WPS5380

Policy Research Working Paper 5380

Sovereign Debt Distress and Corporate Spillover Impacts

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The World Bank
Development Prospects Group
Emerging Global Trends Division
July 2010

Policy Research Working Paper 5380

Abstract

In much of the standard corporate finance literature in which sovereign debt is treated as a risk free asset, corporate bond prices are seen to depend on idiosyncratic risk factors specific to the issuing company, with public debt playing an indirect role to the extent that it affects the term structure of interest rates. In the corporate world, however, the ability of a borrower to access international capital markets and the terms according to which it can raise capital depend not only on its own creditworthiness, but also on the financial health of its home-country sovereign. In times of financial stress, when investors lose confidence in the government's ability to use public finances to stabilize the economy or provide a safety net for corporations in distress, markets' assessment of private credit risk takes on a completely different dynamic than during normal times, incorporating an additional risk premium to compensate investors for the potential consequences of sovereign default. Using a new database that covers nearly every emerging-market corporate and sovereign entity that has issued bonds on global markets between 1995 and 2009, this paper investigates the degree to which heightened sovereign default risk perceptions during times of market turmoil influence the determination of corporate bond yield spreads, controlling for specific bond attributes and common global risk factors. Econometric evidence presented confirms that investors' perceptions of sovereign debt problems translate into higher costs of capital for private corporate issuers, with the magnitude of such costs increasing at times when sovereign bonds trade at spreads exceeding a threshold of 1000 bps. The key policy recommendation emerging from the analysis relates to the need to improve sovereign creditworthiness in order to prevent a loss in investor confidence that could trigger a panicky sell-off in sovereign debt with adverse macroeconomic and fiscal consequences. Implications for future research point to the need to develop better models of corporate bond pricing and valuation, recognizing explicitly the role of sovereign credit risk.

This paper—a product of the Emerging Global Trends Division, Development Prospects Group—is part of a larger effort in the department to to analyze the domestic growth and macroeconomic consequences of heightened sovereign debt stress, and to design appropriate policy measures to improve sovereign creditworthiness in order to prevent a loss in investor confidence that could trigger a panicky sell-off in sovereign debt with adverse macroeconomic and fiscal consequences. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at Mdailami@worldbank.org.

Sovereign Debt Distress and Corporate Spillover Impacts

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Sovereign Debt Distress and Corporate Spillover Impacts

I. Introduction

At a time when rising sovereign credit risk in highly indebted developed economies represents a major source of policy concern and market anxiety, drawing attention to the corporate debt problems that may loom ahead is not only a call for a more systematic approach to debt management, but an opportunity to highlight the hidden dynamics between sovereign and corporate debt that could create a negative feedback loop if investors lose confidence in the government's ability to use public finances to stabilize the economy or provide a safety net for corporations in distress. Though such sovereign credit events are rare, with global financial markets still unsettled and public finances stretched to the limit in many countries, their likelihood is rising, even in countries with seemingly manageable external debt profiles. Under such circumstances, markets' assessment of public and private credit risk takes on a completely different dynamic than during normal times, when markets' belief in a government's power of taxation and spending provides a cushion against macroeconomic shocks. Understanding such market dynamics is, thus, crucial in formulating mitigating policy support measures before investor fear sets in that could have adverse consequences for private firms' access to foreign capital.

This paper investigates the degree to which heightened sovereign default risk perceptions during times of market turmoil—gauged by widening of bond market spreads beyond a critical threshold—influence the determination of corporate bond yield spreads in emerging markets. Using a new database that covers nearly every emerging-market corporate and sovereign entity that has issued bonds on global markets between 1995 and 2009 (4,441 transactions, amounting to $1.46 trillion), we develop an empirical methodology to analyze whether sovereign risk is priced into corporate bond spreads, controlling for specific bond attributes and common global risk factors. We model emerging corporate bond spreads as incorporating three risk premiums: corporate default, home-country sovereign debt distress, and a compensation for the fact that emerging bond market spreads vary systematically with global business cycle and with global financial market conditions. The first point, representing the standard credit risk component of corporate spreads, has received much attention in corporate finance literature, but the other two points are controversial and are based on two sets of considerations. First, private borrowing entities in emerging economies cannot insure the risk of their own home sovereigns through, for instance, selling protection in the credit derivatives swap (CDS) market; and second, emerging market investors are risk averse.

Covering 59 countries and encompassing virtually all major emerging-market crises of past two decades,[2] our data set is sufficiently rich to allow a more rigorous investigation of the link between sovereign and corporate credit risk than has been possible thus far. Further, the unique character and nature of each of crises hitting emerging markets over the past two decades provides an additional degree of variance that allows identification of underlying economic mechanism and channels. A common string running through all these episodes has been intense risk aversion and consequent widening of bond spreads as investors have sold off emerging-market assets in response to perceived local or global risk factors.

In relying on market-based credit spreads, rather than occurrence of default to identify episodes of sovereign debt distress, our approach is consistent with the recent literature on the costs of sovereign default (Trebesch, 2009; Das, Papaioannou, and Trebesch, 2010). This literature recognizes that while emerging-market borrowers have experienced several episodes of severe debt-servicing difficulties and market turmoil over the past two decades, the actual incidence of sovereign default, particularly on bond market obligations, has, in fact, been rare (Prescatori, and Sy, 2004). Part of the reason why sovereign foreign debt servicing difficulties in emerging market economies have not necessarily resulted in default has to do with the advent and growth of the emerging-bond market in the 1990s, which has afforded borrowers in distress broader options for taking pre-emptive measures through debt restructuring and improved liability management (debt buybacks and swaps) to avoid the heavy costs of default (Mediros, Polan, and Ramlogan, 2007; Mendoza and Yue, 2008). Another reason relates to the efforts undertaken by emerging sovereign borrowers to improve their external debt profiles through liability management and buyback and retiring of Brady bonds.[3]

Our paper also takes into account the existing empirical literature on determinants of credit yield spreads, which has emphasized the "benchmark" status of sovereign debt in analyzing the spillover effect between sovereign and corporate bonds (Dittmer and Yuan, 2008; Yuan, 2005). By virtue of the fact that corporate bonds are typically priced based on the existing sovereign curve, and that sovereign debt bears primarily macroeconomic risks, there exists a structural link between sovereign and corporate bonds, reinforced in the case of emerging-market economies by limited liquidity in the emerging-market asset class in general and in corporate assets in particular. We build upon this literature in two important respects: (i) recognizing the

[2] The past two decades have not been short of emerging market crises. Mexico's Tequila crisis of 1994–95, brought on by the devaluation of the peso; the 1998 Russian Gosudarstvennye Kratkosrochnye Obyazatel'stva (GKO) default, a sovereign debt crisis; and the 1997–98 East Asian crisis, which began as a balance of payments crisis under a fixed exchange rate regime in Thailand, all led to significant disruption in global financial markets. The 2002 economic crisis in Brazil and Turkey's external debt problems, both of which were directly related to the market's perception of political risk associated with general elections in these countries, also had negative effects on global markets. The 2008–09 global financial crisis, though, was unique not only in its scope but in the fact that it originated in core financial markets and reverberated to emerging countries through a liquidity squeeze and flight to safety.

[3] At the same time, a country could face market turmoil and reversal of capital flows not because of its own fault, but because of contagion effects and co-variation of bond prices across the emerging-market asset class (Dailami and Masson, 2009).

spillover possibility from the sovereign to corporate side and implementing an empirical methodology to confirm its importance; and (ii) using bond yield spreads at issuance, rather than the volume of issuance, as the main dependent variable in our empirical analysis. Though using offerings' at-issue bond yield spreads has the advantage of better reflecting the state of investors' sentiment and views, it has the drawback of introducing issuance timing endogeneity. A borrower's decision to come to the market to raise capital is rarely an accident of fate, bur typically the product of a deliberate process of balancing the various costs and benefits involved. Success in raising capital depends on an array of factors: deal structure, distribution, marketing, jurisdiction and governing law, and the timing of coming to the market. Getting each of these factors right is important, as there are considerable reputational costs associated with an unfavorable market reaction, as illustrated powerfully by the drying up of emerging-market debt issuance in the fourth quarter of 2008.

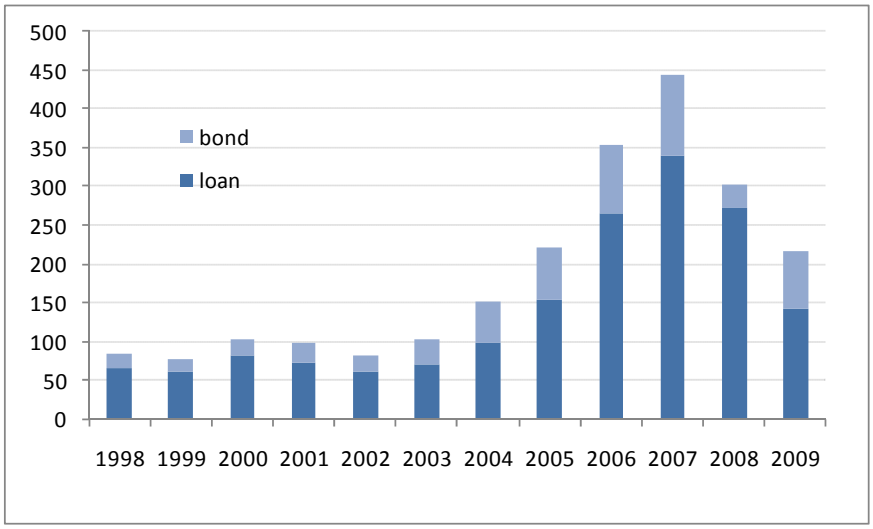
The rest of the paper proceeds as follows: section two highlights the growing importance of corporate debt in the external financial profile of emerging market economies and provides estimates of corporate debt refinancing coming due in the next few years; section three lays out a two-period model of corporate bond price valuation in the presence of sovereign risk to motivate our empirical analysis and reports our main results and findings; and section four concludes with a discussion of policy recommendations and key issues warranting future research and attention.

II. The Growing Importance of Emerging-Market Corporate Debt

Increasing engagement of corporations from developing countries in global investment and finance has been a defining feature of financing of development in the first decade of 21st century. As sovereign demand for external financing declined in the majority of developing countries in years leading to the crisis of 2008-09, market attention shifted to the corporate sector—both public and private-- as offering a new generation of EM credit and equity products. In many respects, the market for emerging-market credit has shifted toward the corporate sector (encompassing both private and public entities), with implications for access to finance, debt sustainability, and long-term investment and growth. Over the decade leading up to the 2008–09 crisis, the emerging-market corporate bond market had evolved quite smoothly into a robust, versatile, and active market offering considerable foreign funding opportunities across major currencies and jurisdictions to many blue-chip companies based in Latin America, Asia, and the Middle East. From 2002 to the end of 2007, 727 privately-owned emerging-market companies tapped international bond markets to raise a total of $336.7 billion of foreign debt capital. Easy financing conditions also facilitated access to the international syndicated loan market, with 1584 emerging-market private firms going to overseas markets to raise a total of $640.4 billion of foreign-currency credit through 2,595 loans. Easy Total foreign capital raised through bonds and syndicated loans during this period amounted to $977 billion, compared to $222.3 billion between 1999 and 2001 (Figure 1). Many companies were borrowing primarily to finance oil and gas or banking operations or to fund aggressive cross-border merger and acquisition (M&A) deals.

Multinational companies based in emerging markets undertook more than 857-cross-border acquisition deals, worth $107 billion in 2008, up from 239 such deals in 2000, worth $12 billion.

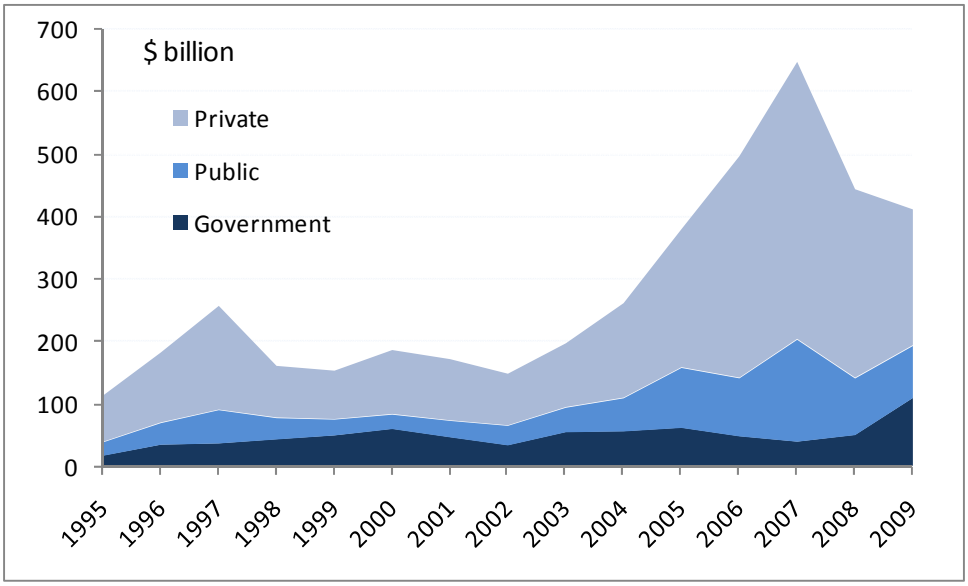
Figure 1. Emerging-market private corporate debt



Data resources: Dealogic DCM Analytics

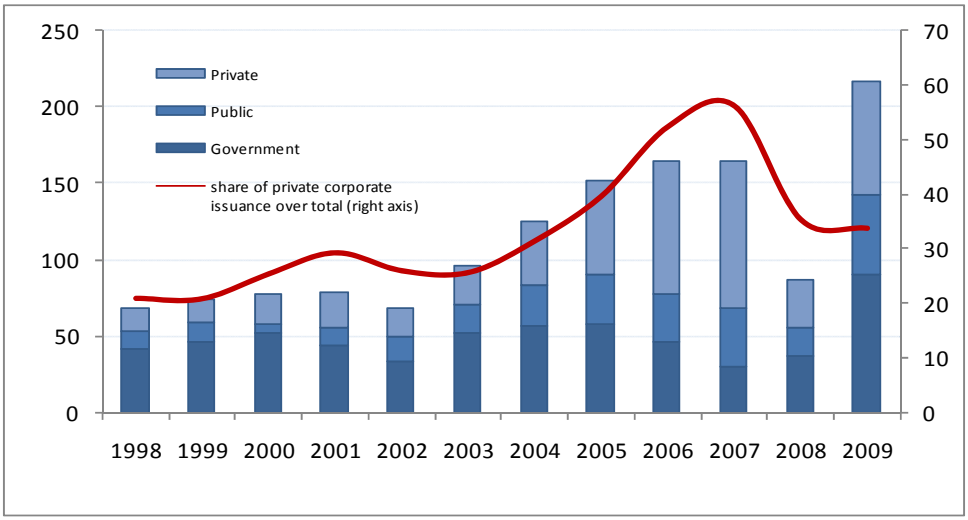
In fact, private-sector borrowing in emerging markets grew during this period, 2002-2007, at a much faster pace than public-sector borrowing, surging to account by 2007 for 69 percent of total emerging market borrowings, while public-sector borrowing totaled about 31 percent (Figures 2 and 3). As emerging-market corporate borrowers are predominantly large private-sector firms in the banking, infrastructure, and mining industries with high growth potential, their access to overseas markets serves not only to underpin long-term growth and competitiveness, but also to afford policy makers greater scope to allocate domestic resources to high priority areas, such as investments in rural areas or small businesses, without crowding out the corporate sector.

Figure 2. Emerging-market gross debt by sector



Data resources: Dealogic DCM Analytics

Figure 3. Emerging-market bond issuance, by sector



Data resources: Dealogic DCM Analytics

Emerging-market private firms' large exposure to foreign-currency debt built up mostly during the boom years of 2002–07, has important implications for both debt sustainability and the design of international institutional arrangements for corporate debt restructuring and liability management. For much of the post-war era, sovereign financing has been the quintessential feature of emerging market finance, generating a whole body of market practice, credit risk assessment standards, international institutional arrangements for debt restructuring and dispute resolution, and national and international policy and regulatory concerns. The shift in the market

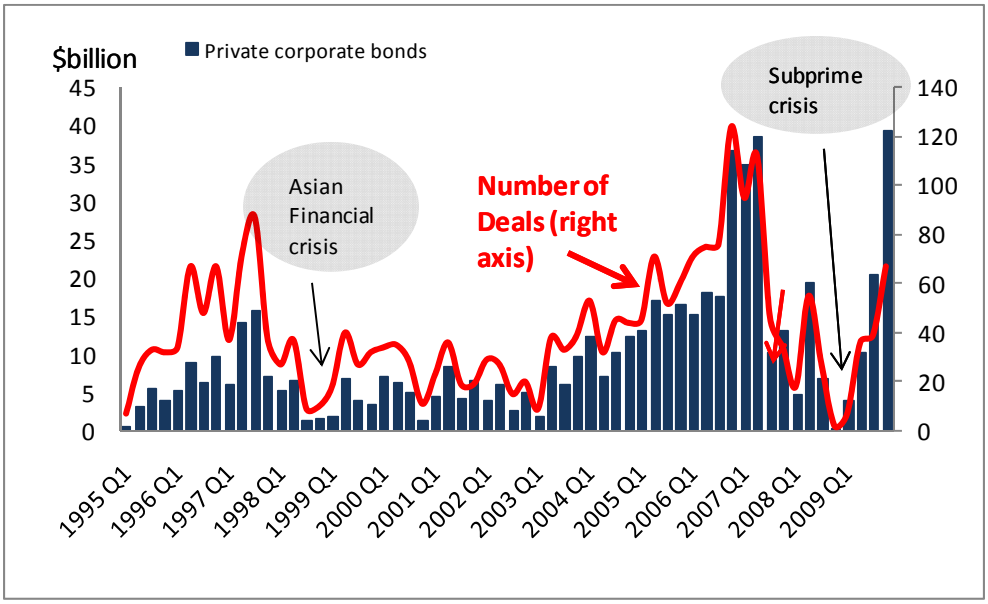
pattern from public to private debt in emerging market finance will bring to the fore, inevitably, a new set of policy challenges, as well as the need to develop appropriate metric to measure and evaluate private corporate risk exposure and default probability. At the same time, several distinctive features of the 2008–09 financial crisis—the severity of the global business downturn, the scale of banks' credit contraction, the precipitous drop in local equity markets, and the global nature of the crisis—implies a more arduous and extended debt restructuring cycle than was experienced following the 1997–98 East Asian crisis.

The crisis hit the EM corporate sector hard

Having been hard hit by the credit crunch and global recession, could the EM corporate sector regain its past momentum to become the dominant source of issuance in global bond markets? In countries with economies battered by a dramatic decline in exports, slumping local equity markets, and authorities pursuing tight domestic monetary policy while simultaneously allowing local currencies to depreciate to fend off external shocks, the corporate sector has borne the combined impacts of the global financial crisis and recession over the past two years.

Relative to emerging-market sovereign bonds, spreads on foreign-currency emerging-market corporate bonds spiked to much higher levels at the outset of the crisis and have remained much wider even after March 2009, when spreads on sovereign debt began to narrow. In the fourth quarter of 2008, emerging-market corporations were virtually locked out of bond markets (Figure 4). Especially in countries with economies battered by a dramatic decline in exports, slumping local equity markets, and authorities pursuing tight domestic monetary policy while simultaneously allowing local currencies to depreciate to fend off external shocks, the financial crisis hit the emerging-market corporate sector hard. The share of private corporate sector debt in total emerging-market bond issuance peaked at 58 percent in 2007 and has declined to about 33 percent since the financial crisis. The share of sovereign debt issuance, on the other hand, has regained sharply since the crisis.

Figure 4: Emerging market private corporate bond issuance by quarter



Data source: Dealogic DCM analytics

Large emerging-market corporate refinancing needs

Corporations based in emerging markets now face the challenge of servicing their substantial debt obligations in an environment of sluggish global growth, high currency volatility, shrinking bank credit, and intensified competition from sovereign borrowers in advanced economies. Of the key drivers of emerging-market corporate bond issuance volume in the next few years, the need to refinance a large volume of foreign currency debt will be the strongest. Approximately $951 billion of emerging-market corporate debt is due to mature in the bond and bank loan markets between 2010 and 2013, with the bulk of that amount—about 75 percent—originating from the syndicated loan market.

Given the fragility of the international banking industry, a full rollover of emerging-market bank loans seems unlikely, leaving bond markets to absorb a portion of such loans. Several factors will dictate the amount of maturing loans that make their way into bond markets: rating status, other available financing options (including those in equity markets), and loan-specific characteristics and covenant clauses. Assuming 25 percent of borrowers with an investment-grade rating in their home countries decide to refinance in bond markets, issuance volumes originating from this source would be in the order of $54 billion in 2010, $46 billion in 2011, and $30 billion in 2012.

Pursuit of cross-border M&A as part of multinational companies' growth and expansion strategies is also expected to contribute to the rebound in emerging-market corporate bond issuance in the coming years. While detailed data on the payments of M&A deals involving emerging-market companies are not disclosed, in practice, such deals can be funded through cash,

share swaps, or credit—and it can be assumed that firms in emerging markets, with the major exception of state-owned Chinese firms, rely on bond markets to fund their transactions. The estimated amount of new issuances arising from demand for cross-border M&A, is expected to be $31 billion in 2010, $34 billion in 2011, and $37 billion in 2012.

III. Determinants of Emerging-Market Corporate Debt Spreads in the Presence of Sovereign Risk

In the standard corporate bond valuation models of structural and reduced-form types dominating the literature in corporate finance in advanced countries (Merton, 1974; Black and Cox 1976; Longstaff and Schwartz, 1995; Jarrow and Turnbull, 1995; Duffie and Singleton, 1999), sovereign debt is treated as a risk free asset, and traded in capital markets according to interest rate and not credit risks. Accordingly corporate bond prices are poised to depend on idiosyncratic risk factors specific to the issuing company, with public debt playing an indirect role to the extent that it is believed to affect the term structure of interest rates. Thus, with concerns over sovereign creditworthiness assumed away, there seems little need to pay attention to the correlation between sovereign and corporate credit risk in the pricing of corporate bonds in advanced countries.

For emerging markets, as indeed for highly indebt advanced countries, the question of how sovereign credit risk affects corporate sector borrowing in international markets commands explicit attention, as sovereign credit risk has been an inherent characteristic feature of the whole asset class and how investors have come to conduct trade and form views. From its inception in early 1990s, the emerging sovereign bond market has been viewed and priced as a risky asset, comparable in many ways to the US high-yield bond asset class. As is well documented, the market's advent in the early 1990s is traced to the conversion of problem bank loans into collateralized marketable bond instruments under the Brady plan. Thus, a key priority in research on the determinants of corporate credit spreads in emerging markets is the question of how sovereign risk perceptions are likely to shape the terms of corporate access to international capital markets.

The channels by which rising sovereign credit risk concerns spill over to the corporate side are basically three. The first is the possibility of reduced liquidity as growing market concerns about a country's sovereign debt lead to a drop in risk appetite across all debt issuers of that country. In turn, investors' perception of greater systemic sovereign risk translates into higher risk premiums, which must be added to the price of emerging-market corporate securities offered on overseas markets. This mechanism is likely to be operative in emerging markets with large corporate external debt refinancing needs—particularly those refinancing from the international banking market, where liquidity conditions, despite significant easing since the collapse of Lehman Brothers in September 2008, remain highly vulnerable to

bank balance sheet and funding pressures. With and as much as $951 billion of emerging-market corporate debt maturing over 2010 to 2014, the risk posed by reduced liquidity is serious and warrants attention, especially in Europe, as the lion's share of emerging-market corporate external debt exposure resides with European banks.

The second mechanism through which sovereign credit risk can spill over to the corporate side relates to fiscal space and the fact that highly indebted governments have less scope to use fiscal policy to provide a cushion for corporate borrowers to fall back in an environment of constrained credit. In practice, this means that emerging-market governments are limited in their ability to offer the guarantees that are generally required for major corporate debt restructurings, such as in the recent case of Naftogaz in Ukraine.

Third, fiscal adjustment in countries with high levels of government debt can lead to substantial spillover effects between sovereign and corporate debt, as tight fiscal policy can have negative real economy consequences, thereby adversely affecting corporate earnings and profitability. Within the corporate sector, it is the banking that is most susceptible to sovereign stress, as banks' funding costs rise with sovereign spreads due to the perception that domestic banks hold typically a large volume of government securities in their balance sheets and that government guarantees are worth less in an environment of sovereign stress.

The fact that most emerging-market firms tapping international debt markets are large and relatively highly leveraged raises the possibility that corporate debt distress could also spill over to the sovereign side, as corporations in distress (both financial and non-financial) may require government support either directly or indirectly through governments involvement in the process of corporate debt restructuring and workouts. While actual corporate default in emerging economies was relatively contained during the financial crisis, the large volume of external corporate debt outstanding and its complex profile continue to remain a source of worry and concern. The spillover effects and the direction of causality between the corporate and sovereign sides are investigated in the following section by jointly estimating equations for the determinants of sovereign and corporate bond yield spreads at issuance.

Analytical framework

As an illustration of how sovereign risk can affect the corporate bond market, we begin with a highly simplified model of corporate bond price valuation in a two-period model that incorporates both corporate and sovereign risk. The approach is in the spirit of the Merton (1974) structural model, with the added complexity that the firm's cash flows are contingent not only on its own investment in real assets, but also on the financial health of its home country government. In the presence of sovereign risk, investors' assessment of the firm's securities depend on both the firm's specific factors and the probability that the sovereign runs into financial problems that bear on the firm's ability and capacity to service its debt obligations.

More formally, consider a firm issuing a bond with face value F dollars at time t=0 to invest in a project with a random cash flow X dollars (in foreign currency equivalence) to be realized at time 1. We define X to include liquidation value of assets but net of operating costs. The debt contract is a fixed obligation which promises to pay $D (which includes interest and principal) at time t=1. To incorporate sovereign risk, a random variable Z is defined, which takes, for simplicity, two alternative values: first, Z =1 with the probability p, indicating that the sovereign is in financial distress; and second, Z =0 , with the probability 1-p, indicating that the sovereign is solvent. In the incidence of sovereign distress, the firm's ability to service its debt obligation on a timely manner is adversely affected by a combination of factors—an economy-wide downturn, tightening of external liquidity conditions, exchange rate depreciation and/or exchange rate controls—and of which can translate into a downward shift in the firm's cash flow distribution.

With this setup, the payoff to bond holders, $\tilde{Y}$, will be a function of both sovereign and corporate risks, expressed as:

$$\tilde{Y} = g(\tilde{X}, D, \tilde{Z}) = \begin{cases} \min(D, \tilde{X}) \; if \; Z = 1 \\ \alpha \min(D, \tilde{X}) \; if \; Z = 0 \end{cases} \qquad (1)$$

where $0 < \propto \leq 1$, and $\min(D, \tilde{X}) = \begin{cases} D \; if \; \tilde{X} \geq D \\ \tilde{X} \; if \; \tilde{X} < D \end{cases}$ (2)

In the general case where X (project cash flow) and variable Z, are not independent, conditional distributions are not identical. Further, it is assumed that distributions of both variables are both normal with means μ_1, μ_2, and variances σ_1^2, σ_2^2. Thus, the expected return to the bondholders can be expressed as follows:

$$E(\tilde{Y}) = p_1 \alpha \left\{ \int_0^D x f_1(x|z=0)dx + D \int_D^\infty f_1(x|z=0)dx \right\} + (1-p_1) \left\{ \int_0^D x f_2(x|z=1)dx + D \int_D^\infty f_2(x|z=1)dx \right\} \qquad (3)$$

where f_1(x) and f_2(x) are the conditional density probability functions of $\tilde{X}$ under the two scenarios of Z=0 and Z=1, respectively.

Equation (3) describes the expected value of the return to the bondholders as a weighted average of the expected values calculated separately for the cases when the government is in distress or not, with the weights reflecting the respective probabilities of such events.

Under the assumption that creditors are risk-neutral, the market price of the corporate debt V is the present value of $E(\tilde{Y})$, discounted at the international risk-free rate of interest, r. That is:

$$V = \frac{E(\tilde{Y})}{1 + r} \qquad (4)$$

To assess how corporate bond price depends on sovereign default risk, we simulate equation (4) for different parameter values. Figure 5 shows a simulated value of a corporate bond price, *V*, for various sovereign default risk values. The simulation study was carried out under the following assumptions and parameter values: the share of foreign currency loan paid back in the case of country default (α) is set to 60 percent; the corporate cash flow follows a normal distribution, as depicted in Figure 6; and the standard deviation is set at 25 but is increased by 30 percent if the country defaults. The payment obligation was obtained by applying an interest rate of 7.5 percent to the debt face value of 100. It is interesting to note how sensitive *V* is with regard to the variation in the probability of sovereign default. Raising p (the probability of sovereign default) from 2.8 percent (corresponding to a credit default swap [CDS] spread of 120 basis points) to 23.8 points (corresponding to a CDS spread of 820 basis points) will result in a decrease in corporate bond price of 9 percent.

Figure 5. Price of corporate bond issued with a face value of 100 to finance a project with debt/equity ratio of 5:1

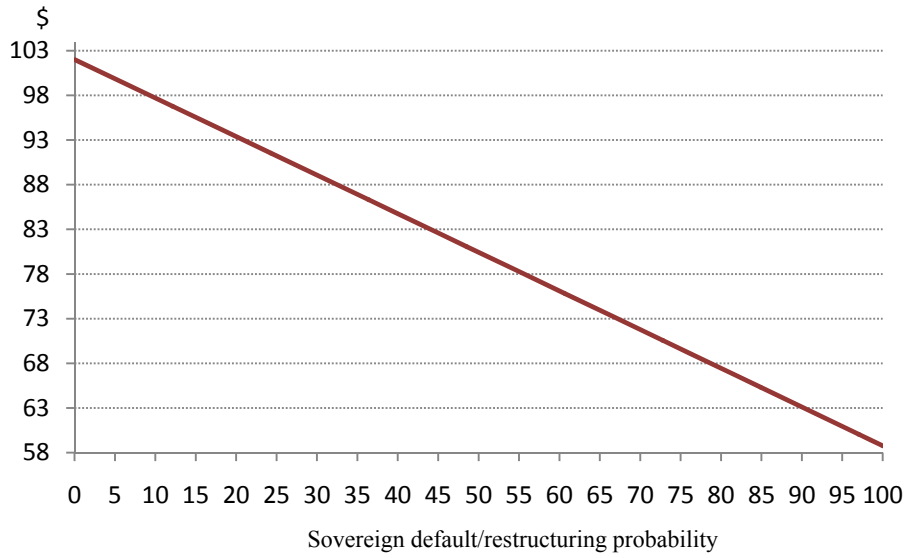


Figure 6. Probability distribution of project cash flow under two sovereign default scenarios

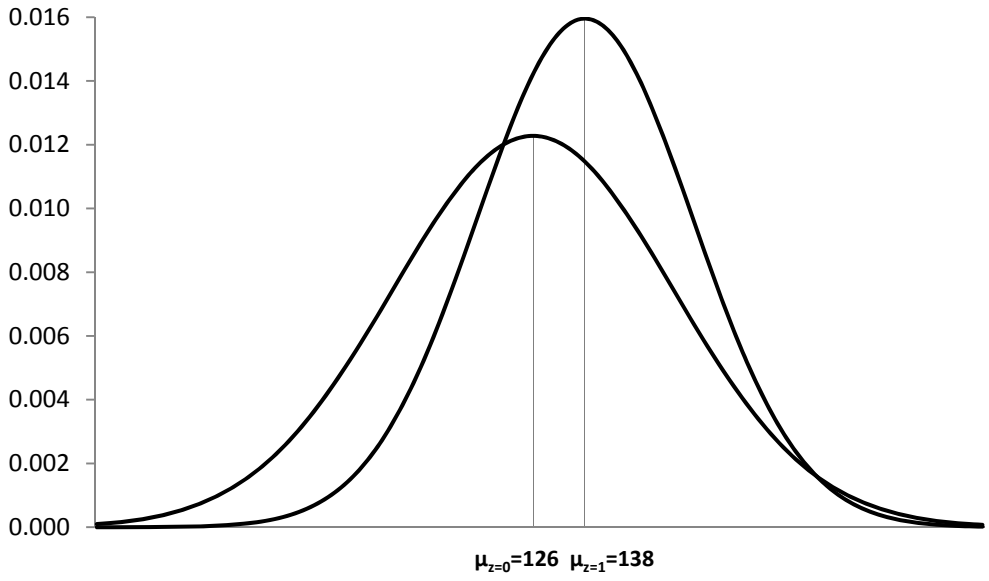
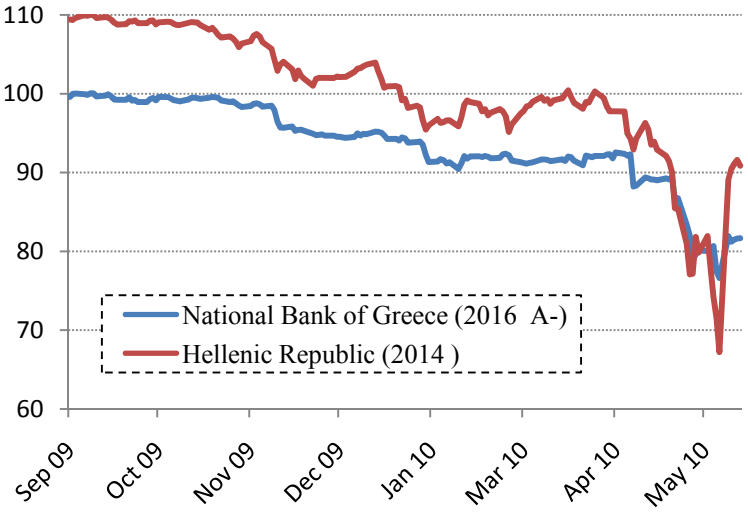


Figure 7. Price of Greek corporate and sovereign bonds



Econometric methodology and specification

When pricing emerging market bond securities issued internationally, investors take into account many risk factors. Investors generally make a distinction between bonds issued by public sector entities (government and government-owned companies) and those offered by private borrowers, while taking into account common factors such as the state of the home country macroeconomy, global financial market conditions, and bond- and firm-specific factors (maturity, currency of denomination, jurisdiction, covenants, sector, and the fact that corporate ratings are often subject to sovereign ceilings). Reflecting the influence of such factors, investors typically attach a higher risk premium to the private rather than public bond instruments.

Formally, our analysis of the relationship between sovereign and corporate risk centers on the following set of regressions , specifying *t* sovereign and corporate bond spreads at issuance as a function of offering terms; currency and jurisdiction; industry; and various macroeconomic economic, financial, and institutional control variables for each issuer's home country.

Sovereign spreads are given by:

$$Y_{s,ijt} = \alpha_{s,j} + \beta_s^{'} X_{jt} + \psi_s^{'} V_t + \gamma_s^{'} Z_i \qquad (5)$$

Corporate spreads are given by:

$$Y_{c,ijt} = \alpha_{c,j} + \beta_c^{'} X_{jt} + \psi_c^{'} V_t + \gamma_c^{'} Z_i + \delta_c^{'} W \qquad (6)$$

where $Y_{s,ijt}$ and $Y_{c,ijt}$ are vectors with elements $\{Y_{s,ijt}, Y_{c,ijt}\}$. The subscripts *s* and *c* refer respectively to sovereign and corporate, and "*ijt*" refers to bond *i* issued in country *j* at time *t*, where:

X_{jt} denotes systematic (macroeconomic) factors
V_t denotes global risk factors
Z_i denotes bond-specific features
W denotes firm-specific characteristics

Our formal econometric analysis of correlation risk between emerging market private corporate borrowers and their home-sovereigns is based on a large sample of 4,441 bond issuance denominated in U.S. dollars or euros offered by the government, public corporations, and private corporations from 59 emerging economies between 1995 and 2009 (see Annex I for the list of countries). Our sample represents a wide cross section of issues by country, industry, and bond attributes, the latter of which includes maturity, amount, coupon, rating, and applicable law and jurisdiction. The summary statistics for the universe of all bonds are reported in Table 1. Thus, total capital raised amounted to $1.4 trillion, with the bulk (80 percent) of new capital raised coming from dollar denominated bonds, and the rest from euro denominated bonds. We refer to sovereign bonds as bonds issued by governments, government agencies and public corporations whose payments are guaranteed explicitly by governments. Such bonds account for 60 percent of total issuance volume, but only 40 percent of deal numbers, reflecting their much larger deal size.

Table 1. Summary statistics of emerging-market sovereign and corporate bond issuances: 1995–2009

	Number of issuances	**Total volume raised** ($ millions)	*In USD*	*In EURO*	**Average amount** ($ millions)	**Average spread** Basis points	**Average maturity** Year	**Average rating**
Sovereign issuers	1,711	866.6	649.2	217.4	506.5	283.5	9.1	BBB-
Government	949	577.9	410.2	167.7	608.9	339.9	9.8	BB+
Public corporate	762	288.7	239	49.7	378.9	213.3	7.2	BBB+
Private corporate	2,730	596.7	537	59.6	218.6	310.7	6.5	BBB-
Total	**4,441**	**1,463.3**	**1,186.3**	**277**	**329.5**	**300.2**	**7.3**	**BBB-**

Several other distinct differences between emerging market sovereign and private corporate bonds, as highlighted in Table 1, deserve attention. Sovereign bonds tend to be larger in size, carry lower at –issue spreads, and issued in longer maturity than private corporate bonds. Such differences in bond attributes reflect several distinct characteristic differences between private corporate and sovereign borrowers in emerging market economies. First, corporate entities face higher information barriers and greater market constraints than sovereigns that derive advantages from membership in multilateral financial institutions and from the state-centric

nature of the international economic order. Second, even locally creditworthy firms may be constrained for several reasons. Corporate ratings are often subject to sovereign ceilings. Corporate assets are not easily amenable to collateralization in international debt markets. Swap markets for credit derivatives are better developed and more liquid for emerging sovereign names than for corporate names. And, private corporate borrowers' relations and interactions, regarding default or debt restructuring, with foreign creditors are largely shaped by economic considerations, whereas sovereigns' relations are driven by a mix of politics and economics in mind.

Estimation results

We begin with estimating equations (5) and (6) separately to establish empirically the structural differences between private and sovereign bond markets in emerging market economies. The dependent variable in both set of equations is at –issue spread, quoted in basis points and measured as the bond's offering spread over the yield of a maturity –matched U.S. Treasury security or, in the case of a euro issue, a comparable German Bunds obligation. The primary data sources are Dealogic DCM Analytics and Bloomberg, with filling in missing data by the author. To capture common local and global systematic risk factors, we include data on the macroeconomic, institutional, financial market development of each issuer's home country, along with data on international interest rates that we match by month, quarter, or year with the issue from a variety of sources. We also control for the state of global investor sentiment to account for common shocks affecting both private and public bond markets. We use the bond issuers' general industry group defined by dialogic DCM analytics to control the sector of issuers. Tables 2 and 3 summarize estimation results for public and private bond spread determinants, respectively, with country fixed effects and under alternative model specifications.

Table 2: Regression results for determinants of emerging market sovereign bond spreads

	Model 1	Model2	Model3
Local Macroeconomic variables			
GDP growth rate	-8.34	-7.19	-7.56
	(0.000)***	(0.000)***	(0.000)***
GDP per capita	-4.82	-3.44	-4.50
	(0.000)***	(0.002)***	(0.000)***
Inflation	131.59	137.73	140.15
	(0.010)***	(0.007)***	(0.005)***
Private credit/GDP	-0.61	-0.49	-0.51
	(0.167)	(0.266)	(0.248)
Fiscal balance/ GDP	-1.08	-2.39	-1.36
	(0.493)	(0.132)	(0.382)
Exports/GDP	1.08	1.84	1.42
	(0.169)	(0.019)**	(0.069)*
Foreign bank claims/GDP	1.45	1.50	1.36
	(0.066)*	(0.058)*	(0.083)*
Country credit risk rating index	15.55	15.87	15.28
	(0.000)***	(0.000)***	(0.000)***
Country financial crisis dummy			80.73
			(0.000)***
Global factors			
US 10 year treasury bond yield (BP)	-0.20	-0.16	-0.18
	(0.003)***	(0.018)**	(0.005)***
US 10 year T-bond yield — 2 year T-bond yield	17.79	15.30	17.82
	(0.001)***	(0.007)***	(0.001)***
Volatility [(1)]	42.64		38.76
	(0.000)***		(0.000)***
World Industrial production index, Y-O-Y growth		-9.487	
		(0.000)***	
Bond attributes			
Euro denominated bond	-6.05	-6.98	-6.96
	(0.576)	(0.519)	(0.515)
Log (maturity)	-4.73	-6.39	-2.90
	(0.463)	(0.320)	(0.650)
Log (value)	-6.94	-7.81	-5.60
	(0.108)	(0.070)*	(0.190)
Floating rate notes	-94.10	-95.66	-93.13
	(0.000)***	(0.000)***	(0.000)***
Guarantee	22.39	15.41	25.82
	(0.106)	(0.266)	(0.060)*
Eurobond	0.63	1.92	0.24
	(0.952)	(0.855)	(0.982)
Rule 144A	-6.44	-3.09	-6.50
	(0.523)	(0.760)	(0.515)
Non negative-pledge issuer	10.57	11.99	10.73
	(0.211)	(0.158)	(0.199)
Bond rating at launch	13.87	13.54	14.02
	(0.000)***	(0.000)***	(0.000)***
Country effects (not reported here)			
Observations	1087	1087	1087
R-squared	0.71	0.71	0.72

Note: p values in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%:

1) Our volatility indicator is derived from a detail factor analysis of several indicators, VIX, commodity prices (agriculture, energy, and metals) and the TED spreads, as described in Dailami, Masson (2009).

Table 3: Regression results for determinants of emerging market private corporate bond spreads

	Model 1	Model2	Model3
Local Macroeconomic variables			
GDP growth rate	-11.34	-8.73	-10.48
	(0.000)***	(0.000)***	(0.000)***
GDP per capita	-0.68	0.60	-0.39
	(0.581)	(0.629)	(0.752)
Inflation	199.40	213.02	200.96
	(0.016)**	(0.010)**	(0.015)**
Private credit/GDP	0.00	-0.06	-0.01
	(0.994)	(0.920)	(0.983)
Fiscal balance/GDP	-0.65	-2.65	-1.10
	(0.725)	(0.158)	(0.554)
Exports/GDP	2.02	2.54	2.07
	(0.045)**	(0.012)**	(0.040)**
Foreign bank claims/GDP	1.02	1.47	1.04
	(0.353)	(0.179)	(0.342)
Country credit risk rating index	17.89	16.06	17.32
	(0.000)***	(0.000)***	(0.000)***
Country financial crisis dummy			58.8410
			(0.004)***
Global factors			
US 10 year treasury bond yield (BP)	-0.29	-0.26	-0.31
	(0.000)***	(0.002)***	(0.000)***
US 10 year T-bond yield — 2 year T-bond yield	24.03	25.80	23.41
	(0.001)***	(0.000)***	(0.001)***
Volatility [(1)]	43.79		42.05
	(0.000)***		(0.000)***
World Industrial production index, Y-O-Y growth		-11.00	
		(0.000)***	
Bond attributes			
Euro denominated bond	-15.51	-17.60	-15.91
	(0.355)	(0.294)	(0.341)
Log (maturity)	8.81	8.39	9.13
	(0.158)	(0.179)	(0.143)
Log (value)	-31.52	-32.25	-31.25
	(0.000)***	(0.000)***	(0.000)***
Floating rate notes	-114.39	-116.15	-112.26
	(0.000)***	(0.000)***	(0.000)***
Guarantee	17.53	18.85	17.52
	(0.090)*	(0.069)*	(0.090)*
Eurobond	-0.29	4.30	1.86
	(0.981)	(0.727)	(0.880)
Rule 144A	33.19	35.36	34.02
	(0.001)***	(0.000)***	(0.001)***
Non negative-pledge issuer	35.05	36.14	34.74
	(0.000)***	(0.000)***	(0.000)***
Bond rating at launch	26.02	26.12	26.65
	(0.000)***	(0.000)***	(0.000)***
Sector			
Finance	-34.75	-32.57	-35.21
	(0.003)***	(0.005)***	(0.002)***
Oil & Gas	-52.54	-56.29	-54.30
	(0.003)***	(0.001)***	(0.002)***
Mining	-90.20	-99.04	-87.77
	(0.003)***	(0.001)***	(0.004)***
Utility & Energy	-75.03	-68.22	-72.33
	(0.003)***	(0.007)***	(0.004)***
Country effects (not reported here)			
Number of observations	1427	1427	1427
R-squared	0.65	0.64	0.65

Note: p values in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%:

The results confirm the view that the emerging sovereign bond market is distinctly different from that of private corporate market in many respects that go beyond differences in bond attributes such as size, maturity, currency of denomination and ratings. Controlling for such attributes, sovereign bonds are more responsive to changes in local macroeconomic conditions than private corporate bonds. This result is consistent with Dittmar and Yuan (2008) argument that sovereign bonds bear only macroeconomic risks, while corporate bonds are driven by both macroeconomic and firm-specific risk factors.

Regarding the determinants of private corporate spreads, results reported in Table 3 support the importance of bond specific characteristics, domestic macroeconomic factors, as well as global risk factors. Local macroeconomic factors affect investors' perceptions largely through their assessment of corporate profitability and cash flows that depend on local economic conditions such as growth performance, inflation, degree of trade openness, and access to local finance. Of particular interest is the role of domestic growth on foreign investors' perception of corporate risk. The estimation results demonstrate that investors attach considerable importance to prospects for economic growth in the home country of companies whose securities they are considering purchasing. In contrast, inflation in the home country increases bond spreads by making the issuer's domestic operations more risky. Second, emerging private firms based in countries with a well-developed banking system (i.e.: high ratio of private credit to GDP) pay significantly less to issue debt. These results confirm anecdotal evidence and previous findings that local financial development has a major role in facilitating access to global capital markets for emerging market firms.

Third, the level of economic development, measured by per -capita income is significant and of the right sign, indicating that countries with higher level of economic development pay less for foreign capital. One explanation for this result is that it is possible that per-capita income is serving as a proxy for a country's institutional development and related corporate governance and transparency indicators.

Spillover impacts from sovereign to corporate sector

Analyzing the spillover from the sovereign to the private corporate side, we define a set of country-specific crisis dummies to identify episodes of sovereign debt distress:

$$I_{jt} = \begin{cases} 1 & if\ country\ j's\ secondary\ sovereign\ spreads\ at\ time\ t\ \geq a\ critical\ threshold \\ 0 & otherwise \end{cases}$$

In relying on secondary market indicators, rather than the actual incidence of default to define episodes of sovereign debt distress, we follow recent literature difficulties (Pescatori, and Sy, 2004) in recognizing the role of capital market development, domestic macroeconomic

improvements in debtor countries along with important reforms in sovereign bond contracts and documentation in international capital markets –such as the shift in adopting collective actions clauses (CACs) in sovereign bond contracts under New York Law– in reducing the actual incidence of default on foreign currency debt obligations. Thus, according to Standard and Poor's, there have been only fourteen foreign–currency sovereign defaults in developing countries – Argentina, Belize, the Dominican Republic, Ecuador, Grenada, Indonesia, Paraguay, Russia, Seychelles, and Venezuela – over the past decade, even though the decade has seen waves of financial, banking and currency crises.

The consideration that sovereign debt distress can have expressions in a broader range of policy and official rescue outcomes along with the backward looking nature of credit ratings provide the reasons for using secondary market bond spreads to capture sovereign debt-servicing problems. Accordingly, for a sovereign borrower, we define episodes of debt distress as when its bonds trade at spreads of at least 1000 bps over the comparable U.S. Treasury securities. This definition captures the periods that countries were classified by Standard and Poor's as being in selective default (Table 4).

Table 4. Sovereign selective default episodes and spreads on the foreign-currency bond markets

Country	Secondary market default spread (bps)	Selective default date	Emergence date	Time in selective default
Argentina	5,320	November 6, 2001	June 1, 2005	43 months
Dominican Rep.	616	February 1, 2005	June 29, 2005	5 months
Ecuador	3,654	December 15, 2008	June 15, 2009	6 months
Russia	2,537	January 27, 1999	December 8, 2000	22 months
Uruguay	929	May 16, 2003	June 2, 2003	1 month
Venezuela*	446	January 18, 2005	March 3, 2005	1½ month
Average	2,250			13 months

Source: Default information is based on "Sovereign Defaults And Rating Transition Data, 2009 Update", Standard and Poors, March 17, 2010; sovereign spreads from J.P. Morgan EMBI Global

(*) In the case of Venezuela, there was a debate at the time among credit agencies; evidently investors did not react to S&P downgrade

We run a set of regressions with interactions between the systematic component of sovereign spreads (estimated from equation 5) and our country-specific crisis dummies using:

$$Y_{c,ijt} = \alpha_{c,j} + \beta_c' X_{jt} + \psi_c' V_t + \gamma_c' Z_i + \delta_c' W + \theta' SSR_{jt} + \eta'(SSR_{jt} \times I_t) \qquad (7)$$

where: $SSR_{jt} = \hat{\alpha}_{s,j} + \hat{\beta}_s' X_{jt}$, and the results are reported in Table 5.

As seen from Table 5, the estimated coefficient SSR is positive and statically significant, even with the presence of domestic macroeconomic variables in the equation explaining the determinants of private corporate bond market spreads in emerging economies. Interacting SSR with the country crisis dummy variable provides a measure of the degree to which sovereign risk affects private external borrowing capital costs during times of sovereign debt distress and financial crises. In all equations reported in Table 5, the estimated coefficient is also positive and significant.

Table 5: Empirical Analysis of Spillover effects from sovereign to private corporate sector

	Model1	Model2	Model3
SSR			
Sovereign Systematic risk(SSR)	0.97	0.74	0.78
	(0.067)*	(0.000)***	(0.000)***
SSR*country crisis dummy	0.10	0.12	0.11
	(0.026)**	(0.011)**	(0.015)**
Local Macroeconomic variables			
GDP growth rate	-3.474		
	(0.477)		
GDP per capita	2.83		
	(0.207)		
Inflation	69.12		
	(0.532)		
Private credit/GDP	0.49		
	(0.383)		
Fiscal balance/GDP	1.32		
	(0.573)		
Exports/GDP	1.78		
	(0.842)		
Foreign bank claims/GDP	0.21		
	(0.878)		
Country credit risk rating index	-0.43		
	(0.340)		
Global factors			
US 10 year treasury bond yield (BP)	-0.31	-0.38	-0.39
	(0.000)***	(0.000)***	(0.000)***
US 10 year T-bond yield — 2 year T-bond yield	23.24	22.86	16.77
	(0.001)***	(0.000)***	(0.006)***
Volatility [(1)]	43.21		48.532
	(0.000)***		(0.000)***
Bond attributes			
Euro denominated bond	-16.15	-15.24	-12.16
	(0.335)	(0.365)	(0.465)
Log (maturity)	9.12	7.62	8.84
	(0.143)	(0.226)	(0.156)
Log (value)	-31.37	-30.91	-30.24
	(0.000)***	(0.000)***	(0.000)***
Floating rate notes	-113.09	-115.45	-112.58
	(0.000)***	(0.000)***	(0.000)***
Guarantee	17.43	13.01	11.04
	(0.092)*	(0.208)	(0.280)
Eurobond	0.94	12.11	5.94
	(0.939)	(0.321)	(0.624)
Rule 144A	33.43	36.34	32.69
	(0.001)***	(0.000)***	(0.001)***
Non negative-pledge issuer	34.58	32.97	31.59
	(0.000)***	(0.000)***	(0.001)***
Bond rating at launch	26.50	25.42	26.03
	(0.000)***	(0.000)***	(0.000)***
Sector			
Finance	-35.29	-37.79	-39.55
	(0.002)***	(0.001)***	(0.001)***
Oil & Gas	-54.21	-54.74	-56.16
	(0.002)***	(0.002)***	(0.001)***
Mining	-88.36	-99.50	-90.30
	(0.004)***	(0.001)***	(0.003)***
Utility & Energy	-73.32	-75.03	-76.83
	(0.004)***	(0.003)***	(0.002)***
Country effects (not reported here)			
Observations	1427	1427	1427
R-squared	0.65	0.63	0.64

Note: p values in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%:

IV. Conclusion and Policy Implications

In the corporate world, the ability of a borrower to access international capital markets and the terms according to which it can raise capital depend not only on its own creditworthiness, but also on the investors' views and risk perceptions of the country in which the borrower is domiciled. For corporate borrowers in advanced countries, country risk has not traditionally figured importantly, given their governments' high credit rating status and the associated perceived institutional strength of rule of law, transparency and corporate governance considerations. In contrast, for private corporate borrowers in emerging economies, country risk or its synonymous sovereign default risk has been a fact of life. From its advent in early 1990s, the market for emerging bonds, in both sovereign and corporate segments, has functioned as incorporating an important element of sovereign risk, which has been impounded in corporate spreads as an additional cost of corporate access to international capital markets.

In this paper, we explore how debt distress can potentially affect the costs of private corporate external borrowing in emerging market economies, using primary bond market spreads that reflect more accurately the actual cost of capital to emerging borrowers than the more commonly used secondary market spreads. We develop an analytical framework for thinking about the correlation between sovereign and corporate credit risk and provide tentative evidence on the size of additional capital costs that private borrowers bear in times of sovereign debt distress. The sources of such a correlation are several and could vary from country to country. One important source could be the fact that both the firm and its home-government operate in the same domestic macroeconomic and global environment, and thus periods of economic downturns that heighten the firm's probability of default worsen also the government's fiscal situation and hence its capacity to service its debt. The second source is the fact that the government's ability to provide emergency support to private firms in distress is compromised when its own credit quality is in question. The third source could be that in many countries local banks hold a large volume of government securities on their books and thus in times of high sovereign default risk the ability of banks to provide finance to private firms is eroded.

An important policy recommendation emerging from our analysis relates to the need to improve sovereign creditworthiness in order to prevent a loss in investor confidence that could lead to a panicky sell-off in sovereign debt with adverse macroeconomic and fiscal consequences. Econometric evidence presented in the paper confirms that investors' perceptions of sovereign debt problems in an emerging economy translate into higher costs of capital for that country's private corporate issuers, with the magnitude of such costs increasing at times when sovereign bonds trade at spreads exceeding a threshold of 1000 bps. This reinforces the need for paying greater attention to the domestic costs of sovereign default in the ongoing debt sustainability work promoted by major international financial institutions. It also emphasizes the salience of domestic growth costs of sovereign debt in explaining the feasibility of sovereign debt as opposed to the

theories of reputation and punishment pioneered by the influential works of Eaton and Gersovitz (1981), and Bulow and Rogoff (1989).

ANNEX I: Emerging market countries with sovereign and corporate bond market spreads

Argentina	Hungary	Philippines
Azerbaijan	India	Poland
Bahrain	Indonesia	Qatar
Belarus	Jamaica	Romania
Brazil	Jordan	Russian Federation
Bulgaria	Kazakhstan	Saudi Arabia
Chile	Kenya	Slovak Republic
China	Kuwait	Slovenia
Colombia	Latvia	South Africa
Costa Rica	Lebanon	South Korea
Croatia	Lithuania	Sri Lanka
Czech Republic	Malaysia	Thailand
Dominican Republic	Mexico	Trinidad and Tobago
Ecuador	Mongolia	Turkey
Egypt	Morocco	Ukraine
El Salvador	Nigeria	United Arab Emirates
Estonia	Oman	Uruguay
Georgia	Pakistan	Venezuela
Ghana	Panama	Vietnam
Guatemala	Peru	

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