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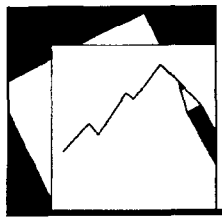

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Emerging Market Bond Spreads and Sovereign Credit Ratings: Reconciling Market Views with Economic Fundamentals

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Emerging Market Bond Spreads and Sovereign Credit Ratings: Reconciling Market Views with Economic Fundamentals

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Abstract

This paper uses a panel data estimation of a simple univariate model of sovereign spreads on ratings to analyze statistically significant deviations from the estimated relationship. We find evidence of an asymmetric adjustment of spreads and ratings when such deviations are significant. In addition, the paper illustrates how significant disagreements between market and rating agencies' views can be used as a signal that further technical and sovereign analysis is warranted. For instance, we find that spreads were "excessively low" for most emerging markets before the Asian crisis. More recently, spreads were "excessively high" for a number of emerging markets.

JEL Classification Numbers: G15, G20, F3

Keywords: Bond spreads, credit ratings, monitoring, sovereign risk, risk appetite

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I. INTRODUCTION

Emerging market bond spreads over U.S. Treasuries are often used as an indicator of sovereign risk. In fact, sovereign spreads are a function of credit risk and are often used to gauge market assessment of a country's economic and political fundamentals and as a proxy for capital market access. In addition, sovereign spreads depend on interest rate and currency risk as well as technical factors such as liquidity conditions and changes in the investor base for a particular country's bonds.

Similarly, sovereign ratings convey analysts' views of a country's economic and political risk variables. Rating agencies view ratings as providing a forward-looking indication of the relative risk that a debt issuer will have the ability—and willingness—to make full and timely payments of principal and interest over the life of a particular rated instruments. The agencies, however, do not regard their ratings as providing either a prediction of the timing of default or an indication of the absolute level of risk associated with a particular financial obligation.

Empirical studies find that sovereign ratings are generally consistent with economic fundamentals. For instance, Cantor and Packer (1996), using ratings from Moody's and S&P's on 49 countries as of September 1995 find that high ratings were associated with high per capita income, low inflation, more rapid growth, a low ratio of foreign currency external debt to exports, the absence of a history of default on foreign currency debt since 1970, and a high level of economic development (as measured by the IMF's classification as an industrial country). In a follow-up study, Juttner and McCarthy (1998) find that the factors identified by Cantor and Packer continued to adequately explain ratings in 1996 and 1997, but that this relationship broke down in 1998, in the wake of the Asian crisis. For 1998, additional variables appeared to have come into play—notably, problematic bank assets as a percent of GDP and the interest rate differential.

There is also evidence that sovereign ratings are key determinants of the pricing of sovereign bonds and that sovereign spreads incorporate market participants' views of expected credit rating changes (see Erb, Harvey, and Viskanta (2000)). In particular, trading strategies based on anticipations of the rating cycle are commonly used by market participants seeking to exploit profit opportunities. Furthermore, since investment restrictions are often based on credit ratings especially for institutional investors, portfolio managers monitor credit rating changes closely.

The relationship between sovereign ratings and spreads can help compare sovereign spreads on a rating-adjusted basis. It can also be used to contrast market views of a country's economic and political fundamentals with rating agencies' assessment of the same variables. This paper studies the relationship between emerging market sovereign spreads and ratings on their long-term foreign currency denominated debt in order to develop a simple framework for the monitoring of market and rating agencies' views on emerging markets. Unlike most studies which use cross-section analysis, this paper uses panel data estimation to exploit the cross-sectional and time series dimensions of sovereign spreads and ratings.

Using J.P. Morgan EMBI+ country spreads and an average of Moody's and S&P's long-term foreign currency debt for 17 emerging market countries (Argentina, Brazil, Bulgaria, Colombia, Ecuador, Korea, Mexico, Morocco, Panama, Peru, the Philippines, Poland, Qatar, Russia, South Africa, Turkey, and Venezuela), from January 1994 to April 2001, we document a few stylized facts and illustrate how the relationship between sovereign spreads and ratings can be used as a first stage in the analysis of market and rating agencies' views of emerging markets.

We find, not surprisingly, that there is a negative association—as measured by the Spearman rank correlation—between sovereign spreads and ratings, with higher ratings being associated with lower spreads. Furthermore, we find that this relationship has strengthened over the years. In addition, we find that the dispersion of spreads—as measured by the coefficient of variation—for similarly rated countries increased during the 1998 crisis, indicating that there was increased discrimination between countries during a crisis, but that this greater differentiation was not based on credit ratings. This result suggests, again not surprisingly, that market participants rely on factors other than ratings to differentiate between countries during episodes of market turbulence.

Using an unbalanced panel data estimation, we fit a simple univariate model of log spreads on ratings. The residuals of this estimation are used to analyze statistically significant deviations from the calculated relationship between market views and fundamentals. We find that sovereign spreads and ratings adjust differently depending on whether spreads are "excessively high"—defined as deviations above the 95 percent confidence interval—or "excessively low"—that is for observations below the 95 percent confidence interval. Indeed, our results indicate that periods with "excessively high" spreads are on average followed by episodes of spread tightening one month later rather than credit downgrades. In contrast, observations with "excessively low" spreads are on average followed by rating upgrades 3 months later rather than episodes of spread widening. These results suggest an asymmetric adjustment when actual spreads are significantly different from fitted spreads which are spreads justified by economic and political fundamentals, as measured by rating agencies. These findings suggest the existence of a predictability pattern in emerging market spreads, which could be exploited by investors.

Finally, as an illustration of the use of the relationship between sovereign spreads and ratings for the monitoring of market and rating agencies' views of emerging markets, an analysis of the panel estimation results finds that most emerging market spreads were "excessively low" before the Asian crisis. In contrast, in April 2001, Argentina, Turkey, and the Philippines had "excessively high" rating-based spreads while Brazil had rating-based spreads very close to the "excessively high" levels. The paper argues that such significant deviations from the levels predicted by ratings alone should indicate that increased scrutiny of a country's fundamentals and market technicals are warranted. The suggested framework is flexible enough to accommodate refinements such as a multivariate model of spreads or the use of "corrected" sovereign ratings obtained through in-house models.

The rest of the paper is organized as follows. Section II briefly reviews the literature on the relationship between sovereign spreads and ratings while section III documents a few stylized facts and studies in more details such a relationship. Section IV suggests a simple framework for the monitoring of market and rating agencies' views of emerging markets, and finally section V concludes.

II. REVIEW OF THE LITERATURE

Our paper is closest in spirit to market analysis which compares sovereign or corporate bond spreads on a rating-adjusted basis. For instance, a study by Deutsche Bank (2000) finds that a combination of technical factors and credit fundamentals could explain the observation that, on a rating-adjusted basis, Asian bonds were trading at between 150bp to 175bp tighter than Non-Asian (ex-Russia) bonds in 1999-2000.

The technical factors cited were mostly liquidity conditions and a broadening investor base that increased the demand for Asian bonds hence leading to tighter spreads. Indeed, in 1999-2000 the demand for Asian fixed-income instruments was said to have increased temporarily thanks to a combination of surging current account surpluses, financial sector recapitalization, improved liquidity in the interbank market, corporate deleveraging, and the entry of investor grade investors attracted by Asian investment grade such as Korea. In addition, the study describes an approach which consists in "correcting" ratings provided by agencies and compare these forward looking fitted ratings with market spreads in order to uncover profitable trading strategies.

Similarly, Erb, Harvey, and Viskanta (2000) show the importance of country risk in the pricing and returns of emerging market bonds. They sort every month the countries in the EMBI Global into two portfolios depending on the prior month's ICRG composite rating (Political Risk Services' International Country Risk Guide Composite Rating). They find that the riskier portfolio outperforms the less risky portfolio and the benchmark, but at substantially higher volatility and beta. As a result, they conclude that country risk discriminates between high and low expected return countries and that we should not be surprised to see that perceptions of country risk are reflected in sovereign yields and county bond returns.

Erb, Harvey, and Viskanta (2000) also show that commonly used country risk ratings do an impressive job in explaining the cross-section of real yields in a sample of developing market bonds. They examine the relation between Institutional Investor's country credit ratings and the spread over US Treasuries for the EMBI Global universe of countries. For each country, they estimate the spread for a 4-year spread duration on September 30, 1999. One of their main recommendation is that analysts need to concern themselves with the reasons behind the deviations from the calculated relationship between spreads and risk ratings in order to add value above and beyond a given benchmark. They suggest that, in the case of outliers, deciding whether the market is improperly estimating country risk or mispricing certain bonds is the key to active emerging market bond selection and that part of the issue may be that the market is

already anticipating credit risk adjustments. As a result, forecasting future risk profiles adds another dimension to the analyst's job in active bond management.

All the previously described studies use secondary market data and cross-sectional analysis. In contrast, Eichengreen and Mody (1998) and Kamin and Kleist (1997) use a time series of primary market spreads for a sample of emerging market bonds. Kamin and Kleist (1997) analyze issue spreads on bonds and use country credit ratings, industrial country interest rates, time trends, and Mexican dummies to find that Latin American spreads are on average 39 percent higher than Asian spreads for a comparable credit rating. Eichengreen and Mody (1998) refine this analysis by controlling for the likelihood of new issues by different classes of borrowers (sovereign, public, private, and by region).

Unlike the rest of the literature, this paper studies the relationship between secondary market spreads on the EMBI+ country indices and sovereign ratings by using an unbalanced panel data estimation rather than a cross-sectional analysis. We choose secondary rather than primary market spreads as they are more likely to incorporate current market assessment of a country's economic and political fundamentals. In addition, they are less likely to depend on supply factors at the time of issuance. For instance, Eichengreen and Mody (1998) document that in poor market conditions, primary market spreads do not rise proportionately and even fall at times, when secondary market spreads rise. They attribute this observation to the tendency for the number of issues to fall and for only the less risky borrowers to remain in the market during such turbulent times.

III. The Relationship between Emerging Market Spreads and Ratings

A. Spreads and Ratings: Stylized Facts

Data Description

We use sovereign stripped spreads from January 1994 to April 2001, for 17 rated countries which have been included or are still part of the J.P. Morgan EMBI+. These countries are Argentina, Brazil, Bulgaria, Colombia, Ecuador, Korea, Mexico, Morocco, Panama, Peru, the Philippines, Poland, Qatar, Russia, South Africa, Turkey, and Venezuela. Since December 31, 1993, the Emerging Market Bond Index Plus tracks most traded external-currency-denominated debt instruments in the emerging markets and offers one of the longest and most comprehensive emerging market spreads series.

We use EMBI+ sovereign spreads as calculated by J.P. Morgan rather than traditional spreads over U.S. Treasuries as they control for floating coupons, unusual features, and principal collateral and rolling interest guarantees. Although the EMBI+ country indices are weighted averages of all external-currency-denominated individual bonds issued by a particular country, we find them useful because they are readily available and because we are interested in the

monitoring of market and rating agencies' views of emerging markets and not in the relative valuation of one particular bond versus another.

Although the EMBI+ index is heavily biased toward Latin American debt and Brady bonds, it has several features that are useful for our analysis. Indeed, since we are interested in market and rating agencies' views of a member country, we can directly use the EMBI+ country indices and avoid the nontrivial task of using the spreads on individual debt instrument to form portfolios for each country. Furthermore, the fact that Bradys as well as most bonds in the index are U.S. dollar denominated, makes the issue of controlling for foreign exchange risk irrelevant as there is little or no currency risk premium in the spreads.

Furthermore, since all instruments included in the index must satisfy certain liquidity criteria, the spreads used in our analysis have little or similar liquidity risk premia. In fact, instruments in the EMBI+ must have a minimum $500 million of face value and must be available and liquid. J.P. Morgan's liquidity ratings are based on a bond's face amount outstanding, its average bid-ask spreads, and the number of designated brokers quoting it. Furthermore, market participants agree that most benchmark emerging market bonds are highly liquid, even more than U.S. high yield bonds.

Although we do not use data on duration to control for interest rate risk, all bonds included in the index have a remaining maturity greater than 2.5 years. Furthermore, since the average maturity of most country indices are comparable, we find it reasonable to assume that duration considerations would not change our results substantially.

We also use the average of monthly Moody's and S&P's Long Term Foreign Currency ratings form January 1994 to April 2001[2]. Since a bond can only be added to the EMBI+ index as long as the country from which it is issued receives a rating of BBB+/Baa1 or lower from either S&P or Moody's, all the ratings used satisfy this requirement. Rating agencies claim that sovereign ratings combine a number of political and economic variables. For instance, Standard & Poor's (1998) report that such economic factors include a country's income and economic structure, economic growth prospects, fiscal flexibility, public debt burden, price stability, balance of payment flexibility, and external debt and liquidity. In addition, political variables include a country's form of government and adaptability of political institutions, the extent of popular participation, the orderliness of leadership succession, the degree of consensus on economic policy objectives, its integration into global trade and financial system, and its internal and external security risks.

Although credit ratings represent analysts' view of a particular country's economic and political fundamentals, a number of studies (Cantor and Packer (1996), Ul Haque, Kumar, Mark, and

[2] We convert S&P's and Moody's ratings to numerical values using a linear scale from 0 to 20 with SD and CC/Ca ratings corresponding to values of zero and 1 respectively, and AAA/Aaa ratings being assigned a value of 20.

Mathieson (1996), Juttner and McCarthy (1998), Monfort and Mulder (2000), and Mulder (2001)), have found a close association between credit ratings and a reduced number of macroeconomic variables. Nonetheless, the framework suggested in this paper is flexible enough to incorporate additional variables as well as disagreements with observed ratings. In addition, more forward looking information such as the rating outlook on a particular country could be easily included.

Stylized Facts

Although sovereign spreads are more volatile than ratings, a graph of average sovereign spreads and ratings from 1994 to 2001 (Figure 1) shows a striking progression in the relationship between spreads and ratings. Since the early days of emerging market debt trading in 1994, there seems to be a stronger relationship between the two variables or in other words, credit ratings seem to explain sovereign spreads better. To document this observation, we study the Spearman rank correlation between spreads and ratings for the 17 emerging market countries in the sample. We also document whether there is evidence of increased differentiation during the 1998 market turbulences.

Rank Correlations

We compute Spearman rank correlations[3] between J.P. Morgan EMBI+ sovereign spreads and the average of Moody's and S&P's ratings for each year since 1994 to 2001 and for the whole sample (1994-2001). The rank correlation between sovereign spreads and ratings has always been negative and has increased (in absolute value) from -0.35 in 1994 to -0.93 in 2001 (see Table 1 and Figure 2). Furthermore, this relationship has increased every year since 1994, with the exception of 1997 and 1998, illustrating a negative association between sovereign spreads and ratings (higher ratings corresponding to lower spreads).

Table 1. Emerging Market Spreads and Ratings: Spearman Rank Correlations from 1994 to 2001

	1994-2001	2001	2000	1999	1998	1997	1996	1995	1994
Spearman Rank Correlation	-0.74	-0.93	-0.90	-0.85	-0.74	-0.73	-0.78	-0.64	-0.35
Number of obs	915	64	185	173	148	120	88	79	58
p-value	0.0000	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0063
* up to April 2001									

Spreads Coefficient of Variation by Rating

As a measure of dispersion of spreads by rating, we compute the coefficient of variation of spreads. Figure 3 shows that the coefficient of variation increased in 1998 for most ratings, indicating that spreads for similarly rated countries are more dispersed during a crisis. Indeed,

[3] See Scholtens (1999) for a similar approach using Institutional Investor's ratings.

there is less discrimination in the 1998 crisis year as compared to the year before the crisis (for those rating categories with available data for both years). However, the increased differentiation between countries was not based on credit ratings. This suggests that during episodes of great market stress, market participants discriminate more among countries with the same ratings.

Cross-section Regressions

A simple regression of log spreads on ratings for each year shows that there is a negative relationship between spreads and ratings with higher rated sovereign debt being associated with lower spreads. Furthermore, the strength of the relationship increases over time as indicated by the increasing R^2. Table 2 shows that the explanatory power of the regression has increased from .15 in 1994 to .81 in 2001. This could be due to the fact that there were very few rated countries in the EMBI+ index in 1994 and that this number has increased gradually with time. Over the whole sample however, the R^2 is 0.56 and the obtained results are statistically significant. Interestingly, the R^2 coefficient has declined during periods of market turbulence, such as in 1997 and 1998 indicating that the relationship between spreads and ratings is less significant during period of crises.

Table 2. Emerging Market Spreads and Rating: Cross-section Regressions

	1994-2001	2001*	2000	1999	1998	1997	1996	1995	1994
R square 1/	0.56	0.87	0.76	0.79	0.63	0.53	0.69	0.51	0.15
Constant 1/	8.33	8.27	7.83	8.63	9.16	7.48	9.33	10.2	8
Slope 2/	-0.24	-0.23	-0.18	-0.27	-0.32	-0.19	-0.39	-0.42	-0.18

* up to April 2001.

1/ Cross-section regression of monthly log spreads on ratings

2/ Intermarket quality spreads (risk appetite).

Risk Appetite

The regression estimates indicate that both the slope and the intercept coefficients are time-varying (see Table 2 and Figure 2). The slope can be interpreted as the intermarket quality spread as it measures investors' perception of default risk and the relative cost of financing for low rated countries compared to higher rated sovereigns. It indicates how much the market would charge a low rated borrower as compared with a high rated borrower. As such this measure can be seen as an indicator of market sentiment. Similarly, the intercept of the regression can be interpreted as the market overall attitude toward risk (see Eichengreen and Mody (1998) for a similar interpretation of both variables). Both measures indicate that there was higher risk appetite in 1994 and 1997, the periods before the Peso and Asian crises. In 2000, these measures were also at relatively high levels. In contrast, these measures indicate very reduced appetite for risk in 1995-1996 and 1998.

B. A Univariate Model of Bond Spreads

We use a univariate model of sovereign bond spreads in order to determine significant differences between market and rating agencies' views of a country's fundamentals. To fully exploit both the cross-sectional and time series nature of the data set, we use unbalanced panel data estimation of log spreads on a numerical transformation of average credit ratings. The relationship between spreads and ratings can be expressed as follows,

$$y_{it} = \alpha_i + \beta_i' x_{it} + \varepsilon_{it} \qquad (1)$$

for i = 1, 2,...,17 cross-section units and periods t = 1, 2, ...88 giving a total unbalanced panel of 915 observations as they were very few emerging market countries with rated foreign-currency external debt in 1994. The dependent variable is the log of sovereign spreads for a particular country's external debt in the EMBI+ and the independent variable is the average of Moody's and S&P's long-term country sovereign external debt ratings.

We first estimate a model with a common intercept $\alpha_i = \alpha$ where all coefficients are restricted to be the same across all countries thereby ignoring all cross-sectional information. The results show (see Table 3) a R^2 coefficient of 0.56. The constant term which can be interpreted as an indicator for overall market sentiment for risk is statistically significant and comparable to levels reached in 1999 and 2001. Similarly, the slope of the regression, which indicates the spread differential paid by riskier borrowers is significant and comparable to the 1999 and 2001 levels.

We then use the same general specification as above, but with fixed effects for the intercept specification, $\alpha_{it} = \alpha_i$, $E(\alpha_i \varepsilon_{it}) \neq 0$, (see Table 4). The R^2 coefficient increases to 0.68 but with a less steeper slope of -0.15 indicating a reduction in the overall relative cost of financing (slope coefficient) and an overall indicator of market sentiment (intercept) smaller than the 1995 and 1998 crisis levels. Among the countries in the sample, Ecuador and Russia have the highest constant terms which is not surprising since they are the only countries that have defaulted in the sample. This result indicates that the market penalizes countries it regards as having defaulted by requiring an overall risk premium higher than that of other countries. In contrast, South Africa and Korea have the lowest constant terms indicating a lower overall risk premium. Interestingly enough, these countries have consistently been among the highest rated credits in the sample.

We also regress log spreads on ratings and on spreads of the Merrill Lynch U.S. high yield bond index to control for the time series variation in the overall price of risk. In particular, we estimate the following relationship:

$$y_{it} = \alpha_i + \beta_i' x_{it} + \gamma z_t + \varepsilon_{it} \qquad (2)$$

where all the variables are defined as before except z_t which denotes the monthly spreads over U.S. Treasuries for the Merrill Lynch U.S. high yield index. This index is often used as an indicator of overall riskiness for both the emerging market and U.S. high yield asset classes. The results are approximately the same as before (see Table 5). The coefficient of the U.S. high yield bond spreads is not economically significant and the fixed effects coefficients barely change which suggests that the time-series variation of the previously obtained residuals are not just a reflection of changes in the overall price of risk.

C. Analysis of Outliers

Deviations from Rating-based Value

The fitted spreads obtained through the panel data estimation of the relationship between sovereign spreads and ratings can be seen as the average spreads warranted by current ratings. More loosely, they can be interpreted as the spreads warranted by credit rating agencies' view of a particular country's economic and political fundamentals. When actual market spreads for a sovereign are significantly different from fitted spreads, or in other words when the regression's outliers are significantly different from zero, it is reasonable to assume the following two explanations:

1. Either actual ratings can be justified by economic and political fundamentals, in which case, market participants are mispricing the sovereign's bonds or;
2. Market participants are anticipating future credit rating adjustments and actual ratings are not justified by fundamentals.

Figure 4 offers a simple illustration of the dynamic relationship between spreads and ratings. In this example, Country Y has actual spreads that are higher than fitted spreads which lie on the curve. These "excessively high" spreads could result in subsequent spread tightening if market participants judge that economic and political fundamentals do not warrant the current level of spreads. Another possibility is that markets are anticipating a rating downgrade and rating agencies could subsequently downgrade the sovereign's ratings thereby confirming the market's negative view on the country's fundamentals.

In contrast, Country X has "excessively low" spreads which lie below the fitted curve. These spreads could be justified by market expectations of an upgrade. Another possibility would be a mispricing of the country's bonds which would result in a future spread widening.

Of course in reality, the relationship between spreads and ratings could be more complicated as spreads are a function of both credit fundamentals and technical factors. As a result, Country X's "excessively low" spreads could also be justified by technical factors. For instance, Deutsche Bank (2000) suggests that in 1999-2000, technical factors such as liquidity conditions and a broadening investor base increased the demand for Asian bonds hence leading to tighter spreads. The reasons for the increased liquidity included a temporary combination of surging C/A surpluses, financial sector recapitalization, easing monetary policy (increased liquidity in

the interbank market), corporate deleveraging, and the entry of investor grade investors attracted by Asian investment grade such as Korea. Similarly, a particular country's spreads could be "too low" because market participants are willing to pay a scarcity premium in order to hold its bonds.

In contrast, technical factors such as rumors, investors' trading strategies, or large capital movements by certain players could lead to "excessively high" spreads. For instance, traders may take short positions during a sell off triggered by bad news in a particular country, thereby pushing spreads well above the levels warranted by the initial bad news. Subsequently, spreads can swing in the other direction as traders begin to cover their shorts and this "pendulum effect" can occur until an equilibrium is found (see Vine (1995) for an illustration of technical analysis of emerging market debt).

How do Ratings and Spreads Adjust Following "Excessively High or Low" Spreads?

Do "high" spreads reflect market anticipation of deteriorating economic fundamentals (as measured by ratings), thereby implying an expected rating downgrade or do they reflect a temporary market underpricing implying a future spread tightening (price increase)? Similarly, do "low" spreads reflect market anticipation of improving economic fundamentals (as measured by ratings), implying market expectations of a rating upgrade or do they reflect a temporary market overpricing implying a future spread widening (price decrease)?
We address these questions by defining countries with "excessively high (low)" spreads as those countries for which the outliers of the panel estimation of log spreads on credit ratings are above (below) the 95 percent confidence bands, in a particular month (see Figure 5-6).
By identifying these outliers and differentiating between "excessively high and low" spreads, we find evidence that spreads adjust in an asymmetric fashion, when there are significant deviations from the estimated relationship between sovereign spreads and ratings. Our results indicate—not surprisingly—that ratings do not change frequently following "excessively high and low" spreads. However, when they do change, rating adjustments have the expected sign. In contrast, spreads are very volatile but do not necessarily adjust in the expected direction.

We find that, when spreads are "excessively low," the rating upgrade effect dominates the spread widening effect which suggests that spreads incorporate market participants' expectations of a rating upgrade. In contrast, when spreads are "excessively high," the spread tightening effect is more important than the downgrade effect which could indicate that bonds were mispriced.

In particular, when spreads are "too low," we find that there is a 50 percent likelihood of a widening or a tightening over the next month (see Table 6). However, when ratings change, there is an expected rating upgrade 3 months later in 13 percent of the cases and an unexpected downgrade in only 3 percent of the cases. In contrast, there is evidence of market mispricing when actual spreads are "too high" relative to fitted spreads. In fact, spreads tighten over the following month in 70 percent of the cases while ratings barely change. When they do change,

however, ratings are downgraded in 10 percent of the cases compared to 2 percent cases of rating downgrades.

We do not find enough evidence of rating adjustments for a one month horizon. In contrast, both rating and spread changes have the expected sign in an increased number of cases over longer horizons (6 and 3 months, respectively).

In the next section, we illustrate how the relationship between spreads and ratings could be used for the monitoring of market and rating agencies' views of emerging markets. The goal is to compare sovereign spreads on a rating-adjusted basis and identify countries that warrant increased scrutiny and further analysis because market participants are in disagreement with rating agencies (and more loosely with economic and political fundamentals).

IV. A Simple Tool for Monitoring Market and Rating Agencies' Views

When sovereign spreads and ratings are in disagreement, it may prove useful to examine in more detail the causes of the discrepancy between market views and economic fundamentals. As described above, we use statistically significant deviations from a panel data estimation of a univariate model of log spreads on ratings as a measure of such a disagreement. In this section, we relax the previously used definition of "excessively large" spreads and focus instead on outliers below or above the standard deviation of the regression.

Figure 5 illustrates deviations from rating-based spreads for the period[4] from January 1994 to June 1997. This period ends just before the July 1997 Thai devaluation and the estimation uses only the data available just before the Asian crisis. It is clear that most emerging market spreads—for which we have data—were "excessively low" indicating that either rating agencies found economic and political fundamentals not to be reflected in overoptimistic market spreads or market participants expected a rating upgrade in the near future. In any case, for the purpose of monitoring market and rating agencies' views of a member country, the model would have indicated that increased analysis of economic fundamentals and market technicals was warranted for Argentina, Bulgaria, Brazil, Mexico, the Philippines, Venezuela, and South Africa. In addition, Poland had spreads relatively close to the "excessively low" boundary.

More recently, when we use the whole sample from January 1994 to June 2001 to estimate the model, we find that emerging market spreads were either "excessively high" or relatively high. Figure 6 and Table 7 show the difference between actual spreads and fitted spreads in April 2001 for the set of countries in the J.P. Morgan EMBI+. Three countries, namely Argentina, Turkey, and the Philippines had "excessively high" spreads. In addition, Brazilian spreads were very close to being "excessively high." Our previous results suggest that more detailed analysis would have been warranted for these countries. For instance, were ratings justified by economic

[4] We do not fit the model for the period before the Peso crisis because of too short an horizon.

and political fundamentals? Were there other economic, financial, and political variables that were deteriorating for these particular countries?

In contrast, although there were no countries below the confidence intervals, residuals for Ecuador, Russia, Venezuela, Mexico, and Qatar were very close to the lower band. Were such low spreads justified? Did markets expect an upgrade? Were there technical factors that warranted such low spreads? Figure 7 illustrates the same relationship graphically and shows the difference between actual and fitted spreads. Again, Argentina, Turkey, and the Philippines clearly stand out.

A number of methods could be used to help answer these questions. One possibility would be to regress the residuals of the estimated relationship between log spreads and ratings on a number of candidate explanatory variables. For instance, bid-ask spreads and trading volume (when available) could be used as a proxy for liquidity. Another possibility, as described by Deutsche Bank (2000) is to assign "corrected" ratings to particular countries and estimate the relationship using these new ratings. These "corrected" ratings would presumably incorporate variables that have been overlooked by rating agencies.

In addition, it is equally important to analyze technical factors that could lead to substantial differences between rating-based and market spreads. For instance, knowledge of the investor base for a country's bonds and of market participants' trading strategies and positions can help explain the levels and movements of spreads. The nature of these technical factors suggests that a qualitative analysis of capital markets is necessary to complement any quantitative assessment of market participants' views.

V. Conclusion

This paper uses data on sovereign spreads and ratings for 17 emerging market countries to suggest a simple framework for the monitoring of market and rating agencies' views of emerging markets. The cross-sectional and time series nature of the data is used to present stylized facts on the relationship between sovereign spreads and ratings, and to estimate a simple univariate model of log spreads on average credit ratings.

Sovereign spreads and ratings are sometimes judged to be of little value because both did not fare well as crisis predictors in 1997. Indeed, prior to the Asian crisis, both spreads and ratings were very low (see IMF (1999)). This paper argues that disagreements between market and rating agencies' assessment of a country's economic and political fundamentals are useful. Significant differences could be used as a signal that further analysis of a country's fundamentals and of its market technicals is warranted. As an illustration, we find that sovereign spreads were "excessively low" prior to the Asian crisis. More recently, we are able to identify Argentina, the Philippines, and Turkey as having "excessively high" spreads in April 2001.

The framework developed in this paper is flexible enough to control for technical factors or disagreements with rating agencies by correcting actual ratings. For instance, one could adjust

ratings on a forward-looking basis, calculate fitted spreads, and analyze outliers. One could also control for independent variables to improve the explanatory power of the univariate model. Another direction for further analysis would be to use data on individual instruments and control for variables such as maturity, duration, rating outlook, recovery value, liquidity, and the presence of covenants such as collective action clauses, collateral, callable, and putable features. Although useful, the benefits of these improvements will have to be weighed against their costs in achieving the goal of assessing emerging markets' vulnerabilities.

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Figure 1
EMBI+ Sovereign Spreads and Average Ratings
Line shows fitted Log Spreads

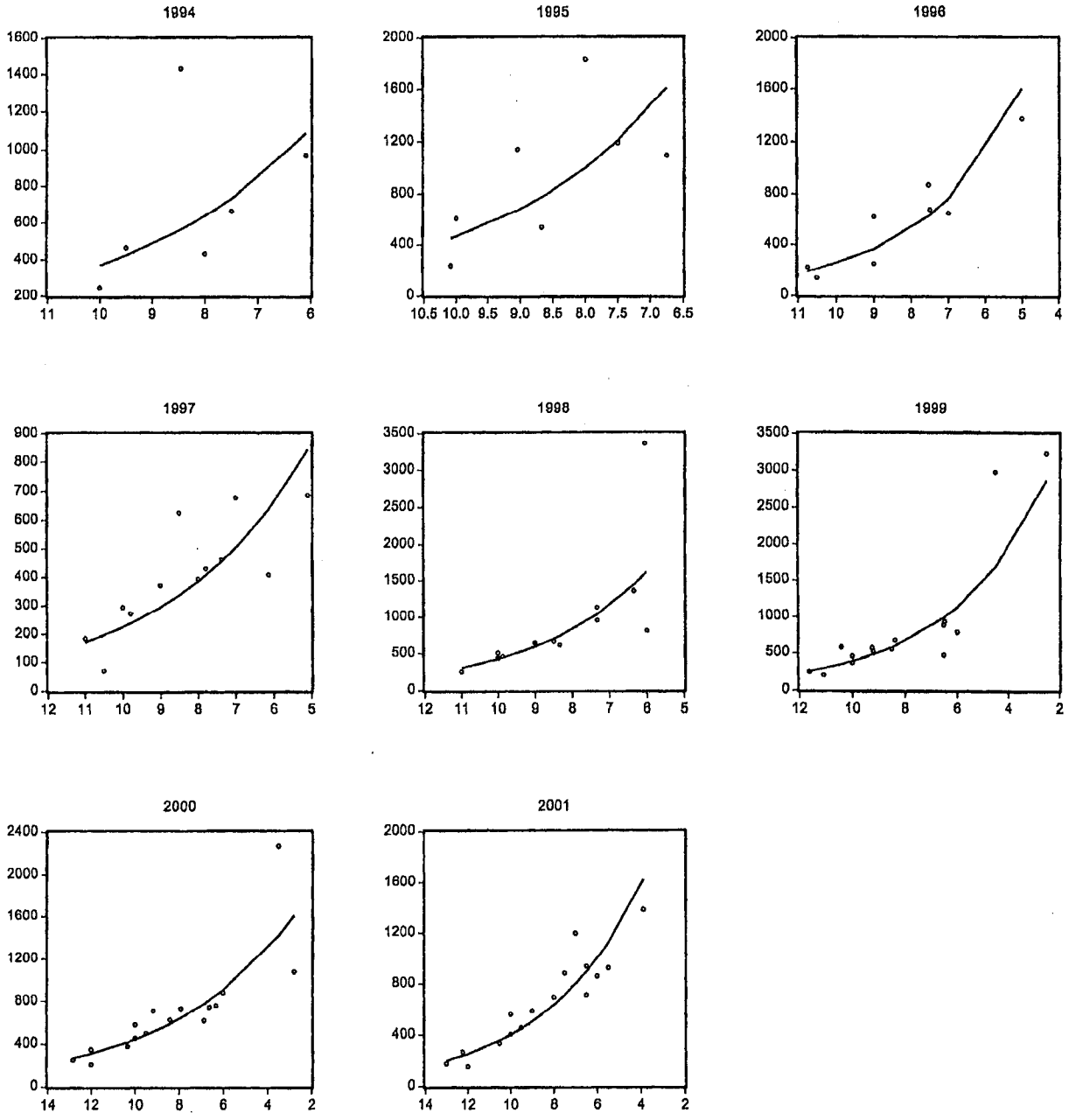
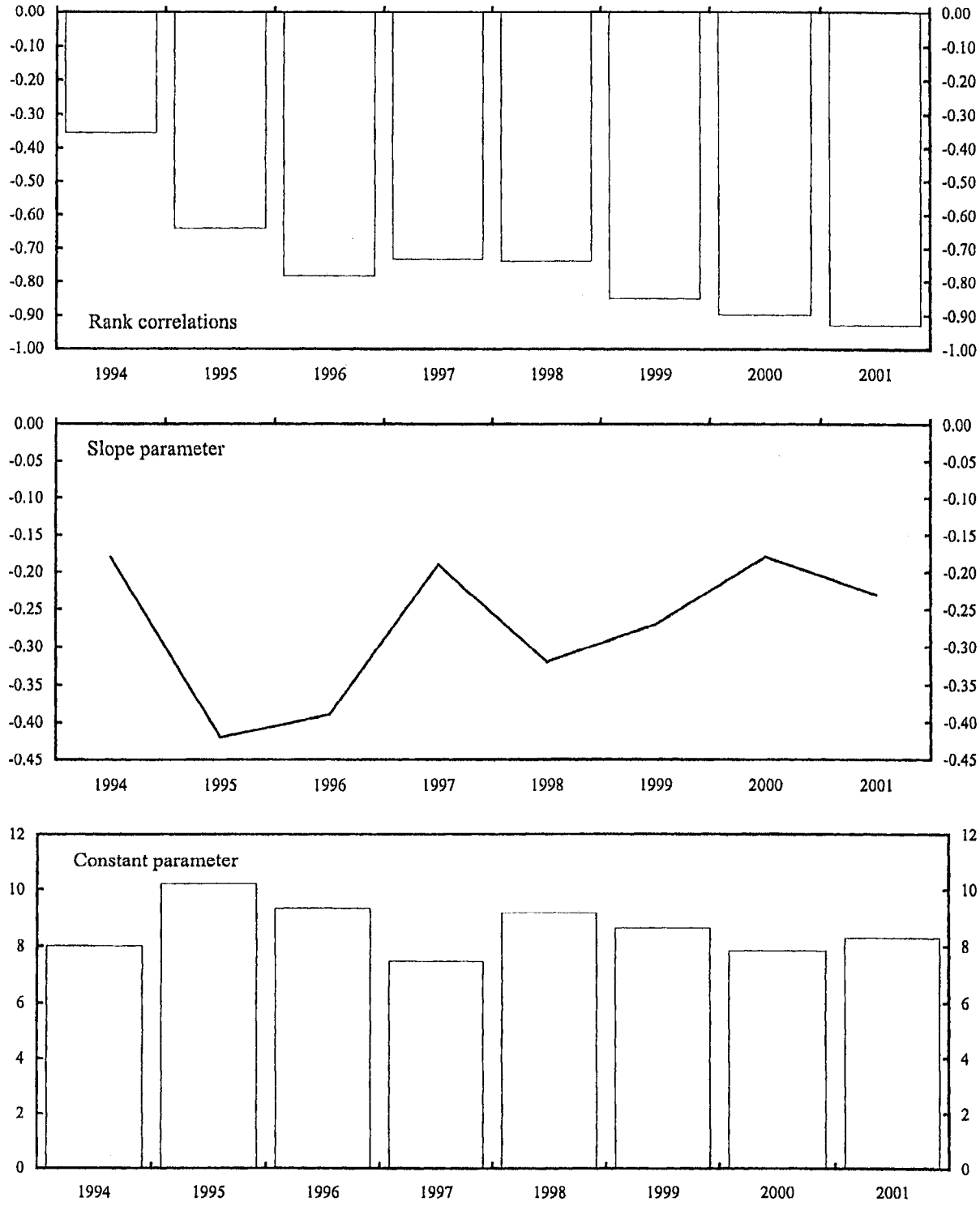


Figure 2. Emerging Markets: Spreads and Ratings (1994-2001) 1/



1/ Spearman correlation between spreads of EMBI+ country subindices and average of Moody's and S&P's ratings on sovereign foreign currency long-term debt.
2/ Parameters of a unbalanced panel data regression of log spreads on ratings using monthly data.

Figure 3
EMBI+ Spreads: Coefficient of Variation by Rating Category

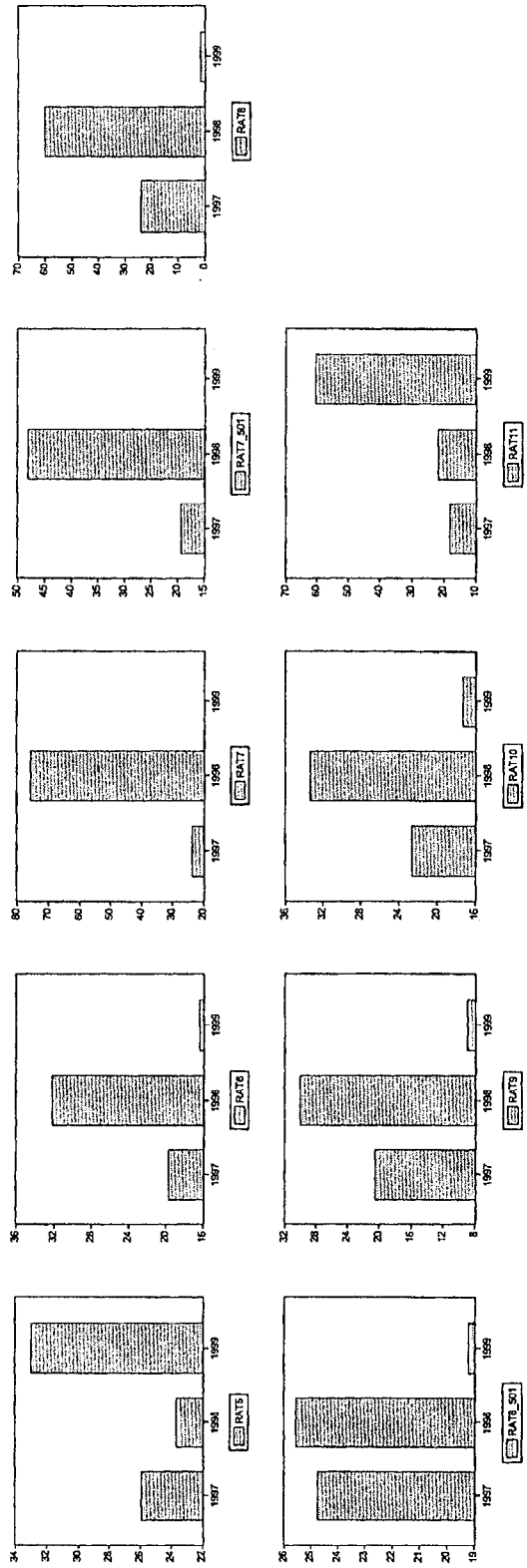


Figure 4
Spreads vs. Ratings Adjustment

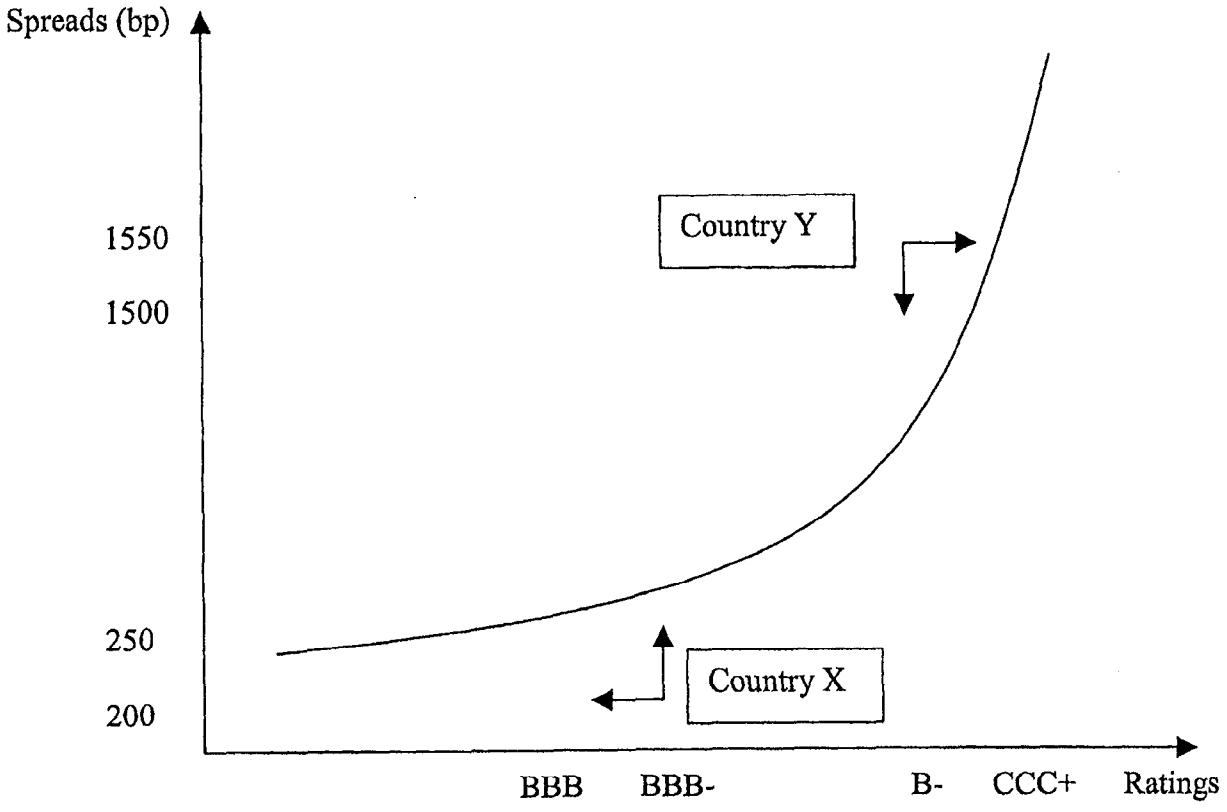


Figure 5
Residuals from the Panel Data Regression of Log Spreads on Ratings
January 1994- June 1997

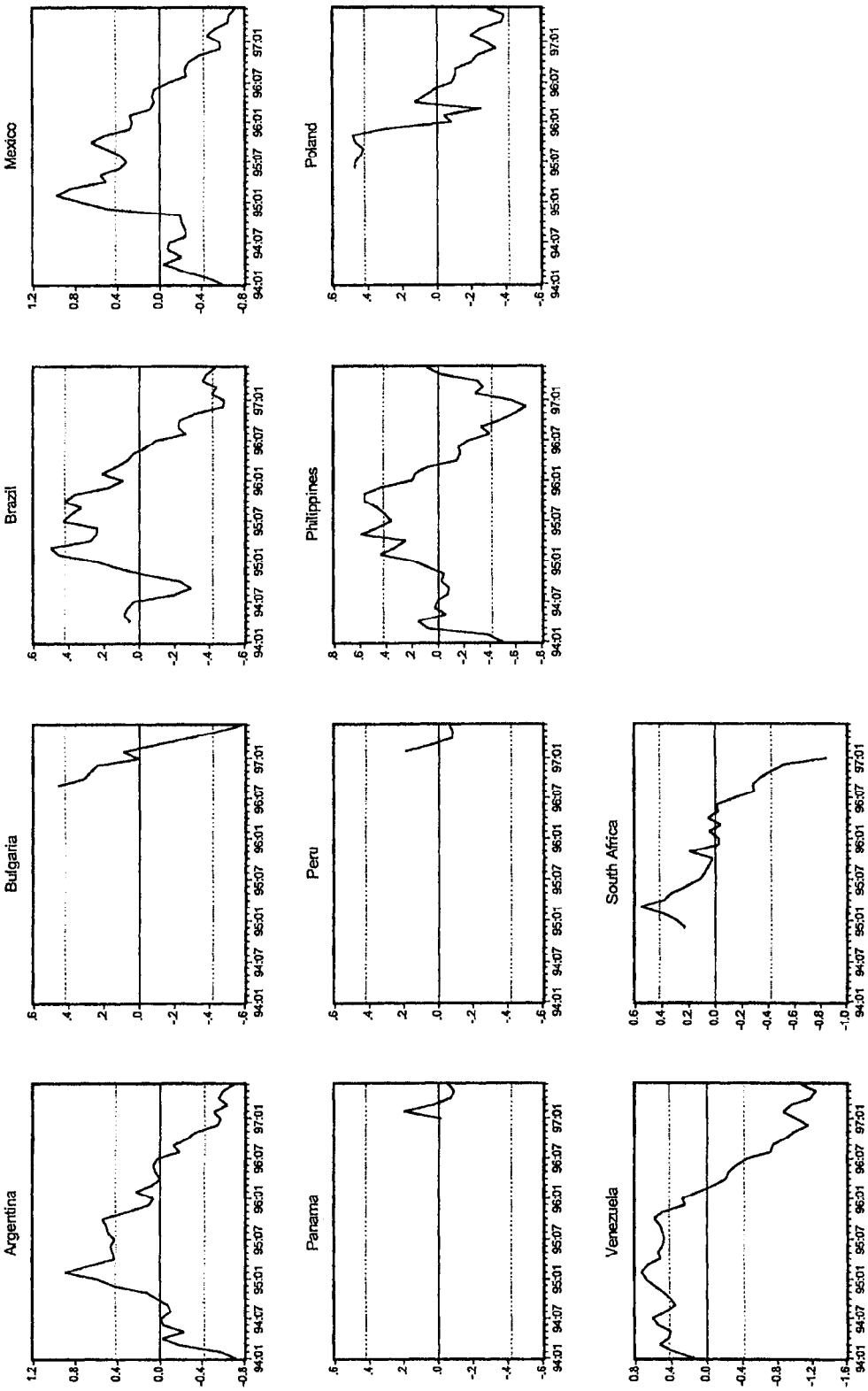


Figure 6
Residuals from the panel data regression of log spreads on ratings
January 1994- June 2001

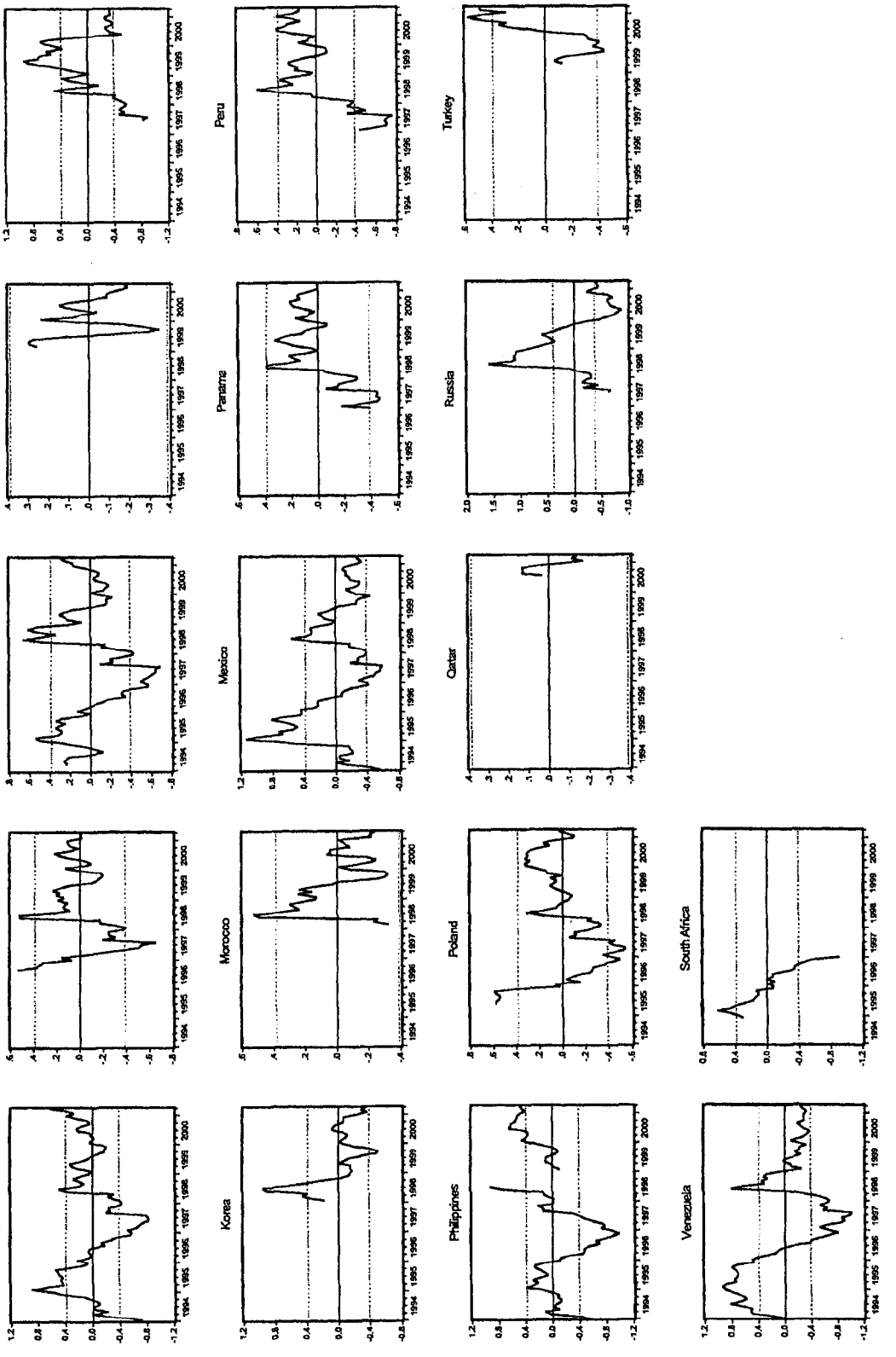


Figure 7. Actual Vs. Rating-based Spreads (April 2001)

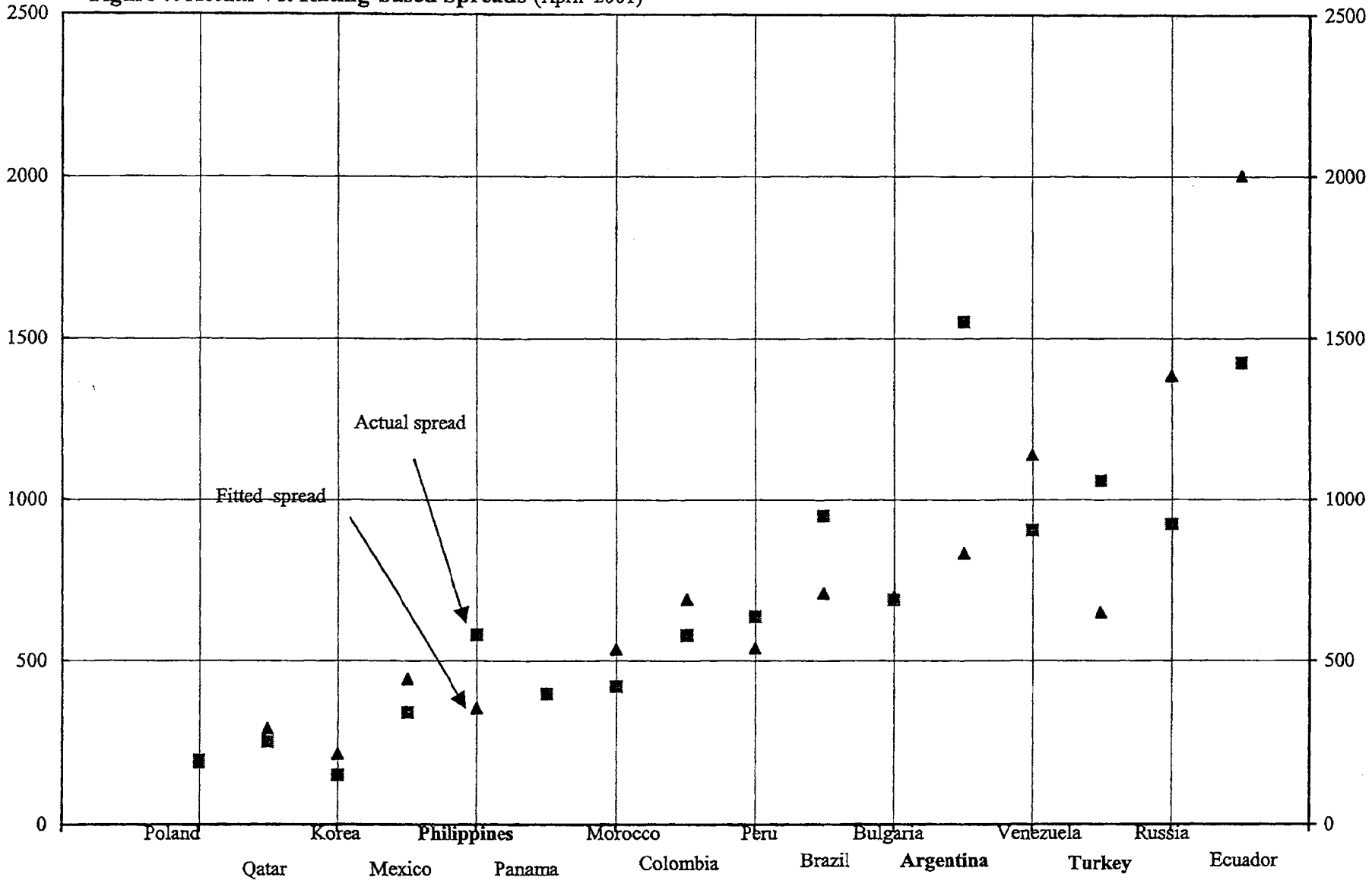


Table 3. A Univariate Model of Emerging Market Bond Spreads (Common Effects)

Unbalanced panel data estimation of $Y(i,t) = a(i) + b(i)X(i,t) + e(i,t)$

for i = 1, 2,...,17 cross-section units and periods t = 1, 2, ...88 from january 1994 to April 2001, giving a total unbalanced panel of 915 observations. The dependent variable is the log of sovereign spreads for a particular country's external debt in the EMBI+ and the independent variables are numerical equivalents of the average of Moody's and S&P's long-term country sovereign external debt rating.

The model is estimated with a common intercept where all coefficients are restricted to be the same across all countries thereby ignoring all cross-sectional information.

Variable	**Coefficient**	**Std. Error**	**p-value**
constant	8.330	0.060	0.000
Ratings	-0.238	0.007	0.000
R-squared	0.561		
Adj. R-Squared	0.561		
F-Statistic	1168.224		
p-value	0.000		

Table 4. A Univariate Model of Emerging Market Bond Spreads (Fixed Effects)

Unbalanced panel data estimation of $Y(i,t) = a(i) + b(i)X(i,t) + e(i,t)$

for i = 1, 2,...,17 cross-section units and periods t = 1, 2, ...88 from january 1994 to April 2001, giving a total unbalanced panel of 915 observations. The dependent variable is the log of sovereign spreads for a particular country's external debt in the EMBI+ and the independent variables are numerical equivalents of the average of Moody's and S&P's long-term country sovereign external debt rating.

The model uses the same general spefication as in Table 3, but with fixed effects for the intercept specification

Variable	**Coefficient**	**Std. Error**	**p-value**
Ratings	-0.146	0.017	0.000
R-squared	0.683		
Adj. R-Squared	0.677		
Fixed Effects			
Argentina	7.670		
Bulgaria	7.494		
Brazil	7.653		
Colombia	7.846		
Ecuador	8.112		
Korea	7.127		
Morocco	7.665		
Mexico	7.628		
Panama	7.447		
Peru	7.452		
Philippines	7.331		
Poland	7.143		
Qatar	7.503		
Russia	8.034		
Turkey	7.348		
Venezuela	7.912		
South Africa	6.649		

Table 5. A Bivariate Model of Bond Spreads

Unbalanced panel data estimation of $Y(i,t) = a(i) + b(i)X(i,t) + cZ(t) + e(i,t)$

for $i = 1, 2,...,17$ cross-section units and periods $t = 1, 2, ...88$ from january 1994 to April 2001, giving a total unbalanced panel of 915 observations. The dependent variable is the log of sovereign spreads for a particular country's external debt in the EMBI+ and the independent variables are numerical equivalents of the average of Moody's and S&P's long-term country sovereign external debt rating and spreads of the Merrill Lynch U.S. High Yield bond index.

Variable	**Coefficient**	**Std. Error**	**p-value**
Ratings	-0.146	0.017	0.000
Spreads on U.S. High Yield/Bonds	0.001	0.000	0.000
R-squared	0.695		
Adj. R-Squared	0.689		
Fixed Effects			
Argentina	7.465		
Bulgaria	7.266		
Brazil	7.446		
Colombia	7.558		
Ecuador	7.865		
Korea	6.864		
Morocco	7.398		
Mexico	7.424		
Panama	7.215		
Peru	7.218		
Philippines	7.132		
Poland	6.929		
Qatar	7.138		
Russia	7.787		
Turkey	7.054		
Venezuela	7.707		
South Africa	6.484		

Table 6. Ratings and Spreads Adjustments

For each country, residuals outside the 95 percent confidence interval from a panel data estimation of log spreads on ratings are collected. Next, the average number of rating changes across countries, over the next 3 and 6 months and the average number of spread changes across countries, over the next month are calculated and expressed in percentage.

"Excessively Low" Spreads

Average Number of Changes	Expected Upgrade	Unexpected Downgrade	No Change	Total
3 months later	13.4	2.5	84.1	100
6 months later	21.2	3.3	75.5	100
	Expected Widening	Unexpected Tightening	No Change	Total
1 month later	49.6	50.4	-	100

"Excessively High" Spreads

Average Number of Changes	Expected Downgrade	Unexpected Upgrade	No Change	Total
3 months later	9.7	2.3	87.9	100
6 months later	16.1	4.3	79.6	100
	Expected Tightening	Unexpected Widening	No Change	Total
1 month later	70.4	29.6	-	100

Table 7. Countries with "Excessively High/Low" Spreads on April 2001

Fitted spreads are obtained from a panel data estimation of log spreads on ratings. Bands refer to the plus/minus one standard deviation interval.

	Rating	Actual Spread	Fitted Spread	Spread Differential	Status
Ecuador	3.5	1424	2002	-578	Close to lower band
Russia	5.5	922	1384	-462	Close to lower band
Turkey	**6**	**1058**	**648**	**410**	**Excessively High**
Venezuela	6	903	1139	-236	Close to lower band
Argentina	**6.5**	**1552**	**831**	**721**	**Excessively High**
Bulgaria	6.5	687	697	-10	
Brazil	7.5	948	707	241	Close to upper band
Peru	8	636	538	98	
Colombia	9	578	689	-111	
Morocco	9.5	422	535	-113	
Panama	10	401	400	1	
Philippines	**10**	**580**	**356**	**224**	**Excessively High**
Mexico	10.5	343	445	-102	Close to lower band
Korea	12	152	217	-65	
Qatar	12.5	255	294	-39	Close to lower band
Poland	13	197	191	6	