thailand.

the form of either an issuer or an issue credit rating. As in the case of local currency credit ratings, a foreign currency credit opinion on Standard and Poor's global scale is based on the obligor's individual credit characteristics, including the influence of country or economic risk factors. However, unlike local currency ratings, a foreign currency credit rating includes transfer and other risks related to sovereign actions that may directly affect access to the foreign exchange needed for timely servicing of the rated obligation. Transfer and other direct sovereign risks addressed in such ratings include the likelihood of foreign-exchange control and the imposition of other restrictions on the repayment of foreign debt."

To calculate a quantitative measure for corporate and sovereign credit ratings, we followed the existing literature and mapped the credit rating categories into 21 numerical values, where the values 21 and 1 corresponded to the highest and lowest ratings, respectively (Cantor and Packer (1996) and Reinhart (2002)). An explanation of this scale and descriptions of the rating categories are presented in Appendix 1.

B. Foreign-Currency Sovereign Credit Ratings

Our main independent variable is the foreign-currency long-term sovereign credit rating issued by S&P, which is an assessment of the probability of default by government debt. The credit rating agencies define government default as (i) a missed payment or (ii) a distressed debt exchange that implies a diminished financial obligation by the government. The credit rating agencies state that they rate a sovereign bond by evaluating a large number of economic and political factors over a 5-year horizon and making qualitative and quantitative assessments. However, Cantor and Packer (1996) find that over 90 percent of the variance of sovereign ratings assigned by Moody's and S&P is explained by eight variables: per-capita income, GDP growth, inflation, fiscal balance, current

account balance, debt-to-export ratio, an indicator variable of an advanced economy, and an indicator variable of default since 1970.

C. Other Corporate Credit Rating Determinants

To control for variables that could affect corporate credit ratings directly, we include a broad set of variables at the firm and macro levels. The choice of our firm-level variables is based mainly on the literature about discriminant analysis and the determinants of corporate credit ratings (Altman (2000)). We consider variables that capture the profitability of a firm (the ratio of earnings before interest and taxes (EBIT) to assets and the ratio of retained earnings to assets), leverage (ratio of equity to capital), liquidity (ratio of working capital to assets), interest coverage (ratio of EBIT to interest expense) and size (total assets).⁶

As discussed above, sovereign and corporate credit ratings correlate when macroeconomic variables increase the risk of both public and private debt. Omitting these variables would bias the estimate of the influence of a sovereign ceiling on private ratings. To address this issue, our baseline specification also includes a set of macroeconomic variables that have been shown in the literature to correlate with sovereign credit ratings. Macroeconomic controls include per-capita GDP, GDP growth, growth volatility, inflation, and current accounts.⁷ Appendix 2 describes these variables and their sources in detail.

⁶ For the size of the firms, we deflate asset data to 2000 values using December-to-December changes in the consumer price index (CPI), then convert them to U.S. dollars using the market exchange rate for December 2000.

⁷ In unreported regressions, we also include the ratio of external debt to exports. Although our results remain unchanged when this ratio is included, we do not consider it in our basic regressions because our sample size drops considerably.

III. Empirical Analysis and Main Results

A. Nonparametric Analysis

The frequency distribution of corporate credit ratings provides a direct window into the question of whether a *de facto* sovereign ceiling policy has persisted even after its relaxation in 1997. This approach is inspired by nonparametric tests of whether the constraints are binding. The premise is that if no sovereign ceiling is binding, then the corporate ratings should have a smooth distribution. In contrast, a cluster of corporate ratings around the sovereign rating would be evidence of a binding sovereign ceiling. Figure 2 plots the histogram of the gap between corporate and sovereign ratings in the period from 1998 to 2009, after the relaxation of the sovereign ceiling policy. The large spike at 0 is evidence of clustering around the sovereign rating and provides preliminary evidence of a persistent sovereign ceiling effect.

B. Baseline Regressions

We begin our regression analysis by measuring the effect of the sovereign credit ratings on the corporate credit ratings when appropriately controlling for other factors that can have a direct effect on corporate ratings. Our baseline specification posits that the credit rating Rtg_{isct} of firm i belonging to industry s in country c during period t is given by

$$Rtg_{isct} = \alpha + \mathbf{A}_s + \mathbf{B}_c + \mathbf{C}_t + \lambda X_{it} + \gamma Z_{ct} + \delta \text{Sov_Rtg}_{ct} + \mu_{isct} \quad (1)$$

where the subscript “ $isct$ ” refers to firm i , industry s , country c , and time t . \mathbf{A}_s , \mathbf{B}_c , and \mathbf{C}_t are vectors of industry, country, and year dummy variables, respectively, that account for industry, country, and year fixed effects. X_{it} are firm-level determinants of idiosyncratic risk, Z_{ct} are country-level

macroeconomic variables that affect the risk level of all firms in the economy, and Sov_Rtg_{it} is the sovereign credit rating. The parameter of interest in this estimation is δ .

Our baseline specification includes industry fixed effects to control for average industry-level characteristics, country fixed effects to control for average country-level characteristics, and time fixed effects to control for global factors such as global financial crises or the world business cycle. We also estimate all of our specifications including firm fixed effects, instead of industry and country fixed effects, to control for average firm-level characteristics. Thus, these firm fixed effects control for endogeneity that arises from time-invariant firm heterogeneity.

Table II reports the results from estimating our baseline regressions by ordinary least squares with clustering of the errors by country and year. Column 1 reports the results from our regression with industry, country and year fixed effects. Column 2 reports the results from our regression with firm and year fixed effects. We find a significant positive correlation between sovereign and corporate credit ratings. The estimated coefficient implies that increasing the sovereign rating by two or three units has the effect of increasing the average corporate rating by one unit.

[Insert Table II about here.]

As suggested by Figures 1c and 1d, a sovereign ceiling seems to be much more of an issue for firms in emerging economies than for firms in advanced economies because sovereign credit ratings for emerging economies are much lower than the ratings for advanced economies. In columns 3 and 4 of Table II, we test this argument by re-estimating our two previous specifications with an interaction term between the sovereign rating and a dummy variable that takes a value equal to one for advanced economies. We find that the effect of sovereign credit ratings is stronger in emerging

countries than in advanced countries. This result is consistent with previous results by Ferri, Liu and Majnoni (2001), although our specification is more complete in the sense that we control for firm- and country-level variables.

We also expect firms whose output is oriented to the domestic market to be more sensitive to sovereign risk as the macroeconomic impact of sovereign default may take a higher toll on them. Furthermore, these firms are more vulnerable to the imposition of capital controls because they do not have direct foreign currency earnings. To explore this hypothesis, columns 5 and 6 augment our baseline regressions with an interaction term between the sovereign rating and a dummy variable that takes the value one for firms in the tradable sector. The significant negative coefficient for the interaction term suggests that, as expected, the firms in the non-tradable sector are more sensitive to sovereign default risk than the firms in the tradable sector are.

In all our regressions, most control variables have strong explanatory power in the expected directions. Among the firm-level variables, there is a positive correlation between the private ratings and the two measures of profitability (retained earnings and current earnings), debt coverage (EBIT to interest expense) and size. Our measure of leverage (equity to assets) is positively correlated with ratings. With regard to the macroeconomic variables, we find that inflation and GDP volatility have negative impacts on corporate credit ratings. Corporations in countries with higher rates of growth of the GDP receive better ratings, and corporations from countries with higher current account deficits receive lower average ratings. Finally, the significant negative coefficients for per-capita GDP confirm that more firms with ratings below the sovereign rating are present in high-income countries (recall Figures 1c and 1d).

C. Sovereign and Corporate Credit Ratings' Correlation over Time

As a consequence of the abolishment of the sovereign ceiling policy by S&P in 1997, we should observe a decline in the magnitude of the correlation between the sovereign credit ratings and the corporate credit ratings over time. In Table III, we test whether the data exhibit this decline by re-estimating our baseline specifications and adding interaction terms between the sovereign rating and year dummies post-1995. The positive coefficient for the sovereign rating variable and the negative coefficients for the interaction terms suggest that there has been a decline in the influence of the sovereign ratings on the corporate ones. The increasing absolute values of the coefficients associated with the interaction terms indicate that the relaxation of the sovereign ceiling policy has been gradual. Note that most of the coefficients for the interaction terms in column 1 are statistically significant at standard levels of confidence. Column 2 reports a similar pattern, although the results are not as significant. In Figure 3, we display the total magnitude of the correlation between sovereign ratings and corporate ratings by year. The figure shows that both specifications (i.e., the one including industry and country fixed effects and the one including firm fixed effects) indicate that the sovereign ceiling policy has been relaxed over time. Although the figure suggests a declining trend in the correlation between sovereign and corporate ratings, there appears to be an inflexion point in this trend approximately 2006. This reversal may be caused by the risks associated with the financial crisis of 2007 to 2009, which increased the probability of a possible reversal in the process of capital liberalization around the world.

[Insert Table III about here.]

[Insert Figure 3 about here.]

D. Asymmetries

This section presents a set of asymmetries, which are consistent with our sovereign ceiling lite hypothesis. We conduct this analysis using data over the period of 1998-2009, which is after the relaxation of the sovereign ceiling policy. The results offer additional evidence to support our sovereign ceiling lite hypothesis for a ceiling that does not impose an absolute constraint but tends to reduce corporate ratings, when these ratings are above the sovereign rating.

If the impact of the sovereign ratings on the private ratings is caused by spillovers or common macroeconomic effects, then this effect should be symmetric. Upgrades and downgrades should have the same effects and affect firms in all credit rating categories in a similar way. Table IV contains a set of asymmetries that address these issues. We begin by analyzing whether the impact of the sovereign ratings on corporate ratings is different for upgrades and downgrades of the sovereign. We estimate our baseline specification in first differences and allow for differentiated effects of the changes in sovereign rating that are positive and negative. In addition to sovereign rating changes, we introduce a dummy variable that equals 1 in the presence of a sovereign credit rating upgrade. The negative coefficient on the interaction term in column 1 of Table IV indicates that the effect is indeed larger for sovereign downgrades and smaller for sovereign upgrades.

[Insert Table IV about here.]

Column 2 allows the effect of changes in the sovereign rating to differ between those firms that hit the ceiling (had ratings equal to that of the sovereign) and those that did not in the previous period. Spillovers or common macro effects imply that all firms should be affected equally by the sovereign rating change, but the estimated coefficients suggest that this is not the case. Sovereign rating changes have a larger effect on firms whose ratings are the same as the sovereign rating.

Column 3 reports a regression that simultaneously incorporates all of the asymmetries and allows for differential impacts in advanced and emerging economies. The negative coefficient for the interaction between the sovereign rating changes and the dummy variable for developed economies is consistent with the fact that a sovereign ceiling policy is a much less significant issue for firms in advanced economies, where the sovereign ratings are relatively high. Finally, columns 4, 5 and 6 replicate our previous specifications using firm fixed effects instead of industry and country fixed effects. Overall, our main results remain qualitatively unchanged.

E. Non-linear Effect

Figure 5 attempts to define the non-linear effect of a sovereign ceiling policy by using a systematic framework. First, we used the values of the parameters that were estimated for firms in a sub-sample of countries with the AAA sovereign rating (these firms are thus unconstrained by sovereign ceilings), and we forecast the ratings for the firms in non-AAA countries. If a sovereign ceiling does not exist, there should be a one-to-one relationship between the actual and the predicted corporate ratings (solid line). A strict sovereign ceiling would create a constraint where no firm is rated above the sovereign (dotted line). The shaded area depicts a sovereign ceiling lite situation. To implement this framework, we estimated the following equation for the period of 1998–2009:

$$Rtg_{isct} = \alpha + \beta_0 \hat{Rtg}_{isct} + \beta_1 (\hat{Rtg}_{isct} - Sov_Rtg_{ct}) I[\hat{Rtg}_{isct} \geq Sov_Rtg_{ct}] + \beta_2 I[\hat{Rtg}_{isct} \geq Sov_Rtg_{ct}] + \mu_{it} \quad (2)$$

where \hat{Rtg}_{isct} is the predicted corporate rating using the coefficients obtained for firms in triple-A countries (no sovereign ceiling). If there is no sovereign ceiling effect, then β_0 would equal 1 and β_1 would equal 0. If there is an absolute sovereign ceiling, then $\beta_0 = 1$, $\beta_1 = -1$. If there is a sovereign

ceiling lite, then $\beta_0 = 1$ and $-1 < \beta_1 < 0$. The last term in the equation is included to ensure that the estimate of β_1 is not biased. Table V reports the coefficients and robust standard errors estimated from equation (2). The results are broadly compatible with a sovereign ceiling lite hypothesis.

[Insert Figure 5 about here.]

[Insert Table V about here.]

IV. Additional Robustness Checks

This section performs a set of specifications to check that our baseline results are not driven by potential endogeneity. Table VI reports different estimation methodologies and samples to evaluate the specification that was reported earlier in Table II (column 1). Column 1 of Table VI replicates our baseline specification using the lagged firm-level variables and the lag of the sovereign credit rating. Column 2 reports our baseline specification using a two-stage least-squares (2SLS) estimator where the average sovereign rating for all countries with a particular degree of development (i.e., developed economies or emerging economies) is used as an instrument for the sovereign rating in a particular country.⁸ This instrument is likely to be more strongly correlated with the sovereign rating than the cross-country variables, such as colonial or legal origins and geographic variables as it exhibit some variation over time. Moreover, the average sovereign credit rating is more likely to be exogenous than the lagged sovereign credit ratings are because the latter rely on exogeneity over time that is unlikely to exist. In columns 3 and 4, we divide our sample into subsets of companies

⁸ This instrument is similar in spirit to the instrument that was used by Honig (2008). Honig used an instrument for capital account liberalization with the average level of openness of other countries to capture the ‘fad’ element in financial liberalization.

with asset sizes below and above the median to check whether our results are driven by reverse causality. The argument for this test is as follows: if firms reach a situation of default, this situation could affect the revenues of the government (or expenditures during a bailout) and increase the probability of sovereign default. Under the premise that larger firms are more likely than smaller firms to affect the fiscal situation of the government, we divide our sample according to the sizes of the firms. Overall, the results in Table VI show that sovereign credit ratings have a positive and highly significant impact on corporate credit ratings and that this result is unlikely to be driven by endogeneity.

V. Conclusions

This paper shows that a *de facto* sovereign ceiling policy on credit ratings has persisted since it was relaxed in the late 1990s. A powerful set of analyses suggests the presence of a sovereign ceiling lite policy that is not an absolute constraint, but a limitation that tends to reduce corporate ratings, when these ratings are above the sovereign rating. Although a sovereign ceiling is much more of an issue in emerging economies that tend to have a low sovereign rating, in view of the recent debt crises in Europe a sovereign ceiling policy may also have important implications for advanced economies under distress. In the short term, governments need to be aware of the potential effects of ratings announcements; in the medium term, they should factor externalities into their decisions about external borrowing. Although the economic impact of sovereign credit risk on corporate credit risk through a sovereign ceiling channel seems to be important, prior empirical studies have not included an explicit evaluation of this channel.

Appendix 1

Scale of Standard and Poor's Foreign Currency Debt Rating

This table defines the credit rating categories. The credit ratings categories are mapped into 21 numerical values; the 21 and 1 correspond to the highest (AAA) and the default (SD/D) categories, respectively.

Interpretation	Rating	Assigned value
INVESTMENT-GRADE RATINGS		
Highest quality	AAA	21
High quality	AA+	20
	AA	19
	AA-	18
Strong payment capacity	A+	17
	A	16
	A-	15
Adequate payment capacity	BBB+	14
	BBB	13
	BBB-	12
NONINVESTMENT-GRADE RATINGS		
Likely to fulfill obligations, ongoing	BB+	11
	BB	10
	BB-	9
High-risk obligation	B+	8
	B	7
	B-	6
Currently vulnerable nonpayment obligation	CCC+	5
	CCC	4
	CCC-	3
Highly vulnerable to nonpayment	CC/C	2
Default	SD/D	1

Appendix 2

Description of Variables

This table describes the variables that are used in our analysis. The names, definitions, units and sources of the variables are listed.

Variable Name	Definition	Unit of Measurement	Data Sources
Sovereign Rating	Ratings assigned as of June 15 by S&P	AAA=21;.....D=1	S&P
Corporate Rating	Ratings assigned as of June 15 by S&P	AAA=21;.....D=1	S&P
EBIT/Assets	EBIT to total assets	Percent	Bloomberg
Retained earnings/Assets	Retained earnings to total assets	Percent	Bloomberg
Working Capital/Assets	Working capital to total assets	Percent	Bloomberg
Equity/Capital	Equity to capital	Percent	Bloomberg
EBIT/Interest expense	EBIT to interest expense	Percent (in natural logarithms)	Bloomberg
Size Assets	Total assets	Millions of US\$ of 2000 is deflated by the CPI (in natural logarithms)	Bloomberg
Inflation	Annual consumer price inflation rate	Percent	WDI
Current Account	Current account relative to GDP	Percent	WDI
Growth GDP	Annual real GDP growth	Percent	WDI
GDP per capita	GDP per capita	Millions of US\$ of 2000 (in natural logarithms)	WDI
Volatility GDP	Variance 10 year GDP growth	Variance 5 years	WDI
Advanced	IMF classification	Advanced=1 ; Developing=0	IMF

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Table I
Descriptive Statistics

This table presents descriptive statistics for the variables in the empirical model. The sample is split into developed and emerging market economies.

Variables	Developed economies	Emerging economies
Sovereign ratings	19.54	11.80
Corporate ratings	14.17	10.55
EBIT/Assets	7.39	9.83
EBIT/Interest expense	7.58	7.31
Retained earnings/Assets	19.23	18.76
Working Capital/Assets	7.61	5.14
Equity/Capital	55.17	54.25
Size	4.21	3.35
Number of corporations	389	89
Number of countries	14	15
Observations	2809	877

Table II
Sovereign and Corporate Credit Ratings

This table reports the parameter estimates for the impact of sovereign credit ratings on corporate credit ratings, controlling for firm-level performance indicators and macroeconomic conditions. The sample covers the period of 1995-2009 for 14 developed economies and 15 emerging-market economies. The labels, *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively. Robust standard errors, clustered by country-year groups, are given in parentheses.

Corporate Rating	(1)	(2)	(3)	(4)	(5)	(6)
EBIT/ Assets	0.082*** (0.009)	0.037*** (0.007)	0.083*** (0.009)	0.043*** (0.006)	0.072*** (0.009)	0.036*** (0.007)
EBIT/ Interest Expense	0.368*** (0.089)	0.221*** (0.061)	0.343*** (0.085)	0.142** (0.056)	0.391*** (0.091)	0.199*** (0.060)
Retained Earnings/ Assets	0.027*** (0.004)	0.014*** (0.004)	0.027*** (0.004)	0.013*** (0.004)	0.027*** (0.004)	0.014*** (0.004)
Working Capital/ Assets	-0.013*** (0.003)	0.012*** (0.005)	-0.014*** (0.003)	0.012** (0.005)	-0.014*** (0.003)	0.012*** (0.005)
Equity/ Capital	0.035*** (0.004)	0.022*** (0.004)	0.035*** (0.004)	0.022*** (0.003)	0.035*** (0.004)	0.022*** (0.004)
Size	0.943*** (0.059)	0.644*** (0.091)	0.953*** (0.059)	0.655*** (0.089)	0.946*** (0.059)	0.634*** (0.091)
GDP per capita	-0.914*** (0.289)	-0.598* (0.355)	-0.926*** (0.270)	-0.604** (0.300)	-0.967*** (0.275)	-0.621* (0.346)
Inflation	-0.023* (0.012)	-0.023* (0.012)	-0.009 (0.013)	0.001 (0.014)	-0.026** (0.011)	-0.023* (0.012)
Current Account/GDP	0.077*** (0.015)	0.062*** (0.016)	0.076*** (0.014)	0.059*** (0.014)	0.076*** (0.015)	0.062*** (0.015)
Growth GDP	0.044* (0.023)	0.074*** (0.026)	0.024 (0.022)	0.041* (0.022)	0.038* (0.021)	0.069*** (0.025)
Volatility GDP	-1.987*** (0.553)	-2.228*** (0.556)	-1.597*** (0.523)	-1.522*** (0.478)	-1.984*** (0.517)	-2.224*** (0.543)
Sovereign Rating	0.453*** (0.043)	0.311*** (0.059)	0.590*** (0.061)	0.552*** (0.065)	0.528*** (0.044)	0.417*** (0.083)
Sovereign Rating x Advanced			-0.267*** (0.080)	-0.527*** (0.077)		
Sovereign Rating x Tradable					-0.144*** (0.021)	-0.215*** (0.081)
Observations	3686	3686	3686	3686	3686	3686
R-squared	0.692	0.921	0.693	0.925	0.697	0.922
Firm Fixed Effects	NO	YES	NO	YES	NO	YES
Industry Fixed Effects	YES	NO	YES	NO	YES	NO
Country Fixed Effects	YES	NO	YES	NO	YES	NO
Time Fixed Effects	YES	YES	YES	YES	YES	YES

Table III
Sovereign and Corporate Credit Ratings over Time

This table reports the parameter estimates for the impact of sovereign credit ratings on corporate credit ratings, controlling for firm-level performance indicators and macroeconomic conditions. The sample covers the period of 1995-2009 for 14 developed economies and 15 emerging-market economies. The labels, *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively. Robust standard errors, clustered by country-year groups, are given in parentheses.

Corporate Rating	(1)	(2)
Sovereign Rating	0.542*** (0.072)	0.305*** (0.074)
Sovereign Rating x 1(1996)	-0.076 (0.074)	-0.115 (0.078)
Sovereign Rating x 1(1997)	-0.085 (0.082)	-0.077 (0.070)
Sovereign Rating x 1(1998)	-0.088 (0.077)	-0.011 (0.077)
Sovereign Rating x 1(1999)	-0.126* (0.070)	-0.066 (0.074)
Sovereign Rating x 1(2000)	-0.143* (0.073)	-0.089 (0.081)
Sovereign Rating x 1(2001)	-0.132* (0.070)	-0.063 (0.069)
Sovereign Rating x 1(2002)	-0.103 (0.082)	-0.011 (0.081)
Sovereign Rating x 1(2003)	-0.132* (0.070)	-0.034 (0.066)
Sovereign Rating x 1(2004)	-0.157** (0.073)	-0.014 (0.071)
Sovereign Rating x 1(2005)	-0.180** (0.076)	-0.044 (0.074)
Sovereign Rating x 1(2006)	-0.257*** (0.074)	-0.133* (0.072)
Sovereign Rating x 1(2007)	-0.253*** (0.075)	-0.143** (0.072)
Sovereign Rating x 1(2008)	-0.250*** (0.075)	-0.136* (0.077)
Sovereign Rating x 1(2009)	-0.207*** (0.079)	-0.092 (0.076)
Observations	3686	3686
R-squared	0.694	0.923
Firm Fixed Effects	NO	YES
Industry Fixed Effects	YES	NO
Country Fixed Effects	YES	NO
Time Fixed Effects	YES	YES

Table IV
Asymmetries

This table reports the parameter estimates for the impact of sovereign credit changes on corporate credit rating changes, controlling for changes in macroeconomics and firm-level factors. The sample covers the period from 1997 to 2009. The labels, *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively. Robust standard errors, clustered by country-year groups, are given in parentheses.

ΔCredit Rating	(1)	(2)	(3)	(4)	(5)	(6)
ΔSovereign Rating	0.657*** (0.179)	0.387*** (0.125)	0.721*** (0.163)	0.673*** (0.197)	0.391*** (0.140)	0.741*** (0.169)
ΔSovereign Rating x 1(Sovereign Rating-Sovereign Rating(-1)>0)	-0.434** (0.195)		-0.399*** (0.143)	-0.443** (0.212)		-0.401*** (0.149)
ΔSovereign Rating x 1(Credit Rating(-1)=Sovereign Rating(-1))		0.315* (0.167)	0.232 (0.143)		0.340* (0.177)	0.246 (0.154)
ΔSovereign Rating x 1(Developed)			-0.424*** (0.134)			-0.474*** (0.142)
Observations	3091	3091	3091	3091	3091	3091
R-squared	0.24	0.232	0.267	0.315	0.308	0.346
Firm Fixed Effects	NO	NO	NO	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	NO	NO	NO
Country Fixed Effects	YES	YES	YES	NO	NO	NO
Time Fixed Effects	YES	YES	YES	YES	YES	YES

Table V
Non-linear Specification of Sovereign Ceiling

This table reports the parameter estimates for equation (2). The sample covers the period from 1997 to 2009. The labels *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively. Robust standard errors, clustered by country-year groups, are given in parentheses.

Credit Rating	(1)
\hat{Rtg}_{isct}	0.965*** (0.03)
$(\hat{Rtg}_{isct} - Sov_Rtg_{ct})I[\hat{Rtg}_{isct} \geq Sov_Rtg_{ct}]$	-0.742*** (0.05)
$I[\hat{Rtg}_{isct} \geq Sov_Rtg_{ct}]$	-0.760*** (0.21)
Constant	0.384 (0.44)
Observations	3546
R-squared	0.523

Table VI
Why a Sovereign Ceiling Remains

This table reports the parameter estimates of the impact of sovereign credit ratings on corporate credit ratings, controlling for firm-level, macroeconomic and global factors. Industry, country and year dummies are controlled. The sample covers the period of 1995-2009 for 14 developed economies and 15 emerging-market economies. The labels *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively. Robust standard errors, clustered by country-year groups, are given in parentheses.

Credit Rating	(1)	(2)	(3)	(4)	(5)	(6)
EBIT/ Assets	0.085*** (0.009)	0.082*** (0.009)	0.086*** (0.009)	0.042*** (0.007)	0.038*** (0.007)	0.042*** (0.007)
EBIT/ Interest Expense	0.346*** (0.088)	0.356*** (0.087)	0.340*** (0.087)	0.170*** (0.064)	0.190*** (0.058)	0.149** (0.062)
Retained Earnings/ Assets	0.027*** (0.004)	0.027*** (0.004)	0.027*** (0.004)	0.016*** (0.004)	0.013*** (0.004)	0.015*** (0.004)
Working Capital/ Assets	-0.015*** (0.003)	-0.014*** (0.003)	-0.015*** (0.003)	0.011** (0.005)	0.012** (0.005)	0.011** (0.005)
Equity/ Capital	0.034*** (0.004)	0.035*** (0.004)	0.035*** (0.004)	0.022*** (0.003)	0.023*** (0.003)	0.023*** (0.003)
Size	0.930*** (0.061)	0.946*** (0.059)	0.932*** (0.061)	0.651*** (0.093)	0.645*** (0.090)	0.655*** (0.092)
GDP per capita	-1.046*** (0.275)	-0.876*** (0.275)	-1.000*** (0.266)	-0.739** (0.313)	-0.578* (0.321)	-0.684** (0.292)
Inflation	-0.023** (0.011)	-0.011 (0.013)	-0.016 (0.012)	-0.027** (0.011)	-0.001 (0.014)	-0.01 (0.012)
Current Account/ GDP	0.070*** (0.014)	0.077*** (0.015)	0.070*** (0.014)	0.066*** (0.015)	0.061*** (0.015)	0.066*** (0.015)
Growth GDP	0.031 (0.022)	0.033 (0.025)	0.027 (0.025)	0.052** (0.024)	0.050* (0.027)	0.039 (0.025)
Volatility GDP	-2.059*** (0.569)	-1.732*** (0.531)	-1.895*** (0.558)	-2.330*** (0.576)	-1.782*** (0.524)	-1.968*** (0.517)
Capital Liberalization	2.799** (1.137)		2.401** (1.193)	5.756*** (1.263)		4.731*** (1.259)
Political Risk		7.454** (3.661)	4.424 (3.656)		15.399*** (3.968)	11.879*** (3.731)
Sovereign Rating	0.606*** (0.066)	0.859*** (0.172)	0.856*** (0.153)	0.563*** (0.071)	1.018*** (0.205)	1.112*** (0.171)
Sovereign Rating x Capital Liberalization	-0.211*** (0.079)		-0.185** (0.082)	-0.429*** (0.085)		-0.363*** (0.084)
Sovereign Rating x Political Risk		-0.558** (0.218)	-0.361* (0.214)		-1.011*** (0.250)	-0.829*** (0.234)
Observations	3613	3686	3613	3613	3686	3613
R-squared	0.695	0.693	0.695	0.923	0.923	0.925
Firm Fixed Effects	NO	NO	NO	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	NO	NO	NO
Country Fixed Effects	YES	YES	YES	NO	NO	NO
Time Fixed Effects	YES	YES	YES	YES	YES	YES

Table VII
Robustness Checks

This table reports the parameter estimates of the impact of sovereign credit ratings on corporate credit ratings, controlling for firm-level, macroeconomic and global factors. Industry, country and year dummies are controlled. The sample covers the period of 1995-2009 for 14 developed economies and 15 emerging-market economies. The labels *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively. Robust standard errors, clustered by country-year groups, are given in parentheses.

Credit Rating	(1)	(2)	(3)	(4)
EBIT/Assets	0.095*** (0.011)	0.080*** (0.009)	0.072*** (0.011)	0.097*** (0.015)
EBIT/ Interest Expense	0.374*** (0.104)	0.392*** (0.095)	0.333*** (0.077)	0.459*** (0.121)
Retained Earnings/Assets	0.022*** (0.004)	0.027*** (0.004)	0.025*** (0.003)	0.037*** (0.006)
Working Capital/Assets	-0.018*** (0.004)	-0.014*** (0.003)	-0.013*** (0.003)	-0.004 (0.006)
Equity/Capital	0.037*** (0.004)	0.035*** (0.004)	0.035*** (0.005)	0.027*** (0.004)
Size	0.926*** (0.064)	0.930*** (0.060)	1.185*** (0.104)	0.918*** (0.088)
GDP per capita	-1.158** (0.488)	-1.003*** (0.266)	0.107 (0.381)	-1.659*** (0.402)
Inflation	-0.047*** (0.017)	-0.012 (0.013)	0.013 (0.019)	-0.057*** (0.017)
Current Account/GDP	0.064*** (0.019)	0.081*** (0.015)	0.100*** (0.026)	0.061*** (0.018)
Growth GDP	0.116*** (0.033)	0.041* (0.022)	0.04 (0.035)	0.068** (0.028)
Volatility GDP	-1.145* (0.641)	-1.528** (0.608)	-2.759*** (0.762)	-0.512 (0.643)
Sovereign Rating	0.371*** (0.048)	0.596*** (0.104)	0.519*** (0.071)	0.387*** (0.050)
Observations	3180	3686	1708	1978
R-squared	0.684	0.690	0.703	0.707
Industry Fixed Effects	YES	YES	YES	YES
Country Fixed Effects	YES	YES	YES	YES
Time Fixed Effects	YES	YES	YES	YES

Figure 1
Corporate and Sovereign Credit Ratings

These figures show the relationship between corporate and sovereign credit ratings assigned by S&P. The credit rating categories are mapped onto 21 numerical values, where 21 corresponds to the highest rating (AAA) and 1 corresponds to the lowest rating (D). The size of each bubble represents the number of observations for each corporate-sovereign credit rating pair. Figures a and b correspond to the pre-1997 and post-1997 periods, respectively. Figures c and d correspond to emerging and developed economies, respectively.

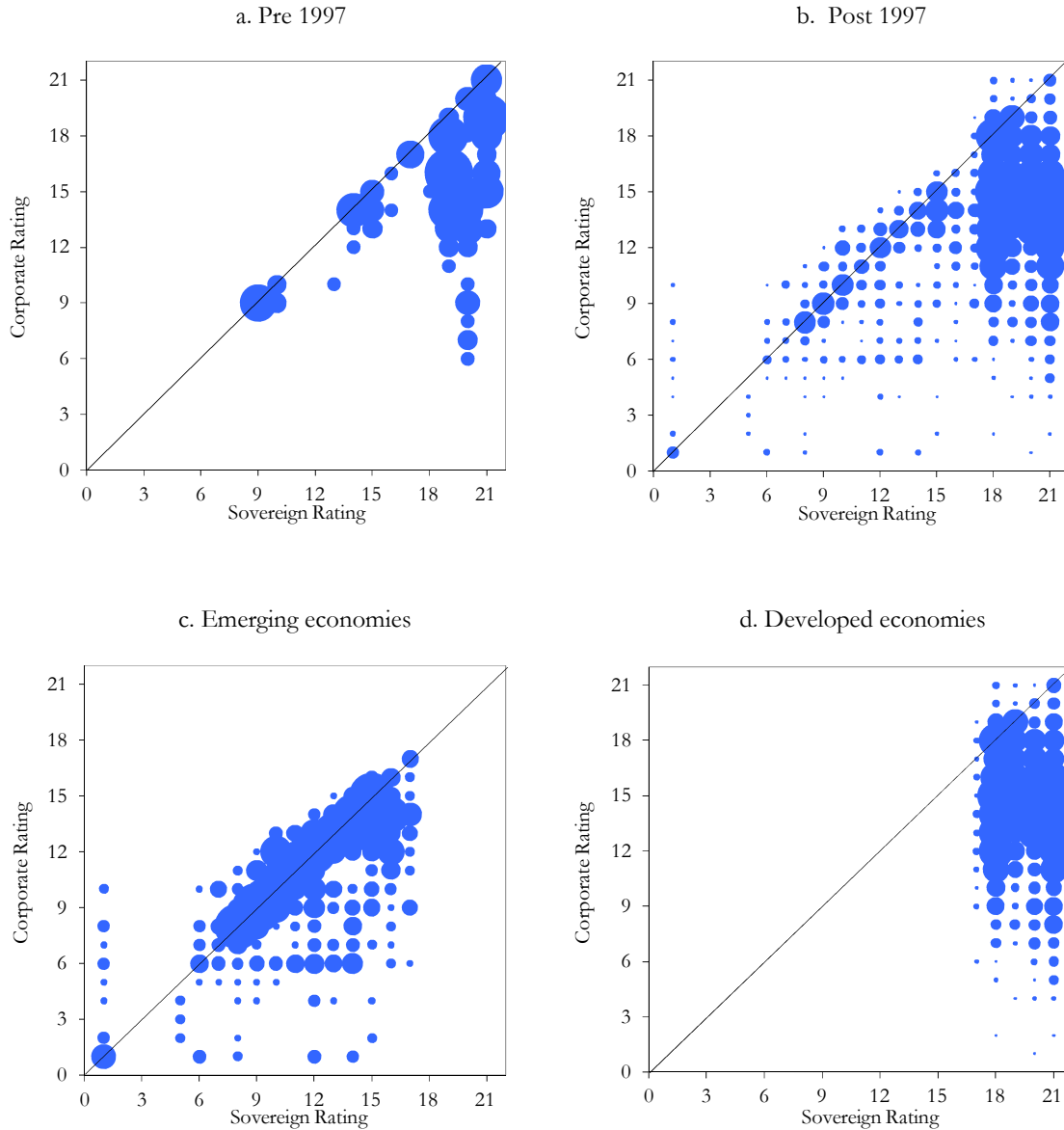


Figure 2
Corporate and Sovereign Credit Rating Gap Distribution

This figure shows the distribution of the gap between corporate and sovereign credit ratings for the period from 1998 to 2009.

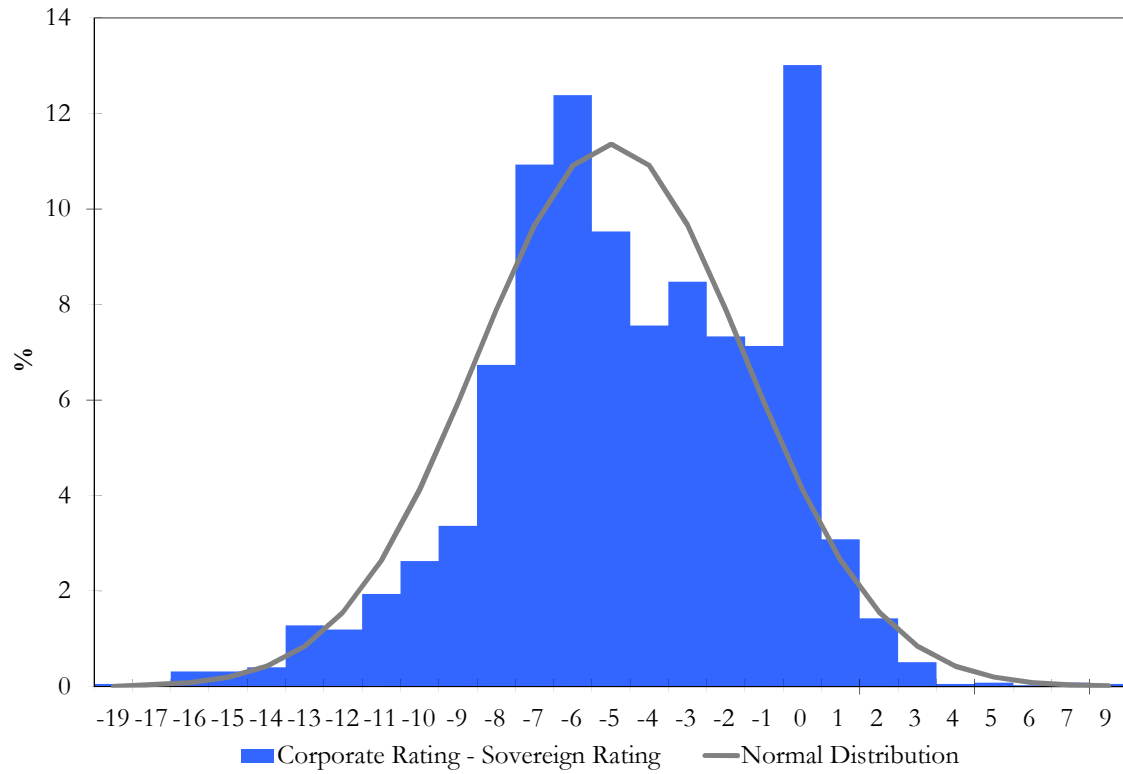


Figure 3
Relaxation of the Sovereign Ceiling Policy

This figure shows the impact of sovereign credit ratings on corporate credit ratings since 1995. The blue and red lines correspond to the estimates obtained from the samples of emerging markets and developed economies, respectively.

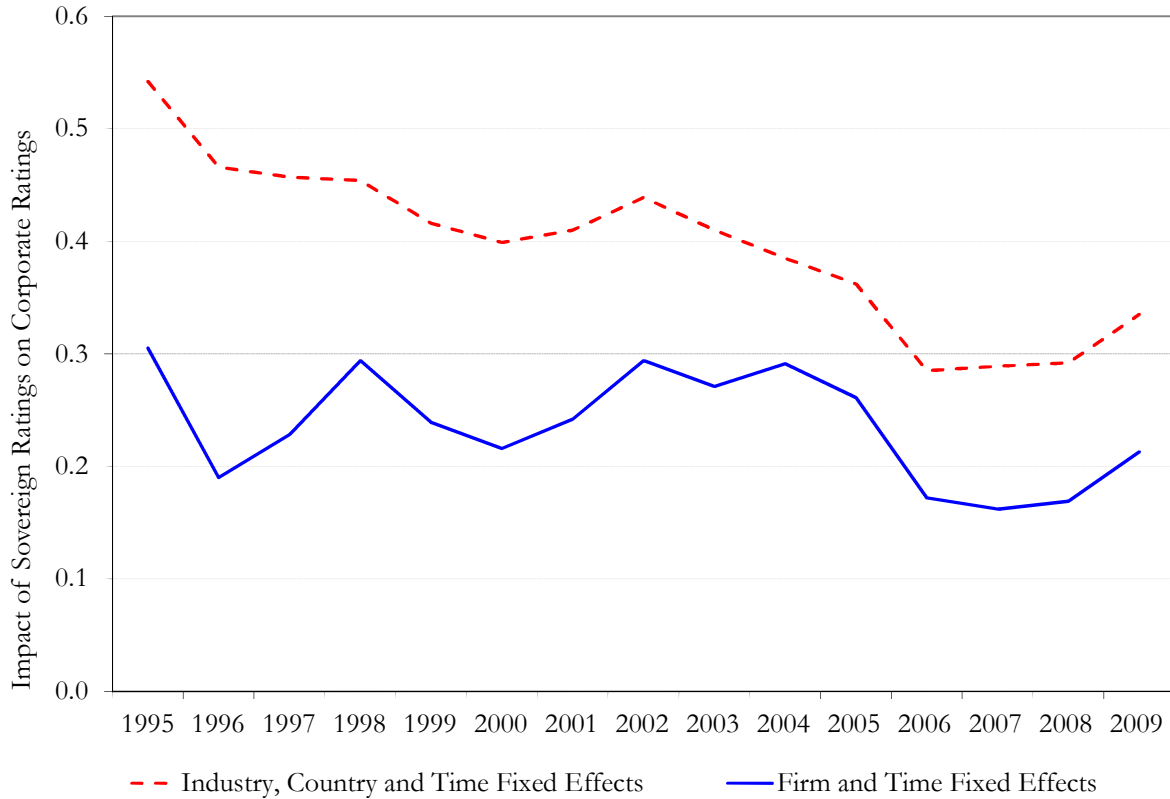
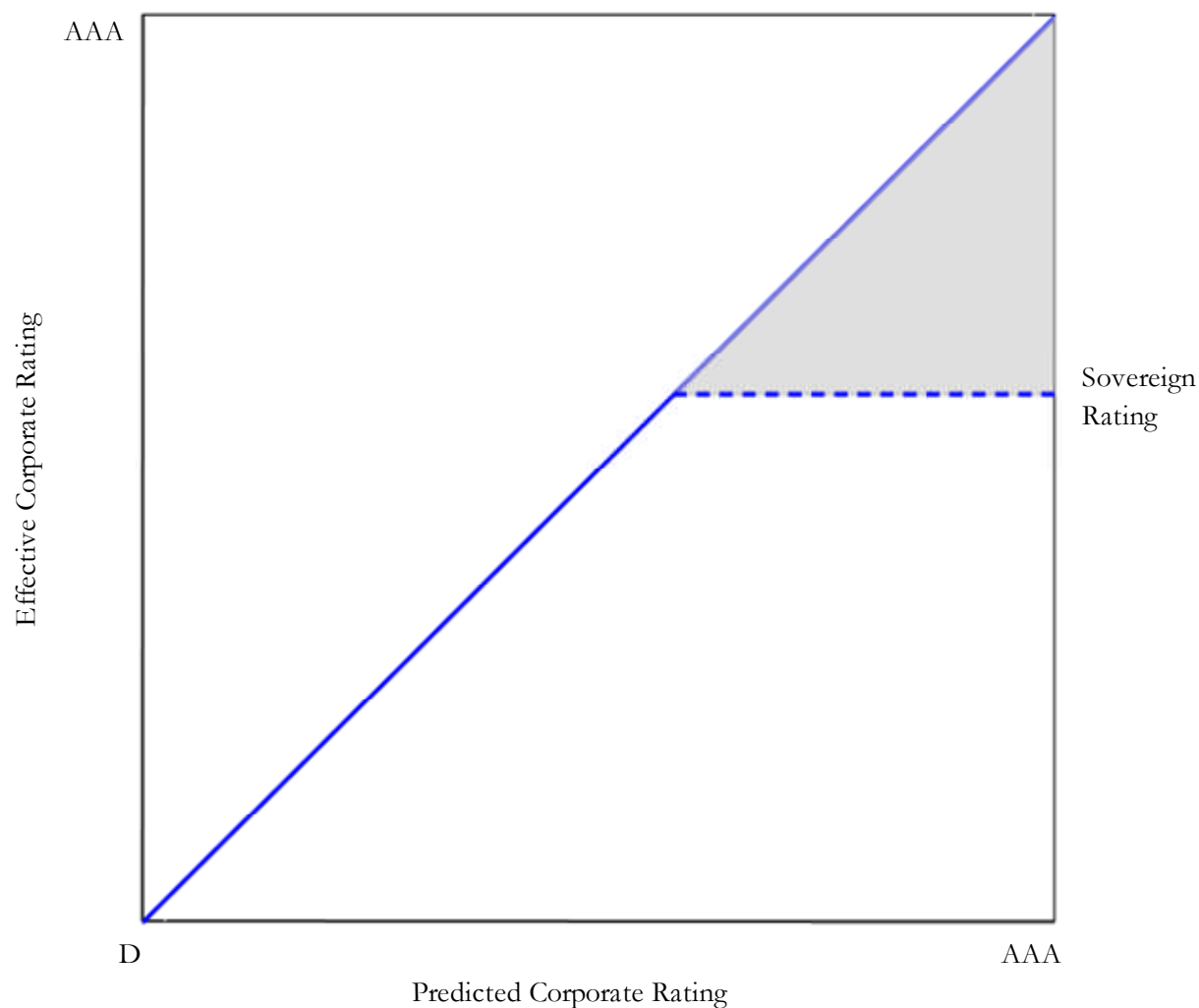


Figure 5
Sovereign Ceiling

This figure shows the relationship between the effective corporate rating and the predicted corporate rating. The latter is obtained by using the coefficient that was estimated for corporations located in AAA countries, where firms are unconstrained by the sovereign ceiling. This relationship is represented by the solid line (no sovereign ceiling), the dotted line (strict sovereign ceiling at the inflection point), and the shaded area (sovereign ceiling lite).



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244. Optimal resource extraction contracts under threat of expropriation
(Publicado como “Optimal Resource Extraction Contracts under Threat of Expropriation”. The Natural Resources Trap: Private Investment without Public Commitment, W. Hogan and F. Stutzenegger (eds), MIT Press, 161-197, June 2010)
Eduardo Engel y Ronald Fischer

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