



Credit cycle dependent spread determinants in emerging sovereign debt markets[☆]

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ABSTRACT

We address credit cycle dependent sovereign credit risk determinants. In our model, the spread determinants' magnitude is conditional on an unobservable endogenous sovereign credit cycle as represented by the underlying state of a Markov regime switching process. Our explanatory variables are motivated in the tradition of structural credit risk models and include changes in asset prices, interest rates, implied market volatility, gold price changes and foreign exchange rates. We examine daily frequency variations of U.S. dollar denominated Eurobond credit spreads of four major Latin American sovereign bond issuers (Brazil, Colombia, Mexico and Venezuela) with liquid bond markets during March 2000 to June 2011. We find that spread determinants are statistically significant and consistent with theory, while their magnitude remarkably varies with the state of the credit cycle. Crisis states are characterized by high spread change uncertainty and high sensitivities with respect to the spread change determinants. We further document that not only changes of local currencies, but also changes of the Euro with respect to the U.S. dollar are significant spread drivers and argue that this is consistent with the sovereigns' ability to pay.

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1. Introduction

The behavior of emerging market sovereign spreads—e.g. during the 1982 and 1995 Mexican crises, the 1997 Asian, the 1998 Russian and the 2001 Argentine crisis—repeatedly raised considerable concerns

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among financial institutions, central bankers, as well as investors worldwide. While various sovereign spread determinants were proposed in the literature, the magnitude and the impact of financial risk factors on emerging market spreads are not yet fully understood. Most of the previous work on the determinants of credit spreads addresses unconditional determinants.¹ However, there is evidence that spread determinants exhibit varying significance during time, which may relate to the state of the underlying credit cycle.² Due to institutional shifts and other instabilities in emerging markets (see e.g. [Bekaert and Harvey, 2003](#)) and the particular features of emerging markets bonds (see [Erb et al., 2000](#)) it is sovereign debt markets in particular, which are prone to time-variation. The highly indebted Latin American economies, which are dominant representatives of emerging market sovereign debt, therefore appear as natural candidates for an examination of the stability of spread determinants.

Given the setting above, we provide further insight into the determinants of sovereign spread changes in Latin American emerging market economies. To this aim, we address spread changes conditional on an unobservable state of an endogenous credit cycle. In our model, sovereign spread determinants may exhibit differing significance and sign conditional on the state of this cycle. The feature is captured by modeling daily spread changes in a Markov regime switching framework given a set of explanatory variables (see e.g. [Ang and Bekaert, 2002](#); [Hamilton, 1990](#)). Our modeling approach considers financial market spread determinants, which are derived in the tradition of the [Merton \(1974\)](#) structural model of default. Structural models predict that asset and interest rate factors are the key determinants of credit spreads. Of course, the causes and consequences of default in the sovereign setting differ from those in the corporate setting. Institutional arrangements and bankruptcy laws are typically ambiguous and political issues may govern defaults in sovereign settings. Still, understanding which variables relate to changes in sovereign spreads and understanding the underlying credit cycle dynamics remains a challenging task in the pricing process of sovereign bonds. Previous studies of sovereign bonds, which address this area include for example [Claessens and Pennacchi \(1996\)](#), [Westphalen \(2001\)](#), [Chan-Lau and Kim \(2004\)](#), [Keswani \(2005\)](#), [Batten et al. \(2006\)](#), [Diaz Weigel and Gemmill \(2006\)](#), [Gray et al. \(2007\)](#), [Gapen et al. \(2008\)](#) and [Galai et al. \(2011\)](#).³

As [Bekaert and Harvey \(2003\)](#) point out, emerging equity markets have gained much more research attention than emerging bond markets. This is somewhat surprising given today's economic relevancy of Latin American sovereign issuers and the fact that Latin American lending had already become widespread in the mid 19th century. The region continues to be the dominant issuer of international bonds among emerging market issuers. As such, e.g. according to [BIS \(2011\)](#) statistics, Latin America accounts for about 35% of the total of emerging markets outstanding international bonds and notes. The region's reliance on external debt financing makes its debt markets highly sensitive to international capital flows and to credit events in particular. For example, following the 2001 Argentine default up to mid 2002, Latin American countries including Brazil suffered from limited debt market access. More recently, [IMF \(2011\)](#) (p. 35–40) reports that emerging market economies including Latin America face new challenges associated with rapid credit growth and large capital inflows. We examine bond issues by four leading Latin American sovereign issuers, namely Brazil, Colombia, Mexico and Venezuela. These countries maintain the most liquid bond markets in the region and—given [BIS \(2011\)](#) December 2010 bond market statistics—represent nearly 70% of the outstanding Latin American debt of 405.7 billion U.S. dollars.

¹ The broadest literature is on corporate bonds and includes [Collin-Dufresne et al. \(2001\)](#) and [Bakshi et al. \(2006\)](#), among many others. Previous work on sovereign bond spreads includes [Eichengreen and Mody \(1998\)](#), [Kamin and Kleist \(1999\)](#), [Erb et al. \(2000\)](#), [Westphalen \(2001\)](#), [Duffie et al. \(2003\)](#), [Chan-Lau and Kim \(2004\)](#), [Keswani \(2005\)](#), [Batten et al. \(2006\)](#), [Diaz Weigel and Gemmill \(2006\)](#), [Gray et al. \(2007\)](#), [Hilscher and Nosbusch \(2010\)](#) and [Longstaff et al. \(2011\)](#) and [Comelli \(2012\)](#), among others.

² The existence of a common sovereign risk factor is discussed for example in [González-Rozada and Levy-Yeyati \(2008\)](#), [Keswani \(2005\)](#) and [Longstaff et al. \(2011\)](#). Time-varying credit risk determinants based on switching regimes were studied by [Alexander and Kaeck \(2007\)](#), [Chun et al. \(2010\)](#) and [Davies \(2004\)](#). [Comelli \(2012\)](#) and [Schreiber et al. \(2012\)](#) report that spread determinant relations differ between crisis and non-crisis periods. [Collin-Dufresne et al. \(2001\)](#) point out that changes in the expected recovery rate should be a function of changes in the overall business climate.

³ Two alternative branches of the literature on sovereign bond pricing may be noted here. First is research with a focus on the likelihood of default, which also includes the effects of political factors including loss of reputation, restructuring options and the lenders ability to punish the borrower. [Duffie et al. \(2003\)](#) is an example of an intensity based model in this area. Second is research that examines the relationship between fundamental macroeconomic or country specific variables and the magnitude of sovereign spreads, see e.g. [Comelli \(2012\)](#), [Eichengreen and Mody \(1998\)](#), [Erb et al. \(2000\)](#), [Hilscher and Nosbusch \(2010\)](#) and [Kamin and Kleist \(1999\)](#).

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