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Interpreting sovereign spreads[1]

Sovereign spreads can be broken up into two components: the expected loss from default and the risk premium, with the latter reflecting how investors price the risk of unexpected losses. We show that the risk premium is often the larger part of the spread.

JEL classification: G15, F34.

Recent years have seen a substantial and steady narrowing of sovereign spreads in emerging debt markets. These spreads are the differentials between yields on emerging market debt and those on what might be considered risk-free government bonds of the corresponding duration. The average spread on the EMBI+ index, a widely watched index of emerging market debt prices, for example, fell from about 1,020 basis points in October 2002 to 170 basis points in December 2006.

Does this mean that the borrowers in these markets have become less risky? Much of the recent literature on sovereign spreads has not been very helpful in answering this question. In principle, sovereign spreads reflect both expected losses from default and risk premia. The latter would depend on both the risk of unexpected losses and on how investors price this risk. The literature, however, has not paid enough attention to this distinction, often implicitly assuming that in some way such spreads primarily measure the risk of default.

In this article, in line with the asset pricing literature, we propose an analytical framework for interpreting sovereign spreads. We estimate expected losses from default and risk premia by using data on credit default swap (CDS) spreads and default histories of rated bonds, considering both sovereign and corporate bonds. We find that the expected loss component of the spread is small, while the risk premium plays a bigger role even in periods of relatively low credit spreads.

[1] We would like to thank participants at seminars at the BIS, Hong Kong Institute for Monetary Research, Asian Development Bank Institute, Bank of Japan, Bangko Sentral ng Pilipinas, Bank of Thailand, Chinese University of Hong Kong and Hong Kong University for Science and Technology, Claudio Borio and Frank Packer for helpful comments. This paper was written while Eliza Wu was visiting the BIS. All errors remain our own and the views expressed here are solely ours and do not reflect those of the BIS.

The remainder of this article is structured as follows. The first section reviews the literature on default risk and risk premia for both sovereign bonds and corporate bonds. The second section proposes default probabilities as a measure of sovereign risk and illustrates the concept by providing estimates based on historical data on defaults of rated bonds. The third section shows how to decompose sovereign spreads into expected losses from default and risk premia. The final section summarises the results and suggests topics for further research.

Default risk, risk premia and sovereign spreads

One component is the expected loss

A sovereign spread, like any other credit spread, is supposed to compensate investors for default risk.[2] An obvious component of this compensation is the expected loss from sovereign default. For investors who hold the sovereign bond to maturity, this loss is simply the product of the probability of default and the loss-given-default. The probability of default is itself a simple measure of default risk. For investors who plan to sell before maturity, the expected loss would also include the probability of a deterioration in credit quality, short of default.

A less obvious component of the spread is the risk premium. Such a premium compensates investors for the fact that the realised loss from default may exceed the expected loss. Such a default risk is asymmetric because the possible losses from default are large relative to the possible gains from an absence of default. Jarrow et al (2005) have laid down the conditions for the absence of a default risk premium in a world of risk-averse investors. First, defaults on different bonds must be independent. Second, investors must be able to diversify away any idiosyncratic risks by holding a sufficiently large portfolio of bonds. Whether these conditions hold is an empirical question. Can we tell from the data whether there is a sovereign risk premium and, if so, how significant it is?

The risk premium on corporates tends to be rather large

In the case of corporate bonds, the empirical evidence points to a rather large risk premium. Indeed, this risk premium is estimated to be such a large part of credit spreads that Driessen (2005) has dubbed the phenomenon the "credit spread puzzle". Driessen estimates an average premium of 189 basis points after accounting for tax and liquidity effects. Berndt et al (2005) estimate an average premium of a similar magnitude, and moreover find that the risk premium varies greatly over time. For BBB/Baa-rated corporate bonds, Amato and Remolona (2003) suggest that default correlations account for about three quarters of the risk premium and undiversifiable idiosyncratic risk for one quarter. While it is not clear whether sovereign defaults are more highly correlated than corporate defaults, it could be argued that idiosyncratic risk is

[2] For less liquid instruments, the spread may also contain a liquidity premium. In the case of US corporate bonds, US local government taxes (which apply to income on corporate bonds but not on US Treasury securities) may also explain part of the spread.

harder to diversify for sovereign bonds because there are fewer available issues.[3]

Models of sovereign default are often estimated with market spreads

Nonetheless, the presumption that credit spreads measure just default risk and not risk premia is common among recent papers that propose structural models to measure probabilities of sovereign defaults. Gapen et al (2005) and Oshiro and Saruwatari (2005), for example, apply the standard structural Merton model for corporate credit risk by defining for countries concepts of balance sheet leverage and option volatility. They then judge their approaches to be good ones because they find their risk indicators to be highly correlated with market spreads over time. Diaz Weigel and Gemmill (2006) fit a similar structural model to par Brady bond prices to derive a "distance-to-default" measure of sovereign risk. They then express surprise that country-specific variables account for only 8% of the explained variance of the distance-to-default measure. However, a possible reason for their result is that their distance-to-default measure largely reflects risk premia that are driven by investors' time-varying risk aversion.

Measuring sovereign risk

In this section, we provide estimates of probabilities of sovereign default as a measure of risk for sovereigns. For present purposes, we rely largely on information from credit ratings, deriving default probabilities from the historical performance of rated bonds. We then examine the power of this measure of risk for explaining the cross-sectional variation of sovereign spreads.

The use of credit ratings

Credit ratings do contain information

To develop a measure of sovereign risk, we rely on information from credit ratings. In the country risk literature, however, this contrasts with another preferred source of information about sovereign risk, the *Institutional Investor* country ratings.[4] Nonetheless, there are good reasons to rely on credit ratings instead. As explained by Borio and Packer (2004), such ratings have the following advantages: (a) rating agencies explain their criteria and rating methodologies while respondents to the *Institutional Investor* survey do not; (b) rating agencies regularly review and report the correspondence of their ratings with historical default rates; and (c) rating agencies stake their business on the accuracy of their ratings, while respondents to the *Institutional Investor* survey are anonymous and do not have to account for their ratings. Moreover, Micu et al (2006) find that corporate credit default swap spreads react significantly to announcements by credit rating agencies. Since we wish to estimate sovereign risk as judged by market participants, it is important to use information on which they evidently rely.

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[3] As of April 2006, for example, Moody's rated the bonds of no more than 92 sovereign issuers. Given their skewed return distributions, these bonds are not nearly enough for a diversified portfolio (see Amato and Remolona (2003)).

[4] These ratings are featured in Baek et al (2005), Reinhart et al (2003) and Ul-Haque et al (1996).

An important disadvantage of ratings in this regard is that, as Altman and Rijken (2004) among others point out, rating agencies focus on a long-term horizon, using a "through-the-cycle" rating methodology. As a result, ratings respond only to the component of credit quality changes that the agencies perceive to be permanent. Sovereign spreads, however, may reflect risk assessments by investors who do care about credit quality in the short term. Hence, ratings are not likely to provide precise point-in-time measures of risk. To abstract from possible short-term variations in market risk assessments that may be reflected in spreads, we will derive only cross-sectional risk premia and we will do so by comparing assessments implied by ratings only with averages of such credit spreads over time.

Ratings do not provide point-in-time estimates

We use ratings performance information from the three leading international credit rating agencies, namely Moody's, Standard & Poor's and Fitch. We do so for several reasons. First, in spite of differences in agency methodologies, market participants have established a clear correspondence between the ratings scales of the three agencies. For instance, a Aa rating from Moody's implies the same risk as a AA rating from Standard & Poor's. Second, Micu et al (2006) find that two ratings are better than one: credit spreads react to a rating change by one agency even when it is preceded by a similar rating change by another agency. Moreover, it is fairly common at any given time for rating agencies to disagree on a given credit, resulting in "split ratings". In these situations, Cantor et al (1997) find that bond spreads tend to be priced at the average of the ratings. In this article, we estimate a default probability for each sovereign rating based on the average of the frequencies of default for that rating as observed by the three agencies.

Two ratings better than one

We focus only on foreign currency ratings of sovereign debt and ignore ratings on local currency debt. This allows us to isolate sovereign default risk from confounding factors like inflation expectations and foreign exchange and liquidity risks that non-resident investors are likely to face in the case of local currency denominated debt (for a discussion on domestic versus foreign currency sovereign ratings, see Packer (2003)).

Calculating sovereign default probabilities

Our sample consists of 26 emerging market countries. There are 10 Latin American, seven European, six Asian and three Middle East and African (MEA) countries. Table 1 reports the number of countries in each rating grade for sovereign ratings by Moody's, Standard & Poor's and Fitch together with the number of cases for which "split ratings" occur. Most of these emerging market sovereigns tend to be rated single-A at best, and in nearly 70% of the cases the ratings are split.

Split ratings are common

To calculate sovereign default probabilities, we map sovereign ratings onto cumulative default rates for each given rating. Moody's, Standard & Poor's and Fitch publish average cumulative default rates by rating for various investment horizons and they do so separately for corporate debt and sovereign debt. We take the five-year cumulative default rate for each rating and annualise it by assuming a constant default probability during the five-year horizon. This horizon is chosen consistently with the predominant five-year

We use both sovereign and corporate defaults

Sample description				
Moody's	S&P	Fitch	Number of countries	Number of split ratings
Aaa–AA	AAA–AA	AAA–AA	0	0
A	A	A	7	6
Baa	BBB	BBB	5	2
Ba	BB	BB	11	6
B	B	B	2	3
Caa down	CCC down	CCC down	1	1

Sources: FitchRatings; Markit; Moody's Investors Service; Standard & Poor's; authors' calculations. Table 1

tenor represented in the CDS market. We do the calculation for each rating using the default experience of both sovereign debt and corporate debt. These probabilities we then call "ratings-implied probabilities of default" (RIPDs), and they are presented in Table 2.

The reason we also consider the corporate bond default experience in estimating sovereign default probabilities is the small number of actual sovereign defaults. For example, while Moody's rates the bonds of 92 sovereigns, only 11 have defaulted since 1983 and none rated single-A or higher has done so. It is a natural question, then, whether market participants would rely on such a limited sample to form their estimates of default probabilities for sovereign borrowers and not rely also on the experience of corporate defaults.

One reason to ignore corporate defaults is that these might be very different from sovereign defaults. As Eaton et al (1986), Bulow and Rogoff (1989) and Duffie et al (2003) point out, a sovereign default is largely a political decision, albeit influenced by macroeconomic factors. Rather than defaulting outright, a sovereign issuer usually pursues a restructuring or renegotiation of its debt. In doing so, sovereigns effectively trade off the reduced cost of making debt repayments against the increased costs of reputation effects, asset seizure, increased regulatory monitoring, reduced access to external finance

Sovereign ratings and implied default probabilities

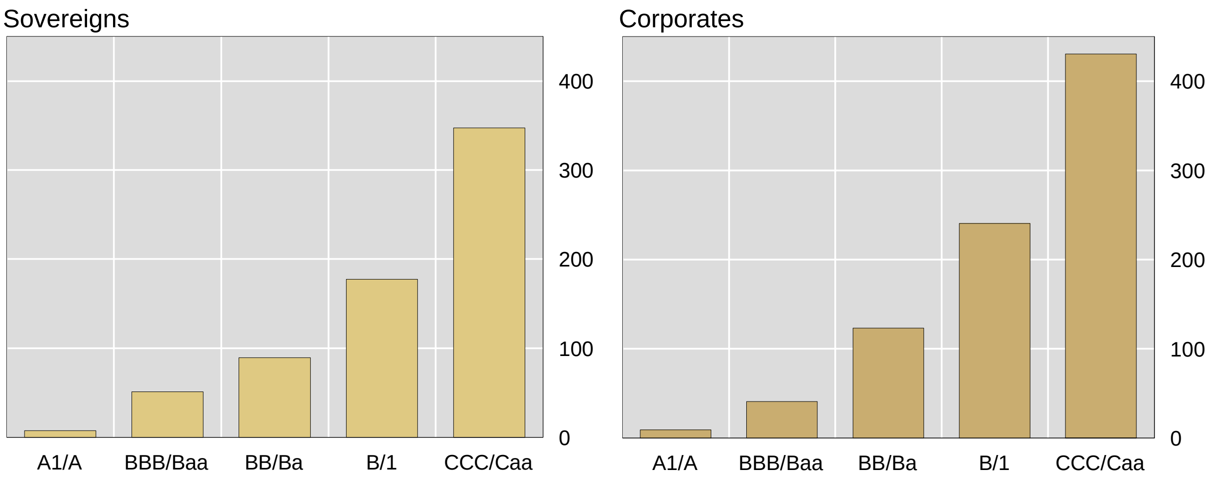
January 2002–June 2006 (in basis points)

Rating category			Moody's		S&P		Fitch		Full RIEL
Moody's	S&P	Fitch	Sovereign	Corporate	Sovereign	Corporate	Sovereign	Corporate	
Investment grade									
Aaa–AA	AAA–AA	AAA–AA	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A	A	A	5.4	6.1	4.5	9.4	13.2	12.0	8.4
Baa	BBB	BBB	48.8	40.6	45.6	41.7	58.8	39.6	45.9
Speculative grade									
Ba	BB	BB	64.0	139.1	111.9	139.3	92.8	90.9	106.3
B	B	B	123.5	280.5	266.4	315.7	142.0	125.3	208.9
Caa down	CCC down	CCC down	273.6	592.9	575.5	469.7	192.7	228.7	388.8

Sources: FitchRatings; Markit; Moody's Investors Service; Standard & Poor's; authors' calculations. Table 2

Average ratings and RIPDs[1]

In basis points



[1] Ratings-implied probabilities of default, average across 26 countries for the period January 2002 to June 2006. The x-axis represents the average ratings across Moody's, S&P and Fitch ratings.

Sources: FitchRatings; Moody's Investors Service; Standard & Poor's; authors' calculations. Graph 1

and international trade disruptions. Nonetheless, rating agencies appear to take all these factors into account and attempt to rate sovereigns and corporates in a consistent manner, so that a given rating represents the same assessment of risk regardless of the nature of the issuer.

Default probabilities are non-linear in ratings

Our calculations show a non-linear relationship between ratings and default probabilities. In Graph 1, we assign a linear scale to ratings, with a AAA/Aaa rating receiving a value of one, a AA/Aa rating a value of two, and so on. The left-hand panel of the graph then shows the relationship of these ratings to RIPDs based on the sovereign default experience and the right-hand panel to RIPDs based on the corporate default experience. As one would expect, in both cases RIPDs rise as ratings decline. In both cases too, the relationship is non-linear, illustrating an important difference of functional form between the two indicators of risk. Amato and Furfine (2003) also find such a non-linear relationship.

In general, default rates have been higher for a given rating for corporates than for sovereigns and this is reflected in the data shown in the two panels. These estimates show an average RIPD for the full sample of countries of 84 basis points a year based on the sovereign default experience. The same average RIPD based on the corporate default experience is 107, about 28% greater than that based on the sovereign default experience.

Are ratings-implied probabilities of default reflected in spreads?

Does our risk measure explain spreads?

To see whether our estimates of RIPDs are indeed relevant measures of sovereign risk from the point of view of market participants, we estimate the extent to which our measure can explain sovereign spreads for our cross section of countries. We also ask whether such estimates can do as well as untransformed sovereign ratings and as well as *Institutional Investor* ratings in explaining sovereign spreads.

For data on sovereign spreads, we use five-year sovereign CDS spreads from the comprehensive Markit database. This database contains monthly quotes on CDS market spreads for 70 developed and emerging market sovereign obligors worldwide. As the sovereign CDS market enables the exchange of sovereign risk between participating financial institutions, Markit compiles quotes from a large sample of financial institutions and aggregates them into a composite spread that is reasonably continuous. We use only spreads of five-year contracts because these contracts are the most liquid and account for a large proportion of the sovereign CDS market.

We avoid a possible "peso problem"

We compare the explanatory power of three alternative dependent variables: our full RIPD estimates, a simple linear mapping of sovereign foreign currency credit ratings, and the *Institutional Investor* ratings. To ameliorate a possible "peso problem" inherent in our limited sample of sovereign defaults, we propose that our simple RIPD indicator of sovereign default risk be based on the average of sovereign and corporate default rates. This use of corporate default information will not qualitatively change our results. For control variables, we use debt outstanding as a rough measure of liquidity and the VIX index as a measure of global risk (for more discussion on this index, see the special feature by Cairns, Ho and McCauley in this issue). Except for VIX and our risk variables, all the other variables are expressed in natural logarithms. We estimate fixed-effects panel regressions for our sample of countries from March 2002 to end-2005. These estimates use White's correction method so that they are robust to heteroskedasticity.

RIPD helps explain spreads

Our results (Table 3) suggest that, as a measure of default risk, RIPD is a significant determinant of sovereign spreads (for a discussion on the determinants of RIPD, see the box). Both the RIPD measure and the agency ratings are statistically significant and economically meaningful for explaining spreads. The *Institutional Investor* country rating appears not to have

Explaining CDS spreads

Explanatory variables	Sovereign risk measures		
	Log (RIPD) (1)	Average agency ratings (2)	*Institutional Investor* ratings (3)
Sovereign risk proxy (1, 2 or 3)	0.262***	–0.274***	0.003
	(0.000)	(0.000)	(0.205)
Bonds outstanding	–0.05	–0.138***	0.111
	(0.231)	(0.011)	(0.163)
VIX	0.062***	0.055***	0.08***
	(0.000)	(0.000)	(0.000)
Time series frequency	quarterly	quarterly	annual
Adjusted R^2	0.95	0.96	0.97

Note: The estimated panel regressions are of the form $log(S_{i,t}) = a_0 + a_1 Sov\_risk_{i,t} + a_2 \, log(Bond_{i,t}) + a_3 VIX_t + \mu_{i,t}$, where $log(S_{i,t})$ is the natural logarithm of the CDS spread for country *i* at time *t* and *Sov_risk* is the natural logarithm of RIPD, averaged agency ratings, and *Institutional Investor* ratings respectively; *VIX* is the implied volatility index of S&P 500; and $u_{i,t}$ are the iid disturbances. P-values are shown in parentheses, and *, ** and *** denote 10%, 5% and 1% level of significance respectively. Table 3 explanatory power for sovereign spreads. Of the control variables, the liquidity variable and global risk (VIX) are statistically significant with the appropriate signs.

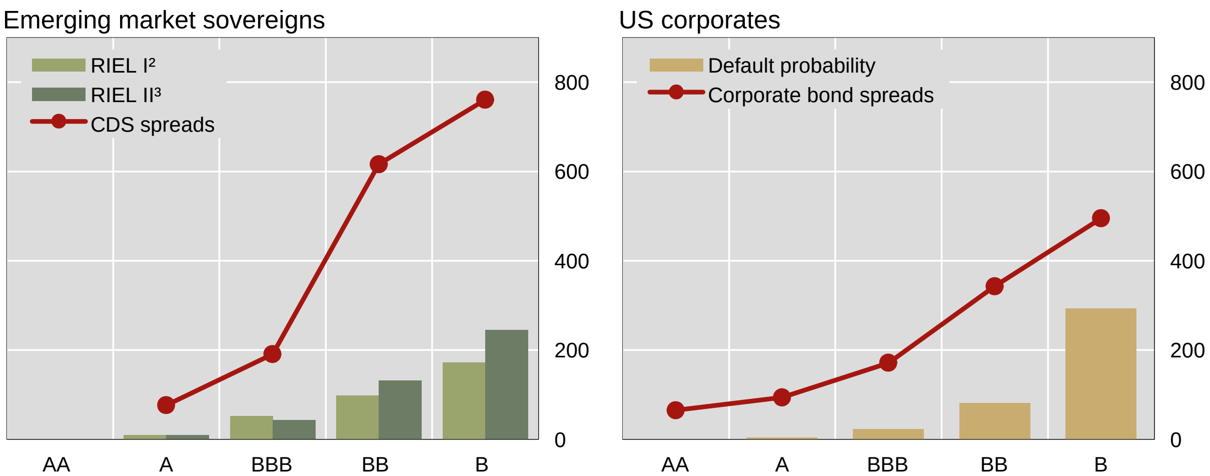
Decomposing sovereign spreads

We now turn to decomposing sovereign spreads into their two components: expected losses and risk premia. In this section, we do so by first calculating expected losses and then subtracting them from averages of spreads over time to arrive at estimates of risk premia for each rating and country. Since our expected losses are based on RIPDs, we call them ratings-implied expected losses (RIELs).

We calculate expected loss by taking the product of the default probability and the average loss-given-default. For the loss-given-default, we rely on historical average recovery rates. Sturzenegger and Zettelmeyer (2005) and Moody’s (2006) provide estimates of such recovery rates given default, but the methods for estimating them differ. One method relies on the trading price of a sovereign’s bonds 30 days after the first missed interest payment. Another method compares discounted cash flows between the original securities and the new securities received after a distressed exchange. For a given method, the estimated recovery rates also vary widely from one default to another. For example, the recovery rate for the Russian default of 1998 is estimated under the first method at 18% and that for the Dominican Republic default of 2005 at 92%. For the purposes of this article, we take the simple average of recovery rates for the 11 sovereign defaults since 1983 based on the 30-day post default price of the debt. The resulting average recovery rate is 55%, implying a loss-given-default of 45%.

CDS spreads and expected losses[1]

In basis points



[1] January 2002–June 2006. [2] Ratings-implied expected losses based on sovereign default experience. [3] Ratings-implied expected losses based on corporate default experience.

Sources: CreditPro; FitchRatings; Markit; Merrill Lynch; Moody’s Investors Service; Standard & Poor’s; authors’ calculations. Graph 2

What determines sovereign default risk?

In order to investigate the determinants of our measure of expected loss (RIPD), we employ a panel regression framework with fixed effects, using annual data from 1990 to 2005.

We follow the credit risk literature and assume a log-normal functional form, as it is known to fit the fat tails of relevant financial distributions. The models we estimate are of the following specification: $Y_{it} = a_{0i} + a_1 F_{it} + u_{it}$, where Y_{it} represents the natural logarithm of RIPD for country *i* in year *t*. This sovereign risk measure is explained by F_{it}, a vector comprising country-specific fundamentals as well as measures of original sin and currency mismatch created using the international securities statistics of the BIS,[①] u_{it} being the error term.

Explanatory variables	(1)	(2)	(3)	(4)
Log nominal GDP	0.211*** (0.000)	0.324*** (0.000)	0.976*** (0.003)	0.980*** (0.001)
Log GDP per capita	–0.2152*** (0.000)	–0.212*** (0.004)	–0.904** (0.011)	–0.900*** (0.004)
Inflation	0.045*** (0.000)	0.021*** (0.002)	0.019*** (0.004)	0.026*** (0.000)
Current account balance/GDP	0.016*** (0.000)	0.015*** (0.002)	0.014** (0.037)	0.018*** (0.011)
External debt/GDP	0.003** (0.02)	0.002* (0.074)	0.003* (0.077)	–0.000 (0.675)
Political risk		–0.005 (0.188)	–0.012** (0.022)	–0.015*** (0.005)
Years since last default		–0.039*** (0.000)	–0.042*** (0.000)	–0.045*** (0.000)
Original sin			0.309* (0.094)	
Currency mismatch				–0.074*** (0.000)
Adjusted R^2	*0.80*	*0.82*	*0.84*	*0.84*

Note: P-values are shown in parentheses, and *, ** and *** denote 10%, 5% and 1% level of significance respectively; standard errors corrected using White's method. As the currency mismatch variable is simply a scaled version of the original sin measure, they are highly collinear and the panel regressions were estimated separately to ensure robustness (insignificant variable not shown). The political risk variable is constructed so that higher values reflect better conditions.

In regression (1), we only use country-specific fundamentals to explain our RIPD and find that the macroeconomic measures for country size, economic development, inflation, current account balance and external debt are all significant and have the expected signs. Of the qualitative variables added in regression (2), which measure political risk and history of default, only the latter is significant, suggesting that countries with more recent defaults will experience higher expected losses, even after controlling for other fundamentals.

In addition to country-specific fundamentals and debt intolerance perspective, we test whether variables using the BIS data on original sin and currency mismatch help explain our country risk variable (regressions (3) and (4)). The coefficient on the original sin variable, which is meant to measure the inability of a country to borrow abroad in its own currency, is positive and significant, consistent with the concept that countries with a lower capacity to borrow in domestic currency should be riskier. Similarly, the coefficient on the proxy measure for currency mismatch, which is meant to measure the sensitivity of net worth or net income to changes in the exchange rate, is significant with the expected sign, implying that countries whose net asset positions are more vulnerable to exchange rate depreciations have higher expected losses, ceteris paribus.

Overall, while the findings above are consistent with extant sovereign debt studies, they also suggest that the addition of measures of country financial structure using BIS data on the currency denomination of securities issuance significantly contributes to our measurement of sovereign risk.

[①] For details on the creation of these variables, see Borio and Packer (2004). The measure of original sin used here measures the ratio of foreign currency debt to total debt outstanding, assuming that all debt issued in a country's currency should be counted as local currency issuance regardless of the nationality of the issuer. The proxy measure for currency mismatch multiplies the above original sin measure by (reserves – debt) / exports.

Expected losses are a small part of spreads

How large a component of spreads are expected losses? Graph 2 compares average credit spreads to expected losses for varying credit ratings. The left-hand panel does this for emerging market sovereign debt and the right-hand panel for corporate debt. Consistent with the credit spread puzzle in the corporate bond pricing literature, the left-hand panel shows that sovereign spreads are much bigger than measured expected losses. The average RIEL for our sample is 96 basis points. The average CDS spread for our entire sample is 450 basis points, five times the average RIEL based on the sovereign default experience and four times the average RIEL based on the corporate default experience. Even if we made the extreme assumption of a loss-given-default of 100%, the average spread would still be twice the average RIEL.

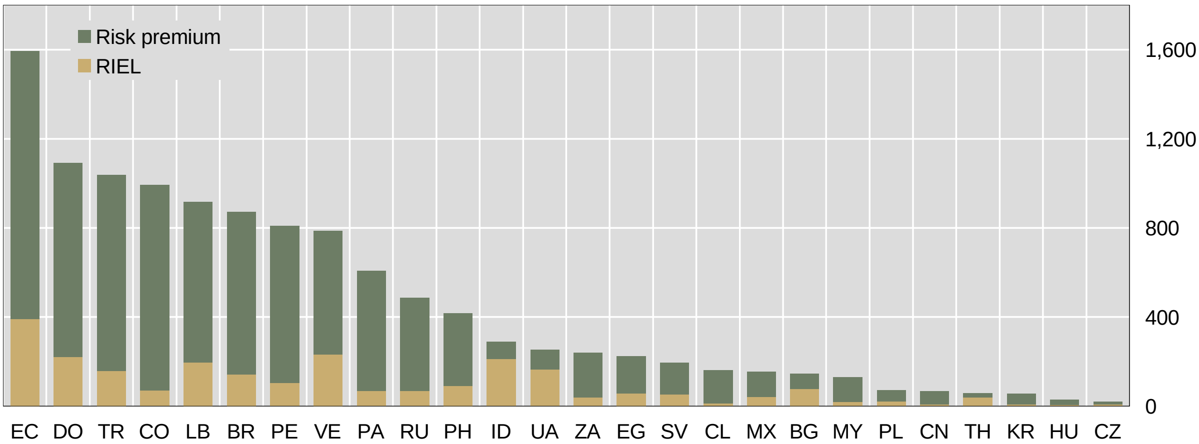
There are clear patterns in the way sovereign spreads and expected losses relate to credit ratings. First, the multiple of spread over expected loss appears to be greater, the higher the country's credit quality. For example, Korea, which is rated single-A, has an average CDS spread of 55 basis points, more than 17 times one estimate of RIEL and seven times the other estimate. Second, average spreads tend to be wider than average RIELs at every letter rating. Third, both average spreads and average RIELs widen as credit ratings decline. Finally, spreads widen more dramatically with lower ratings, and hence the differential between them and expected losses becomes larger.

Credit spread puzzle more pronounced for sovereigns

Comparing the left-hand and right-hand panels, it is evident that spreads on sovereign debt have on average been wider than those on corporate debt for each given rating and relative to estimates of expected losses. In other words, the credit spread puzzle is more pronounced for sovereign debt than for corporate debt. One possible reason for this, as suggested earlier, is that it is more difficult to diversify idiosyncratic default risk for sovereign bonds than for corporate bonds, because there are far fewer issuers of the former than of the latter. Hence, such idiosyncratic risk is priced in the wider spreads on sovereign bonds.

RIEL and risk premia[1]

In basis points



BG = Bulgaria; BR = Brazil; CL = Chile; CN = China; CO = Colombia; CZ = Czech Republic; DO = Dominican Republic; EC = Ecuador; EG = Egypt; HU = Hungary; ID = Indonesia; KR = Korea; LB = Lebanon; MX = Mexico; MY = Malaysia; PA = Panama; PE = Peru; PH = Philippines; PL = Poland; RU = Russia; SV = El Salvador; TH = Thailand; TR = Turkey; UA = Ukraine; VE = Venezuela; ZA = South Africa.

[1] Calculated as the difference between the CDS spread and the ratings-implied expected loss (RIEL).

Sources: FitchRatings; Markit; Moody's Investors Service; Standard & Poor's; authors' calculations. Graph 3

How about sovereign risk premia? Graph 3 shows these risk premia, which are calculated by subtracting expected losses from sovereign debt spreads. In nearly all cases, estimated risk premia are positive. The estimates confirm what one would expect: lower sovereign ratings tend to command higher risk premia. More interestingly, they tend to account for a larger part of the spread than do expected losses. When we calculate risk premia on the basis of the RIEL derived from sovereign defaults, the average risk premium for our sample of countries is 365 basis points, accounting for about four fifths of the spread. When we calculate it on the basis of the RIEL derived from corporate defaults, the average risk premium is 342 basis points, constituting more than two thirds of the spread.

Risk premia account for the larger part of spreads ...

One additional factor is worth noting about our calculation of sovereign risk premia. These premia are derived from averages of sovereign spreads over a period in which such spreads have been relatively low. This factor serves to bias downwards our estimates of risk premia. Even so, these estimates imply that risk premia tend to account for the larger part of sovereign spreads.

Conclusions

To interpret sovereign spreads, we make a clear distinction between sovereign risk and risk premia as the price of that risk. The spreads themselves can be divided into two components: expected losses from default and risk premia.

We propose default probabilities as a measure of sovereign risk and offer illustrative estimates based on information from the historical performance of sovereign and corporate credit ratings. We find our estimated measure of sovereign risk to be a significant determinant of the cross-sectional variation of sovereign spreads. However, it does not fully explain spreads because the price of risk is itself a separate determinant.

We estimate expected losses by taking the product of default probabilities and average sovereign loss-given-default. These expected losses turn out to be a relatively small part of average sovereign spreads. Indeed, they tend to be a smaller part of spreads than are expected losses for corporate bonds, suggesting a "credit spread puzzle" that is more pronounced for sovereign debt than for corporate debt. The size of expected losses implies that risk premia account for the larger part of average sovereign spreads even during a period when such spreads have been relatively low.

... even when spreads are low

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