Economics Bulletin

Volume 32, Issue 4

Revisiting the effects of country specific fundamentals on sovereign default risk

Manuel Ramos-Francia
Banco de México

José G Rangel
Goldman Sachs Group, Inc.

Abstract

This paper re-examines the association of country-specific macroeconomic fundamentals and sovereign risk. Our analysis focuses on 26 countries, including both developed and emerging economies, during the period 2000-2009. For both groups, while inflation and twin deficits are associated with higher sovereign spreads, real growth shows negative effects on default risk. International reserves and exchange rate appreciations are associated with lower default risk in emerging markets.

The final draft of this paper was written while José Gonzalo Rangel was working at Banco de México. The opinions expressed in this article are solely those of the authors and do not necessarily reflect the views of Banco de México or Goldman Sachs Group, Inc.
Citation: Manuel Ramos-Francia and José G Rangel, (2012) "Revisiting the effects of country specific fundamentals on sovereign default risk", *Economics Bulletin*, Vol. 32 No. 4 pp. 3008-3016.
Contact: Manuel Ramos-Francia - mrfran@banxico.org.mx, José G Rangel - jgrangell@gmail.com.
Submitted: March 11, 2012. **Published:** October 30, 2012.

1. Introduction

The recent global crisis and solvency problems that a number of developed countries have experienced during the last years raise questions about the effect of idiosyncratic or country-specific fundamentals on the perception of sovereign risk, regardless of the level of economic development of each country. The analysis of variables or domestic factors that allow us to better classify countries in terms of their risk profile is clearly relevant for investors and policy makers, especially in the current context of high financial integration and levels of global financial volatility above those of the pre-crisis years.

Although there is a large literature on the determinants of sovereign spreads, it has mainly focused on emerging markets given their history of more frequent default episodes.[1] However, the fact that the recent global recession and most of the subsequent events affecting global volatility have been originated in developed economies, motivates an empirical revision of the evidence on the time series and cross sectional variation of country default risk in both developed and emerging markets. Moreover, the discussion on the relation between fundamentals and sovereign risk continues because the empirical evidence about the role of country-specific variables is far from being conclusive.[2]

This paper contributes to the discussion of these concerns. It revisits the evidence for emerging markets using recent data that include the period from 2000 to 2009 and, furthermore, it examines sovereign spreads in developed economies during the same period. The goal is to analyze to what extent the patterns observed in sovereign spreads reflect the state of country-specific fundamentals. We perform econometric exercises based on two unbalanced panel structures of emerging and developed markets, respectively, which combine country-specific financial and macroeconomic data. In particular, we relate the time series and cross sectional variation of country sovereign spreads to local macroeconomic variables including inflation, growth, fiscal and current account deficits, international reserves, and nominal exchange rate variations.

These macroeconomic variables have been considered in the literature as relevant for sovereign spreads because they are related to the debt sustainability of a country. For example, Remolona, Scatigna and Wu (2008) consider the inflation rate as an indicator of a country's monetary policy management and fiscal responsibility. Higher inflation rates may indicate excessive spending and borrowing, which increases the country default risk. Also, these authors suggest GDP growth and foreign exchange reserves as indicators of a country's economic strength and ability to repay its debt. Edwards (1984) and Sachs (1985) also suggest that sovereign spreads are determined by variables like inflation and GDP growth. Furthermore, Baek et al. (2005) consider the effect of government budget balance, current account balance and variations in the real exchange rate as country-specific variables related to sovereign risk in emerging markets. Large fiscal deficits or public debt are likely to raise concerns about a country's ability to service its debt. Kharas (1984) and Uribe (2006) relate

[1] Examples of this literature include Edwards (1984, 1986), Kharas (1984), Sachs (1985), Eichengreen and Mody (1998), Min (1998), Mauro et al. (2002), Duffie et al. (2003), Ferrucci (2003), Baek et al. (2005), and Diaz-Weigel and Gemmill (2006), among others.

[2] For example, some recent studies have suggested that sovereign spreads are mainly driven by common global factors and that the role of country-specific fundamentals is modest (e.g., Mauro et al. (2002) and McGuire and Schrijvers (2003)).

sovereign default probability to a government's debt service-capital ratio and tax policy.[3] Sachs (1981, 1985) argues that yield spreads will increase if the ratio current account balance to GDP is negative because a country's current account deficits mean that foreign countries and investors increase their claims on the country's net liabilities. Exchange rate variations are also relevant for sovereign risk because they have a direct impact on a country's terms of trade, which may affect the ability of the country to generate dollar revenue and make payments on its external debt (see Bulow and Rogoff, 1989).

Our results suggest that sovereign spreads are positively related to inflation, fiscal deficits, and current account deficits. However, the current account effect is only significant for developed economies. In contrast, spreads are negatively associated with growth, although this effect is only significant for emerging markets. Moreover, we find evidence that the level of international reserves and exchange rate appreciations are negatively related to sovereign spreads in emerging markets. For the group of developed economies, our evidence also suggests a non-linear effect of inflation. In particular, while positive levels of inflation are associated with higher spreads, deflation relates positively to sovereign risk. The rest of the paper is outlined as follows. Section 2 describes the data and the empirical specifications, Section 3 presents the results, and Section 4 offers our conclusions.

2. Data and empirical specifications

We used quarterly macroeconomic data on real GDP, inflation, fiscal and current account balances. Data on exchange rates and international reserves for emerging markets were used as well. All the series were obtained from the IMF's International Financial Statistics (IFS) dataset. The group of emerging markets includes the following countries: Brazil, Chile, Colombia, Czech Republic, Hungary, Indonesia, Korea, Malaysia, Mexico, Peru, Philippines, Poland, Thailand, and Turkey. The group of developed markets includes Canada, England, France, Germany, Greece, Ireland, Italy, Japan, Portugal, Spain, Sweden, and Switzerland.[4] In the case of emerging markets, yield spreads are measured using data on the JP Morgan's EMBI Global bond indices (from Bloomberg). Table I lists the analyzed countries, groups them into regions and reports descriptive statistics of their EMBI spreads. For developed markets, we constructed the sovereign spreads as the difference between the yields on long-term government bonds and the yield on 10-year US Treasuries. Table II lists the examined developed economies and presents descriptive statistics of their sovereign spreads. The data on spreads were gathered at a daily frequency and then aggregated at a quarterly frequency. The sample period is from January 2000 to December 2009.

We classified the countries into two groups: developed and emerging economies. For the group of emerging markets, we estimated the following panel specification, which associates EMBI spreads with domestic macroeconomic variables and incorporates time and country-specific fixed effects. Hence,

[3] In terms of the empirical literature, Afonso et al. (2007), Baldacci et al. (2008), and Hallerberg and Wolf (2008), among others, find evidence that fiscal positions and public debt levels have an impact on sovereign spreads.

[4] Since most of the countries are European, there may be issues with respect to the representative features of the sample.

$$EMBI_{i,t} = \beta_1 \Delta GDP_{i,t} + \beta_2 \Delta e_{i,t} + \beta_3 Inf_{i,t} + \beta_4 FD_{i,t} + \beta_5 CAD_{i,t} + \beta_6 \ln(IR_{i,t}) + \sum_{t'=1}^{T} \lambda_{t'} + \sum_{i'=1}^{N} \gamma_{i'} + \varepsilon_{it}, \quad (1)$$

where ΔGDP denotes real GDP growth, Δe is the nominal depreciation rate of the local currency (against the US dollar), *Inf* is the level of inflation, *FD* is the ratio of fiscal balance to GDP, *CAD* denotes the ratio of current account balance to GDP, and *IR* is the level of international reserves. The fixed effects partially take into account possible endogeneities associated with omitted or unobserved country-specific characteristics of static nature and the homogeneous effects of common global factors.[5]

For the group of developed markets, we estimated a panel specification, which relates sovereign spreads (*SPREAD*) to inflation, real growth, fiscal and current account deficits:

$$SPREAD_{i,t} = \tilde{\beta}_1 \Delta GDP_{i,t} + \tilde{\beta}_2 Inf_{i,t} * 1(Inf_{i,t} > 0) + \tilde{\beta}_3 Inf_{i,t} + \tilde{\beta}_4 FD_{i,t} + \tilde{\beta}_5 CAD_{i,t} + \sum_{t'=1}^{T} \tilde{\lambda}_{t'} + \sum_{i'=1}^{N} \tilde{\gamma}_{i'} + \tilde{\varepsilon}_{it}, \quad (2)$$

This specification allows inflation and deflation to have different effects on spreads.[6] It also includes time and country-specific fixed effects. The exchange rate and international reserves variables were not included in the regression for developed markets because the role of these variables is not straightforward for this group of countries. For example, many of them share a common currency and the role of international reserves as a self-insurance mechanism against speculative market activity becomes less clear.

3. Results

We first examine the results for emerging markets. The estimates of Equation 1 are shown in Table III. They indicate that sovereign risk increases with fiscal deficits, inflation, depreciations of the nominal exchange rate, and current account deficits. These effects are statistically significant at the 5% level except for the current account effect, which shows a critical value in the margin of 11%. In contrast, emerging market spreads decline with real growth and the level of international reserves. Both effects are significant at the 5% level. In summary, we find results consistent with previous literature suggesting that emerging economies with high debt levels, large current account deficits, high levels of inflation, and low levels of growth tend to have higher sovereign risk. Our evidence also supports the argument that the level of international reserves works as a buffer and relates negatively to sovereign spreads.

Although adding country specific and time fixed-effects partially addresses endogeneity issues associated with country-specific unobservables that are time invariant, or the effect of common factors that have symmetric effects across countries, there may be additional sources of endogeneity affecting our regressions with contemporaneous variables. To further examine the robustness of our results to problems of simultaneous causality, we also estimated a

[5] A number of studies have emphasized the importance of global factors for sovereign risk in emerging markets, see for example Mauro et al. (2002), Herrera and Perry (2002), Diaz-Weigel and Gemmill (2006), and Garcia-Herrero and Ortiz (2007).

[6] None of the countries in the group of emerging economies showed deflationary episodes during our sample period. Thus, the non-linear effect of inflation modeled in (2) is not identified for this group. For this reason, this effect was not included in regression (1).

model where the explanatory variables were lagged one period. In this case, we find that all the variables show the same sign and statistical significance at the 5% level, with exception of GDP growth that is not significant but shows a consistent negative sign (see the last two columns of Table III).

As for the group of developed economies, we estimated the specification in Equation 2. The results are shown in Table IV. As it was observed in the group of emerging markets, the estimates suggest that sovereign spreads in developed markets are higher when inflation and the twin deficits are higher. These effects are statistically significant at the 5% level. In contrast, real GDP growth shows a negative relation with spreads, but its effect is not significant. Moreover, we find an interesting non-linear effect of inflation on risk premia for this group of countries. In particular, our results suggest that deflation is associated with wider spreads. As in the previous case, these results do not show high sensitivity to possible endogeneities arising from using contemporaneous data. In fact, a regression with explanatory variables lagged one period leads to qualitatively similar findings.

The results for developed economies are in line with the findings for emerging countries. Specifically, balance sheet concerns along with high inflation and slow growth are associated with higher levels of sovereign spreads. We recognize that our analysis focuses on the empirical relationship between sovereign spreads and specific macroeconomic variables, leaving key questions unanswered such as the channels through which public debt, growth, and inflation interact with each other and with other variables in the economy that are important to disentangle causal links between the cost of debt and country-specific macroeconomic factors. We leave these questions for future research.

4. Conclusions

This paper examines the association between country-specific macroeconomic variables and sovereign risk in emerging and developed markets. The results suggest that in both groups of economies increases in fiscal deficits relate to higher country risk premia. Also, increases in current account deficits and inflation levels are associated with increases in sovereign spreads. For developed markets, deflation is related to higher country risk. In contrast, economic growth is negatively related to sovereign spreads, although this effect is only significant for emerging markets.

Our analysis also controls for the effect of international reserves and exchange rate fluctuations on the sovereign risk of emerging markets. The results indicate that higher levels of international reserves as well as exchange rate appreciations lead to lower spreads in emerging economies.

In sum, this paper shows a number of results that are consistent with the existing evidence, especially for emerging markets. Nevertheless, our analysis focuses on a recent period that includes 2008 pre-crisis and post-crisis data. It also incorporates evidence from developed markets that have received less attention in the literature on sovereign risk given the fact that defaults are historically more common in emerging markets. However, the recent events in developed countries, such as Greece, Ireland, Portugal and Spain, confirm that default risk is not an exclusive feature of the emerging world. This paper provides consistent empirical evidence that, regardless of the level of economic development, fundamentals are related to country risk premia in ways that make sense with economic theory.

References

Afonso, A., P. Gomes, and P. Rother, (2007) "What "Hides" Behind Sovereign Debt Ratings?" European Central Bank working paper number 711.

Baek, I-M, A. Bandopadhyaya, and C. Du (2005) "Determinants of market-asessed sovereign risk: Economic fundamentals or market risk appetite?" *Journal of International Money and Finance* **24**, 533-548.

Baldacci, E., S. Gupta, and A. Mati (2008) "Is it (Still) Mostly Fiscal? Determinants of Sovereign Spreads in Emerging Markets" IMF working paper number 08/259.

Bulow, J. and K. Rogoff, (1989) "Sovereign Debt: Is to Forgive to Forget?" *American Economic Review* **79**, 43–50.

Diaz-Weigel, D. and G. Gemmill (2006) "What drives credit risk in emerging markets? The roles of country fundamentals and market co-movements" *Journal of International Money and Finance* **25**, 476-502.

Duffie, D., L. H. Pedersen, and K. Singleton (2003) "Modeling Sovereign Yield Spreads: A Case Study of Russian Debt" *Journal of Finance* **58**, 119–159.

Edwards, S. (1984) "LDC Foreign Borrowing and Default Risk: An Empirical Investigation, 1976–80" *American Economic Review* **74**, 726–734.

Edwards, S. (1986) "The Pricing of Bonds and Bank Loans in International Markets, An Empirical Analysis of Developing Countries' Foreign Borrowing" *European Economic Review* **30**, 565–589.

Eichengreen, B. and A. Mody (1998) "What explains changing spreads on emerging market debt: Fundamentals or market sentiment?" NBER working paper number 6408.

Ferrucci, G. (2003) "Empirical Determinants of Emerging Market Economies' Sovereign Bond Spreads" Bank of England working paper number 205.

Garcia-Herrero, A. and A. Ortiz (2007) "The role of global risk aversion in explaining Latin American sovereign spreads" *Economia* **7**, 125-155.

Hallerberg, M. and G. Wolff (2008) "Fiscal institutions, fiscal policy and sovereign risk premia in EMU" *Public Choice* **136**, 379-396.

Herrera, S. and G. Perry (2002) "Determinants of Latin Spreads in the New Economy Era: The Role of U.S. Interest Rates and Other External Variables" The World Bank, mimeo.

Kharas, H. (1984) "The Long-Run Creditworthiness of Developing Countries: Theory and Practice" *Quarterly Journal of Economics* **99**, 415-439.

McGuire, P. and M. Schrijvers (2003) "Common factors in emerging market spreads" BIS Quarterly Review, December issue.

Min, H. G. (1998) "Determinants of Emerging Market Bond Spreads: Do Economic Fundamentals Matter?" World Bank Policy Research Paper 1899.

Mauro, P., N. Sussman, and Y. Yafeh (2002) "Emerging market spreads: then versus now" *Quarterly Journal of Economics* **117**, 695-733.

Remolona, E., M. Scatigna, and E. Wu (2008) "The dynamic pricing of sovereign risk in emerging markets: Fundamentals and risk aversion" *Journal of Fixed Income* **17**, 57-71.

Uribe, M. (2006) "A Fiscal Theory of Sovereign Risk" *Journal of Monetary Economics* **53**, 1857-1875.

Table I. Emerging markets and EMBI spreads

Country	Mean	Std. Dev.	Max	Min
		Asia		
Indonesia	319.85	169.61	848.92	154.60
Korea	78.28	88.29	368.02	15.63
Malaysia	158.20	72.89	375.03	69.85
Thailand	104.12	46.49	197.62	47.55
Philippines	386.44	138.25	658.35	149.35
		Europe		
Czech Rep.	50.49	62.62	248.01	9.57
Hungary	111.85	112.84	481.05	20.43
Poland	138.50	81.84	311.23	47.64
Turkey	450.71	240.31	1003.54	192.78
		Latin America		
Brazil	560.20	404.33	1899.03	149.85
Chile	144.26	68.99	356.52	56.71
Colombia	408.42	200.49	842.64	127.14
Mexico	244.41	98.34	451.44	101.62
Peru	365.83	193.68	777.92	110.55

Notes: The spreads are in basis points. Source: Bloomberg

Table II. Developed markets sovereign spreads

Country	Mean	Std. Dev.	Max	Min
Germany	-28.67	48.31	45.26	-110.71
Canada	9.76	46.38	108.88	-64.30
Spain	-4.31	63.05	146.49	-109.59
France	-20.75	51.75	75.82	-114.99
Greece	43.97	112.90	494.03	-90.81
England	20.09	46.90	96.13	-95.01
Ireland	13.40	89.54	265.66	-110.56
Italy	-46.35	61.83	119.32	-138.91
Japan	-288.22	139.60	66.56	-410.62
Portugal	12.14	67.23	178.46	-105.24
Sweden	-14.78	62.64	100.61	-118.04
Switzerland	-166.48	49.98	-54.47	-267.55

Notes: The spreads are in basis points. They are constructed as the difference between the yield on each country long-term government bond and the yield on 10-year US Treasuries. Source: Bloomberg and IFS dataset.

Table III. Panel regressions of EMBI spreads

	Contemporaneous		Lagged	
	Coef	Std. Err.	Coef	Std. Err.
Real GDP Growth	-2382.73	723.14**	-910.60	793.18
Inflation	18.25	5.30**	16.69	4.28**
Budget Balance	-10.00	4.27**	-13.54	4.78**
Current Account Balance	-0.05	0.03	-19.01	5.70**
FX Depreciation	-1424.99	499.16**	-1353.46	415.78**
log(International Reserves)	-281.83	55.60**	-366.45	62.59**

Notes: The second and third column show estimates of the contemporaneous regression of EMBI spreads on macroeconomic explanatory variables. The last two columns show estimates of a regression where the explanatory variables are lagged one period. The time and country-specific fixed effects are not shown for reasons of space. Heteroskedasticity-robust standard errors are considered. **) denotes statistical significance at the 5% level; *) denotes significance at the 10% level.

Table IV. Panel regressions of developed markets sovereign spreads

	Contemporaneous		Lagged	
	Coef	Std. Err.	Coef	Std. Err.
Real GDP Growth	118.37	217.38	3.92	190.15
Inflation*1(Inflación>0)	27.21	7.06**	17.77	7.64**
Inflation	-20.63	5.47**	-12.87	6.24**
Budget Balance	-5.11	1.35**	-6.13	1.43**
Current Account Balance	-2.16	0.74**	-2.36	0.82**

Notes: The second and third column show estimates of the contemporaneous regression of sovereign spreads on macroeconomic explanatory variables. The last two columns show estimates of a regression where the explanatory variables are lagged one period. The time and country-specific fixed effects are not shown for reasons of space. Heteroskedasticity-robust standard errors are considered. **) denotes statistical significance at the 5% level; *) denotes significance at the 10% level.