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Does Corruption Increase Emerging Market Bond Spreads?

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Comments welcome.

Abstract

We study the relationship between corruption and borrowing costs for governments and firms in emerging markets. Combining data on bonds traded in the global market with survey data on corruption compiled by Transparency International, we show that countries that are perceived as more corrupt must pay a higher risk premium when issuing bonds. The global bond market ascribes a significant cost to corruption: an improvement in the corruption score from the level of Lithuania to that of the Czech Republic lowers the bond spread by about one-fifth. This is true even after controlling for macroeconomic effects that are correlated with corruption. We find little evidence that investors became more sensitive to corruption in the wake of the Asian financial crisis.

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1 Introduction

In this paper we study the impact of corruption on borrowing costs for governments and firms in emerging markets. Recently, both the economics literature and the popular press have begun to focus on the central role of corruption in economic development and financial market performance. The World Bank calls corruption "the single greatest obstacle to economic and social development. It undermines development by distorting the rule of law and weakening the institutional foundation on which economic growth depends."[1] Corruption has been shown to be associated with lower levels of investment and growth (Mauro (1995)), less foreign direct investment (Wei (1997)), lower stock values (Lee and Ng (2002)), and higher child mortality and student dropout rates (Gupta et al. (2001)).

This paper focuses specifically on the role of corruption in determining the price of emerging market bonds sold on the global bond market. The spread of these bonds above those issued in developed countries reflects the higher default probability associated with emerging market debt. We are therefore studying the relationship between corruption and the perceived likelihood that a firm or government will default on its debt. Our main finding is that global investors require a substantially greater return on debt when the issuer is in a more corrupt country. This is true even after controlling for other factors that determine default risk. Our estimation includes macroeconomic variables, such as GDP growth and external debt, as well as a credit rating score from Institutional Investor that captures political risk. Corruption plays an important role in determining default risk even apart from its impact on other types of economic performance.

Understanding how corruption affects bond spreads is important for two reasons. First, it contributes to our understanding of what determines default probability in emerging markets, a central question in development finance. Most studies on this question have focused on which macroeconomic factors contribute to the likelihood of sovereign default, with the central question being whether default risk arises from liquidity problems or insolvency (see, for example, Edwards (1984), Boehmer and Megginson (1990) and Eichengreen and Mody (1998b)). We show that corruption is also an important source of default risk, in addition to those macroeconomic factors that have been identified.

Second, looking at corruption and spreads improves our understanding of how corruption

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[1]http://www1.worldbank.org/publicsector/anticorrupt/

matters for economic growth. We show that higher corruption increases borrowing costs on the international market for both government and firms in developing countries. Thus we identify one channel through which corruption lowers investment in emerging markets. While this one channel represents only part of the overall picture, it represents a step toward a more detailed understanding of the costs of corruption.

Corruption can take many forms. Following the previous literature, we define it broadly as the misuse of public office for private gain (Klitgaard (1991) and Shleifer and Vishny (1993)).There are various ways that higher levels of corruption might lead to higher likelihood of default.

For government debt, the impact of corruption is quite direct: corrupt officials may confiscate loaned funds or other sources of government income, limiting the government's ability to meet debt obligations. For example, in Russia more than US$4 billion in IMF loans apparently disappeared shortly before Russia's default in 1998. Apart from direct theft, several authors have shown that higher levels of corruption are associated with lower tax revenue, which would in turn lower the government's ability to repay loans (Haque and Sahay (1996), Tanzi and Davoodi (1997), Johnson et al. (1999)).

For corporations, corruption may increase the likelihood of arbitrary government actions that reduce profits and leave the firm unable to repay loans. In addition, higher levels of corruption may lower the effectiveness of government services, making it even more difficult for firms to realize profits. (Shleifer and Vishny (1993)) Finally, corruption may reduce legal protection of bondholders. Controlling shareholders may be tempted to divert resources from the firm to their own private ends. Corruption reduces the regulatory oversight against this at the expense of bondholders (Lee and Ng (2002)).

Our hypothesis is that governments and firms that are in more corrupt countries have had higher default risk and therefore higher spreads. To test this hypothesis, we use data on the spreads of bonds launched by emerging market firms and governments during the 1990's, along with survey data on corruption from Transparency International. In using bond launch data we are following Eichengreen and Mody, who in a series of papers use spreads of emerging market bonds to study the role of developed-country interest rates in the pricing of emerging markets debt (Eichengreen and Mody (1998a)), the determinants of the decrease in spreads during the 90's (Eichengreen and Mody (1998b)), and the nature of contagion in emerging market debt crises (Eichengreen et al. (2001)).

These papers establish a set of macroeconomic variables that act as determinants of default spreads. We use these variables as controls, so that we measure the impact of corruption independent of the influence of other macroeconomic factors. This is important since corruption is known to be correlated with factors such as GDP growth. We find that the impact of corruption is quite large even after controlling for these other factors. For example, we estimate that a decrease in the level of corruption from that of China or the Ukraine to that of Lithuania or Jamaica is associated with a decrease in spreads of about one-fifth. This result is fairly consistent across different regions of the world, and across corporate and sovereign spreads. Note that our approach underestimates corruption's total impact on spreads, since it does not capture the indirect impact of corruption through its influence on other factors. For example, if corruption lowers GDP growth, then the impact of corruption includes the increase in spreads that arises from lower GDP growth.

The role of corruption in emerging market investment came to the forefront in the wake of the Asian financial crisis. Many analysts claim that the crisis arose at least in part from the cronyism and lack of transparency that characterized many economies in East Asia, and one result was that the IMF began to add anti-corruption measures to the list of conditions necessary for acquiring a loan. We find that both sovereign and corporate bond spreads did not become more sensitive to corruption after the Asian crisis, suggesting that investors in fact did not substantially revise their opinions about the importance of corruption following the crisis.

The remainder of the paper are sections that describe the data, the empirical approach, the results, and the conclusion. All the tables are presented at the end of the paper.

2   Data

Our principal analysis looks at the relationship between corruption and the spreads on sovereign and corporate bonds on the primary market, when they are initially launched.

Most studies on corruption employ "perceived" corruption indices based on survey data collected by organizations that analyze business risk. The most widely recognized indices are the Transparency International corruption score, the International Country Risk Guide and *The Economist*'s Business International ratings. In our study, we use Transparency International's annual corruption perception index from 1995 to 1999.[2] This index is a "poll of polls," a composite

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[2]Transparency International started publishing the annual index in 1995. Transparency International maintains a website www.transparency.org that contains the corruption perception index and explains the details on how the

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measure that summarizes survey data on corruption from up to 14 individual sources. The ratings are based on surveys of businesspeople, risk analysts and the public. To be included, each country must be covered by three surveys or more. We use this index because it contains information from many different sources, and because of its usage in other studies.

The indices used by Transparency International represent subjective opinions, and inevitably they are not very precise. Nonetheless, there is reason to believe that they contain useful information about corruption. Transparency International's measure is highly correlated with the other two ratings, suggesting that there is something of a consensus about relative corruption levels. Treisman (2000) points out that indices of corruption that come from surveys of businessmen conducting business in a country are highly correlated with the indices of corruption that come from surveys of the citizens in these countries. Keeping in mind that our measure is clearly not perfect, we follow other authors in arguing that noisy information about corruption is better than no information, given the economic importance of the question.

We are specifically interested in how corruption affects bond spreads for corporations and governments in the emerging markets. We use data on the spread, maturity and amount of the bond issues from Capital Bondware published by Euromoney, as in Eichengreen et al. (2001).[3] These bonds are placed on international markets by emerging market borrowers but denominated in hard currencies (nearly always in US dollars, although some are in other hard currencies). We use the launch spreads of these bonds, which refer to the difference between the initial yield of these bonds and the rate commanded by a risk-free bond of the same maturity. As pointed out in Eichengreen and Mody (1998a,b), when using launch spreads it is important to keep in mind that the decision to launch a bond is endogenous. Countries and firms that choose to issue debt will differ systematically from those that do not. Therefore, it is important to control for the likelihood of new issues by different classes of borrowers. As we describe in the next section, our empirical strategy consists of estimating the impact of corruption on spreads, first by ordinary least squares (OLS) and then by means of the Heckman procedure, which controls for the possible sample selection problem.

Table 1 shows the summary statistics on the countries in our sample for which at least one

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index is constructed.

[3]We thank Barry Eichengreen and Ashoka Mody for providing us with the launch spread and the issue data in this study.

bond was launched during the sample period.[4] The first three columns list the number of bonds launched by issuers in each country, divided into private and sovereign issuers. There is large variation in the number of bonds launched in each country - while many countries have only a handful of bonds, certain countries have a large number, notably Argentina, Brazil, South Korea, and Mexico. There is also a lot of variation in the mix of sovereign vs. private issues. For example, in India and Hong Kong there are no sovereign bonds issued, whereas in South Africa we see no private bonds, and in Hungary 24 sovereign bonds and only one private issue.

The fourth column gives the mean corruption score over the time period in our sample. Transparency International assigns each country a score between 0 and 10, with 0 representing the most corrupt country and 10 the least corrupt. In the period covered by our dataset, out of the 40 emerging market countries in our sample, Pakistan, Kazakhstan, and Russia are scored as the most corrupt (among those issuing bonds), while Singapore, Hong Kong and Chile are rated as least corrupt. While our sample covers nearly the full range of possible corruption scores, almost 80% of the observations in Table 1 fall between scores of 2.5 and 5, and 50% are between 2.5 and 3.5.

The final three columns of Table 1 list mean spreads for each country's bonds, in basis points. Casual inspection suggests that spreads are higher for more corrupt countries - for example, average spreads in the five most corrupt countries range from 245 to 791 basis points, while average spreads in the five least corrupt countries range from 86 to 205 basis points. On the other hand, there is no clear relationship between the number of bonds issued and the corruption ranking.

To look more explicitly at the correlation between corruption and spreads, we conduct univariate regressions of launch spreads (in logs) on corruption scores. Table 2 shows that higher corruption is indeed related to higher spreads. On average, a one point improvement of the corruption score leads to a 12.6% decrease in sovereign spreads, and a 25.5% decrease in corporate spreads. These coefficients are statistically significant at the one percent level.

Table 2 establishes a correlation between corruption and spreads, but it is difficult to interpret for two reasons. First, we know that corruption is correlated with several other factors that are likely to affect spreads (for example, economic growth, overall indebtedness of the country, or political instability). Our analysis will focus on trying to disentangle the effect of corruption from

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[4]Our sample also includes seven countries for which no bonds were issued during the sample period: Paraguay, Bangladesh, Kenya, Ecuador, Bolivia, Bulgaria, and Guatemala. Average corruption scores for these countries are reported in the footnote to Table 1.

these other factors. Second, these results do not control for sample selection (i.e., systematic differences between issuers and non-issuers). Though it is not obvious which way the selection would go, this could drive the results - for example, more corrupt countries might have greater liquidity needs, and therefore launch bonds regardless of the spread they must offer, while less corrupt countries might have the discretion to stay out of the debt market when it means offering a high spread. We discuss the macroeconomic variables we will use below and in the next section we describe our empirical strategy for handling the selection issue.

Apart from the corruption score, we use a variety of control variables that have been shown to predict bond spreads. To ensure compatibility with previous literature, these controls are the same as in Eichengreen et al. (2001). We will discuss the summary statistics for some of these variables below; a full description of the variables is provided in the Appendix.

One control that deserves some discussion is the sovereign credit rating published by Institutional Investor. These ratings are published twice a year in March and September, and are based on surveys of international bankers of the default probability of a country. The ratings take on values of 0 to 100, with 100 implying no risk of default. We use the latest rating published before the launch. The credit score should reflect all information relevant to default risk, including macroeconomic variables, corruption, and political risk. Because of this it will be highly correlated with many of our regressors, making the coefficients difficult to interpret. To isolate the impact of those determinants of the credit rating not included in our regressors, we first regress the credit rating on a set of macroeconomic variables and the country's corruption score, then use the residuals from this regression as a regressor. The credit rating residual will reflect all information in the credit rating not explained by these other factors. We expect that the most important factor they represent is political risk, and this is how we interpret the coefficient on the residuals. The Appendix presents results from the regression that generates the credit rating residuals; all coefficients have the expected sign.

Table 3 presents descriptive statistics for our data, both for the full sample and split by corruption category.[5] To form these categories, we split the observations into thirds based on the corruption score in their home countries. Thus "high corruption" refers to the 33% of the observations from countries rated most corrupt (i.e., with the lowest corruption score), "medium" refers to

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[5]The number of bond issues reported in Table 3 is not the same as in Tables 1 and 2. The reason is that some of the regressors have missing values.

the third with the medium score, and "low corruption" refers to the set with the highest corruption score. Note that since corruption scores change over time, a country may change corruption categories within our sample (this accounts for the fact that the number of countries in each category adds to more than the number of countries in the sample).[6]

The first nine rows contain summary statistics for bonds in the sample. Bonds in the low corruption group of countries do have the lowest spreads, but bonds in the medium corruption countries (not in the high corruption countries) have the highest ones. It is surprising that countries perceived as more corrupt do not have higher spreads on average, and we will discuss possible explanations below. On average, bonds issued in the medium corruption group have the largest issue amounts and the longest maturities, followed by bonds in the high corruption group and the low corruption group.

The remaining rows of Table 3 present summary statistics for issuer characteristics in our data. The variable "indic" is given a value of 1 if the issuer actually issued a bond and a value 0 if it did not.[7] Within each corruption category, we compare the averages of the statistics over bonds in our sample (indic=1) to the averages over those quarters in which no bond was issued (indic=0). Comparing issuers to non-issuers enables us to describe the nature of sample selection bias in our data. Within each of the three corruption categories, issuers of bonds are on average in countries with higher credit ratings than non-issuers. In each category, the issuing countries also have lower debt/GDP ratios, higher GDP growth, lower reserves relative to GDP or short-term debt, and lower variability in export growth.

These results illustrate the two ways in which sample selection is likely to work in the launch data: bonds are issued only when the issuer wants to launch and when investors are willing to buy the bonds. The credit rating result shows that more creditworthy countries are more likely to launch (reflecting demand for bonds), while the results for reserves/short-term debt indicate that countries with lower reserves are more likely to issue bonds, reflecting a supply-of-bonds effect.

Also, note that the differences between issuers and non-issuers vary somewhat by corruption category. For example, issuers in high-corruption countries had an average external debt/GDP ratio of 0.39, while non-issuers had an average ratio of 0.50. In contrast, for the medium-corruption

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[6]The number of observations in each category is not exactly 1/3, since there are many observations with the same corruption score.

[7]For each country we considered two types of issues: sovereign and private. A zero was recorded (indic=0) for each quarter and country where one of these issuers did not come to the market; a one was recorded (indic=1) when they did.

countries, issuers had an average ratio of 0.37 while for non-issuers the ratio was 0.45. This suggests that the selection bias could be more severe for more corrupt countries. If credit rationing is most severe for more corrupt countries, then ignoring the selection problem could lead us to underestimate the impact of corruption. Aside from debt/GDP ratios, other variables do not seem to vary too much across categories. Indeed, later on we find that sample selection does not affect the main results on corruption.

Across corruption categories, the low corruption countries that issue bonds (in a given quarter) tend to have higher GDP growth, as one would expect, but high corruption countries tend to grow faster than the medium group. Compared to the medium-corruption issuers, countries rated as most corrupt had higher GDP growth, a higher ratio of external debt to GDP, a lower ratio of reserves to GDP, and a much higher proportion of debt rescheduled in the previous year. This illustrates the fact that the corruption score is not perfectly correlated with macroeconomic indicators, suggesting that it adds an additional source of information in predicting default spreads. It also helps explain the non-monotonic relationship between corruption and spreads seen in the table, and highlights the importance of controlling for other factors when measuring the impact of corruption.

3 Empirical Approach

We start by running OLS regressions of the form:

$$\ln(S) = b_1 X + g_1 C + u_1 \tag{1}$$

where S is the spread of the bond, C measures corruption in the issuer's country, and X is a vector of macroeconomic variables contributing to creditworthiness.[8] We use (almost) the same set of variables that Eichengreen et al. (2001) use. X consists of bond characteristics (maturity of the bond, principal amount, fixed rate bond dummy, dummies for the currency of issue, and a private placement dummy), issuer characteristics (dummies proxying for the region of the issuers, dummies for government and private bonds, dummies for the industrial classification of the issuer), and country characteristics (ratio of debt to GDP, dummy for debt rescheduling, real GDP growth, export growth variability, reserves to bank debt, domestic credit to GDP, debt service to exports

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[8]For a motivation of this specification see Edwards (1984).

and the sovereign credit rating residual), as well as the global interest rate and yield curve. For a comprehensive list of variables and descriptions, see the Appendix.

As discussed in the last section, the fact that we do not observe the spreads that would have been associated with issuers that do not launch bonds could lead to selection bias. To correct this potential problem we simultaneously estimate the decision to issue a bond and the spread equation (1). The equation that determines the sample selection is

$$B^* = b_2 Y + g_2 C + u_2 \tag{2}$$

where Y is a vector of variables that determine the issuer's desire to borrow and the investor's willingness to lend. These are determined by the factors that affect the supply and demand of bonds. The sample rule is that the spread is observed only when B^* is greater than zero. Assuming that the error terms u_1 and u_2 are bivariate normal, with $Corr(u_1, u_2) = \rho$,[9] this is a standard Heckman selection model.[10]

4   Results

4.1   OLS Regressions

Table 4 presents the results for the spread equation obtained by OLS. Column (a) presents results on the determinants of spreads for the full sample. The coefficient on the corruption score is negative and significant, confirming our central hypothesis: issuers in more corrupt countries must offer a higher return on the debt they issue. The corruption score enters significantly while controlling for not only macroeconomic determinants of spreads, but also the credit rating residual, which should capture all information about political instability and other factors that are separate from (but likely to be correlated with) corruption.

The estimated effect of corruption is economically quite significant: an improvement in the corruption score by one point (for example, from the level of Lithuania to that of the Czech

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[9]The selectivity effect is sometimes summarized not by ρ but by $\lambda = \rho \sigma_1$, where σ_1 is the standard error of the residual in the spread equation. When presenting our results, we report both statistics at the bottom of each table.

[10]The estimation is by Maximum Likelihood (ML). In a few cases for which the ML procedure does not converge we use the two-step procedure proposed by Heckman (1979). The model can be identified by the nonlinearity in the selection equation and by the inclusion of elements in Y that are not also in X. Note that many variables that increase a borrower's desire to issue a bond (for example, low reserves) are also likely to increase investors' perceived default risk. This means that the coefficients b_2 and g_2 will be difficult to interpret, since they represent the net impact of these two effects.

Republic) lowers the spread by about one-fifth (18%). Based on the average spread reported in the first column of Table 3, this corresponds to a decrease of 53 basis points for the average bond in our sample. Note that this measures the impact of corruption holding other factors constant. The overall impact of corruption is likely to be greater, since corruption is associated with lower growth (for example) and lower growth leads to higher spreads.

In theory, corruption should affect the default risk of governments and firms in different ways, and there are good reasons to think that other determinants of sovereign and corporate default risk are different as well. Thus we next split the sample and consider these groups separately. Columns (b) and (c) of Table 4 present separate regressions for sovereign and private issuers, respectively. Corruption increases spreads for both sovereign and private debt, and to a similar degree. The other coefficients are similar, with some exceptions (for example, GDP growth seems to be more important for government spreads than for corporate spreads). The similar results suggest that macroeconomic factors affect firm and government spreads in similar ways. One explanation is that "country risk" is a central determinant of firm spreads, so that factors that increase the risk of government default necessarily increase the risk of firm default.[11]

We next test the robustness of the results to a different specification of the relationship between the corruption score and bond spreads. The corruption score from Transparency International has no inherent economic meaning; the categories 1-10 are essentially arbitrary. This means that there is no reason to assume that the index affects the log of spreads in a linear manner. To check that this is not playing an important role, we divide the bonds into the three corruption categories used in Table 3 (the category is based on the corruption score of the country when the bond was launched). We then test the previous specification, substituting dummies representing these categories for the corruption score itself.[12] Table 5 presents the results for the determinants of spreads. "low corruption" represents the lowest-corruption group, "medium corruption" the intermediate group, and the highest-corruption countries are omitted. The mean corruption score is 2.5 for high-corruption countries, 3.3 for medium-corruption countries, and 5.5 for low-corruption countries. A linear relationship would imply that the difference in the coefficients for low- and medium-corruption countries ("low corruption" - "medium corruption") should be about

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[11]For a simple theoretical model showing the relation between country-risk and the spread on private debt, see Ciocchini (2002).

[12]To be consistent, we re-estimate the credit rating residual using dummies for corruption categories instead of the corruption score.

2.8 times larger (in absolute value) than the difference in the coefficients between medium- and high-corruption countries ("medium corruption").

Looking at Table 5 we see that the ranking of coefficients is as expected: more corrupt countries have higher spreads. Results for the full sample and for the sample of private bonds are consistent with a linear relationship between corruption and (log)spreads. For sovereign bonds the relationship is not linear, in that the difference in spreads between low- and medium-corruption countries is much larger than a linear specification would predict. For these types of bonds we find a large and significant difference between low-corruption and medium-corruption countries, but no significant difference between medium- and high-corruption countries. The basic negative relationship is confirmed. Though there is some evidence that the relationship is not linear for sovereign bonds, we retain the linear specification in order not to throw out too much of the variation in our data.

4.2   The Asian Crisis

In this section we turn to the question of how the Asian crisis interacted with the impact of corruption on spreads. In the wake of the crisis, many analysts claimed that "crony capitalism" was an underlying cause of the collapse in asset values in Asian markets. The claim was that a big part of the change in asset values resulted from investors "waking up to" the importance of governance and corruption in determining an economy's health. This would suggest that the crisis led to increased sensitivity to corruption. If investors learned (or came to believe) that corruption was more important than they had previously thought, then the impact of corruption on spreads should increase as a result of the crisis.

We split the sample into two periods, before and after the beginning of the Asian crisis (we define the pre-crisis period as 1995Q1-1997Q3; we create a post-crisis dummy - "post asia" - which takes value one for 1997Q4-1999Q4). We start with univariate regressions that allow a separate coefficient before and after the onset of the crisis (an interaction term between the corruption score and the crisis dummy). Table 6 presents these results. For sovereign bonds, there is no correlation between spreads and corruption prior to the crisis, but there is a strong relationship afterwards. For firms (and for the full sample), there is no significant change with the onset of the crisis; moreover, the coefficient on the interaction term is positive.

Table 7 presents the results of the specification in Table 4, separately for the two time

periods. For the full sample, once we control for macroeconomic and other factors, we find very similar coefficients on corruption before and after the crisis. Though the point estimate is slightly larger following the crisis, the difference is very small. For sovereign bonds we do find a higher point estimate following the crisis, but the opposite is true for private bonds. In both cases the differences are small (the impact of a one point change in the corruption score differs by less than five percentage points). This suggests that investors did not revise their opinions about the importance of corruption following the Asian crisis.[13]

4.3 Regional Regressions

In Table 8 we report separate results for three regions: Latin America, East Asia/Pacific, and the rest of the world.[14] Although many of the coefficients are quite different in the different regions, the coefficient on corruption is remarkably stable across regions. The lowest point estimate (in absolute value) corresponds to East Asia/Pacific, while the highest corresponds to the rest of the world. The coefficient for Latin America is almost the same as the one for the full sample. These results suggest that investors do not see major differences in the way that corruption affects default probabilities across regions.

We next test whether sensitivity of spreads to corruption increased after the Asian crisis for any particular region, especially for East Asia/Pacific. To do it we add the crisis dummy and the interaction term between the corruption score and the crisis dummy to the specifications in Table 8.[15] Results are presented in Table 9. The coefficient on the interaction term is insignificantly different from zero in all cases, and the point estimates are positive for all the regions. These results confirm the findings of the previous section that the "wake-up call" hypothesis is not supported by the data.

4.4 Correction for Sample Selection

As we discussed above, the OLS results could be biased due to sample selection. To check this, we jointly estimate the equations for (log)spreads and issue probability using the Heckman selection model.

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[13]We note, however, that the impact of corruption on Institutional Investor's credit rating did increase following the crisis; see the Appendix (section 7.2).

[14]For comparability purposes we also report the results for the full sample.

[15]To be consistent, we re-estimate the credit rating residual adding the crisis dummy and the interaction term to the original specification.

Tables 10 and 11 present our estimation results for the launch probabilities and spreads, respectively. Eichengreen and Mody (1998a,b) find that the determinants of launch probabilities seem to be very different for countries in Latin America than for countries in the rest of the world. Because of this, in Table 10 we estimate separate coefficients for firms and sovereigns in Latin America.[16] The coefficients reported are the marginal effects from the Heckman MLE procedure evaluated at the mean of the data. Column (a) presents coefficient estimates for the full sample of bonds. The results are broadly consistent with Eichengreen et al. (2001), and confirm the impressions from the summary statistics. For example, a higher credit rating residual (i.e., a country with lower political risk) increases the likelihood of issue, and a higher ratio of reserves to short-term debt decreases the likelihood of issue. The coefficient on corruption is positive for Latin American issuers but negative for issuers outside Latin America, indicating that corruption decreases the likelihood of a bond issue for Latin American issuers but increases it for issuers outside Latin America (recall that a higher corruption score means less corruption). One might expect lenders to be less likely to lend to borrowers in more corrupt countries, so the results outside of Latin America may seem surprising. One possibility is that other sources of finance (e.g., the banking system) are less effective in more corrupt countries, making borrowers more reliant on international bonds for finance. In terms of the supply and demand of bonds interpretation given in Section 2.3, this would imply that the supply of bonds effect is higher than the demand effect for countries outside Latin America, while the opposite occurs for Latin American countries. Comparing columns (b) and (c), we see that the negative coefficient is larger in absolute value for governments than for firms outside of Latin America. For Latin American issuers, there is a strong positive coefficient for firms, but the coefficient for governments is not significantly different from zero.

Table 11 presents results on the determinants of log spreads. The coefficient on the corruption score remains negative and significant, confirming our findings in Table 4.[17] The magnitudes of the coefficients are remarkably similar, with the Heckman estimates being somewhat smaller (in absolute value).

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[16] For reasons of space, we only report the interactions that are relevant for our purposes.

[17] Notice that, if the supply of bonds is positively correlated with corruption, and the demand of bonds is negatively correlated with corruption, the impact of an increase in corruption on the spread of a bond should be positive regardless of which of the two effects dominates (i.e., regardless of the sign of the corruption score in the issue equation). Therefore, we would expect corruption to increase spreads for all issuers, whether they are in Latin America or not.

The Heckman estimates for the pre- and post-crisis periods are presented in Table 12. In all samples, the point estimates are higher (in absolute value) after the Asian crisis, but the differences are very small. The conclusions obtained from the OLS results remain unchanged: there is no evidence that investors became more sensitive to corruption after the Asian crisis.

Regional results are presented in Tables 13 and 14. Again, we confirm the OLS results: the coefficients on the corruption score are very similar across regions, and there is no evidence of a higher impact of corruption on spreads after the Asian crisis in any particular region.

5   Conclusion

We have shown that the global bond market ascribes a central role to corruption in determining the price of debt for both firms and governments in emerging markets. This is true even when we account for macroeconomic variables and political risk. We reach the same conclusions whether we estimate the impact of corruption on spreads using OLS or the Heckman selection model.

We have not found evidence to support the "wake-up call" hypothesis that the impact of perceived corruption on spreads increased as a result of the Asian crisis. The sensitivity of spreads to corruption remains the same before and after the onset of the crisis.

A central question that we have not addressed in this study is exactly how corruption affects the likelihood of default. One surprising finding in this paper is that perceived corruption in a country impacts firm spreads and sovereign spreads to the same degree, even though in theory corruption should matter in very different ways for these two types of borrower. A better understanding of the relationship between government and firm default, and how corruption affects this, is an important area for future research.

6 Tables

Table 1: **Number of bond issues, average corruption score, and average spreads (for hard-currency denominated bonds), by country**

Country	Number of bonds	Number of sovereign bonds	Number of private bonds	Average corruption score	Average spread	Average sovereign spread	Average private spread
Pakistan	2	2	0	1.8	322	322	
Kazakhstan	3	3	0	2.3	791	791	
Russia	33	15	18	2.4	468	515	429
Venezuela	36	18	18	2.5	245	253	238
Indonesia	77	1	76	2.5	287	111	290
Croatia	2	2	0	2.7	340	340	
India	19	0	19	2.7	195		195
Ukraine	4	4	0	2.8	1,311	1,311	
China	22	9	13	2.8	209	116	273
Colombia	24	17	7	2.9	364	261	614
Mexico	115	36	79	3.1	364	303	392
Thailand	48	6	42	3.1	133	30	148
Philippines	41	16	25	3.1	287	304	276
Argentina	187	97	90	3.3	414	405	425
Egypt	1	0	1	3.3	646		646
Brazil	218	22	196	3.4	419	388	422
Latvia	2	2	0	3.4	278	278	
Romania	2	1	1	3.4	300	300	300
Turkey	54	42	12	3.5	418	412	438
Lithuania	5	5	0	3.8	413	413	
Jamaica	1	1	0	3.8	525	525	
Slovak Republic	9	8	1	3.8	379	371	440
El Salvador	1	1	0	3.9	500	500	
Morocco	1	1	0	4.1	55	55	
Uruguay	9	6	3	4.3	234	212	279
Peru	1	0	1	4.5	315		315
Korea	160	2	158	4.6	72	350	69
Hungary	25	24	1	4.6	167	158	375
Poland	20	3	17	4.7	323	85	365
Czech Republic	14	0	14	4.8	118		118
Tunisia	1	1	0	5.0	280	280	
Taiwan	7	0	7	5.0	75		75
Malaysia	15	1	14	5.1	133	330	118
South Africa	8	8	0	5.2	224	224	
Costa Rica	2	2	0	5.4	323	323	
Estonia	1	0	1	5.7	205		205
Slovenia	1	1	0	6.0	86	86	
Chile	27	1	26	6.7	154	175	153
Hong Kong	53	0	53	7.1	125		125
Singapore	6	0	6	9.0	94	371	94
Total	1,257	358	899	3.7	298	347	279

Note: Countries that are always non-issuers (average corruption score in parentheses): Paraguay (1.7), Bangladesh (2.3), Kenya (2.3), Ecuador (2.6), Bolivia (2.7), Bulgaria (3.1), Guatemala (3.1).

Table 2: **Univariate regressions of log spreads on the corruption score (OLS)**

	Full Sample (a)	Sovereign (b)	Private (c)
corruption	-0.290	-0.135	-0.295
	**(16.08)	**(2.80)	**(14.85)
constant	6.452	6.115	6.396
	**(95.10)	**(35.64)	**(82.70)
Observations	1,257	358	899
R^2	0.16	0.03	0.17

Note: Robust t statistics in parentheses. * significant at 5%; ** significant at 1%. For a definition of the variables, see the Appendix.

Table 3: **Descriptive statistics for issuers (indic=1) and non-issuers (indic=0), by corruption category**

	Full Sample		High Corruption		Medium Corruption		Low Corruption	
	indic=1	indic=0	indic=1	indic=0	indic=1	indic=0	indic=1	indic=0
Number of countries	46		23		19		19	
Number of bonds issued	1,175		350		464		361	
Number of bonds per country	26		15		24		19	
Spread (basis points)	294		305		388		162	
Amount (millions of dollars)	224		252		256		157	
Maturity (years)	7.0		7.3		7.4		6.3	
Share of privately placed issues	0.35		0.38		0.41		0.25	
Share of fixed-rate bonds	0.72		0.71		0.92		0.47	
Share of floating-rate bonds	0.28		0.29		0.08		0.53	
External debt / GDP	0.34	0.40	0.39	0.50	0.37	0.45	0.26	0.29
Total debt service / Exports	0.32	0.21	0.33	0.31	0.46	0.21	0.14	0.13
Share of issuers with debt rescheduled in the previous year	0.10	0.07	0.29	0.12	0.02	0.10	0.00	0.00
Standard dev. of export growth	0.29	0.31	0.28	0.33	0.30	0.31	0.28	0.30
GDP growth (quarterly)	1.1	0.7	1.2	0.7	0.9	0.4	1.2	0.9
Reserves / GDP	0.43	0.64	0.32	0.36	0.35	0.49	0.65	0.99
Reserves / Short-term debt	1.26	2.24	1.41	2.50	1.14	2.21	1.26	2.01
Domestic credit / GDP	1.68	1.80	1.33	1.13	1.12	1.41	2.73	2.66
US 10-year treasury rate	6.21	5.82	6.28	5.83	6.06	5.64	6.34	5.91
US (10-year - 1-year) tr. rate	0.70	0.54	0.72	0.55	0.67	0.50	0.73	0.57
Inflation rate (% per year)	14	15	19	19	15	19	8	8
Share of private issuers	0.72	0.47	0.73	0.49	0.62	0.53	0.85	0.41
Share of sovereign issuers	0.28	0.53	0.27	0.51	0.38	0.47	0.15	0.59
Credit rating	48.4	43.9	42.5	34.2	41.8	37.6	62.6	56.9
Credit rating residual	2.1	-3.6	1.2	-4.6	0.4	-5.2	5.1	-1.6
Corruption score	3.7	4.0	2.6	2.4	3.3	3.4	5.2	5.8
Number of observations	1,175	784	350	301	464	174	361	309

Note: See the text for a definition of the corruption categories and the indicator for isuers and non-isuers. See the Appendix for a definition of the variables.

Table 4: **Determinants of log spreads (OLS)**

	Full Sample (a)	Sovereign (b)	Private (c)
amount	-0.015	0.023	-0.785
	(0.33)	(0.53)	**(3.51)
maturity	0.001	0.006	-0.000
	(0.65)	*(1.98)	(0.00)
private placement	0.097	-0.170	0.195
	*(2.55)	**(2.60)	**(4.42)
fixed	0.382	0.368	0.473
	**(5.92)	**(2.65)	**(6.58)
log interest rate	-0.767	-0.880	-1.005
	**(2.94)	**(2.61)	**(2.86)
yield curve	-0.051	-0.055	-0.028
	(1.16)	(0.87)	(0.49)
credit rating residual	-0.046	-0.056	-0.045
	**(14.83)	**(7.45)	**(12.67)
corruption	-0.199	-0.262	-0.202
	**(10.00)	**(6.33)	**(8.82)
external debt / gdp	0.692	0.468	0.890
	**(5.13)	*(2.04)	**(5.23)
debt rescheduling	-0.000	-0.086	0.059
	(0.00)	(0.90)	(0.82)
gdp growth	-13.254	-19.965	-8.374
	**(5.30)	**(6.33)	*(2.21)
st. dev. export growth	0.739	1.109	0.576
	**(4.81)	**(4.40)	*(2.35)
reserves / short term debt	-0.074	-0.112	-0.033
	**(3.28)	*(2.48)	(1.30)
domestic credit / gdp	0.069	-0.046	0.115
	**(2.66)	(0.93)	**(3.51)
latin america	0.346	0.427	0.348
	**(5.55)	**(3.93)	**(3.39)
east asia and pacific	-0.116	-0.277	-0.077
	(1.26)	*(2.39)	(0.53)
private	0.047		
	(0.48)		
constant	6.891	7.770	7.203
	**(12.74)	**(10.08)	**(10.35)
Observations	1,175	326	849
R^2	0.64	0.64	0.65
F-stat	146.74	22.01	101.36
P > F	0.00	0.00	0.00

Note: Robust t statistics in parentheses. * significant at 5%; ** significant at 1%. Dummies for currencies, supranational entity, and production sectors included but not reported. F-stat is the F statistic for the null hypothesis that all the coefficients, except the constant, are jointly equal to zero. For a definition of the variables, see the Appendix.

Table 5: **Determinants of log spreads - corruption categories (OLS)**

	Full Sample (a)	Sovereign (b)	Private (c)
amount	-0.026	0.038	-0.875
	(0.54)	(0.85)	**(3.85)
maturity	0.000	0.004	-0.001
	(0.12)	(1.50)	(0.45)
private placement	0.100	-0.149	0.196
	**(2.61)	*(2.26)	**(4.49)
fixed	0.391	0.361	0.478
	**(5.89)	*(2.57)	**(6.49)
log interest rate	-0.792	-0.809	-1.086
	**(2.94)	*(2.35)	**(2.96)
yield curve	-0.042	-0.071	-0.012
	(0.92)	(1.14)	(0.20)
credit rating residual	-0.041	-0.050	-0.039
	**(11.09)	**(6.76)	**(8.58)
medium corruption	-0.168	-0.096	-0.168
	**(2.98)	(1.19)	*(2.17)
low corruption	-0.642	-0.656	-0.666
	**(11.27)	**(6.28)	**(9.46)
external debt / gdp	0.734	0.088	0.934
	**(5.24)	(0.39)	**(4.98)
debt rescheduling	-0.060	-0.112	-0.000
	(0.88)	(1.06)	(0.00)
gdp growth	-15.067	-21.261	-11.250
	**(5.64)	**(6.14)	*(2.56)
st. dev. export growth	0.644	1.023	0.441
	**(4.18)	**(4.18)	(1.76)
reserves / short term debt	-0.082	-0.144	-0.034
	**(3.62)	**(2.92)	(1.33)
domestic credit / gdp	0.025	-0.094	0.065
	(1.15)	*(2.01)	*(2.36)
latin america	0.254	0.261	0.258
	**(3.74)	**(2.88)	**(2.29)
east asia/pacific	-0.114	-0.211	-0.055
	(1.27)	(1.74)	(0.38)
private	0.043		
	(0.41)		
constant	6.624	7.341	7.063
	**(11.92)	**(9.61)	**(9.78)
Observations	1,175	326	849
R^2	0.62	0.63	0.64
F-stat	141.35	19.43	94.04
P > F	0.00	0.00	0.00
medium - low	-0.474	-0.560	-0.498
P > F (medium - low = 0)	0.00	0.00	0.00

Note: Robust t statistics in parentheses. * significant at 5%; ** significant at 1%. Dummies for currencies, supranational entity, and production sectors included but not reported. F-stat is the F statistic for the null hypothesis that all the coefficients, except the constant, are jointly equal to zero. For a definition of the variables, see the Appendix.

Table 6: **Regressions of log spreads on the corruption score - Asian crisis interaction (OLS)**

	Full Sample (a)	Sovereign (b)	Private (c)
corruption	-0.285	0.010	-0.302
	**(13.93)	(0.15)	**(13.45)
corruption * post-asia	0.063	-0.290	0.119
	(1.45)	**(3.11)	*(2.31)
post-asia	0.421	1.492	0.236
	**(2.61)	**(4.58)	(1.19)
constant	6.224	5.362	6.256
	**(79.53)	**(23.48)	**(70.83)
Observations	1,257	358	899
R^2	0.27	0.18	0.27
F-stat	153.44	22.87	114.72
P > F	0.00	0.00	0.00

Note: Robust t statistics in parentheses. * significant at 5%; ** significant at 1%. F-stat is the F statistic for the null hypothesis that all the coefficients, except the constant, are jointly equal to zero. For a definition of the variables, see the Appendix.

Table 7: **Determinants of log spreads - before and after the Asian crisis (OLS)**

	Full Sample before Asia (a)	Full Sample after Asia (b)	Sovereign before Asia (c)	Sovereign after Asia (d)	Private before Asia (e)	Private after Asia (f)
amount	-0.005	-0.026	0.014	-0.006	-0.547	-0.986
	(0.10)	(0.31)	(0.32)	(0.09)	(1.64)	**(4.00)
maturity	0.004	0.000	0.014	0.008	0.003	-0.002
	(1.42)	(0.07)	**(3.35)	(1.61)	(0.70)	(0.54)
private placement	0.111	0.044	-0.107	-0.164	0.164	0.179
	*(2.49)	(0.62)	(1.17)	*(2.32)	**(3.22)	(1.95)
fixed	0.303	0.618	0.232	0.425	0.392	0.724
	**(4.38)	**(3.37)	(1.88)	*(2.16)	**(4.98)	**(3.14)
log interest rate	0.238	-1.064	1.360	-0.921	-0.198	-2.460
	(0.55)	**(2.66)	(1.86)	**(2.71)	(0.39)	**(3.47)
yield curve	-0.115	0.069	-0.483	0.050	0.014	0.102
	(1.06)	(1.43)	(1.96)	(0.84)	(0.11)	(1.49)
credit rating residual	-0.051	-0.028	-0.046	-0.045	-0.048	-0.040
	**(12.96)	**(4.39)	**(4.77)	**(5.71)	**(10.80)	**(4.38)
corruption	-0.180	-0.193	-0.253	-0.305	-0.205	-0.152
	**(7.04)	**(3.99)	**(3.10)	**(4.51)	**(7.44)	**(2.74)
external debt / gdp	1.080	-0.339	0.068	0.029	1.079	-0.312
	**(6.53)	(0.99)	(0.17)	(0.09)	**(5.71)	(0.68)
debt rescheduling	0.205	-0.580	-0.021	-0.467	0.249	-0.405
	**(3.15)	**(5.45)	(0.15)	**(3.09)	**(3.08)	**(2.63)
gdp growth	-18.026	-5.105	-18.324	-15.663	-17.319	7.607
	**(5.75)	(0.94)	**(4.00)	**(2.99)	**(3.95)	(0.92)
st. dev. export growth	0.723	0.418	0.529	0.501	0.616	0.434
	*(2.22)	*(2.28)	(1.13)	*(2.41)	(1.41)	(1.41)
reserves / short term debt	-0.096	-0.077	-0.156	-0.067	-0.062	0.003
	**(3.50)	(1.69)	*(2.18)	(1.75)	*(2.22)	(0.06)
domestic credit / gdp	0.124	0.046	-0.209	0.030	0.163	0.163
	**(3.77)	(1.03)	(1.91)	(0.94)	**(4.59)	*(2.50)
latin america	0.558	-0.160	0.317	0.059	0.661	-0.266
	**(6.77)	(1.68)	*(2.13)	(0.71)	**(4.78)	(1.86)
east asia and pacific	-0.240	-0.020	-0.456	-0.222	-0.042	0.165
	*(2.06)	(0.13)	*(2.02)	(1.50)	(0.26)	(0.79)
private	1.210	0.165				
	**(6.81)	(1.15)				
constant	3.475	8.223	2.362	8.463	5.415	10.482
	**(4.00)	**(10.07)	(1.83)	**(11.42)	**(5.40)	**(7.75)
Observations	849	326	171	155	678	171
R^2	0.63	0.44	0.65	0.70	0.66	0.49
F-stat	75.08	14.17	9.66	18.27	83.98	10.00
P > F	0.00	0.00	0.00	0.00	0.00	0.00

Note: Robust t statistics in parentheses. * significant at 5%; ** significant at 1%. Dummies for currencies, supranational entity, and production sectors included but not reported. F-stat is the F statistic for the null hypothesis that all the coefficients, except the constant, are jointly equal to zero. For a definition of the variables, see the Appendix.

Table 8: **Determinants of log spreads - by region (OLS)**

	Full Sample	Latin America	East Asia/Pacific	Rest
	(a)	(b)	(c)	(d)
amount	-0.015	-0.019	0.098	-0.030
	(0.33)	(0.33)	(0.33)	(0.49)
maturity	0.001	0.003	0.012	0.002
	(0.65)	(0.96)	**(3.20)	(0.53)
private placement	0.097	0.052	0.131	0.190
	*(2.55)	(1.12)	(1.86)	(1.41)
fixed	0.382	0.516	0.346	0.525
	**(5.92)	**(3.88)	**(3.53)	**(3.10)
log interest rate	-0.767	-1.064	-0.501	-0.807
	**(2.94)	**(3.60)	(1.06)	(1.29)
yield curve	-0.051	0.053	-0.302	-0.148
	(1.16)	(1.17)	**(3.00)	(1.34)
credit rating residual	-0.046	-0.047	-0.053	-0.031
	**(14.83)	**(5.81)	**(10.45)	**(2.76)
corruption	-0.199	-0.201	-0.159	-0.234
	**(10.00)	**(5.73)	**(3.83)	**(3.29)
external debt / gdp	0.692	0.142	1.031	-0.147
	**(5.13)	(0.29)	**(3.14)	(0.51)
debt rescheduling	-0.000	0.189	-0.565	-0.690
	(0.00)	**(3.03)	**(4.69)	**(2.96)
gdp growth	-13.254	-16.441	-24.625	-12.509
	**(5.30)	**(5.53)	*(2.29)	*(2.60)
st. dev. export growth	0.739	0.693	1.665	0.970
	**(4.81)	**(3.63)	**(4.10)	(1.59)
reserves / short term debt	-0.074	-0.286	0.075	-0.119
	**(3.28)	**(6.78)	*(2.30)	**(2.90)
domestic credit / gdp	0.069	0.190	0.026	-0.094
	**(2.66)	*(2.19)	(0.53)	(1.25)
latin america	0.346			
	**(5.55)			
east asia and pacific	-0.116			
	(1.26)			
private	0.047	0.861	0.808	-0.405
	(0.48)	**(4.66)	**(4.98)	(1.52)
constant	6.891	7.275	5.760	7.790
	**(12.74)	**(11.60)	**(5.59)	**(5.93)
Observations	1,175	581	418	176
R^2	0.64	0.40	0.62	0.52
F-stat	146.74	22.84	226.84	13.97
P > F	0.00	0.00	0.00	

Note: Robust t statistics in parentheses. * significant at 5%; ** significant at 1%. Dummies for currencies, supranational entity, and production sectors included but not reported. F-stat is the F statistic for the null hypothesis that all the coefficients, except the constant, are jointly equal to zero. For a definition of the variables, see the Appendix.

Table 9: **Determinants of log spreads - by region - Asian crisis interaction (OLS)**

	Full Sample (a)	Latin America (b)	East Asia/Pacific (c)	Rest (d)
amount	-0.001	-0.013	0.059	0.007
	(0.02)	(0.23)	(0.19)	(0.12)
maturity	0.001	0.003	0.012	0.002
	(0.24)	(0.90)	**(3.33)	(0.45)
private placement	0.102	0.047	0.134	0.160
	**(2.64)	(1.01)	(1.93)	(1.20)
fixed	0.385	0.501	0.327	0.503
	**(5.91)	**(3.77)	**(3.26)	**(3.01)
log interest rate	-0.394	-0.733	-0.373	-0.103
	(1.42)	*(2.22)	(0.78)	(0.17)
yield curve	0.006	0.079	-0.251	-0.045
	(0.13)	(1.67)	*(2.38)	(0.35)
credit rating residual	-0.043	-0.048	-0.053	-0.036
	**(13.49)	**(5.74)	**(10.52)	**(3.25)
corruption	-0.191	-0.200	-0.151	-0.257
	**(8.30)	**(5.57)	**(3.71)	**(3.27)
corruption * post-asia	-0.002	0.028	0.061	0.137
	(0.05)	(0.56)	(0.41)	(1.34)
post-asia	0.316	0.046	0.419	0.150
	(1.93)	(0.23)	(0.70)	(0.39)
external debt / gdp	0.584	0.047	0.900	-0.100
	**(4.03)	(0.10)	**(2.74)	(0.37)
debt rescheduling	0.038	0.222	-0.410	-0.595
	(0.63)	**(3.32)	**(3.33)	*(2.48)
gdp growth	-11.359	-17.640	-12.562	-7.497
	**(4.44)	**(6.05)	(1.19)	(1.76)
st. dev. export growth	0.665	0.742	1.298	0.776
	**(4.34)	**(3.98)	**(3.26)	(1.34)
reserves / short term debt	-0.066	-0.283	0.062	-0.120
	**(2.79)	**(6.81)	(1.86)	**(2.90)
domestic credit / gdp	0.062	0.146	0.037	-0.114
	**(2.32)	(1.62)	(0.75)	(1.68)
latin america	0.361			
	**(5.69)			
east asia and pacific	-0.122			
	(1.31)			
private	0.008	0.863	0.836	-0.196
	(0.08)	**(4.81)	**(5.07)	(0.77)
constant	6.172	6.733	5.337	6.248
	**(10.62)	**(9.48)	**(5.20)	**(4.63)
Observations	1,175	581	418	176
R^2	0.63	0.41	0.63	0.55
F-stat	139.50	22.17	210.72	15.76
P > F	0.00	0.00	0.00	

Note: Robust t statistics in parentheses. * significant at 5%; ** significant at 1%. Dummies for currencies, supranational entity, and production sectors included but not reported. Chi2 is a Wald test for the null hypothesis that all the coefficients, except the constant, are jointly equal to zero. P>Chi2 (rho=0) is a Likelihood Ratio test for independence between the spread and issue equations (null hypothesis of no selectivity effect). For a definition of the variables, see the Appendix.

Table 10: **Determinants of issue probability (Heckman)**

	Full Sample (a)	Sovereign (b)	Private (c)
log interest rate	1.216	1.045	1.060
	**(5.58)	**(3.48)	**(4.08)
yield curve	-0.027	-0.111	0.025
	(0.69)	*(2.11)	(0.57)
credit rating residual	0.008	-0.005	0.015
	**(3.40)	(1.37)	**(5.60)
cr-residual * la	0.026	0.036	0.014
	**(5.09)	**(5.55)	**(2.31)
corruption	-0.048	-0.068	-0.042
	**(3.40)	**(3.09)	**(2.62)
corruption * la	0.146	0.065	0.206
	**(4.94)	(1.74)	**(5.17)
external debt / gdp	0.057	-0.046	0.221
	(0.48)	(0.27)	(1.56)
debt service / exports	-0.741	0.022	-1.343
	**(3.63)	(0.08)	**(4.89)
debt rescheduling	-0.188	-0.220	-0.001
	*(2.35)	**(2.75)	(0.01)
gdp growth	10.095	1.169	15.983
	**(4.98)	(0.42)	**(5.80)
st. dev. export growth	-0.217	0.779	-1.304
	(1.38)	**(3.86)	**(5.09)
reserves / short term debt	-0.089	-0.053	-0.078
	**(6.98)	**(3.20)	**(5.21)
reserves / imports	0.025	0.030	-0.003
	(1.35)	(1.25)	(0.10)
domestic credit / gdp	-0.053	-0.058	-0.022
	**(3.68)	*(2.36)	(1.36)
latin america	0.964	0.999	0.602
	**(16.15)	**(297.65)	**(1.17)
east asia and pacific	0.076	0.023	-0.016
	(1.29)	(0.25)	(0.23)
private	0.254		
	**(8.04)		
Observations	1,959	742	1,217
Uncensored obs.	1,175	326	849
Censored obs.	784	416	368

Note: Absolute value of z statistics in parentheses. * significant at 5%; ** significant at 1%. Point estimates are marginal effects evaluated at the mean of the data. The z statistics and significance levels refer to the marginal effects, not tho the underlying coefficients. Interactions between all the variables and the dummy for Latin America included but not reported. For a definition of the variables, see the Appendix.

Table 11: **Determinants of log spreads (Heckman)**

	Full Sample (a)	Sovereign (b)	Private (c)
amount	-0.002	0.037	-0.777
	(0.04)	(0.90)	**(4.03)
maturity	0.000	0.005	-0.000
	(0.17)	*(2.01)	(0.05)
private placement	0.109	-0.139	0.199
	**(2.98)	*(2.47)	**(4.59)
fixed	0.393	0.277	0.472
	**(7.87)	**(2.59)	**(7.92)
log interest rate	-1.136	-1.157	-1.088
	**(3.79)	**(3.04)	**(2.82)
yield curve	-0.078	-0.101	-0.041
	(1.66)	*(1.63)	(0.69)
credit rating residual	-0.049	-0.062	-0.046
	**(16.82)	**(10.51)	**(13.39)
corruption	-0.169	-0.230	-0.191
	**(9.14)	**(6.07)	**(8.32)
external debt / gdp	0.960	0.591	0.992
	**(7.16)	**(2.72)	**(5.69)
debt rescheduling	0.018	0.020	0.053
	(0.28)	(0.19)	(0.75)
gdp growth	-15.665	-21.679	-9.074
	**(6.30)	**(6.84)	**(2.71)
st. dev. export growth	1.009	1.272	0.680
	**(5.26)	**(5.45)	*(2.40)
reserves / short term debt	-0.019	-0.021	-0.018
	(1.03)	(0.83)	(0.76)
domestic credit / gdp	0.109	0.123	0.119
	**(4.69)	**(3.04)	**(4.30)
latin america	0.107	0.288	0.263
	(1.61)	**(3.17)	**(2.66)
east asia and pacific	-0.300	-0.345	-0.147
	**(3.24)	**(2.76)	(1.12)
private	0.039		
	(0.08)		
constant	7.498	8.003	7.337
	**(9.90)	**(9.86)	**(9.76)
Observations	1,959	742	1,217
Uncensored obs.	1,175	326	849
Censored obs.	784	416	368
Chi2	1,947.89	479.19	1574.50
P>Chi2	0.00	0.00	0.00
lambda	-0.44	-0.50	-0.16
s.e. lamda	0.05	0.04	0.09
rho	-0.73	-0.94	-0.28
P>Chi2 (rho=0)	0.00	0.00	0.09

Note: Absolute value of z statistics in parentheses. * significant at 5%; ** significant at 1%. Dummies for currencies, supranational entity, and production sectors included but not reported. Chi2 is a Wald test for the null hypothesis that all the coefficients, except the constant, are jointly equal to zero. P>Chi2 (rho=0) is a Likelihood Ratio test for independence between the spread and issue equations (null hypothesis of no selectivity effect). For a definition of the variables, see the Appendix.

Table 12: **Determinants of log spreads - before and after the Asian crisis (Heckman)**

	Full Sample before Asia (a)	Full Sample after Asia (b)	Sovereign before Asia (c)	Sovereign after Asia (d)	Private before Asia (e)	Private after Asia (f)
amount	-0.009	0.029	0.013	-0.002	-0.427	-0.988
	(0.14)	(0.32)	(0.23)	(0.03)	(1.66)	**(3.30)
maturity	0.000	0.000	0.014	0.008	0.002	-0.001
	(0.15)	(0.06)	**(3.50)	(1.62)	(0.42)	(0.31)
private placement	0.114	0.049	-0.108	-0.141	0.162	0.225
	**(2.65)	(0.71)	(1.23)	(1.81)	**(3.36)	*(2.35)
fixed	0.310	0.615	0.231	0.420	0.388	0.719
	**(5.72)	**(3.97)	(1.91)	(1.76)	**(5.89)	**(3.77)
log interest rate	0.458	-1.119	1.370	-1.077	-0.117	-2.837
	(0.98)	**(2.64)	(1.82)	**(2.87)	(0.22)	**(4.21)
yield curve	-0.132	0.070	-0.482	0.051	-0.011	0.103
	(1.25)	(1.41)	**(2.67)	(1.07)	(0.09)	(1.40)
credit rating residual	-0.052	-0.029	-0.047	-0.049	-0.050	-0.049
	**(13.95)	**(4.66)	**(5.01)	**(6.53)	**(12.02)	**(5.31)
corruption	-0.147	-0.192	-0.254	-0.275	-0.174	-0.180
	**(6.55)	**(4.72)	**(4.26)	**(4.89)	**(6.57)	**(3.25)
external debt / gdp	1.336	-0.305	0.074	0.021	1.286	0.435
	**(8.04)	(0.93)	(0.21)	(0.06)	**(6.57)	(0.78)
debt rescheduling	0.262	-0.576	-0.018	-0.448	0.266	-0.467
	**(3.56)	**(3.30)	(0.13)	*(2.36)	**(3.31)	(1.90)
gdp growth	-16.871	-5.133	-18.430	-15.652	-17.511	9.067
	**(5.46)	(1.07)	**(4.29)	**(3.33)	**(4.52)	(1.24)
st. dev. export growth	1.389	0.418	0.546	0.475	0.949	0.537
	**(3.91)	*(2.01)	(1.07)	*(2.52)	*(2.22)	(1.43)
reserves / short term debt	-0.046	-0.069	-0.154	-0.044	-0.021	0.049
	*(2.26)	(1.79)	**(4.37)	(1.00)	(0.83)	(0.96)
domestic credit / gdp	0.164	0.056	-0.204	0.053	0.172	0.247
	**(5.81)	(1.22)	(1.84)	(1.33)	**(5.71)	**(3.32)
latin america	0.280	-0.186	0.316	0.007	0.453	-0.506
	**(3.33)	(1.80)	*(2.31)	(0.07)	**(3.86)	**(2.99)
east asia and pacific	-0.492	-0.042	-0.0458	-0.259	-0.256	-0.106
	**(4.16)	(0.26)	(1.95)	(1.78)	(1.68)	(0.40)
private	-0.025	0.186				
	(0.27)	(0.37)				
constant	4.130	8.307	3.608	8.704	5.153	11.120
	**(4.59)	**(8.37)	**(2.61)	**(9.94)	**(4.85)	**(8.65)
Observations	1,152	807	351	391	801	416
Uncensored obs.	849	326	171	155	678	171
Censored obs.	303	481	180	236	123	245
Chi2	1,277.30	253.44	229.66	388.64	1,247.88	216.46
P>Chi2	0.00	0.00	0.00	0.00	0.00	0.00
lambda	-0.54	-0.05	-0.01	-0.15	-0.41	-0.36
s.e. lamda	0.04	0.11	0.10	0.11	0.08	0.14
rho	-0.87	-0.10	-0.03	-0.50	-0.71	-0.68
P>Chi2 (rho=0)	0.00	0.66	0.92		0.00	

Note: Absolute value of z statistics in parentheses. * significant at 5%; ** significant at 1%. Dummies for currencies, supranational entity, and production sectors included but not reported. Chi2 is a Wald test for the null hypothesis that all the coefficients, except the constant, are jointly equal to zero. P>Chi2 (rho=0) is a Likelihood Ratio test for independence between the spread and issue equations (null of no selectivity effect). P>Chi2 (rho=0) is missing in those specifications estimated by the two-step procedure. For a definition of the variables, see the Appendix.

Table 13: **Determinants of log spreads - by region (Heckman)**

	Full Sample (a)	Latin America (b)	East Asia/Pacific (c)	Rest (d)
amount	-0.002	-0.024	-0.003	-0.027
	(0.04)	(0.41)	(0.01)	(0.24)
maturity	0.000	0.003	0.011	0.002
	(0.17)	(0.95)	*(2.25)	(0.35)
private placement	0.109	0.053	0.133	0.189
	**(2.98)	(1.27)	*(1.97)	(1.78)
fixed	0.393	0.515	0.361	0.532
	**(7.87)	**(5.70)	**(4.25)	**(4.02)
log interest rate	-1.136	-1.067	-0.414	-0.408
	**(3.79)	**(3.26)	(0.73)	(0.48)
yield curve	-0.078	0.050	-0.256	-0.176
	(1.66)	(1.05)	*(2.23)	(1.48)
credit rating residual	-0.049	-0.048	-0.053	-0.026
	**(16.82)	**(6.70)	**(12.17)	*(2.19)
corruption	-0.169	-0.199	-0.188	-0.221
	**(9.14)	**(6.19)	**(4.25)	**(2.96)
external debt / gdp	0.960	0.240	0.938	-0.180
	**(7.16)	(0.64)	**(3.00)	(0.45)
debt rescheduling	0.018	0.192	-0.591	-0.609
	(0.28)	**(2.86)	**(3.35)	**(2.81)
gdp growth	-15.665	-16.359	-22.637	-9.029
	**(6.30)	**(5.87)	**(2.59)	(1.25)
st. dev. export growth	1.009	0.724	1.981	0.810
	**(5.26)	**(3.39)	**(4.08)	(1.21)
reserves / short term debt	-0.019	-0.281	0.032	-0.137
	(1.03)	**(7.47)	(0.84)	**(3.20)
domestic credit / gdp	0.109	0.197	0.027	-0.140
	**(4.69)	*(2.56)	(0.75)	(1.53)
latin america	0.107			
	(1.61)			
east asia and pacific	-0.300			
	**(3.24)			
private	0.039	0.849	1.034	-0.456
	(0.08)	**(5.19)	**(5.82)	(0.77)
constant	7.498	7.240	5.668	7.022
	**(9.90)	**(10.90)	**(4.74)	**(3.93)
Observations	1,959	799	624	536
Uncensored obs.	1,175	581	418	176
Censored obs.	784	218	206	360
Chi2	1,947.89	353.09	657.98	187.87
P>Chi2	0.00	0.00	0.00	0.00
lambda	-0.44	-0.04	0.27	0.16
s.e. lamda	0.05	0.07	0.07	0.19
rho	-0.73	-0.09	0.47	0.29
P>Chi2 (rho=0)	0.00	0.57	0.01	0.57

Note: Absolute value of z statistics in parentheses. * significant at 5%; ** significant at 1%. Dummies for currencies, supranational entity, and production sectors included but not reported. Chi2 is a Wald test for the null hypothesis that all the coefficients, except the constant, are jointly equal to zero. P>Chi2 (rho=0) is a Likelihood Ratio test for independence between the spread and issue equations (null hypothesis of no selectivity effect). For a definition of the variables, see the Appendix.

Table 14: **Determinants of log spreads - by region - Asian crisis interaction (Heckman)**

	Full Sample (a)	Latin America (b)	East Asia/Pacific (c)	Rest (d)
amount	-0.001	-0.024	-0.047	0.011
	(0.01)	(0.42)	(0.17)	(0.10)
maturity	0.001	0.003	0.011	0.002
	(0.22)	(0.90)	*(2.23)	(0.29)
private placement	0.101	0.050	0.137	0.159
	**(2.70)	(1.20)	*(2.03)	(1.53)
fixed	0.385	0.498	0.344	0.511
	**(7.38)	**(5.53)	**(4.02)	**(3.85)
log interest rate	-0.390	-0.714	-0.318	0.201
	(1.26)	*(2.01)	(0.56)	(0.25)
yield curve	0.006	0.075	-0.224	-0.080
	(0.13)	(1.51)	(1.88)	(0.64)
credit rating residual	-0.043	-0.050	-0.053	-0.030
	**(14.61)	**(6.87)	**(12.22)	*(2.52)
corruption	-0.192	-0.194	-0.175	-0.236
	**(9.06)	**(5.67)	**(3.96)	**(2.83)
corruption * post-asia	-0.003	0.026	0.038	0.123
	(0.08)	(0.55)	(0.21)	(1.16)
post-asia	0.318	0.067	0.459	0.133
	*(2.01)	(0.37)	(0.72)	(0.33)
external debt / gdp	0.577	0.239	0.828	-0.139
	**(3.95)	(0.63)	**(2.62)	(0.35)
debt rescheduling	0.037	0.233	-0.448	-0.524
	(0.61)	**(3.27)	*(2.52)	*(2.38)
gdp growth	-11.315	-17.543	-11.041	-4.751
	**(4.60)	**(6.27)	(1.24)	(0.74)
st. dev. export growth	0.658	0.805	1.613	0.646
	**(3.54)	**(3.73)	**(3.30)	(1.03)
reserves / short term debt	-0.067	-0.270	0.023	-0.138
	**(3.53)	**(7.02)	(0.61)	**(3.34)
domestic credit / gdp	0.061	0.158	0.037	-0.164
	*(2.57)	*(1.99)	(0.99)	(1.80)
latin america	0.367			
	**(5.20)			
east asia and pacific	-0.118			
	(1.23)			
private	0.008	0.200	1.052	-0.252
	(0.02)	*(2.55)	**(5.91)	(0.43)
constant	6.164	7.250	5.282	5.676
	**(7.38)	**(10.18)	**(4.43)	**(3.32)
Observations	1,959	799	624	536
Uncensored obs.	1,175	581	418	176
Censored obs.	784	218	206	360
Chi2	1,989.85	356.48	664.70	204.52
P>Chi2	0.00	0.00	0.00	0.00
lambda	0.01	-0.09	0.26	0.15
s.e. lamda	0.08	0.09	0.07	0.17
rho	0.02	-0.21	0.45	0.28
P>Chi2 (rho=0)	0.88	0.27	0.01	0.50

Note: Absolute value of z statistics in parentheses. * significant at 5%; ** significant at 1%. Dummies for currencies, supranational entity, and production sectors included but not reported. Chi2 is a Wald test for the null hypothesis that all the coefficients, except the constant, are jointly equal to zero. P>Chi2 (rho=0) is a Likelihood Ratio test for independence between the spread and issue equations (null hypothesis of no selectivity effect). For a definition of the variables, see the Appendix.

7 Appendix

In this appendix we describe the data used in the econometric analysis. We also present the regressions used to calculate the credit rating residual.

7.1 Data

This section describes the variables used in the specifications. The bond dataset was obtained from *Capital Bondware*; it contains information on bond characteristics (spread, amount of the issue, maturity, etc.) and on issuer characteristics (country, area, sector, etc.). Tables 15 and 16 describe these types of variables. The data is quarterly, and covers the period 1995-Q1 through 1999-Q3. For a precise description of the periodicity and source of each variable (except the corruption score, which is described in the text), please refer to Eichengreen et al. (2001).

Table 15: **Bond Characteristics**

Variable name	Definition
spread	launch spread over risk-free (government) issue denominated in the same currency and of about the same maturity, in basis points
lnspread	natural log of spread
amount	amount of the issue, in millions of dollars
maturity	maturity of the issue, in years
fixed	dummy that takes value one for fixed-rate bonds
float	dummy that takes value one for floating-rate bonds
dollar	dummy that takes value one if the bond is denominated in dollars
mark	dummy that takes value one if the bond is denominated in deutsche marks
yen	dummy that takes value one if the bond is denominated in yens
euro	dummy that takes value one if the bond is denominated in euros
othcurr	dummy that takes value one if the bond is denominated in other currencies
private placement	dummy that takes value one if the bond was privately placed

The data on bond and issuer characteristics were supplemented with country characteristics. The sources for the latter included the International Monetary Fund's *World Economic Outlook* and *International Financial Statistics*, the World Bank's *World Debt Tables* and *Global Development Finance*, the Bank of International Settlements' *Maturity, Sectoral and National Distribution of International Bank Lending*, *Institutional Investor's* Country Credit Rating, and *Transparency International's* corruption score. Missing data for some countries were filled in using the U.S. State Department's annual country reports on *Economic Policy and Trade Practices*. We also included the ten-year rate on U.S. treasuries, and a measure of the yield curve, to proxy for global economic conditions. Table 17 describes these variables.

Table 16: **Issuer Characteristics**

Variable name	Definition
issuer	issuer's denomination
country	issuer's country name
sovern	dummy that takes value one for sovereign issuers
private	dummy that takes value one for private issuers
latin america	dummy that takes value one if the issuer is from Latin America
east asia and pacific	dummy that takes value one if the issuer is from East Asia/Pacific
finance	dummy that takes value one if the issuer is from the financial services sector
manf	dummy that takes value one if the issuer is from the manufacturing sector
utinfr	dummy that takes value one if the issuer is from the utility and infrastructure sector
service	dummy that takes value one if the issuer is from the "other services" sector
govern	dummy that takes value one if the issuer is from the government sector, where government refers to sub-sovereign entities and central banks which could not be classified in the other four production sectors
supra	dummy that takes value one if the issuer is "supranational"; this variable corresponds to bonds floated by the "Corporación Andina de Fomento", a Latin American development bank operating in more than one country[18]

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[18]The country characteristics for these issues are those of Venezuela, the country in which the "Corporación Andina de Fomento" is headquartered

Table 17: **Country Characteristics and Global Variables**

Variable name	Definition	Description
corruption	Transparency International's corruption score	A measure of corruption, the primary variable of interest
external debt / gdp	ratio of total external debt to gdp	A measure of the indebtedness of the country, scaled by its GDP
debt rescheduling	dummy that takes value one if a debt rescheduling with either private or official creditors took place in the previous year	a proxy for credit history
gdp growth	GDP growth, calculated from real GDP in 1990 prices	A proxy for future repayment capacity
st. dev. export growth	standard deviation of export growth (standard deviation of monthly growth rates over six months)	A measure of the variability of a country's foreign exchange earnings
reserves / short term debt	ratio of reserves to short-term bank debt: total reserves minus gold / cross-border bank claims in all currencies, of maturity up to and including one year	A proxy for the short term liquidity of a country in repaying its foreign debt
domestic credit / gdp	ratio of domestic credit to GDP	A measure of bank credit extended within the economy as a percentage of GDP
debt service / exports	total debt service over exports	A proxy for the short term liquidity of the country in repaying foreign debt
reserves / imports	reserves to imports ratio	A measure of the country's level of reserves relative to the foreign exchange needed for imports
reserves / gdp	reserves to GDP ratio	Another measure of the country's level of reserves, scaled by GDP
credit rating	Institutional Investor's country credit rating	Required to calculate the credit rating residual (see below)
credit rating residual	credit rating residual (see description in next section)	A proxy for any information in credit ratings not captured by the macroeconomic variables and the corruption score
log interest rate	log of the yield on ten-year U.S. treasury bonds (at time of issue)	A proxy for global credit conditions
yield curve	log of the difference between the yield of a 10-year and a 1-year US treasury bond	Another proxy for global credit conditions

7.2 The Credit Rating Residual

In this section we present the regressions used to construct the credit rating residual.

Table 18: **Determinants of Credit Rating**

	Full Sample	Before Asia	After Asia
	(a)	(b)	(c)
corruption	4.437	3.754	5.209
	**(13.49)	**(8.59)	**(12.08)
corruption * la	-1.581	-1.089	-2.271
	**(3.80)	(1.96)	**(3.74)
debt rescheduling	-6.529	-11.770	-0.493
	**(5.85)	**(10.39)	(0.32)
reserves / gdp	4.503	1.605	7.160
	**(6.02)	(1.81)	**(6.68)
external debt / gdp	-2.930	-12.283	0.455
	(1.64)	**(6.10)	(0.23)
gdp growth	444.159	741.970	54.292
	**(11.27)	**(14.95)	(1.14)
st. dev. export growth	-27.961	-36.593	-9.914
	**(10.15)	**(7.78)	**(2.99)
latin america	-3.332	-12.391	11.688
	(1.58)	**(3.74)	**(4.05)
debt resch. * la	2.547	7.722	-4.485
	*(1.99)	**(5.73)	*(1.96)
reserves / gdp * la	2.040	4.763	0.709
	(1.01)	(1.78)	(0.22)
external debt / gdp * la	-1.649	12.609	-11.404
	(0.59)	**(3.66)	**(3.06)
gdp growth * la	-254.309	-571.184	246.327
	**(5.43)	**(10.02)	**(3.78)
s.d. exp. growth * la	13.668	21.580	-7.138
	**(4.00)	**(3.86)	(1.70)
constant	35.908	44.366	22.681
	**(20.84)	**(15.49)	**(11.19)
Observations	2,233	1,233	1,000
Adjusted R^2	0.61	0.73	0.55
F-stat	370.83	488.20	85.80
P > F	0.00	0.00	0.00

Note: Robust t statistics in parentheses. * significant at 5%; ** significant at 1%. F-stat is the F test for the null hypothesis that all the coefficients, except the constant, are jointly equal to zero.

Following Eichengreen et al. (2001), we regress *Institutional Investor's* country credit ratings on a dummy for debt rescheduling, reserves over GDP, total external debt over GDP, the growth rate of GDP, the standard deviation of export growth, a dummy for Latin America, and interactions between all these variables and the dummy for Latin America. Unlike Eichengreen et al. (2001), we include the corruption score and its interaction with the dummy for Latin America, as regressors. We do this because we want the credit rating residual to be orthogonal to our corruption index.[19]

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[19]Eichengreen et al. (2001) interpret their credit rating residual as a measure of political risk. Under this interpre-

We estimate the regression for the full sample, and for the two sub-periods: Before Asia and After Asia. Results are presented in Table 18.

The results are generally consistent with the ones in Eichengreen et al. (2001). We see that debt rescheduling, indebtedness, and export variability reduce the credit rating, while higher reserves and higher growth improve the credit rating. The dummy for Latin America enters negatively in the first two columns, and positively in the third one.[20] Better corruption scores significantly improve the credit rating in all cases. The coefficient on corruption is higher after the Asian crisis, both for countries in Latin America and the rest of the world.

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tation, our credit rating residual should be understood as a measure of political risk "net of corruption effects".

[20]The change in the sign of the Latin American dummy for column (c) is due to the inclusion of the corruption score as regressor.

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