Categories, Creditworthiness and Contagion: How Investors' Shortcuts Affect Sovereign Debt Markets

Sarah Brooks[‡], Raphael da Cunha[‡], Layna Mosley[†]

[‡] Ohio State University
[†]University of North Carolina, Chapel Hill

What determines the prices that governments pay to access international capital markets? Sovereign borrowers have long differed in their abilities to access credit markets, in terms of interest rates as well as debt maturities and currency denominations. The interest rates paid by governments are influenced heavily by country-specific factors such as inflation and the debt burden; risk premiums also can reflect the ideology of the governing party, the degree of democratic governance (Archer et al 2007, Saiegh 2005, Vaaler et al 2006), or the occurrence of elections (Bechtel 2009, Hardie 2006, Jensen and Schmith 2005, Spanakos and Renno 2009). Moreover, global market conditions affect governments' access to financing: high global liquidity and risk acceptance allows for easier access, all else equal; system-wide risk aversion or capital shortages result in more expensive access and perhaps, even, credit rationing.

Recent research on financial market-government relations establishes that different types of governments—for instance, developed versus developing nations; commodity versus manufacturing exporters; or governments that borrow from commercial banks versus from bond markets—are differently constrained by global capital markets (Campello 2012, Mosley 2003, Kaplan 2012, Wibbels 2006). But, within the sovereign credit markets, scant attention has been paid to the fact that professional investors sort sovereign borrowers into distinct categories. We argue that these categorizations, which serve as heuristic devices for investors, are an important determinant of governments' cost of borrowing. Investors' country categorizations render sovereign credit risk interdependent; governments' ability to borrow depends not only on what they do, but also on what their peers do.

Recent events in Europe serve to illustrate peer group effects. Investors' changing categorizations of peripheral EU member states—from "emerging Europe" in the 1990s to "eurozone" in the 2000s to "PIIGS" in the 2010s—are associated with shrinking or widening risk premiums, over and above country-specific outcomes. Although changes in European governments' risk premiums were partly the result of shifts in economic fundamentals—fiscal burdens expanded markedly throughout Europe in the way of 2008's banking crises, bursting real estate bubbles and recessions—we posit that they also reflect shifts in how investors sort countries into groups. When investors are more optimistic about a given group of countries, each country in that group will experience an improvement in market access. But when investors are more pessimistic about a particularly set of countries, every borrower in that category may suffer—even if the country's fundamentals do not warrant such pessimism.

Hence, a sovereign borrower with "responsible, risk-free" peers may be treated differently, all else equal, than one with "frontier market, risky" peers. A country with the same general economic and political profile therefore will be treated differently depending on its categorization. Turkey will be evaluated differently when it is placed in "emerging Europe" or among "future EU members," rather than as a member of "Middle East/North Africa," "West Asia" or "emerging markets." Similarly, Brazil may have been assessed quite differently as it came to be known as one of the high-growth "BRIC" countries, compared to when it was lumped alongside other Latin American countries with legacies of past defaults and difficulties borrowing in their own currencies (Eichengreen, Hausmann and Panizza 2003).

This article assesses the effect of a country's category, and the behavior of other countries in that category, on the risk premiums paid by sovereign borrowers. Our statistical analyses lend evidence to the claim that ostensibly "sovereign" risk evaluations are in fact to some degree interdependent, as peer group effects offer a significant source of the variation in market constraints.

Analysis of credit default swap prices and sovereign credit spreads for 26 countries from 2000-2010 shows that the risk premium on a given country's sovereign debt is predicted not only by its own fundamentals, but also by market assessments of other countries with which it is categorized. Hence, the way in which professional investors conceptualize and categorize individual sovereign borrowers can affect governments' capacity to access capital markets. "Peer group effects," for instance, allow financial crises—or, at least, higher risk premiums—to spread within groups of countries, sometimes affecting borrowers that have experienced few changes in their objective circumstances. And these effects can persist over a number of years.

Moreover, the peer group effects we observe occur in non-crisis, as well as crisis, periods. Short-term changes may disrupt these equilibria, but the long-term correlations are variously restored and, in many instances, persist over several months and years. These results force us to reconsider the extent to which sovereign debt markets are indeed "sovereign," and whether we can treat such market responses to government actions as independent of such responses to events lying well beyond the nation's borders. Indeed, our results suggest another way in which governments fall victim to market "push factors" which emanate from beyond their borders.

I. Investors, Sovereign Borrowing and Government Policies

The contemporary era of financial globalization presents governments with opportunities as well as constraints.[1] Reduced barriers to cross-border capital flows offer governments—as well as their citizens and firms—access to a much wider set of potential investors. These investors, which include banks, mutual funds, official entities (such as foreign central banks) and individual (retail) investors, provide capital that allows governments to issue debt, finance their fiscal policies, and smooth consumption. Access to global capital markets, however, comes with a cost: in order to

[1] On the determinants of capital account liberalization, see Brooks 2004, Brooks and Kurtz 2007, Mukherjee and Singer 2010, Quinn and Toyoda 2007, Simmons and Elkins 2004.

maintain access at favorable rates of interest, governments attend to the preferences of international investors.

Because investors are concerned with minimizing the risk of sovereign default and the loss of real value of their assets (Bernhard and Leblang 2006, Mosley 2003, Tomz 2007), they assess the prospects for future inflation (which may be affected by current monetary policy, the institutional structure of monetary institutions, and the level of public debt), as well as the willingness and ability of governments to repay their obligations. As such, investors could pressure borrowing governments to pursue monetary restraint, limit debt levels and, in some instances, enact neoliberal-oriented reforms. This "golden straightjacket" (Friedman 2005) still allows governments to do many things ("golden," then), but requires them to foreswear a swath of "big government" policies (the "straightjacket").

The logic of capital market constraints implies a cross-national, downward convergence of government policy choices and outcomes, in which governments privilege the need to satisfy international investors over domestic policy preferences and demands, and in which cross-national diversity in government policies is eliminated. Empirical analyses of the convergence prediction, however, have suggested that the power of market actors vis-à-vis governments is often limited. Much cross-national diversity in economic and social policies persists, even as governments have become more similar in terms of overall monetary and fiscal policy outcomes (Mosley 2003, Wibbels 2006). Even among developing countries, the pressures generated by financial openness often do not overwhelm the impact of domestic institutions and ideology (Avelino et al 2005, Brooks 2009, Plümper et al 2009).

At the same time, scholarship on financial market-government relations finds that investors' assessments of sovereign borrowers vary both across groups of countries and over time. Developed and developing nations are treated differently by investors, even when their economic fundamentals

are similar (Mosley 2005). During most of the contemporary era of financial globalization, investors have assumed that wealthy, established democracies are very unlikely to default on their sovereign obligations. As a result, investors looked only at overall macroeconomic outcomes when deciding whether to invest (and at what price). And because developed countries were free from the "original sin" that tainted emerging market sovereign debt (Eichengreen et al 2005), governments of developed democracies could borrow in their own currencies, and at relatively long maturities. These features served to insulate such governments somewhat from shifts in market sentiment, and they facilitated continued cross-national divergence in many policy areas. Fiscal deficits that would be treated as "excessive" in the context of Latin America, for example, sometimes were taken as more "normal" among European countries. A "developed nation discount" existed in private capital markets: where investors placed a country ("developed," "emerged," "emerging") helped to determine its access to global capital markets.

In developing nations, however, default risk remained of central concern to investors. Many low and middle income countries were tainted not only by being labeled "developing," but also more specifically by the legacy of debt accumulation and debt crises. In the post-structural adjustment era of the 1990s, these governments were able to access international capital markets, but they did so with much greater scrutiny. Investors worried about default and currency, as well as inflation, risk; this meant sustained attention to a wide array of government policies (a "broad" financial market constraint; see Hardie 2006) as well as the frequent need to borrow in foreign currencies and at shorter maturities. Financial flows were more volatile than those to rich countries, and, in terms of cross-national convergence, economic globalization was associated with reductions in public spending (Rudra 2008, Wibbels 2006).

Cross-country variation in financial market pressures also results from the extent to which and the way in which governments access capital markets. Certainly, governments that borrow less

from private capital markets—perhaps, for instance, because they are natural resource exporters and therefore have fewer financing needs (Campello 2012)—are less exposed to pressures from investors. Additionally, if bank lenders evaluate sovereign borrowers less stringently than do portfolio market lenders (see Devlin 1989, Kaplan 2012), then those governments that rely more heavily on bond market-based financing will be more constrained. And, in terms of debt management, governments with longer-term, domestic currency-denominated debt are less exposed to rollover and currency risk than are governments whose debt is shorter-term and foreign-currency denominated. Although recent research has begun to investigate these more subtle variations in financial market-government relations, much work remains to be done.

Turning to variation over time in financial market pressures, recent financial history suggests that investors' appetite for risk ebbs and flows. When global liquidity is higher, investors are more risk acceptant, and the premiums they charge for "suboptimal" government policies are smaller. Investors are more willing to invest in high-risk, high-return locations, and governments will have easier access to sovereign finance—as in 2006 and 2007, when many governments of low-income countries issued internationally-rated bonds for the first time. Such global liquidity booms serve to increase governments' autonomy vis-à-vis capital markets (Campello 2012). When global liquidity is lower, however, investors behave more cautiously, perhaps even tending toward panic (Kindleberger 1978). Investors seek low-risk, low-return assets, and they exact large penalties for policies and events that appear to increase the risk of default. At the extreme, investors' "flight to quality" leads to credit rationing for riskier sovereign borrowers. In the wake of the Latin American debt crisis of the 1980s as well as the Asian financial crisis of 1997-1998, risk aversion was a hallmark of global capital markets.

Variation over time in global market conditions means that the (interest rate and credit access) costs associated with a given policy (for instance, a high level of debt, or a generous public

pension system) also vary over time. When global liquidity is high, even borrowers with "questionable" policies can get credit at low rates of interest. But, in periods of low liquidity, even the "prettiest" (to invoke Keynes' "beauty contest" analogy) borrowers may find themselves unable to tap global credit markets. The mood of global markets affects developing nations more than their developed country counterparts: for developing nations, "push" (external) factors often are as important as, if not more important than, country-specific ("pull") factors in determining the cost and availability of financing (Eichengreen and Mody 2000).

While scholars of international political economy have noted the variation over time and across groups of countries in how investors evaluate sovereign borrowers, extant research has not yet explored the precise ways in which this variation affects the capacity of governments to act vis-à-vis capital markets. Variation in market constraints across groups of countries suggests that governments will be more or less constrained by virtue of the groups into which they are placed. The "original sin" argument, for instance, implies that countries that are labeled "developing" will have difficulty accessing markets, particularly at longer maturities and in their domestic currencies. The assumption underlying "original sin," though, is that being classified as "developing" is completely endogenous to economic and political fundamentals. Yet, beyond noting the differences in developed and developing nations, scholars have done little to explore the effects of changes in categorizations on sovereign access to credit, or the mechanisms by which investment professionals classify and reclassify countries.

II. Country Categorizations and Peer Group Effects

An extensive body of empirical and theoretical research has shown that economic agents' cognitive traits help explain how and why economic behavior—as evidenced in asset prices—systematically deviates from the axioms of expected utility theory (Camerer 1995, Stracca 2004, 375).

Research in behavioral finance draws upon studies of bounded rationality (Conlisk 1996, Simon 1955, 2000), in which limitations on computational and information-processing capabilities lead agents to rely on decision heuristics—or cognitive shortcuts—to solve complex problems of choice and judgment (Quattrone and Tversky 1988). One such heuristic is category-based reasoning. Social psychologists have shown that categorization is a cognitive shortcut through which individuals associate groups with a given set of characteristics in order to make sense of a complex environment (Taylor 1981, Wilder 1986). Categorization serves to accentuate perceived differences between groups and to minimize perceived differences within groups (McGarty and Penny 1988, Tajfel and Wilkes 1963).

We therefore propose that sovereign risk evaluations are interdependent, because of the tendency for market actors to rely on country categories to assess the riskiness of a particular asset. Categorization, we posit, operates as a cognitive shortcut through which market actors cope with the abundance of information available about sovereign creditworthiness across a highly diversified portfolio. Indeed, the professional investors who purchase sovereign debt, either at the time of issue or in secondary markets, often manage portfolios that include a range of asset types—not only sovereign debt, but also corporate debt, equities, derivatives and cash—and they often invest in a range of locations. Given investors' need to compare across numerous countries, multiple instruments, and dozens of individual issues, they often are forced to rely on information shortcuts. For instance, investment professionals may use outcomes on and trends in main macroeconomic indicators—budget deficits, debt and inflation—as indicative of a country's investment risk. Reliance on a limited set of indicators is common practice when assessing sovereign debt issued by advanced democracies, where investors have assumed (until the Great Recession and the subsequent European debt crisis, at least) that default was a very distant possibility. When evaluating developing country issuers of debt, however, investment professionals look at a broader set of indicators,

including supply-side policies, elections and government ideology, as well as macroeconomic outcomes (Mosley 2003).

Although previous research establishes the importance of country-specific events and policies, as well as global market liquidity and attitudes, to sovereign risk assessments (e.g. Campello 2012), we draw attention to an intermediate level of influences. In their assessments of a specific sovereign borrower, investors are more sensitive to what is happening in that borrower's "neighborhood" than they are to what happens in the world as a whole. We expect country categories are meaningful, above and beyond the economic and political characteristics that may typically be associated with them; even if a country is placed in a category for reasons related to its policy profile (so that categories might seem endogenous to country characteristics), the stickiness of these categories and the diversity of countries within these categories render such peer group classifications important in a way that goes beyond economic fundamentals.

As a result, contagion—of enthusiasm or of pessimism—occurs not only at the global level (as many observers have suggested) but also at the peer group level. For example, when a crisis prompts private investors or credit ratings agencies to reassess similar borrowers, it is borrowers in the same category—rather than sovereign borrowers generally—who are reassessed. These peer groups, and the contagion they facilitate, may be geographic (as in the East Asian financial crisis of the late 1990s), or they may be based on structural position in the world economy (commodity exporters, emerging markets). Crucially, such interdependence is not confined only to times of crisis or panic, nor merely a symptom of declining risk appetites. Rather, contagion of sovereign risk assessments may occur throughout the global liquidity cycle, as part of a long-run equilibrium among countries of the same category.

One striking fact about peer effects is that country categorizations can be quite sticky over time. In the mid- to late 1990s, those governments that were assumed to be poised for EMU

membership benefited from a virtuous circle, based on a recategorization from "emerging Europe" to "Europe" or "developed country." Interest rate premiums declined, allowing debt to be serviced more cheaply, facilitating the reduction in overall levels of debt, and additional declines in risk premiums. The declines appeared to be over and above what would be produced from improvements in macroeconomic outcomes alone (like inflation and fiscal balances), although that certainly was part of the dynamic (see Gray 2009).

In the next section, we provide a preliminary test of our hypothesis in data that allow us to estimate whether commonalities among countries in market risk assessments are merely episodic responses to crisis or changes in global liquidity, or whether they represent persistent, long-term interdependencies in the relationship between global capital and groups of national governments. Because professional investors rely on a variety of categorization schemes, we estimate peer group effects in several ways: on the basis of geographic region; level of economic and market development (e.g. developed market, emerging market, frontier market); and credit quality (countries that are in the same, or similar, sovereign ratings categories).

III. Data and Empirical Model

Dependent Variables. To gauge market responses to national government policies, we employ two measures of sovereign risk. The first is the sovereign spread, the difference between the yield on a given country's government debt and (what is considered to be) a risk-free government bond of an equivalent duration (*Spread*). Sovereign spreads capture both the expected losses from default as well as the risk associated with the possibility of unexpected losses (Remolona et al. 2007). Sovereign spreads are widely employed in analyses of sovereign credit risk to capture the market evaluation of the creditworthiness of a government (Block and Vaaler 2004; Obstfeld and Taylor 2003). Higher sovereign spreads also are correlated with lower sovereign risk ratings (Cantor and

Packer 1996; Kaminsky and Schmukler 2002). We use measures of annual and monthly stripped spreads from the principal index of emerging market debt prices, the JP Morgan EMBI Global Bond Index, for 26 countries from 2001–2010.[2]

Our second dependent variable is based on credit default swap (CDS) contracts on external sovereign debt. The CDS is an important type of credit derivative through which investors hedge the risk of default or of restructuring on fixed income investments. In essence, a CDS is an insurance policy for corporate or sovereign debt. In a typical CDS contract, the purchaser of default protection pays a fee to the seller (the insurer) during the term of the CDS contract. If the issuer (here, the government) defaults or restructures its debt, the seller of the CDS compensates the buyer (Longstaff 2011, Mengle 2007). By capturing the premium that investors will pay to hedge against default risk, CDS prices approximate the market perception of the creditworthiness of sovereign borrowers. Moreover, CDS markets are more liquid than sovereign debt markets; they may more closely approximate the perception of risk associated with government borrowing at any given time (Longstaff et al. 2011). We examine a set of monthly CDS prices for a 26 developed and developing countries from October 2000 to January 2010.

Independent Variables. We regress our two measures of sovereign risk on an array of domestic and global variables that capture the established determinants of sovereign risk. At the domestic level, scholars have found that defaults are closely associated with the state of the domestic economy (Grossman and Van Huyck 1988). Domestic macroeconomic and government financing variables also are among the principal determinants of sovereign risk ratings (Archer et al 2007, Cantor and Packer 1996). We therefore include the following domestic economic variables in our analyses: government consumption, the ratio of sovereign debt to gross national income, the average

[2] By definition, the EMBI indices include only emerging (not developed) markets with sufficiently liquid public debt issues. A bond's stripped spread adjusts the market price of the bond by subtracting (stripping) the present value of the collateralized cash flows from the price of the bond. The appendix provides a complete list of variable definitions and sources.

maturity on new external debt commitments, the budget balance, and inflation. We also include a measure of capital account openness; this may signal to investors the extent to which a government is willing to subject itself to the 'discipline' of capital flight (Bartolini and Drazen 1997). An open capital account also expands a government's access to funds, which also would suggest that more open countries will pay borrowing costs.

In addition, we include an array of political variables that have been found to affect market risk assessments. These include the level of democracy, the partisanship of the executive and of the largest opposition party, the year in the electoral cycle (proximity to the next election), and whether the country's electoral institutions are presidential or parliamentary (Bernhard and Leblang 2006, Biglaiser and DeRouen 2007, Freeman et al 2000, Saiegh 2005).

Moreover, we account for global market factors, as we anticipate that these will affect country spreads. These international measures include the U.S. prime lending rate, which should have a negative impact on investors' demand for emerging market debt: as interest rates in the U.S. rise, global liquidity declines, as do the risk appetites of international market actors (Eichengreen and Mody 1998, Kaminsky and Schmuckler 2002). Along these lines, we also control for the change in yields on US Treasury bonds, which may indicate shifts in US growth, and hence in the global business cycle, as well as flight to-quality dynamics (Longstaff et al. 2011). And we include a measure of US stock market returns, since bond spreads for developing nations have been shown to co-vary with US stock market volatility (Pan and Singleton 2008).

Interdependence in Sovereign Risk. The country-specific and global factors, discussed above as independent variables, have been shown to have long-term correspondence to sovereign risk premiums (Mosley 2003, Tomz 2007). These equilibrium relationships may be disturbed by common shocks such as regional crises or global liquidity booms. Indeed, Longstaff and colleagues

report that credit spreads reveal a high level of commonality over time (2011: 76). It is possible that co-movements in sovereign spreads are only temporary: a country's risk profile is disrupted, and influenced by those of its peers, during exceptional market conditions, but then returns to its long-term equilibrium as the market settles. As such, the interdependencies would be exceptional and temporary, as well-known episodes of contagion suggest.

We hypothesize, however, that co-movements in sovereign risk are a regular, long-term feature of capital markets: there are persistent interdependencies in the ways that investors assess sovereign borrowers. That is, investors' evaluations of one country are shaped by evaluations of other countries with which that nation is categorized; country risk evaluations covary over the long term among countries that share a category, such as "emerging markets" or "AAA-rated sovereign borrowers." As such, the assumption of independence in sovereign risk that characterizes scholarship in international political economy would need to be revisited: it is not only that governments may lose "room to move" because of financial openness generally (Mosley 2003), but also that they may lose autonomy specifically because of what happens elsewhere in their peer group.

We therefore test whether, net of domestic and global variables, the risk premiums attached to sovereign debt—and hence the price and possibility for fiscal autonomy—are interdependent across countries. We treat interdependencies in market evaluations of sovereign creditworthiness as a type of diffusion process. Diffusion processes indicate that outcomes in one country are affected systematically by the outcomes of commensurate processes in other countries. Increasingly, scholars have treated cross-national diffusion as a form of spatial autocorrelation, rather than merely a spatial error term (Franzese and Hays 2007). Such an approach seeks to model interdependencies in theoretically-relevant ways rather than simply treating contemporaneous correlations among countries' risk spreads as a nuisance.

This approach turns our attention to identifying the basis of commonalities in market actors' assessments of sovereign borrowers. We model the interdependence in market responses as the weighted average of the outcome variable—CDS prices and bond spreads—among "proximate" nations, where proximity is defined (see below) by four theoretically-relevant categories rather than only by geographical distance (Beck, Gleditsch, and Beardsley 2006). We follow the standard model for estimating the presence of diffusion in the term $\rho(WY)_{it-1}$, wherein the W matrix specifies which countries' risk evaluations are expected to influence that of country *i* at time *t*. Crucial to this task is the creation of a matrix of weights that captures the influence that market responses to one category of 'sending' countries will have on the receiving nation. The coefficient on the spatial lag, ρ, permits us to answer the question of how membership in different peer groups or categories affects the standing of a sovereign government in the eyes of international bond market actors, net of the array of features (country-specific and global market-specific) that may directly affect that market evaluation.

We specify a series of spatial weights matrices, **W**, to operationalize four potentially relevant types of groups into which professional investors sort borrowing countries (Franzese and Hays 2007). Our first peer group measure recognizes the tendency of investors to lump nations—reflected in the popularity of region-specific investment funds—into geographic portfolios. Thus the variable *Region* groups nations into the following major geographically-based categories: Asia, Western Europe, post-Communist Europe, Latin America, Non-Latin Caribbean, Middle East and North Africa, North America, South Asia, and Africa. This spatial lag estimates the extent to which the average sovereign risk assessment of other countries in the region affects a government's own sovereign premium.

Our second peer category identifies countries according to their level of economic and market development. To assess the interdependence of risk among economic peers, we employ one

coarse (three tier) and one fine (five tier) measure. The fine measure, *FTSE*, groups countries into one of five investment categories: Frontier Markets; Secondary Emerging Markets; Emerging Markets; Advanced Emerging; and Developed. According to the FTSE, which is a subsidiary of the London Stock Exchange, such categorizations are based on "a range of criteria which was developed in conjunction with international investors" and which are reviewed annually.[3]

The coarse measure of market development comes from the investment firm MSCI. It categorizes countries as Frontier Markets; Emerging Markets; or Developed Markets. Like the FTSE, MSCI's criteria for categorization are developed via discussions with the investment community.[4] In this sense, the categorizations represent both objective differences in levels of development as well as subjective assessments by market participants. As with the FTSE, the countries included in each MSCI category are reviewed (and in some cases re-classified) annually. Crucially, both the fine (FTSE) and the coarse (MSCI) market development categories cross-cut the geographic peer group measure. For instance, MSCI's "Emerging Markets" group includes Brazil, Chile, Colombia, Mexico and Peru in the Americas, but also the Czech Republic, Egypt, Hungary, Morocco, Poland, Russia, South Africa and Turkey, as well as China, India, Indonesia, Korea, Malaysia, Philippines, Taiwan and Thailand.

Our final categorization depends on countries' sovereign credit ratings (*Risk Rating*). Sovereign ratings are qualitative measures of the probability of default, published by three major credit rating agencies (Standard and Poor's, Moody's and Fitch) on the basis of a broad set of economic, social, and political factors (Jaramillo and Tejada 2011). The ratings attempt to capture both the willingness and the ability of governments to repay their obligations. We expect that if, for instance, a AA-rated sovereign experiences a debt default or restructuring, investors may begin to re-

[3] http://www.ftse.com/Indices/Country_Classification/

[4] http://www.msci.com/products/indices/country_and_regional/em/

evaluate the overall credit quality of AA borrowers. They may assign a higher risk premium to other AA-rated borrowers. To test this expectation, we utilize the weighted average Fitch Sovereign Rating for each country and year, removing the +/- designations (so that AA+, AA and AA- country-years are treated as a single group) and transforming ratings into integers ranging from 1-12 (where higher scores represent higher risk).

Empirical Model. Because we are interested in measuring whether interdependencies in sovereign risk assessment are merely episodic—such as a temporary crisis—or whether they represent long-term equilibrium relationships (or both), we employ an error correction model (ECM) to estimate these relationships. In general, error correction models estimate the rate at which Y_t returns to equilibrium after a change in X_t. These models are known to be well-suited for the analysis of cointegrated data; they are appropriate also for the analysis of stationary data series that are not cointegrated but for which we have theoretical reasons to explore both long- and short-term relationships (De Boef and Keele 2008). The single-equation ECM takes the following form:

$$\Delta Y_t = \alpha_0 - \alpha_1(Y_{t-1} - \beta_1 X_{t-1}) + \beta_0 \Delta X_t + \varepsilon_t$$

We estimate changes in Y (sovereign spreads and CDS prices) as a function of the vector of lagged X political and economic variables known to affect sovereign risk, and of the short-term changes that bring these variables out of their equilibrium. Among the independent variables, we include the spatial lags that capture the impact of different categories of nations on whose market evaluations a government's own risk premium may depend. In the equation above, the short-term effect of changes in X on Y is captured by β_0, and the long-term or equilibrium relationship between those variables is estimated in the coefficient β_1. The rate at which the correction or re-equilibrium is

achieved—i.e., the error correction—is measured by the coefficient α_1 (De Boef and Keele 2008). The equation above can be rewritten and estimated by OLS:

$$\Delta Y_{it} = \alpha + \phi Y_{i,t-1} + \beta_k \Delta X_{i,t-1} + \beta_j X_{i,t-1} + \varepsilon_{it}$$

Our estimation strategy relies on a pooled cross-sectional time-series analysis. We employ a generalized least squares estimator, and include country fixed effects and a linear time trend to control for country and temporal dynamics not explicitly modeled in the data. We also correct for first order serial correlation and heteroskedasticity in the errors. The use of country dummies restricts our analysis to within-country effects, which, along with the panel-corrected standard errors, sets up a rather conservative test of our hypotheses, as there is typically more cross-sectional than intertemporal variation in sovereign risk. Yet, the use of fixed effects is particularly important for our purposes as we wish to set aside country-specific legacies that may affect sovereign ratings, such as the 'original sin' of historic default, or the difficult-to-measure qualities that make Argentina, Argentina. We first examine annual spreads on sovereign bonds for a set of 26 countries; we then turn to monthly changes in sovereign risk measured both by CDS prices and bond spreads.

IV. Results

As noted above, our model rests on the premise—well-supported by theoretical and empirical research—that there are significant long-run relationships between a government's sovereign credit risk and an array of political and economic variables. To the extent that such relationships are disturbed either by domestic events such as elections, or by international shocks such as changes in global liquidity or risk attitudes, we expect the equilibrium relationships to be restored with the passing of these phenomena. Over the longer-term, and in periods of normal market operation, we expect that market participants' assessments of a given country's sovereign

creditworthiness are affected by market participants evaluations of other countries in the same peer category.

We first test this expectation using annual data on the stripped spreads on sovereign debt, for a set of emerging market economies. In this and the other tables, country fixed effects are included in the analysis but are not reported for the sake of brevity. In Table 1, the coefficients on the lagged independent variables ($X_{i,t-1}$) indicate the longer-term equilibrium relationship between those variables and the sovereign bond spreads. The magnitude of the relationship depends not only on those coefficients, however, but also on the coefficient on the lagged dependent variable ($Spread_{t-1}$), which captures the rate at which changes in Y return to equilibrium. Specifically, the parameter capturing the long-term multiplier is defined as $\Upsilon = \beta_j/-\phi$ (De Boef and Keele 2008, 191; Kaufman and Segura-Ubiergo 2001, 587). The first differences of the X variables, in turn, estimate whether short-term changes in X—here, measured annually—bring about changes in Y. The ECM permits us to estimate both the size of those changes, and the rate at which such departures from the equilibrium persist—i.e., the time it takes for the long-term relationship to be restored.

Insert Table 1 here

The first thing that we observe in Table 1 is that the absolute value of the coefficient on the lagged dependent variable ($Spread_{t-1}$) is greater than 1 in three of the four model specifications, meaning that in each instance the rate of correction is shorter than the time frame in which changes are measured here. Thus, when we measure diffusion among countries grouped by *Region,* risk rating (*Fitch)* or five-level development category (FTSE), the disturbance in sovereign spreads are corrected in less than a year's time. This is not surprising given that financial liberalization allows investors to evaluate and re-evaluate their portfolios on a daily, or even hourly, basis. Measuring both the level and change in sovereign spreads on an annual basis thus obscures a tremendous degree of intra-year variation in sovereign credit risk.

That said, Table 1 offers support for our hypothesis of interdependence among country risk spreads. Examining the coefficients on *Region* peer spreads, we observe both long and short-term correlations. The coefficients indicate that the long-term relationship between a country's spreads and that of its regional peers, Υ, is positive and significant; the coefficient of .19 implies that, for every basis-point increase in the spread for other countries in the region, the baseline country will experience a .19 basis point rise in its bond spread. The coefficient on the first difference of the diffusion variable *(ΔPeer Spread)* indicates that a one-year increase in the average spreads among a country's geographic peers will disrupt this equilibrium relationship, bringing an increase in the government's own spreads over the course of that year. However, as mentioned above, the coefficient on the lagged *Spread* level indicates that the error correction rate is less than the units of time (years) measured in this analysis. Thus, we do not observe persistent effects of such short-term contagion. The results for the other peer variables are similar. We find a coefficient of .23 for the long-term effect (Υ) of both *MSCI* and *FTSE* peer spreads; only *MSCI* peer spreads, however, show a short-term impact (*ΔPeer Spread*) in a government's own spread. The results for *Risk Rating* peer spreads also suggest the existence of a long-term relationship (Υ = .18) between a government's risk premium and its peers' spreads.

Therefore, we find significant confirmation both that a government's sovereign risk spread is tied in the long term to those of its neighbors, all else being equal, and that short-term changes in the spreads within a region likewise can bring significant, if temporary, changes to the price at which a government can access international bond markets. Note that these effects are over and above global market conditions as well as country-specific outcomes, both of which are accounted for in our models.

Other variables in Table 1 likewise confirm our expectations and are consistent with existing research on the forces that shape sovereign risk premia. For instance, we observe that the higher a

country's level of sovereign debt as a share of gross national income, the higher the price that investors demand in order to hold a country's debt. A short-term rise in the government's sovereign debt ratio also brings a one-off increase in the sovereign risk spread. Again, however, such effects dissipate rapidly. Similarly, the coefficient on the overall budget balance reveals that the more positive the fiscal balance, the more likely investors are to trust that a government will meet its debt payment obligations, and the lower the spread on sovereign debt. This effect holds in most model specifications except the third, where only short-term changes in budget balance are significant. We also find some support for the expectation that more financially open countries, which are at risk of market discipline via capital flight, pay lower interest rates (Bartolini and Drazen 1997). The coefficient on *KA Open*, which indicates that in the long and short term, countries with fewer capital account restrictions indeed have lower sovereign risk spreads. This effect is significant in the equilibrium, lagged variable, for three of the four specifications. We do not find that annual levels or changes in inflation correlate significantly with the sovereign spread.

Turning to the political variables, the timing of the electoral cycle has a significant impact on indicators of sovereign risk. In particular, and consistent with previous research, the coefficient on *Years to Election* indicates that sovereign bond spreads are systematically lower the further away an election is. Indeed, elections have been shown to be significant moments of uncertainty about future macroeconomic policy management (Bernhard and Leblang 2006, Jensen and Schmith 2005). However, year-to-year changes in the electoral cycle do not significantly alter sovereign bond spreads. Interestingly, there is not a significant difference between governments headed by left-leaning executives and the reference category (centrist governments), although in some specifications we see that right-leaning executives do have a meaningfully lower spread than centrist-headed governments, all else being equal. This partisan effect is significant at the 90% confidence level in all but the first specification. Finally, the coefficient on the *US Prime Rate* is supports the

claim that, when U.S. interest rates are high, investors become more discriminating with regard to risk and thus charge a higher price to hold emerging market debt. This equilibrium is disturbed by one-off changes in U.S. interest rates, which may temporarily contract spreads below their historic relationship, all else being equal. However, over the long term, the positive link between U.S. interest rates and sovereign risk spreads is restored.

The results in Table 1, while supportive of our general expectations, indicate that market corrections in sovereign risk spreads usually occur in a time frame shorter than a year. Accordingly, we move to examine data measuring sovereign risk premia on a monthly basis, which allows us to capture finer movements in sovereign risk. We consider both the price of insuring against sovereign default (*CDS spreads*) and the month-end Sovereign Stripped Spreads from the EMBI Global database. Table 2 examines month-end CDS spreads for 26 countries from October 2000 to January 2010, while Table 3 reports results for models in which monthly *Spreads* is the dependent variable. Once again, we examine these relationships using an error correction model. Because most political variables do not change on a monthly basis, we regress the CDS spreads on the lagged annual levels for the political and other variables for which we do not have monthly data. Country fixed effects and a linear time trend are again included in the ECM specifications, but not shown in the tables for ease of presentation.

Insert Tables 2 and 3 here

As discussed above, the CDS contract functions as insurance against sovereign default, so that the higher the price attached to this contract, the greater the perceived risk of default. The monthly prices on 5-year five-year sovereign credit default swaps, also referred to as a spread, are measured in basis points (Longstaff et al. 2011). The analysis of these monthly data provides additional support for our hypothesis of interdependence among sovereign risk premiums for three of the four country categorizations we examine. The first thing we observe in Table 2 is that the

error correction process in CDS markets operates on a different temporality than does that of the secondary market for sovereign debt. Looking at specification 2, where countries are categorized by *Fitch* rating, we find a long-term equilibrium correlation between the CDS yields of countries of a common risk rating, be it AAA, BB or C. In addition, monthly changes in the risk premium of other similarly-rated countries bring short-term changes in the same direction for the reference country. For every one basis point increase in the price of a CDS contract for countries of the same risk rating, the reference country's spread rises in turn by 0.31 basis points. Short-term shifts in the CDS spread for credit-rating peers also bring an immediate 0.17 basis point increase in CDS spreads. The coefficient on the lagged dependent variable indicates, moreover, that the impact of short-term changes in CDS prices among peers is quite persistent: after one month, only 13 percent of that increase has been corrected, and five months later, fully half of the increase remains. Indeed, it takes a full year for 96 percent of the error correction—the impact of the short-term change in the CDS prices of other countries in the same sovereign risk category—to occur. Peer effects thus are felt quite immediately in a country's own risk spread, but they also persist for more than a year. Associations among countries occur not only in times of crisis, but also shape ongoing evaluations of "sovereign" risk and investment choice over the long term.

The analysis in Table 2 also reveals that, for monthly CDS spreads, other peer categories do not significantly affect the equilibrium (long-term) CDS price relationships. Rather, we see that CDS market prices for countries of the same region and the same MSCI category are subject to short-term contagion. These prices, though, do not move together in equilibrium in the way that countries of the same sovereign risk category do. At least for the derivatives (CDS) market for sovereign debt, then, the extent to which market actors' fear of default risk in one country is affected by corresponding fears of default in other peer countries is mostly confined to short-term transmission of risk. An important exception, however, is the sovereign ratings peer category: over the long term,

one country's perceived riskiness is tied systematically to assessments of risk for other countries in its credit quality category. What remains to be seen is whether such co-movements are distributed equally across sovereign risk categories: for instance, are AAA countries subject to the same interdependence as BB or CCC countries might be? The disaggregation of such effects—which could employ interviews with professional investors as well as analysis of daily data for specific sovereign borrowers—is a fruitful topic for future research.

At the same time, the CDS contract represents a unique species of sovereign risk indicator—albeit an important one. In order to check the robustness of these findings using an alternative indicator of sovereign risk, we next examine monthly sovereign debt spreads for emerging market debt. In Table 3, we use monthly stripped bond spreads from the EMBI Global dataset (*Spreads*) as our dependent variable. The analysis includes the same countries and time period used in Table 2. The results of the ECM analysis of monthly spreads again reveal important long-term relationships, as well as short-term contagion, among the sovereign bond spreads of countries of a common credit rating. In addition, we find both long-term and short-term ties among the spreads for countries within the same geographic region. Moreover, among the FTSE and MSCI categories, there is evidence of short-term contagion; we do not find a long-term equilibrium relationship, however, in the spreads for countries within these market development categorizations.

The first specification in Table 3 includes geographic peer groupings *(Region)* as a measure of risk interdependence. The analysis again supports our expectation of interdependence: there is a significant long-term correlation among the sovereign risk spreads for countries of the same geographic region. For every basis point increase in the average of regional peer spreads, a government's spread increases by 0.52 basis points ($\beta_1/-\phi$). And where there is a one-off monthly rise in the average regional peer spread, an attendant increase of 0.51 basis points occurs. The impact of such short-run changes is again quite salient: only 22 percent of that departure from the

equilibrium , or "error," is corrected by the next month. After three months, 68 percent of the interdependent bump in the country's spread remains. After five months, more than half of the impact has dissipated; after 12 months, all but 22 percent of the long-term trend has been restored.

Turning to the second specification reported in Table 3, we again find significant long and short-term effects of credit-rating peers *(Fitch)*. The coefficients on the lagged dependent variable and the level and first difference of the peer spreads are almost identical to the relationships estimated in the CDS models in Table 2. Again, there is a positive equilibrium relationship in which each one point increase in the average risk peer spread is associated with a 0.46 basis point increase in the reference government's spread. As with geographic peer diffusion, short-term changes also bring significant and rather persistent bumps in the equilibrium relationship; a one point rise in the average spread of countries in the same risk category brings a 0.29 increase in the government spreads, 87 percent of which is still present in the country's own spread a month later, and 19 percent of which remains after a year.

The duration of the error correction process in the monthly analysis differs from that of the annual analysis in Table 1; the latter indicated that deviations from the long-term correlations in sovereign risk spreads among countries within the same regional and risk groupings are corrected in less than a year's time. This disparity is likely due to differences in the model specifications and data. The monthly analysis does not include short-term changes in many of the political and macroeconomic variables (available only in annual time series), and thus the analysis cannot control for short-term changes in political variables. A next step in such analyses would therefore be to incorporate monthly changes in political variables; this would better isolate the impact of partisan shifts and variations in the electoral cycle. Where long-term trends are concerned, however, we do find that more democratic countries have higher bond spreads. In the first and fourth specifications, a unit increase in the *Polity* score is associated with a 4.7 and 5.9 basis point higher risk spread,

respectively (also see Saiegh 2005). We only observe partisan effects in specification 2, where left governments are associated with a more than 100 basis point higher spread than center governments, all else being equal.

The empirical analyses thus have tested our main hypothesis that there is significant interdependence in the ways that markets assess the riskiness of sovereign borrowers and, hence, in the scope for autonomous domestic policymaking. We find evidence of significant long-run ties among the risk spreads for sovereign borrowers in the same region and risk categories. And we have estimated the magnitude and persistence of short-term changes that alter these equilibrium relationships, which vary significantly across types of peer groupings.

V. Conclusion

Scholarship examining the effect of financial globalization on domestic politics has typically examined the government-financial market relationship for any given country in relative isolation from corresponding relationships abroad. When other nations are considered, it is in the context of common global shocks, such as when global liquidity declines, or when a financial crisis in one nation or region prompts capital flight in other nations or regions. What is missing from these analyses is attention to how global market pressures might be transmitted to national governments via the evaluation of other, comparable countries.

Our analysis suggests that extant work overlooks a theoretically and empirically significant element of interdependence among nations. Not only do market assessments of sovereign risk abroad alter the risk premium paid by a sovereign borrower in moments of crisis, but they also tie these outcomes together across countries over the long term, net of the array of exogenous shocks and domestic fundamentals that are known to shape sovereign risk assessments. Sovereign credit risk, and hence the price at which governments can borrow internationally, is therefore not entirely

sovereign; instead, it depends on the credit risk of—and, ultimately, the policies of—countries with which a sovereign borrower is categorized.

Therefore, in order to understand more completely the extent to which governments are pressured by international capital markets, we need to account for the fact that investors sort countries into categories. Beyond analyzing the ways in which these categories affect risk premiums, as this paper does, we also need to consider the rubrics that professional investors use to categorize countries. Do they rely more heavily on geography, on the level of development or on the degree of sovereign risk? To what extent do the categorizations employed vary across investors, so that some (e.g. those who allocate assets across a single region, such as Latin America) employ finer categories than others (e.g. those who manage portfolios with a global reach)? To what extent do investors rely on categorizations developed by other entities, such as MSCI, Morgan Stanley, or the World Bank, rather than on those developed internally by the investment professional or her investment institution?

Finally, our focus on country categorizations may put in context the continued capacity of the United States government to borrow at low rates of interest, despite increases in government debt and fiscal deficits. Despite much discussion of the need for rebalancing in the global economy, the United States continues to attract large capital inflows (including investment in government bonds) and to borrow at low rates of interest. The desirability of the dollar and of Treasury securities as reserve assets (Cohen 1998, Eichengreen 2011, Helleiner 2009, 2011, Schwartz 2009) has facilitated continued U.S. access to debt markets, even while many European governments struggle to convince investors of their creditworthiness. In some ways, the United States represents a category of one country: the issuer of the key global currency, with the largest and most liquid sovereign debt market, and with a long history as the ultimate "safe" asset. As such, while US debt and deficits are large relative to many other countries, the US is simply not compared to these

countries—for the US, peer country effects may be absent, because investors view it as peerless. Were this to change, it—like any country categorization—would have noticeable implications for the United States' capacity to access capital markets.

DV: Annual Δ_Spread	Table 1. Explaining Annual Changes in Sovereign Debt Spreads											
Peer Category:	**Region**			**Risk Rating**			**MSCI**			**FTSE**		
	1			2			3			4		
	Coef.		**Std. Err.**	**Coef.**		**Std. Err.**	**Coef.**		**Std. Err.**	**Coef.**		**Std. Err.**
Spread $_{t-1}$	-1.08	***	0.07	-1.12	***	0.06	-0.94	***	0.07	-1.11	***	0.07
Peer Diffusion												
Peer Spread												
t-1	0.21	**	0.10	-0.20	*	0.11	0.22	*	0.13	-0.26	***	0.09
Δ	0.37	***	0.07	0.09		0.07	0.45	***	0.10	-0.13		0.09
Domestic Politics and Economy												
Gov Consumption												
t-1	1.02		24.23	4.59		27.13	3.72		24.43	19.76		25.89
Δ	-23.86		19.78	-4.07		21.34	-15.16		20.08	-36.84	*	22.33
Debt												
t-1	4.37	**	2.18	4.15	**	1.88	2.77		2.24	5.51	***	2.10
Δ	6.40	***	2.26	5.78	***	1.76	7.04	***	2.13	7.88	***	2.15
Maturity												
t-1	1.15		5.10	-3.85		5.46	-7.16		5.38	-2.40		4.82
Δ	-1.79		3.56	-6.35	*	3.62	-8.14	**	3.66	-2.77		3.51
Inflation												
t-1	0.33		0.46	0.07		0.48	0.68		0.46	0.63		0.52
Δ	0.02		0.33	-0.11		0.34	0.10		0.34	0.02		0.39
Budget Balance												
t-1	-20.89	**	10.57	-26.37	**	10.98	-16.42		11.20	-20.98	*	11.21
Δ	-31.89	***	8.30	-25.73	***	8.47	-25.46	***	8.64	-23.93	***	8.79
Democracy												
t-1	11.86		14.17	20.07		14.42	12.47		13.52	15.10		12.90
Δ	22.40		22.37	25.12		21.99	5.68		23.53	32.87		22.03
KA Open												
t-1	-80.68	**	33.55	-65.33	*	35.37	-54.40		33.85	-59.09	*	33.26
Δ	-59.39	*	36.41	-56.40		40.39	-58.81		40.33	-31.58		35.59
Years to Election												
t-1	-32.76	**	14.63	-29.64	*	15.49	-25.99	*	14.44	-25.52	**	13.04
Δ	-9.47		9.92	-12.17		9.98	-10.52		9.90	-7.66		8.88
Left												
t-1	128.18		267.97	26.77		385.25	-30.57		440.41	28.30		337.53
Right												
t-1	36.95		400.40	-673.79	*	399.72	-642.29	*	377.14	-650.50	*	346.34
Opposition Right												
t-1	85.90		61.58	40.49		61.68	56.35		57.26	50.99		45.05
Opposition Left												
t-1	116.75	*	70.25	104.07		68.31	93.53		67.58	54.50		55.99
System												
t-1	-52.33		39.09	-7.75		39.86	1.05		39.45	-29.78		39.05
Common Shocks												
US Prime Rate												
t-1	29.75	**	12.28	30.99	***	12.44	34.93	***	13.21	33.09	***	13.00
Δ	-25.89	*	14.80	-68.22	***	14.88	-10.85		17.29	-70.54	***	15.19
Time												
t-1	-12.85		8.95	-22.22	***	8.47	-9.43		9.64	-19.05	**	8.42
Const.	25956		17988	44910	***	16975	19192		19351	38372	**	16896
N. obs	171			171			171			171		
Wald chi^2	454.59			1353.14			479.67			444.68		
Prob > chi^2	0			0			0			0		

FGLS error correction model of annual change in Sovereign Stripped Spreads *** p<.01; ** p<.05; * p<.1

Table 2. Explaining Monthly Changes in Credit Default Swap Prices

DV: Monthly Δ_CDS	1			2			3			4		
Peer Category:	**Region**			**Risk Rating**			**FTSE**			**MSCI**		
	Coef.		Std. Err.	Coef.		Std. Err.	Coef.		Std. Err.	Coef.		Std. Err.
CDS												
t-1	-0.11	***	0.02	-0.13	***	0.02	-0.09	***	0.02	-0.09	***	0.02
Peer Diffusion												
Peer CDS												
t-1	0.01		0.02	0.04	**	0.02	-0.02		0.02	0.00		0.02
Δ	0.35	***	0.05	0.17	***	0.02	0.05		0.03	0.15	***	0.05
Domestic Politics and Economy												
Debt												
t-1	0.67	**	0.31	0.76	***	0.26	1.19	**	0.51	1.29	**	0.66
Budget Balance												
t-1	-0.36		1.30	-0.10		1.15	0.24		1.27	0.20		1.65
Inflation												
t-1	0.25		0.92	0.14		0.83	-0.04		1.03	0.49		1.26
GDP per cap												
t-1	0.01		0.02	0.02	*	0.01	0.01		0.01	0.00		0.02
KA Open												
t-1	-6.65		4.68	-6.71	*	3.89	-7.16		4.82	-9.95		7.29
FX Rate												
t-1	433	***	121	397	***	92	436	***	95	444	***	121
Δ	282	***	79	324	***	61	373	***	64	363	***	80
Democracy												
t-1	-0.42		1.00	-0.51		0.83	-0.05		0.69	0.49		1.25
System												
t-1	-7.08		20.55	-19.48		18.17	81.76	***	15.26	63.29		48.74
Right												
t-1	41.33		71.19	66.72		66.49	-193.06	***	39.27	162.77		101.24
Common Shocks												
US Prime Rate												
t-1	-1.08		1.60	-1.10		1.34	-1.01		1.57	-0.69		2.06
Δ	-16.23		11.05	-16.66	*	9.24	-23.56	**	9.68	-26.17	**	13.07
US Stock Market												
t-1	-2.89	***	0.83	-3.14	***	0.69	-3.41	***	0.73	-2.85	***	1.01
Δ	-2.78	***	0.48	-3.16	***	0.39	-3.39	***	0.40	-2.88	***	0.59
Invest.Grade Yield												
t-1	-5.94		6.37	-3.71		5.32	-3.83		5.36	-2.99		7.29
High Yield												
t-1	-10.35	**	4.87	-6.88	*	4.09	-11.77	***	4.21	-7.56		5.59
Treasury Yield												
t-1	-7.57		10.05	-6.90		8.33	-10.96		8.25	-9.63		11.15
Equity Premium												
t-1	390.49		695.81	542.11		578.83	912.63		594.56	388.26		752.01
Volatility Premium												
t-1	-0.02		0.39	0.26		0.32	0.65	**	0.32	0.60		0.43
Term Premium												
t-1	1.38		2.35	1.87		1.92	2.80		1.93	3.03		2.58
Stock Flows												
t-1	-37.47		33.83	-49.66	*	28.94	-77.57	***	31.33	-96.90	**	41.74
Δ	-45.32	**	21.52	-43.38	**	18.56	-67.72	***	19.88	-85.81	***	26.10
Bond Flows												
t-1	0.00		0.00	0.00		0.00	0.00		0.00	0.00		0.00
Δ	0.00		0.00	0.00		0.00	0.00		0.00	0.00		0.00
Time	-0.15		0.20	-0.19		0.17	0.10		0.23	0.18		0.31
Const.	-4.41		62.70	-28.44		53.87	-93.90	*	53.93	-236.29		157.31
N. obs	927			1009			825			885		
Wald chi^2	443.44			556.07			536.41			368.31		
Prob > chi^2	0			0			0			0		

FGLS error correction model of monthly change in CDS prices *** p<.01; ** p<.05; * p<.1

Table 3. Explaining Monthly Changes in Sovereign Debt Spreads

DV: Monthly Δ_Spreads	1			2			3			4		
Peer Category:	Region			Risk Rating			FTSE			MSCI		
	Coef.		Std. Err.	Coef.		Std. Err.	Coef.		Std. Err.	Coef.		Std. Err.
Spread												
t-1	-0.12	***	0.02	-0.13	***	0.02	-0.10	***	0.01	-0.10	***	0.02
Peer Diffusion												
Peer Spread												
t-1	0.06	***	0.02	0.06	***	0.02	0.00		0.02	0.02		0.02
Δ	0.51	***	0.04	0.29	***	0.03	0.34	***	0.07	0.30	***	0.04
Domestic Politics and Economy												
Democracy												
t-1	4.65	**	2.39	1.20		2.03	2.78		1.80	5.85	***	1.94
System												
t-1	-2.50		15.98	-25.84		19.65	-9.95		16.81	-28.00		19.21
Left												
t-1	-73.57		46.47	106.04	***	32.41	19.54		50.58			
Right												
t-1										-8.76		55.49
KA Open												
t-1	-4.69		3.58	-4.26		3.29	-9.23	**	4.17	-10.96	**	4.93
FX Rate												
t-1	414.73	***	92.13	432.40	***	77.88	394.42	***	74.78	402.16	***	84.45
Δ	1.56		62.82	58.09		54.88	46.95		53.33	40.06		58.30
Debt												
t-1	0.37		0.24	0.49	**	0.23	0.44		0.37	0.60		0.42
Inflation												
t-1	0.41		0.78	-0.18		0.74	-1.02		0.77	-0.66		0.86
Budget Balance												
t-1	-0.68		1.03	-0.19		0.94	-1.16		0.94	-1.42		1.03
GDP per cap												
t-1	0.02		0.01	0.03	**	0.01	0.02		0.01	0.01		0.01
Common Shocks												
US Prime Rate												
t-1	-0.61		1.26	-2.50	**	1.17	-2.66	**	1.21	-2.00		1.38
Δ	-7.41		9.22	-12.61		8.20	-17.93	**	9.11	-16.53	*	10.14
Stock Flows												
t-1	-60.41	**	30.56	-63.23	**	28.11	-81.70	***	30.04	-78.15	**	32.94
Δ	-3.83		20.65	8.29		19.22	14.57		20.58	12.43		21.86
US Market												
t-1	-1.41	**	0.68	-2.31	***	0.56	-2.00	***	0.74	-2.03	***	0.77
Δ	0.68	*	0.37	0.34		0.35	0.63	*	0.36	0.54		0.40
Invest.Grade Yield												
t-1	10.13	*	5.95	9.63	*	5.39	5.78		5.72	15.16	***	6.06
High Yield												
t-1	5.22		4.51	10.74	***	4.06	6.04		4.28	13.88	***	4.57
Treasury Yield												
t-1	-5.15		8.80	-4.12		7.98	-7.21		8.39	-8.38		9.15
Equity Premium												
t-1	-1584	**	666	-1968	***	562	-2031	***	579	-1893	***	645
Volatility Premium												
t-1	-0.03		0.35	-0.56	*	0.31	-0.09		0.35	-0.22		0.36
Term Premium												
t-1	0.06		1.92	-0.26		1.73	-0.96		1.90	-0.05		2.05
Bond Flows												
t-1	0.00		0.00	0.00	**	0.00	0.00		0.00	0.00	**	0.00
Δ	0.00		0.00	0.00		0.00	0.00		0.00	0.00		0.00
Time	-0.26	**	0.16	-0.21		0.15	-0.18		0.17	-0.05		0.19
Const.	7.08		34.50	-144.10	**	73.04	-30.31		62.94	-28.85		52.31
N. obs	940			1015			911			959		
Wald chi^2	756.12			830.14			846.89			743.5		
Prob > chi^2	0			0			0			0		

FGLS error correction model of monthly change in Sovereign Stripped Spreads *** p<.01; ** p<.05; * p<.1

Appendix

Below are the summary statistics, definitions and sources for the data employed in our analyses.

Sovereign CDS price. These CDS spreads are mid-market indicative prices for five-year CDS contracts. In all cases, the CDS contract references the sovereign (as opposed to a central bank or some other entity). The monthly data are generally for the last trading day of the month. When there is no quotation for the last trading day of the month, however, the last available quotation during the month is used. Source: Longstaff and colleagues (2011), who obtained the data from the Bloomberg system.

Sovereign Spread. The sovereign spread tracks the difference in yield between traded external debt instruments and comparable U.S. Treasuries that are understood to reflect different credit quality. Source: J.P. Morgan Emerging Markets Bond Index Global.

FTSE Category. Countries are coded according to the categorizations of the 5-tiered level of economic development in the following way: Emerging Markets = 1; Frontier = 2; Developed = 3; Advanced emerging =4; Secondary Emerging = 5.

MSCI Barra Category. This variable codes countries according to a 3-tiered categorization: Emerging Markets = 1; Frontier = 2; Developed = 3.

Fitch Sovereign Rating. This variable measures the long term, foreign currency rating for sovereign debt, from Fitch Ratings. We remove the +/- denominations and transform qualitative ratings into integers, weighted by the duration of the rating and averaged for the year: AAA 1, AA 2, A 3, BBB 4, BB 5, B 6, CCC 7, CC 8, C 9, RD 10, DDD 11, DD 12, D 13.

Left Executive. Coded 1 if the head of the executive branch is of the Left, 0 otherwise. Data from the Execrlc variable in the Database of Political Institutions (Beck et al. 2001, 2010 update).

Right Executive. Coded 1 if the head of the executive branch is of the Right, 0 otherwise. Data from the Execrlc variable in the Database of Political Institutions (Beck et al. 2001, 2010 update).

Left Opposition. Coded 1 if the largest opposition party is of the Left, 0 otherwise. Data from the Opp1rlc variable in the Database of Political Institutions (Beck et al. 2001, 2010 update).

Right Opposition. Coded 1 if the largest opposition party is of the Right, 0 otherwise. Data from the Opp1rlc variable in the Database of Political Institutions (Beck et al. 2001, 2010 update).

Democracy. Data on political regime from the Polity IV database, the "POLITY2" score. Higher scores represent more democratic political systems.

System. Countries are coded according to the form of political institutions: Parliamentary (2), Assembly-elected President (1), Presidential (0). Source: Database of Political Institutions (Beck et al. 2001, 2010 update).

Yrs Office. According to the DPI, this variable measures, "How many years has the chief executive been in office?" Source: Database of Political Institutions (Beck et al. 2001, 2010 update).

US Prime Rate. Average majority prime rate charged by banks on short-term loans to business, quoted on an investment basis. Source: U.S. Federal Reserve (http://www.federalreserve.gov/releases/h15/data.htm).

Budget Balance. Cash surplus/deficit (% of GDP) Cash surplus or deficit is revenue (including grants) minus expense, minus net acquisition of nonfinancial assets. In the 1986 GFS manual nonfinancial assets were included under revenue and expenditure in gross terms. This cash surplus or deficit is closest to the earlier overall budget balance (still missing is lending minus repayments, which are now a financing item under net acquisition of financial assets).

Debt. Central government debt, total (% of GDP) Debt is the entire stock of direct government fixed-term contractual obligations to others outstanding on a particular date. It includes domestic and foreign liabilities such as currency and money deposits, securities other than shares, and loans. It is the gross amount of government liabilities reduced by the amount of equity and financial derivatives held by the government. Because debt is a stock rather than a flow, it is measured as of a given date, usually the last day of the fiscal year.

Inflation. Consumer prices (annual %) Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used. Source: World Development Indicators.

GDP per capita. GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2000 U.S. dollars. Source: World Development Indicators.

KA OPEN. Capital account openness score, from the Chinn & Ito index (their indicator is labeled kaopen in their excel file). Data (which go through 2010) are available here (in Excel format): http://web.pdx.edu/~ito/kaopen_2010.xls

Maturity. Maturity is the number of years to original maturity date, which is the sum of grace and repayment periods. Source: World Development Indicators.

Local Stock Market Returns. The local stock market returns for the countries in the sample are monthly total returns (including dividends). Source: Longstaff et al. (2011).

Exchange Rates. Exchange rates, expressed as units of the local currency per US dollar, are obtained from Datastream. Source: Longstaff et al. (2011).

Foreign Currency Reserves. The dollar values of sovereign foreign currency holdings are obtained from the Datastream system. The original source of the data is the International Monetary Fund. Source: Longstaff et al. (2011).

US Stock Market Returns. The US stock market excess return is the monthly value-weighted return on all NYSE, AMEX, and NASDAQ stocks (from CRSP) minus the one-month Treasury-bill return (from Ibbotson Associates). Source: Longstaff et al. (2011).

Treasury Yields. Monthly changes in the Treasury yields are based on the five-year constant maturity Treasury (CMT) rates reported as part of the H.15 Federal Reserve Statistical Release (Historical Data). Source: Longstaff et al. (2011).

Corporate Yield Spreads. Changes in investment-grade yield spreads are monthly changes in the basis-point yield spread between BBB and AAA industrial bond indexes. Changes in high-yield spreads are monthly changes in the basis-point yield spread between BB and BBB industrial bond indexes. Source: Longstaff et al. (2011).

Equity Premium. As a proxy for changes in the equity premium, we use monthly changes in the price-earnings ratio for the S&P 100 index. Source: Longstaff et al. (2011).

Volatility Risk Premium. The volatility risk premium is calculated as the difference between the VIX index (obtained from the Bloomberg system) and a measure of realized volatility for the S&P 100 index. Source: Longstaff et al. (2011).

Term Premium. The term premium is based on Cochrane-Piazzesi model in which expected excess returns on Treasury bonds are represented as a linear function of one- through five-year forward rates. Source: Longstaff et al. (2011).

Bond and Equity Flows. These values are obtained from the Investment Company Institute which reports them on its website. Source: Longstaff et al. (2011).

Summary Statistics: Annual Data

Variable	Obs	Mean	Std. Dev	Min	Max
Spread	493	573.76	754.82	0.00	6342.27
Debt	962	53.11	36.92	0.65	384.01
Maturity	970	17.21	7.89	0.00	48.38
Inflation	1821	28.07	247.55	-16.12	7481.66
Budget	1081	-1.51	8.11	-202.70	29.06
GDP/cap	1930	10315	11202	221	56389
Fitch	2046	1.91	2.12	0	12
KA Open	1783	0.85	1.56	-1.85564	2.45573
System	1888	1.65	0.63	1	3
Yrs Office	1887	6.42	7.48	1	46
Left	1885	0.13	0.34	0	1
Right	1885	0.77	0.42	0	1
Opp Right	1614	0.57	0.49	0	1
Opp Left	1614	0.36	0.48	0	1
US Prime	2046	6.64	2.07	3.25	10.01

Summary Statistics: Monthly Data					
Variable	Obs	Mean	Std. Dev.	Min	Max
CDS	2355	218.91	361.11	2.17	3857.61
US Market	2886	-0.07	4.91	-18.55	11.04
Treasury Yiel	2886	-0.03	0.32	-0.87	0.92
Inv.Grade	2886	0.01	0.44	-3.09	2.89
High Yield	2886	0.00	0.61	-4.20	2.56
Equity Prem	2886	0.00	0.00	-0.01	0.02
Vol. Premium	2886	0.11	4.54	-16.62	13.70
Term Prem	2886	-0.02	1.18	-3.19	4.69
Stock Flows	2886	4634	18256	-72318	42965
Bond Flows	2886	6849	10137	-32782	40174
FX Rate	2707	0.00	0.04	-0.15	0.36
Spread	2119	336.67	341.90	9.37	3569.37
Debt	2016	39.45	18.93	8.34	114.07
Maturity	2016	14.38	5.32	2.83	28.95
Inflation	2801	6.61	7.57	-4.86	54.92
Budget	2232	-1.32	4.12	-8.59	16.45
GDP/cap	2912	7093.76	9091.55	511.11	40707.00
Democracy	2912	6.31	5.21	-10	10
KA Open	2912	0.51	1.39	-1.86	2.46
System	2912	1.55	0.65	1	3
Fitch	2685	4.15	1.03	2	7
US Prime Rate	2912	5.70	1.83	3.25	9.5
Left	2912	0.17	0.37	0	1
Right	2912	0.83	0.37	0	1

References

Archer, Candace Glen Biglaiser and Karl DeRouen. 2007. Sovereign Bonds and the "Democratic Advantage": Does Regime Type Affect Credit Rating Agency Ratings in the Developing World? *International Organization* 61(2): 341-365.

Avelino, George, David S. Brown and Wendy Hunter. 2005. "The Effects of Capital Mobility, Trade Openness, and Democracy on Social Spending in Latin America, 1980–1999," *American Journal of Political Science* 49: 625-641.

Bechtel, Michael M. 2009. "The Political Sources of Systematic Investment Risk: Lessons from a Consensus Democracy." *The Journal of Politics* 71: 661-677.

Beck, Thorsten, George Clarke, Alberto Groff, Philip Keefer, and Patrick Walsh. 2001. "New tools in comparative political economy: The Database of Political Institutions." (2010 Update) *World Bank Economic Review*. 15(1): 165-176.

Beck, Nathaniel, Gleditsch, Kristian Skrede and Kyle Beardsley. 2006. Space Is More than Geography: Using Spatial Econometrics in the Study of Political Economy. *International Studies Quarterly*, 50: 27–44.

Bernhard, William T. and David Leblang. 2006. Democratic Processes and Financial Markets: Pricing Politics. New York: Cambridge University Press.

Biglaiser, Glen and Karl DeRouen, Jr. 2007. "Sovereign Bond Ratings and Neoliberalism in Latin America." *International Studies Quarterly* 51(1): 121-138.

Block, Steven and Paul Vaaler. 2004. "The price of democracy: sovereign risk ratings, bond spreads and political business cycles in developing countries." *Journal of International Money & Finance*, 23(6), 917-946.

Brooks, Sarah M. 2009. *Social Protection and the Market in Latin America : The Transformation of Social Security Institutions*. Cambridge University Press.

Brooks, Sarah M. and Marcus J. Kurtz. 2007. "Capital, Trade, and the Political Economies of Reform." *American Journal of Political Science* 51(4):703-720.

Calvo, Guillermo A. and Enrique Mendoza. 2000. "Rational Contagion and the Globalization of Securities Markets." *Journal of International Economics* 51(1): 79-113.

Campello, Daniela. 2012. Between Votes and Capital: The Politics of Market Discipline in Emerging Economies. Manuscript, Princeton University Press.

Cantor, Richard and Frank Packer. 1996. "Determinants and impacts of sovereign credit ratings," *Economic Policy Review*, Federal Reserve Bank of New York, 2 (2): 37-53.

Chwieroth, Jeffrey M. 2009. *Capital Ideas: The IMF and the Rise of Financial Liberalization*. Princeton University Press.

Chwieroth, Jeffrey M. 2007. "Neoliberal Economists and Capital Account Liberalization in Emerging Markets." *International Organization*, 61(2): 443-463.

Cohen, Benjamin J. 1998. *The Geography of Money*. Ithaca: Cornell University Press.

De Boef, Suzanna and Keele, Luke. 2008, "Taking Time Seriously." *American Journal of Political Science*, 52:184–200.

Devlin, Robert. 1989. *Debt and Crisis in Latin America: The Supply Side of the Story*. Princeton University Press.

Eichengreen, Barry. 2011. *Exorbitant Privilege: The Rise and Fall of the Dollar*. Oxford University Press.

Eichengreen, Barry and Mody, Ashoka. 1998. "Interest Rates in the North and Capital Flows to the South: Is There a Missing Link?" *International Finance*, 1:35–57.

Eichengreen, Barry and Ashoka Mody. 2000. "What Explains the Changing Spreads on Emerging Market Debt?" In Sebastian Edwards, ed., *The Economics of International Capital Flows*. Chicago: University of Chicago Press.

Eichengreen, Barry, Ricardo Hausmann, and Ugo Panizza. 2005. "The Pain of Original Sin," in Eichengreen and Hausmann, eds., Other People's Money. Chicago: Chicago University Press.

Franzese, Robert J. and Jude C. Hays. 2007. "Spatial Econometric Models of Cross-Sectional Interdependence in Political Science Panel and Time-Series-Cross-Section Data." *Political Analysis* 15(2):140-164.

Freeman, John R., Jude C. Hays and Helmut Stix. 2000. "Democracy and Markets: The Case of Exchange Rates," *American Journal of Political Science* 44:449-468.

Friedman, Thomas L. 2005. *The World is Flat: A Brief History of the Twenty-First Century*. New York: Farrar, Straus and Giroux.

Gray, Julia. 2009. "International Organization as a Seal of Approval: European Union Accession and Investor Risk." *American Journal of Political Science* 53(4):931-949.

Grossman, Herschel I and Van Huyck, John B, 1988. "Sovereign Debt as a Contingent Claim: Excusable Default, Repudiation, and Reputation," *American Economic Review*, American Economic Association, vol. 78(5):1088-97.

Hardie, Iain. 2006. "The Power of Markets? The International Bond Markets and the 2002 Elections in Brazil." *Review of International Political Economy* 13(1):53-77.

Helleiner, Eric. 2009. "Enduring Top Currency, Fragile Negotiated Currency: Politics and the Dollar's International Role." In Eric Helleiner and Jonathan Kirshner, eds., Future of the US Dollar. Cornell University Press.

Helleiner, Eric. 2011. Understanding the 2007–2008 Global Financial Crisis: Lessons for Scholars of International Political Economy." *Annual Reviews of Political Science.*

Hill, Paula, Robert Brooks and Robert Faff. 2010. "Variations in Sovereign Credit Quality Assessments across Ratings Agencies." *Journal of Banking and Finance* 34:1327-1343.

IMF. 2010. *Global Financial Stability Report: Sovereigns, Funding and Systemic Liquidity*. Washington: International Monetary Fund, October.

Jaramillo, Laura and Tejada, Michelle. 2011. "Sovereign Credit Ratings and Spreads in Emerging Markets: Does Investment Grade Matter?" (March). *IMF Working Papers*, 1-17.

Jensen, Nathan and Scott Schmith. 2005. "Market Responses to Politics: The Rise of Lula and the Decline of the Brazilian Stock Market." *Comparative Political Studies* 38(10):1245-1270.

Kaminsky, Graciela and Sergio L. Schmukler. 2002. "Emerging Market Instability: Do Sovereign Ratings Affect Country Risk and Stock Returns?" *The World Bank Economic Review*, Vol. 16, No. 2:171-195.

Kaplan, Stephen B. 2012. *Globalization and Austerity Politics in Latin America*. New York: Cambridge University Press, forthcoming.

Kaufman, Robert R. and Alex Segura–Ubiergo. 2001. "Globalization, Domestic Politics, and Social Spending in Latin America: A Time–Series Cross–Section Analysis, 1973–1997", *World Politics* 53(4):553–587.

Kindleberger, Charles P. 1978. *Manias, Panics and Crashes: A History of Financial Crises.* (New York: Wiley, Fifth Edition, 2005).

Longstaff, Francis A., Pan, Jun, Pedersen, Lasse H. and Singleton, Kenneth J. 2011. "How Sovereign Is Sovereign Credit Risk?" *American Economic Journal: Macroeconomics*, Volume 3, Number 2, April, pp. 75-103.

MacKenzie, Donald. 2006. *An Engine, not a Camera: How Financial Models Shape Markets*. Cambridge: MIT Press.

Mengle, David. 2007. Credit Derivatives: An Overview. *Economic Review. Federal Reserve Bank of Atlanta.* Fourth Quarter, pp. 1-14.

Mosley, Layna. 2003. *Global Capital and National Governments*. Cambridge: Cambridge University Press.

Mosley, Layna. 2004. "Government-Financial Market Relations after EMU," *European Union Politics* 5(2):181-210.

Mosley, Layna. 2005. "Constraints, Opportunities and Information: Financial Market-Government Relations around the World." In Pranab K. Bardhan, Samuel Bowles, Michael Wallerstein, eds. *Globalization and Egalitarian Redistribution*. Princeton University Press, pp.87-112.

Mukherjee, Bumba and David Singer. 2010. "International Institutions and Domestic Compensation: The IMF and the Politics of Capital Account Liberalization." *American Journal of Political Science* 54(1):45-60.

Obstfeld, Maurice and Taylor, Alan. 2003. "Sovereign risk, credibility and the gold standard: 1870–1913 versus 1925–31." *The Economic Journal*, 113:241–275.

Pan, Jun and Kenneth Singleton. 2008. "Default and Recovery Implicit in the Term Structure of Sovereign CDS Spreads." *The Journal of Finance*, 63:2345–2384.

Plümper, Thomas ,Vera E. Troeger and Hannes Winner. 2009. "Why is There No Race to the Bottom in Capital Taxation?" *International Studies Quarterly* 53(3):761-786.

Quinn, Dennis P. and A. Maria Toyoda. 2007. "Ideology and Voter Preferences as Determinants of Financial Globalization." *American Journal of Political Science* 51 2: 344–363.

Reinhart, Carmen, Kenneth S. Rogoff and Miguel A. Savastano. 2003. "Debt Intolerance." *Brookings Papers on Economic Activity,* no. 1:1-74.

Remolona, Eli M, Michela Scatigna and Eliza Wu. 2007. "Interpreting sovereign spreads" *BIS Quarterly Review*, Bank for International Settlements. March: 27-39. Available at: http://www.bis.org/repofficepubl/arpresearch_fs_200703.02.pdf

Rudra, Nita. 2008. *Globalization and the Poor: Who Really Gets Hurt in Developing Countries?* Cambridge: Cambridge University Press.

Saiegh, Sebastian. 2005. "Do Countries Have a 'Democratic Advantage?' Political Institutions, Multilateral Agencies, and Sovereign Borrowing." *Comparative Political Studies* 38(4):366-387.

Santiso, Javier. 2003. The Political Economy of Emerging Markets: Actors, Institutions and Financial Crises in Latin America. New York: Palgrave Macmillan.

Schwartz, Herman. 2009. *Subprime Nation.* Ithaca: Cornell University Press.

Simmons, Beth A. and Zachary Elkins. 2004. "The Globalization of Liberalization: Policy Diffusion in the International Economy." *American Political Science Review* 98(1).

Spanakos, Anthony Peter and Lucio R. Renno. 2009. "Speak Clearly and Carry a Big Stock of Dollar Reserves: Sovereign Risk, Ideology, and Presidential Elections in Argentina, Brazil, Mexico, and Venezuela." *Comparative Political Studies* 42:1292-1316.

Tomz, Michael. 2007. *Reputation and International Cooperation: Sovereign Debt Across Three Centuries.* Princeton: Princeton University Press.

Vaaler, Paul M., Burkhard N. Schrage, Steven A. Block. 2006. "Elections, Opportunism, Partisanship and Sovereign Ratings in Developing Countries" *Review of Development Economics* 10 (1):154–170.

_____. 2005. "Counting the investor vote: political business cycle effects on sovereign bond spreads in developing countries" *Journal of International Business Studies* 36:62–88.

Wibbels, Erik. 2006. "Dependency Revisited: International Markets, Business Cycles, and Social Spending in the Developing World" *International Organization*. 60:433-468.