

IMF Working Paper

Sovereign Credit Ratings and Spreads in Emerging Markets: Does Investment Grade Matter?

Laura Jaramillo and Catalina Michelle Tejada

IMF Working Paper

Western Hemisphere Department

**Sovereign Credit Ratings and Spreads in Emerging Markets:
Does Investment Grade Matter?**

Prepared by Laura Jaramillo and Catalina Michelle Tejada¹

Authorized for distribution by David Vegara

March 2011

Abstract

Sovereign investment grade status is often associated with lower spreads in international markets. Using a panel framework for 35 emerging markets between 1997 and 2010, this paper finds that investment grade status reduces spreads by 36 percent, above and beyond what is implied by macroeconomic fundamentals. This compares to a 5-10 percent reduction in spreads following upgrades within the investment grade asset class, and no impact for movements within the speculative grade asset class, *ceteris paribus*. While global financial conditions play a central role in determining spreads, market sentiment improves with lower external public debt to GDP levels and higher domestic growth rates.

JEL Classification Numbers: E44, F30, F34, G15, H63

Keywords: Credit Ratings, Sovereign Debt, Rating Agencies, Emerging Markets

Author's E-Mail Address: ljaramillomayor@imf.org, mtejada@imf.org

This Working Paper should not be reported as representing the views of the IMF.

The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

¹ The authors wish to thank Mario Dehesa for valuable comments to an earlier version of the paper; Gaston Gelos, David Vegara, and Rodrigo Valdes for their useful suggestions; and participants at the Western Hemisphere Department seminar on this research for their helpful comments.

Contents

Page

A. Introduction.....	3
B. Background and Literature Review.....	4
C. Stylized Facts	5
D. Empirical Model Specification	7
E. Data and Estimation Results.....	8
F. Summary and Conclusions	13
References.....	15
Appendix.....	17

Tables

1. Sovereign Credit Ratings by Agency	4
2. Data Description	9
3. Regression Results: Sovereign Spreads.....	10

Figures

1. EMBI Spreads and Global Conditions	5
2. Emerging Markets: Sovereign Credit Ratings and Spreads by Year.....	6
3. Median Spreads: Fitted Values	12
4. Spreads Implied by Rating Dummy Coefficients, All Else Equal.....	12
5. Sovereign Spread Minus Cross-Country Median	12

A. INTRODUCTION

Achieving investment grade status is an aim shared by many emerging market economies, but questions may arise as to whether an upgrade to investment grade is any different from other upward movement along the rating scale. Investment grade status is linked to a lower default risk and therefore would result in lower financing costs for the sovereign. Investment grade status is expected to further reduce spreads by triggering greater flows from institutional investors whose covenants prevent them from taking on high risk in their portfolios. However, emerging market spreads have been compressing in recent years and differences across investment and speculative grade countries have narrowed substantially, apparently reducing the premium afforded by investment grade status.

This paper builds on the existing literature on the determinants of sovereign spreads in several ways. First, the paper captures the benefits of investment grade status by allowing for differences in the impact of each rating grade on spreads. This contrasts with the approach of previous studies that estimate that the impact on spreads of a one-notch rating movement is identical all along the rating scale. Second, the paper assesses whether ratings provide information to markets above and beyond that of country fundamentals. Third, the paper gauges further the impact of investment grade status by checking if markets react differently to global or macroeconomic conditions depending on whether the country has investment grade status.

The paper finds that investment grade status reduces financing costs significantly. Using a panel dataset for 35 emerging market economies for the period 1997–2010, the analysis for sovereign spreads is based on a fixed effects model with robust standard errors. The econometric results indicate that sovereign spreads for investment grade countries are 36 percent lower than for speculative grade countries, above and beyond what is implied by macroeconomic fundamentals. This implies that if at particular point in time a BB+ rated country has a spread of 440 basis points (average for speculative grade countries during 2010 Q1), a country at BBB- would have a spread of only 279 basis points, *ceteris paribus*. This compares to a 5–10 percent reduction in spreads following rating upgrades within the investment grade asset class, and no impact for movements within the speculative grade asset class, all else equal. While global financial conditions play a central role in determining the variability of spreads, lower external public debt to GDP levels improve market sentiment, even more so for lower rated sovereigns. Stronger real GDP growth helps reduce borrowing costs, while higher international reserves lead to lower spreads only in the case of speculative grade countries.

The rest of the paper is organized as follows. Section B presents background information on sovereign credit ratings and reviews the existing literature on the determinants of spreads. Section C presents stylized facts and illustrates the relationship between sovereign ratings and spreads. Section D outlines the econometric methodology. Section E describes the data and presents the main results of the estimation, including a robustness analysis. The last section summarizes and provides concluding remarks.

B. BACKGROUND AND LITERATURE REVIEW

Sovereign debt ratings are intended to be forward-looking qualitative measures of the probability of default elaborated by credit rating agencies. The three major credit rating agencies—Moody’s Investor Services (Moody’s), Standard and Poor’s (S&P), and Fitch Ratings (Fitch)—indicate that their assessments of government risk are based on the analysis of a broad set of economic, social, and political factors.² Ratings and their interpretation are summarized in Table 1. Countries with a rating of BBB- or above in the case of S&P and Fitch, and Baa3 or above in the case of Moody’s, are considered to be in the investment grade asset class; countries with ratings below that threshold are considered to be in speculative grade asset class.

	S&P	Moody's	Fitch
Investment Grade			
Highest quality, reliable, stable	AAA	Aaa	AAA
High quality	AA	Aa	AA
Strong payment capacity	A	A	A
Adequate payment capacity	BBB	Baa	BBB
Speculative Grade			
Likely to fulfill obligations, ongoing uncertainty	BB	Ba	BB
Financial situation varies considerably	B	Ba	B
Vulnerable, dependent on favorable economic conditions to meet payments	CCC	Caa	CCC
Highly vulnerable, speculative	CC	Ca	CC
Close to default, may be in arrears	C	C	C
Defaulted on obligations	D		D
<small>Note: Within rating categories, S&P and Fitch use plus (+) or minus (-) signs to show relative standing, with A+ being better than A or A-. Moody's uses a modifier of 1,2, or 3 for the same purpose, with A1 being better than A2 or A3. Sources: Standard and Poor's, Moody's Investor Services, Fitch Ratings</small>			

Empirical studies have generally found that better ratings are associated with lower spreads. Cantor and Packer (1996) estimate that a one-notch deterioration in credit ratings raises spreads by 25 percent. Kaminsky and Schmukler (2002) show that changes in sovereign debt ratings and outlooks affect financial markets in emerging economies, with average yield spreads increasing 2 percentage points in response to a one-notch downgrade. Sy (2002) finds that a one-notch upgrade reduces sovereign spreads on average by 14 percent (or 70 basis points for an initial spread of 500 basis points). Furthermore, Hartelius et al. (2008) find that improvements in emerging market credit ratings explain the fall in sovereign spreads since mid-2002. Contrary to these findings, Gonzalez-Rozada et al. (2008) conclude that ratings are largely endogenous, reflecting changes in spreads rather than anticipating them, underscoring the importance of exogenous factors such as the international business cycle.

Few studies have focused specifically on the impact of investment grade status on spreads, with mixed results. Kamim and von Kleist (1999) identify different trends in spreads for emerging market debt instruments with different levels of creditworthiness during the 1990s. They find that while spreads on the riskiest credits behaved much like Brady bond spreads—rising with the Mexican financial crisis and declining thereafter—spreads on investment grade credits declined steadily throughout the 1992–97 period, enjoying the benefits of a “flight to quality” during the Mexican crisis.³ All else equal, their model predicts that a deterioration of

² Jaramillo (2010) identifies a parsimonious set of determinants of investment grade status: external public debt, domestic public debt, broad money, exports (all these as a percentage of GDP) and a political risk index.

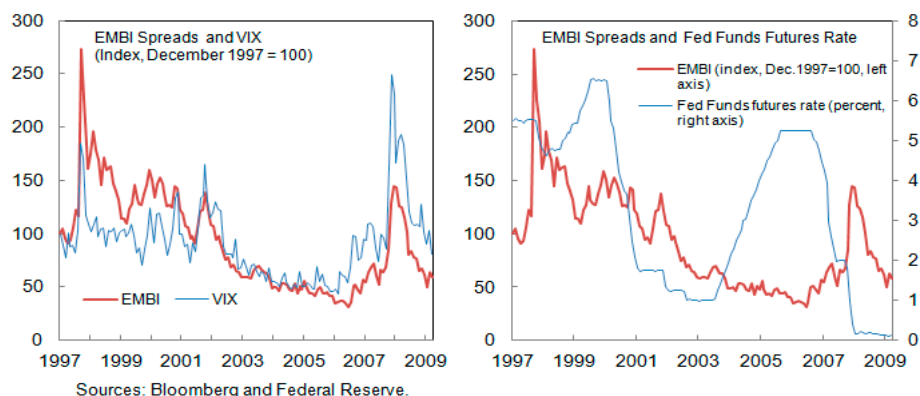
³ Other benefits of investment grade status are identified by Rigobon (2002), who finds that the transmission of shocks to Mexico from other Latin American countries was reduced following the upgrade to investment grade.

credit ratings in the investment grade range by one notch, (say from BBB+ to BBB) leads to a 21 percent increase in spreads, while a one-notch deterioration in the speculative grade range leads to a 26 percent increase in spreads. IMF (2010) finds that, even though rating changes in general have little market impact, crossings of the investment-grade threshold lead to statistically significant widening of CDS spreads. In contrast, Cavallo et al. (2008) find that rating changes between asset classes (i.e. investment to non-investment grade and vice-versa) have no additional explanatory power vis-à-vis all the other rating changes.

C. STYLIZED FACTS

Global factors are key drivers of the borrowing costs of emerging market economies. Global financial conditions, such as the availability of international liquidity and international investors' risk appetite, affect borrowing costs for emerging markets, as depicted in Figure 1. In recent years, EMBI Global spreads⁴ have followed closely the Chicago Board Options Exchange Volatility Index (VIX⁵), a proxy for international investors' appetite for risk. The relationship between spreads and the implied yield on the 3-month Fed Funds futures—which incorporates expectations of future interest rates and uncertainty related to changes in liquidity conditions—appears to have changed since the mid 2000s, and now these two indicators tend to move in opposite directions.⁶

Figure 1. EMBI Spreads and Global Conditions



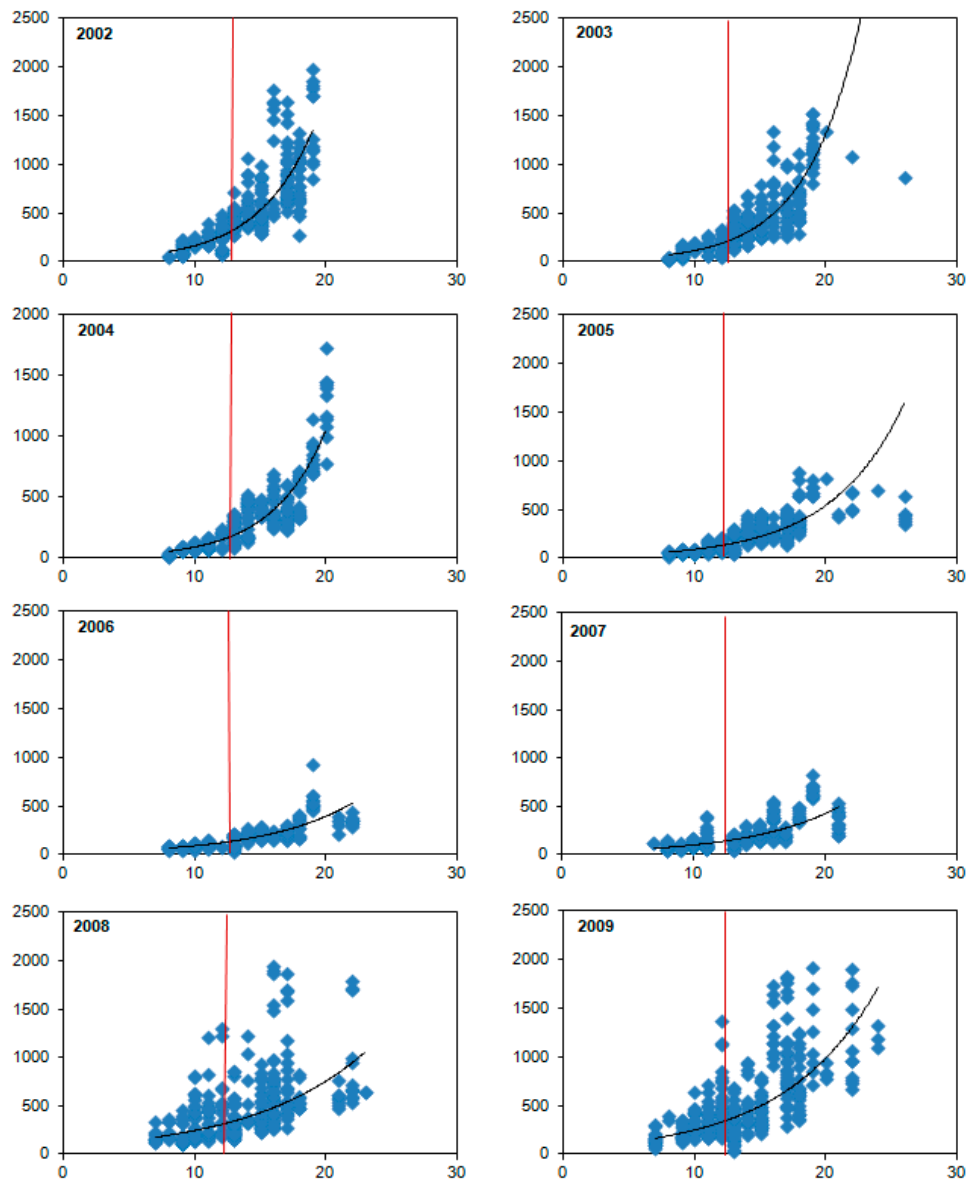
⁴ The EMBI Global provides a market-capitalization-weighted index for each country. The index includes U.S. dollar denominated Brady bonds, Eurobonds, and traded loans issued by sovereigns. Instruments must have a minimum issue size of US\$500 million, a maturity of at least 2.5 years when included, and at least one year until maturity to continue to be included. Spread over Treasury is calculated as the difference between the yield to maturity of each bond (i.e. the internal rate of return of the bond instrument) and the yield to maturity of the corresponding point on the U.S. Treasury spot curve. See http://data.cbonds.info/indexdocs/g_eng_37.pdf

⁵ The VIX is a measure of the market's expectation of stock market volatility over the next 30 day period. It is a weighted blend of prices for a range of options on the S&P 500 index. See <http://www.cboe.com/micro/VIX/vixintro.aspx>

⁶ The literature is inconclusive concerning the effects of the global interest rate environment on spreads. Arora and Cerisola (2000) and Hartelius et al. (2008) find a positive correlation, Eichengreen and Mody (1998), McGuire and Schrijvers (2003), and Uribe and Yue (2006) find a negative relationship, while Kamin and von Kleist (1999), Sløk and Kennedy (2003), and Baldacci et al. (2008) find the relationship insignificant.

Sovereigns with better credit ratings have tended to enjoy lower spreads, though other factors are at play. Figure 2 illustrates the relationship between spreads and ratings by year between 2004 and 2009, imposing an exponential trend line. The graphs suggest that spreads increase substantially for countries with speculative grade rating. The figure also shows that the dispersion of spreads has changed over the years, implying that international markets rely on additional indicators beyond credit ratings in order to discriminate among different risk profiles.

Figure 2. Emerging Markets: Sovereign Credit Ratings and Spreads by Year 1/



1/ The horizontal axis corresponds to sovereign credit ratings, while the vertical axis shows EMBI spreads in basis points. Sovereign credit ratings are averaged across the three main rating agencies and then linearly converted to numerical values, with a lower number representing a better credit rating (i.e., BBB+=10, BB-=15, CCC=20, C+=25). The red line indicates the investment grade threshold (BBB-/BB+).

Sources: Bloomberg, Standard and Poor's, Moody's Investor Services, Fitch Ratings, and authors' calculations.

D. EMPIRICAL MODEL SPECIFICATION

The paper seeks to measure the impact of investment grade status on sovereign borrowing costs. Naturally, better credit ratings reflect lower risk of default and therefore are expected to result in lower spreads. However, the question arises as to whether moving up from a rating of BB+ to BBB- results in significantly lower spreads than any other movement along the rating scale, as such a move would be expected to considerably diversify and broaden the country's investor base. Previous studies generally convert ratings linearly to numerical values, under the simplifying assumption that, on average, one-notch movements have the same impact on spreads regardless of the asset class (i.e. investment grade or speculative grade). In contrast, this paper creates dummy variables for each rating grade between A+ and CC- (18 dummies), which allows for different coefficients across asset classes.

Global financial conditions are incorporated as control variables. Global risk appetite is proxied by the VIX, and global liquidity conditions by the Fed Funds futures rate. In addition, interaction terms of these two variables with investment grade status are included to assess whether investment grade amplifies or attenuates the impact of global conditions. Year dummies are also included to account for any other unidentified global events.

Furthermore, macroeconomic factors are included in order to isolate the influence of ratings above and beyond the evolution of country-specific fundamentals. Including only rating variables in the regression analysis leaves the question of whether ratings are merely adequately capturing relevant country information and not exerting an influence of their own. This paper addresses this shortcoming by including macroeconomic control variables, specifically: (i) external and domestic public debt to GDP—the higher the debt burden, the larger the effort by the government to service its obligations, and therefore a higher risk of default; (ii) international reserves to GDP—the higher the ratio, the more resources are available to service foreign debt, reducing a country's vulnerability to liquidity shocks; and (iii) real GDP growth—higher economic growth strengthens the fiscal position, making the country's debt burden easier to service. Interaction terms of each of these variables with investment grade status are also included to allow for differences across asset class.⁷

⁷ Interaction dummies with other rating grades were tested in the model and found to be insignificant. They were therefore excluded to preserve degrees of freedom.

The model is estimated using a fixed effects panel regression with robust standard errors.⁸ The empirical specification is based on a commonly used model, originally developed by Edwards (1984, 1986) and applied by Akitoby and Stratmann (2008) to secondary market sovereign bond spreads. Based on this derivation, the paper specifies:⁹

$$sov_{it} = \alpha + \beta rating_{it} + \lambda X_{it} + \delta_i + \eta_{it}, \quad i = 1, \dots, N, t = 1, \dots, T \quad (1)$$

Where sov_{it} denotes the log of sovereign spreads; α is a constant; $\beta rating_{it}$ is a vector of time-varying dummy variables for each rating grade, X_{it} is a vector containing control variables for macroeconomic factors and global conditions; δ_i are country fixed effects; and η_{it} represents disturbances that are independent across countries and time.

E. DATA AND ESTIMATION RESULTS

The regression analysis is based on a sample of 35 emerging market countries from December 1997 to February 2010. The paper uses end-of-period monthly observations of EMBI Global spreads for individual countries, drawn from Bloomberg. End-of-month long-term foreign currency sovereign credit ratings are collected for each country from Standard and Poor's, Moody's Services and Fitch Ratings, and averaged across the three agencies.¹⁰ Macroeconomic variables are drawn from the WEO database and global conditions variables are taken from Bloomberg.¹¹ Table 2 provides a description of the spreads data by country and rating.

⁸ Likelihood-ratio tests indicate the need to control for country-specific effects and Hausman specification tests suggest that the fixed effects model is appropriate. To account for possible endogeneity of credit ratings to sovereign spreads (as some may argue that actions by rating agencies are driven by markets), the rating dummies are lagged one period. Standard errors are clustered by country.

⁹ See the Appendix for the derivation.

¹⁰ The ratings do not differ significantly across the three main agencies. Investment and speculative grade status coincide across the three agencies for 94 percent of the all observations in the sample.

¹¹ Some of the macroeconomic data, such as real GDP growth and debt, are available on an annual basis and are interpolated to fit the monthly frequency.

Table 2. Data Description

	EMBI Spreads, Dec. 1997 - Feb. 2010			Sovereign Rating, as of Feb. 2010 ^{1/}
	Mean	Median	SD	
Total	398	343	335	BB+
By Country				
Argentina	699	614	396	CCC-
Brazil	607	520	376	BBB-
Bulgaria	393	255	307	BBB-
Chile	147	143	69	A+
China	110	99	55	A+
Colombia	435	425	206	BB+
Croatia	248	261	37	BBB-
Dominican Republic	606	483	397	B
Ecuador	981	822	392	CCC-
Egypt	183	132	131	BB+
El Salvador	307	275	146	BB
Hungary	110	75	106	BBB
Indonesia	322	278	167	BB
Jamaica	657	629	261	B-
Kazakhstan	611	479	343	BBB-
Lebanon	425	377	209	B
Lithuania	358	344	46	BBB
Malaysia	201	169	148	A-
Mexico	303	255	168	BBB
Morocco	380	391	245	BBB-
Pakistan	560	386	454	B-
Panama	340	351	121	BB+
Peru	411	408	207	BBB-
Philippines	403	415	145	BB-
Poland	158	168	91	A-
Russia	441	298	343	BBB
Serbia	367	293	238	BB
South Africa	248	230	142	BBB+
Sri Lanka	941	755	507	B
Thailand	155	128	128	BBB+
Tunisia	175	148	106	BBB
Turkey	458	376	242	BB
Ukraine	598	345	513	B-
Uruguay	492	357	329	BB-
Venezuela	791	834	388	B+
By Rating				
A	116	127	73	
BBB	232	231	168	
BB	366	354	197	
B	618	481	359	
CCC	971	677	425	
CC	829	610	446	

^{1/} Average sovereign long-term foreign currency rating across S&P, Moody's and Fitch.

Sources: Bloomberg, Standard and Poor's, Moody's Investor Services, Fitch Ratings, and authors' calculations

The model has high explanatory power, as illustrated in Figure 3, explaining about 80 percent of the variation in spreads. Table 3 presents the results of estimating equation (1) using fixed effects (column A). The table also shows that these results are robust to the use of different samples, such as: (i) shortening the time period to 2005-2010 to account for the compression of spreads in recent years (column B); and (ii) narrowing the group of countries to those at BBB or BB rating to eliminate the effect of countries at both ends of the rating scale (column C). Global financial conditions explain about 47 percent of the variation in spreads, while the rating dummies and domestic macroeconomic variables explain 32 percent. The results are broadly similar when using either 5 year or 10 year sovereign CDS spreads as the dependent variable.¹²

	Fixed Effects 2000-10	Fixed Effects 2005-10	Fixed Effects BBB/BB
	A	B	C
A+	-0.97 *** (0.26)	-1.50 *** (0.29)	
A	-1.05 *** (0.32)	-1.30 *** (0.31)	
A-	-0.93 *** (0.26)	-1.31 *** (0.28)	
BBB+	-0.70 *** (0.25)	-0.98 *** (0.29)	0.05 (0.11)
BBB	-0.57 ** (0.26)	-0.80 *** (0.28)	0.17 ** (0.08)
BBB-	-0.46 * (0.26)	-0.59 ** (0.28)	0.25 *** (0.08)
BB+	-0.36 (0.24)	-0.60 ** (0.26)	0.32 *** (0.11)
BB	-0.09 (0.21)	-0.25 (0.24)	0.55 *** (0.12)
BB-	-0.12 (0.21)	-0.18 (0.19)	0.61 *** (0.12)
B+	0.07 (0.20)	-0.15 (0.16)	0.65 *** (0.13)
B	0.09 (0.20)	-0.14 (0.14)	1.11 *** (0.13)
B-	0.28 (0.18)	0.07 (0.15)	0.46 *** (0.16)
CCC+	0.52 *** (0.16)	0.32 ** (0.12)	
CCC	0.50 ** (0.22)	0.37 *** (0.11)	
CCC-	0.05 (0.12)	0.04 (0.08)	
CC+	0.26 *** (0.08)	0.24 ** (0.09)	
CC	0.26 (0.18)	-0.02 (0.12)	
CC-	0.81 *** (0.19)	0.47 *** (0.12)	

¹² Results are available from the authors.

	Fixed Effects 2000-10	Fixed Effects 2005-10	Fixed Effects BBB/BB
	A	B	C
VIX	0.03 *** (0.00)	0.02 *** (0.00)	0.03 *** (0.00)
Fed Funds futures rate	-0.03 (0.02)	-0.10 * (0.05)	0.00 (0.02)
External public debt to GDP	0.02 *** (0.00)	0.03 *** (0.01)	-0.02 *** (0.00)
Domestic public debt to GDP	0.00 (0.00)	0.00 (0.01)	-0.01 (0.01)
Reserves to GDP	-0.01 *** (0.00)	-0.02 *** (0.00)	-0.01 ** (0.01)
Real GDP growth	-0.02 *** (0.01)	-0.01 (0.01)	-0.02 (0.01)
VIX*investment grade status	0.00 (0.00)	0.01 * (0.00)	0.01 * (0.00)
Fed Funds futures rate*investment grade status	0.06 (0.06)	0.02 (0.02)	0.01 (0.02)
External public debt to GDP*investment grade status	-0.01 *** (0.00)	-0.04 *** (0.01)	-0.02 *** (0.00)
Domestic public debt to GDP*investment grade status	-0.01 (0.00)	-0.01 (0.00)	-0.01 (0.00)
Reserves to GDP*investment grade status	0.02 *** (0.00)	0.03 *** (0.01)	0.02 *** (0.00)
Real GDP growth*investment grade status	-0.04 *** (0.01)	0.00 (0.01)	-0.03 *** (0.01)
Constant	5.19 *** (0.32)	5.45 *** (0.27)	4.70 *** (0.23)
Observations	3,636	1,842	2,129
R-squared	0.787	0.805	0.807
Number of countries	35	35	29

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1; Coefficients for year dummies are not shown for succinctness.

The estimated coefficients for the rating dummies corroborate the intuition that a move to investment grade status significantly reduces spreads. The coefficients on all investment grade rating dummies (A+ to BBB-) are significant and negative and show that, ceteris paribus, sovereigns with those rating grades enjoy spreads between 35–60 percent lower than the omitted group.¹³ In contrast, the BB and B rating dummies are not significant, and therefore have no estimated impact on spreads, all else equal. Furthermore, the coefficients for CCC ratings are significant and positive, with spreads about 65–70 percent higher on average than the omitted group. Overall, these findings confirm that investment grade status does provide countries with an additional seal of approval that is rewarded by markets with lower spreads—including by spurring greater inflows from institutional investors—while speculative grade ratings do not generally influence markets beyond country fundamentals.

¹³ The impact of each coefficient is calculated as $[\exp(\beta) - 1] * 100$.

The results also indicate that a movement across the investment grade threshold has a larger impact than movements within each asset class. A one-notch upgrade within the investment grade asset class reduces spreads between 5–10 percent, while a move from BB+ to BBB- would reduce spreads by 36 percent. Moreover, Wald tests show that even within the investment grade asset class, the coefficients for A+, A and A- are not statistically different from one another (although the coefficients for A grades are statistically different from those of BBB grades). As mentioned above, the coefficients for BB and B rating grades are insignificant, indicating that movements within these categories have no impact on spreads beyond macro fundamentals. By making distinctions across rating grades, these results contrast with previous studies that find that a one-notch upgrade at any point in the rating scale reduces spreads between 14 and 25 percent.

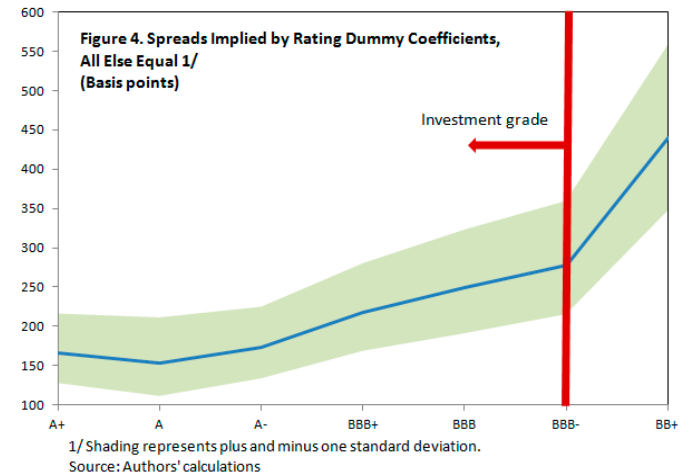
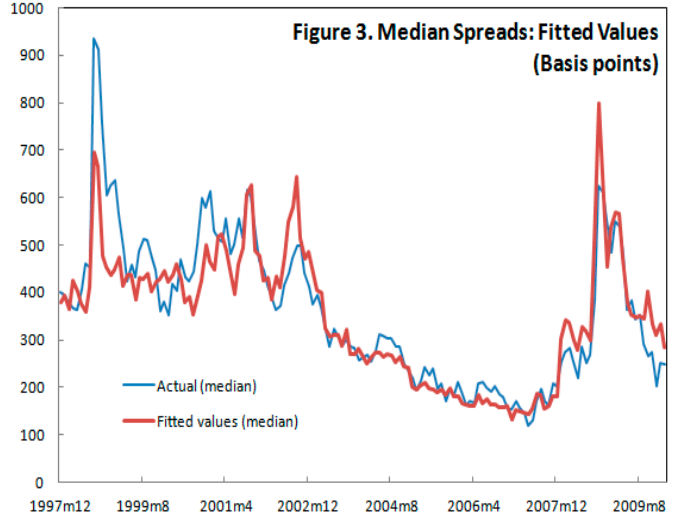
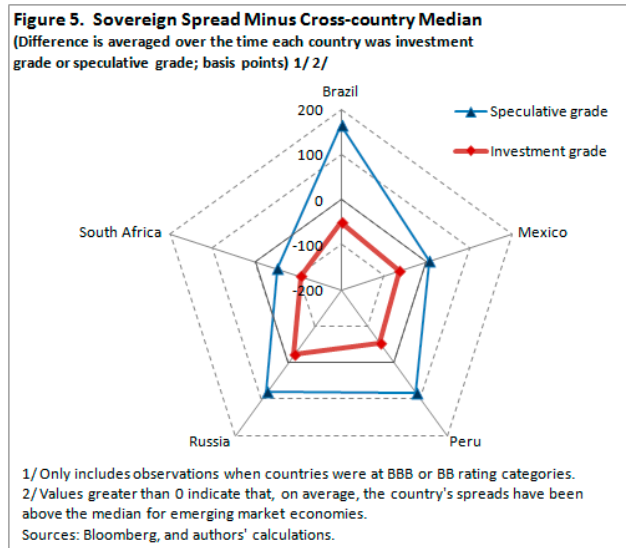


Figure 4 plots the effect of the different rating grades on spreads by translating them into basis points. If at a particular point in time a BB+ rated country has a spread of 440 basis points (average for speculative grade countries during 2010 Q1), a country at BBB- would have a spread of only 279 basis points, ceteris paribus, a difference of about 160 basis points. Figure 5 provides some flavor to these results through examples of countries that have been upgraded to investment grade. On average, the countries depicted had spreads 85 basis points above the emerging market median before the upgrade, and 55 basis points below the emerging market median after the upgrade, illustrating that the findings of the model are reasonable.



As expected, external factors play a central role in determining sovereign spreads, in particular international investors' appetite for risk. The coefficient for the VIX is significant and positive (the interaction term with investment grade is not significant), indicating that emerging markets spreads do suffer from shifts in international risk appetite. A one standard deviation increase in the VIX index (9 points) would raise spreads by 27 percent. The coefficient for the Fed Funds futures rate is not significant, in line with the findings of Kamin and von Kleist (1999), Sløk and Kennedy (2003), and Baldacci et al. (2008).

Even after accounting for credit ratings, markets are closely monitoring external debt developments. External public debt to GDP is significant and positive, though the impact is slightly lower for investment grade countries. Domestic debt to GDP is not significant. If external debt to GDP were to increase by 7 percentage points (one standard deviation for countries in the sample), spreads would increase by 17 percent for speculative grade countries, and 7 percent of investment grade countries. Evaluated at the median, a one standard deviation increase in external debt to GDP would raise spreads by 59 basis points for countries at BBB and by 16 basis points for countries at BB. Overall, these results indicate that markets rely on the information provided by rating agencies, but are closely monitoring other indicators looking for possible delays in rating changes. This implies that investment grade countries have a little more leeway, but will nonetheless be punished by markets if external debt increases abruptly.

The effects of other macroeconomic variables differ by asset class. The coefficient on reserves to GDP is significant and negative for speculative grade countries, but has no impact for investment grade countries once the interaction term is accounted for. If reserves to GDP were to increase by 4 percentage points (one standard deviation), spreads would fall by 4 percent, implying a 14 basis point reduction if evaluated at the median of BBB rated countries. The coefficient for real GDP growth is significant and negative, more so for investment grade countries. If real GDP growth were to improve by 2 percentage points (one standard deviation), spreads would fall by 4 percent for speculative grade countries and 10 percent for investment grade countries. Evaluated at the median, a one standard deviation increase in real GDP growth would reduce spreads by 13 basis points for countries at BBB and by 24 basis points for countries at BB.

F. SUMMARY AND CONCLUSIONS

The empirical evidence shows that investment grade status reduces financing costs significantly, including by improving market expectations and encouraging greater inflows from a broader and more diversified investor base. Using a panel dataset for 35 emerging market economies for the period 1997-2010, the analysis for sovereign spreads is based on a fixed effects model with robust standard errors. Econometric results indicate that reaching investment grade lowers sovereign spreads by 36 percent, above and beyond what is implied by macroeconomic fundamentals. This compares to a 5-10 percent reduction in spreads following rating upgrades within the investment grade asset class, and no impact for movements within the speculative grade asset class, *ceteris paribus*. Translated into basis points, this implies that the spreads of a BBB- rated country would be 160 basis points lower than those of a BB+ rated country with a spread of 440 basis points.

While global financial conditions play a central role in determining spreads, lower external public debt to GDP levels and higher domestic growth rates help improve market sentiment. Stronger real GDP growth helps reduce borrowing costs, while higher international reserves lead to lower spreads only in the case of speculative grade countries. External debt to GDP levels have the highest impact on spreads, especially for lower rated sovereigns. These results underscore the importance of debt reduction efforts by speculative grade countries. These findings also imply that investment grade countries have some flexibility but will ultimately be held accountable by markets if their debt levels do not stay in check. In a similar line, countries that are able to strengthen their fiscal positions could be doubly rewarded by a possible rating upgrade and by improved market sentiment.

REFERENCES

- Akitoby, B. and T. Stratmann (2008), “Fiscal Policy and Financial Markets,” *The Economic Journal*, 118, November.
- Arora, V. and M. Cerisola (2000), “How Does U.S. Monetary Policy Influence Economic Conditions in Emergin Markets?” *IMF Working Paper* No. 00/148.
- Baldacci, E., G. Sanjeev, and A. Mati (2008), “Is It (Still) Mostly Fiscal? Determinants of Sovereign Spreads in Emerging Markets”, *IMF Working Paper* 08/259.
- Cantor, R. and F. Packer (1996), “Determinants and Impact of Sovereign Credit Ratings,” Federal Reserve Bank of New York *Economic Policy Review*, September.
- Cavallo, E. A. Powell, and R. Rigobon (2008), “Do Credit Rating Agencies Add Value? Evidence from the Sovereign Rating Business Institutions,” *IADB Research Department Working Papers* 647, November.
- Edwards, S. (1984), “LDC’s foreign borrowing and default risk: an empirical investigation,” *American Economic Review*, vol. 74(4), pp. 726–34.
- Edwards, S. (1986), “The Pricing of Bonds and Bank Loans in International Markets: An Empirical Analysis of Developing Countries’ Foreign Borrowing,” *European Economic Review*, vol. 30(3), pp. 565–89.
- Eichengreen, B. and A. Mody (1998), “What Explains Changing Spreads on Emerging-Market Debt: Fundamentals or Market Sentiment?”, NBER Working Paper 6408.
- Gonzalez-Rozada, M. and E. Levy Yeyati (2008), “Global Factors and Emerging Market Spreads”, *The Economic Journal*, 118.
- Hartelius, K., K. Kashiwase, and L.E. Kodres (2008), “Emerging Market Spread Compression: Is it Real or is it Liquidity?” *IMF Working Paper* 08/10.
- International Monetary Fund (2010), *Global Financial Stability Report*, October 2010: Sovereigns, Funding, and Systemic Liquidity .
- Jaramillo, L. (2010), “Determinants of Investment Grade status in Emerging Markets” *IMF Working Paper* 10/117.
- Kamin, S. and K. von Kleist (1999), “The Evolution and Determinants of Emerging Market Credit Spreads in the 1990s” *BIS Working Paper* 68, May.
- Kaminsky, G. and S. Schmukler (2002), “Emerging market Instability: Do Sovereign Ratings Affect Country Risk and Stock Returns?” *The World Bank Economic Review*, Vol. 16, No. 2, pp. 171–195.

McGuire, P. and M. Schrijvers (2003), “Common Factors in Emerging Market Spreads,” *BIS Quarterly Review*.

Rigobon, R. (2002), “The Curse of Non-investment Grade Countries,” *Journal of Development Economics* 69, pp. 423–449.

Sløk, T. and M. Kennedy (2004), “Factors Driving Risk Premia” *OECD Working Paper* No. 385.

Sy, A. (2002), “Emerging Market Bond Spreads and Sovereign Credit Ratings: Reconciling Market Views with Economic Fundamentals,” *Emerging Markets Review* 3, pp. 380–408.

Uribe, M., and V.Z. Yue (2006), “Country Spreads and Emerging Countries: Who drives Whom?” *Journal of International Economics* 69, pp. 6–36.

APPENDIX

This appendix presents the derivation of a spread equation using the model developed by Edwards (1984, 1986) and applied by Akitoby and Stratmann (2008).

A risk-neutral investor lends to a given country that is a price-taker in the world capital market. The equilibrium condition for the optimal allocation of the investor's portfolio is expressed as:

$$(1 + r^*) = \phi\omega + (1 - \phi)(1 + r^L) \quad (\text{A.1})$$

Where r^* is the risk-free world interest rate; ϕ is the probability of default; ω is the payment made by the borrower to the lender in the default state and r^L is the lending rate.

Equation (A.1) implies that the spread over the risk free rate $r^L - r^*$ denoted s is given by:

$$s = \frac{\phi}{1 - \phi}(1 + r^* - \omega) \quad (\text{A.2})$$

According to standard practice, a logistic form for the probability of default is specified:

$$\phi = \frac{\exp\left(\sum_{k=1}^n \beta_k Z_k\right)}{1 + \exp\left(\sum_{k=1}^n \beta_k Z_k\right)} \quad (\text{A.3})$$

where Z_k are determinants of the probability of default and β_k are the corresponding coefficients. By combining equations (A.2) and (A.3), taking the natural logarithm, and setting ω to zero (without loss of generality), the resulting equation is written as:

$$\ln s = \ln(1 + r^*) + \sum_{k=1}^n \beta_k Z_k \quad (\text{A.4})$$

By adding the country and time dimensions, and allowing for fixed effects, the stochastic model to be estimated is given by:

$$\ln s_{it} = \ln(1 + r^*) + \gamma Z_{it} + \delta_i + \eta_{it} \quad (\text{A.5})$$

where s_{it} is the secondary market spread over the risk-free world interest rate in country i at time t ; δ_i is a country fixed effect; and η_{it} is a Gaussian error term.