EMERGING MARKET SPREADS:
THEN VERSUS NOW

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Abstract

This paper analyzes yield spreads on sovereign debt issued by emerging markets using modern data from the 1990s and newly-collected historical data on debt traded in London during 1870–1913, a previous "golden era" for international capital market integration. Applying several empirical approaches, we show that the co-movement of spreads across emerging markets is higher today than it was in the historical sample. We also show that sharp changes in spreads today tend to be mostly related to global events, whereas country-specific events played a bigger role in 1870–1913. Although we find some evidence that economic fundamentals, too, co-move more strongly today than at that time, our interpretation of the results is that today's investors pay less attention to country-specific events than their predecessors did in 1870–1913.

I. INTRODUCTION

The frequency and virulence of financial crises that affected emerging markets in the second half of the 1990s have led to calls for reform of the current international financial architecture. Many observers have also wondered whether globalization in international financial markets, perhaps owing to informational and technological advances, has gone too far. The 1990s were characterized by large and volatile private international capital flows toward emerging market countries and, for the first time after several decades, large amounts of sovereign bonds were issued by emerging market countries and actively traded on secondary markets. This paper seeks to shed light on today's international financial environment by comparing it with that of 1870-1913, a previous "golden age" for emerging market bonds and international capital flows toward "emerging markets." Our focus is on sovereign bond yield spreads and on comparing the nature of financial crises and the degree of financial integration in emerging markets, "then" (1870-1913) versus "now" (1992-2000).

There is a growing consensus that global economic integration reached a peak in the late nineteenth and early twentieth century, collapsed with the world wars and the intervening great depression, and gradually increased again after the collapse of the Bretton Woods system to attain levels similar to pre-1914 in the 1990s (Sachs and Warner, 1995). O'Rourke and Williamson (1998) show that capital outflows from Britain to contemporary developing economies were extremely high, and barriers to movement of capital (and labor) were virtually absent. Bordo et al. (1998) describe the period between 1870 and World War I as an era of global finance in which large amounts of foreign securities were actively traded in England. Obstfeld and Taylor

(1998) argue that only in the 1990s did financial integration return to the levels experienced in the era of the classical gold standard.[1]

Our main contribution is to analyze a newly-collected data set on monthly observations of secondary market yields on sovereign bonds denominated in British pounds and traded in London during 1870-1913, issued by the "emerging markets" of the day, namely Argentina, Brazil, China, Egypt, Japan, Portugal, Queensland,[2] Russia, Sweden, and Turkey.[3] We compare the characteristics of those data with a variety of similar data sets on emerging market spreads today. For this purpose, the best modern data set on secondary market sovereign bond yield spreads is that on Brady bonds—the largest and most liquid emerging debt market during 1992-2000.[4] Brady bonds are denominated in U.S. dollars and spreads are computed vis-à-vis yields on U.S. government long-term bonds—just as spreads are computed vis-à-vis British consols for the historical data.

A number of institutional differences in the markets for which data are available "then" and "now" imply that the comparison cannot be perfect. In particular, all countries issuing Brady bonds have previously defaulted on (or restructured) loans from foreign commercial banks, whereas only some countries in the "emerging markets then" group had defaulted prior to 1870. Conversely, some of the historical emerging market countries defaulted on the bonds we are considering during 1870-1913, whereas

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[1] Obstfeld and Taylor (1998) support this claim by tracking three indicators of international capital integration over the past 130 years: the cross-country mean absolute value of the current account as a share of GDP, the standard deviation of the difference between interest rates on sterling-denominated assets in New York and in London, and the cross-country average absolute real interest differential.
[2] Queensland became an independent British colony in 1859 and one of the states forming the federation of Australia in 1901.
[3] A subset of these data is used to analyze other issues in Sussman and Yafeh (1999 and 2000).
[4] The Brady market started with the first restructuring of Mexico's defaulted sovereign loans into Brady bonds in 1990. The stock of outstanding dollar-denominated Brady bonds reached its peak of $156 billion in March 1997 and has been declining following a series of buybacks and exchanges for uncollateralized bonds and Eurobonds (International Monetary Fund, 1997, p. 75).

no country defaulted on (or restructured) Brady bonds, with the exception of Ecuador in the aftermath of its late 1999 crisis. These differences need to be kept in mind in interpreting the results.

Although it might be argued that the 1990s have been "special" in some sense, perhaps because we all tend to remember more recent crises better, we feel that the 1990s are indeed representative of the "today" that we are interested in, for three reasons. First, it is events in the 1990s that have generated calls for reform of the international financial architecture. Second, the 1990s are the first time since the first world war to see the return of large private capital flows toward emerging markets in the form of bonds; under this strict definition of "emerging markets," there were no emerging markets between the first world war and the 1990s. Third, and perhaps most important, crises have *not* occurred more frequently in the 1990s than in the 1980s or 1970s, as shown by Bordo and Eichengreen (2000) with respect to currency and banking crises.[5]

In comparing 1870–1913 to 1992–2000, we address the following questions. How frequent are crises and sudden improvements in emerging market spreads? To what extent do sharp changes in spreads tend to affect more than one emerging market at a time? How large is the common component in the variation of all emerging market spreads? To what extent do investors benefit from holding a portfolio of bonds issued by several emerging markets rather than by only one emerging market? What kinds of

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[5] Accordingly, in considering crises during the past 120 years, Bordo and Eichengreen (2000) analyze the entire post-Bretton Woods era as one period. They show that the frequency of banking and currency crises of the period since 1973 has been about double that of the Bretton Woods era and the classical gold standard period, and is matched only by that of the 1920s and 1930s. Aziz, Caramazza, and Salgado (2000) show that currency crises were as frequent in the 1970s and 1980s as in the 1990s. Caprio and Klingebiel (1999) report a similar number of banking crises in the 1990s as in the 1980s, and fewer banking crises in the 1970s.

events trigger changes in spreads? Do crises reflect news about macroeconomic developments, political events, or reforms?

To analyze these issues, we adopt a variety of approaches. We consider the number of sharp changes in spreads defined in a number of ways. We then compute the proportion of these changes that affect more than one country at a time. To assess the extent to which the variation in emerging markets' sovereign bond yield spreads is accounted for by a common component, we use principal components analysis. This approach is similar to that adopted by other studies (for example, Nellis, 1982), which use the extent of interest rate variation that is explained by the first principal component to gauge the extent of international financial integration. To analyze the nature of events that cause major changes in spreads, we search the spread series for "structural breaks," and systematically relate the breaks to significant events. We supplement these results by briefly considering two case studies, one relating Japanese spreads to events in China using monthly data for 1870–1913, and one relating Korea's spreads to events in other Asian countries using daily information for 1996–98.

The main conclusions of our empirical analysis are the following:

- For the typical emerging market, financial crises with associated sharp increases in sovereign spreads were common in 1870–1913, though far less common than in the 1990s. Even less common in 1870–1913 were truly "global" crises with increases in sovereign spreads in almost all of the emerging markets, whereas these seem to have been the norm since the early 1990s.

- The proportion of the variance in emerging market spreads accounted for by the

first principal component was about ½ in the historical sample and about ¾ in the 1990s.

- The diversification benefits from investing in several emerging markets rather than in only one emerging market are lower today than they were in the past.

- In the historical sample period, most structural breaks in the spread series are related to country-specific (mainly political) events, whereas in the modern sample period most of the breaks are related to global crises.

Increased co-movement of spreads "now" compared with "then" may be due to higher co-movement of economic fundamentals, or different patterns of investor behavior. While providing new evidence that, indeed, economic fundamentals co-vary to a greater extent today than they did in the past, we argue that changes in investor behavior are also an important factor underlying our results.

The remainder of the paper is organized as follows. Section II describes the data sets used for this study. Section III presents the main empirical results on emerging market spreads. Section IV discusses possible interpretations of the main results, and reports additional evidence on fundamentals. Section V concludes.

II. DATA DESCRIPTION

A. Historical data on spreads (1870-1913)

Our data set consists of monthly observations on sovereign bond yields for 1870–1913. The data were collected by hand from the *London Times* and *The*

Economist's Investor's Monthly Manual. The data are available daily, but only end-of-the-month observations were collected, owing to resource constraints. All bond coupons were payable in pounds in London. For each emerging market, yields are calculated as the ratio of interest payments to market price[6] and spreads are computed as the absolute (percentage point) difference between the yields on bonds issued by the emerging market and the yields on British consols. Further detail on the bonds is provided in Appendix 1.

Our historical sample includes ten contemporary "emerging markets:" Argentina, Brazil, China, Egypt, Japan, Portugal, Queensland, Russia, Sweden, and Turkey. These countries represent some of the major borrowers on the London market and several types of "emerging markets" in terms of their geography, macroeconomic policies, and economic and institutional structure.[7]

Our definition of "emerging markets" is similar to that adopted by Bordo and Eichengreen (2000, henceforth BE), who classify countries as "emerging markets"—following modern parlance—using relative per capita incomes and especially on the basis of whether they were net recipients of capital inflows. We apply that definition somewhat more stringently, in the sense that we do not include in our sample some countries, e.g., the United States, that BE classify as emerging markets. By contrast, all countries in our sample that are also considered by BE are classified by BE as emerging markets rather than industrial countries. Countries included in our sample that are not

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[6] This is a reasonable approximation because, for most bonds in our sample, coupon payments take place on a regular basis and the maturity is very long. This procedure is adopted in view of the difficulty of collecting detailed data on each bond's characteristics such as covenants, and options for early calls. Other historical studies adopt a similar procedure—see, for example, the historical data base in http://www.globalfindata.com.
[7] In addition to Queensland (until 1900), only Egypt was a British colony (since 1882) among the countries in our sample.

considered by BE (China, Egypt, Russia, and Turkey) are clearly emerging markets using BE's criteria.

The London market for foreign government bonds during this period was very active and liquid. The total market value of government bonds traded in London was £3 billion in 1875 and £4 billion in 1905, of which £0.5 billion in 1875 and £1 billion in 1905 (or 45 percent of Britain's GDP in 1875 and 55 percent of Britain's GDP in 1905) issued by emerging markets in our sample.[8] Table 1 (which we compiled from *The Economist's Investor's Monthly Manual*) reports the total market value of bonds traded in London by issuing country. Our sample includes the larger emerging markets of the day; it excludes the advanced countries in the industrial core of Europe and the smaller emerging markets.[9] Complementary evidence from an alternative source (Suzuki, 1994) on bond issuance activity on the London market by the emerging markets in our sample is presented in Appendix 2.

B. Modern data on spreads (1992-2000)

The data on emerging market spreads on sovereign bonds denominated in U.S. dollars are drawn from J.P.Morgan and consist of the EMBI (Emerging Markets Bond Index) and EMBI+ bond yield spreads (vis-à-vis yields on U.S. long-term government bonds). EMBI and EMBI+ spreads are the most closely watched indicators of emerging market spreads by market participants, and have been widely used by researchers in previous work.

The EMBI and EMBI+ spreads are available at a daily frequency and—being secondary market spreads—at all times, including times of crisis. By contrast, primary

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[8] Our own calculations based on *The Economist's Investor's Monthly Manual*.
[9] In this paper we strive to show that our results are robust to changes in the sample of countries—

market yields are observed with erratic frequency and are often not available in times of crisis (arguably, the most interesting times), when many countries are just unable to launch new issues.

The EMBI spreads are a weighted average of the spreads on a variety of Brady bonds issued by the country being considered. Yields on those Brady bonds that are collateralized are "stripped" yields, that is, yields after the value of the collateral has been subtracted from the value of the bond. The bonds typically have a long maturity.

Brady bonds were by far the most widespread and actively traded form of emerging market sovereign bonds in the 1990s. Although their relative importance has been declining in recent years, they still accounted for more than half of sovereign debt in the emerging markets surveyed by the Emerging Market Traders Association in 1999 (Table 2a). They also accounted for a large portion of the sovereign debt issued by each of the countries considered in our sample (Table 2b). The EMBI+ spreads include also a number of non-Brady issues (both sovereign and corporate bonds), but still consist mainly of Brady bonds, reflecting their relative importance in overall market capitalization and trading activity.

In modern times, there was no significant active secondary market for emerging market bonds prior to the introduction of Brady bonds in the early 1990s. Most foreign borrowing by emerging market countries took the form of bank loans. It was only following the payments difficulties experienced by a number of emerging market countries (beginning with Mexico) that bank loans were repackaged as Brady bonds and secondary market trading began on a large scale.

As the EMBI yields are based upon Brady bonds, the sample consists of countries that have defaulted, or experienced payments difficulties, on foreign

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Appendix 3 in particular reports a large number of such robustness tests.

commercial bank loans in the past. Another anomaly observed on Brady bond spreads is a sizable differential between (stripped) yields on Brady bonds and other bonds issued by the same country, controlling for differences in maturity and other factors. Although a number of potential explanations have been put forward for this anomaly, none is fully satisfactory (International Monetary Fund, pp. 75-76).

Despite these drawbacks, the EMBI and EMBI+ spreads are the best available data for our purpose and permit a meaningful comparison between today's emerging markets and those in historical times. To obtain a similar number of countries as that in the historical data set, we analyze the period since November 1994; this gives us daily (or end-of-the-month) EMBI spreads for the following eight emerging markets: Argentina, Brazil, Bulgaria, Mexico, Nigeria, the Philippines, Poland, and Venezuela. To obtain a larger sample (14 countries—Ecuador, Korea,[10] Morocco, Panama, Peru, and Russia in addition to those listed above) we also analyze daily data on EMBI+ yields since April 30, 1998.

C. Data on Exports in Common Currency

The data on exports in common currency used in Section IV are drawn from the following sources. For the historical sample, the data on exports in local currency are drawn from Mitchell (1998) and the data on exchange rates vis-à-vis the British pound are drawn from Schneider et al. (1991). For the modern sample, data on exports in U.S. dollars are drawn from the IMF's International Financial Statistics. Further detail on the data sources is provided in Appendix 1.

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[10] Korea never restructured, nor defaulted on, its debt.

III. EMERGING MARKET SPREADS, THEN AND NOW

A. An Informal Look at the Data

Simple inspection of the spreads over 1870–1913 and 1992–2000 (Figures 1 and 2) reveals the following:

- The spreads are substantially higher (in basis points) in modern times than in historical times.

- There is a great deal more common variation across countries in modern times than in historical times. Around the time of the Mexican crisis (December 1994) and the Russian crisis (August 1998) spreads rise in near-unison in most emerging markets. By contrast, in historical times there seem to be many more country-specific developments in the spreads. There are several instances in which the spread drops in a particular country around the time of an identified country-specific event. For example, the spread on Japanese bonds dropped significantly around the time when the gold standard was introduced (Sussman and Yafeh, 2000).

- The period 1870–1913 saw times of turbulence and sharp changes in spreads, but also tranquil times. By contrast, during 1992–2000 there seems to have been considerable volatility in most countries almost all the time.

The next sections confirm these informal observations using a variety of techniques and testing for robustness of the results.

B. Estimation and Results

Sample Statistics

In absolute terms, spreads are higher today than in the historical sample. The cross-country mean of the period average spread over the modern sample is around 800

basis points, compared with less than 300 basis points in 1870-1913 (Table 3). This comparison might however be influenced by the fact that interest rates in Britain in the historical sample were much lower than interest rates in the United States in the 1990s (on average, 3.0 percent, compared with 6.8 percent, respectively). The cross-country means of each country's mean spread over the sample period divided by the interest rate in Britain (in historical times) or in the United States (in modern times) amount to 0.815 and 1.24, respectively (omitting Turkey from the historical sample because of data problems, see Appendix 1). The difference is statistically significant. Similar results hold using medians instead of means, both over the sample period in one country and cross-sectionally.

The standard deviation of the spreads is typically higher in the modern sample than in the historical sample. However, the cross-sectional average of the coefficient of correlation (the standard deviation divided by the mean) is roughly the same in the modern sample as it is in the historical sample.[11]

As already mentioned in the context of the mean spreads, an important issue is whether the spreads are affected by interest rates in the base country (Britain in the historical sample, the United States in the modern sample). The implications of this issue are pervasive: interest rates in the base country are not only higher but also more volatile in the modern sample than in the historical sample, and it might be argued that higher volatility of interest rates in the base country tends to increase both the volatility

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[11] A majority of the spread series display considerable skewness (with the long tail in the direction of higher spreads) and, as is often the case with financial data, higher kurtosis than a normal distribution (i.e. fat tails—more frequent extreme events than under a normal distribution). Considering the proportional change in the spreads, in several cases there is again considerable skewness (with the long tail in the direction of larger increases in spreads) and almost all spread series display much higher kurtosis than with a normal distribution. Whether the series are considered in levels or proportional changes, the null hypothesis that they are normally distributed is rejected in virtually all cases.

and the co-variation of spreads in emerging markets.[12] This issue is unresolved from both a theoretical and, especially, an empirical standpoint. From the theoretical point of view, Kamin and von Kleist (1999) suggest that an increase in interest rates in the base country would tend to raise the absolute (percentage point) spreads.[13] Increases in the base country's interest rates may also reduce the emerging countries' creditworthiness, reinforcing the positive effect of base country interest rates on absolute spreads, and mitigating (and possibly overturning) their negative effect on relative spreads.

From the empirical point of view, existing studies (including Kamin and von Kleist, 1999) do not find significant and robust effects of U.S. interest rates on emerging market spreads. Nevertheless, some of the estimates in the following sections control for the effect of interest rates in the base country.

Correlations

Correlation coefficients for the spreads across pairs of emerging markets are considerably higher in modern times than in historical times. The average correlation coefficient is 0.77 in modern times compared with 0.41 in historical times (Table 4). All of the correlation coefficients are positive and significant in modern times, whereas there are a number of coefficients that are close to zero (or even negative) in historical times.[14]

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[12] Britain's low and stable interest rates in the historical sample period are related to its adherence to the gold standard.

[13] They consider the case of a safe instrument with interest rate r and of a risky instrument that is repaid with probability $p<1$, with interest rate i. In equilibrium, $1+r = p(1+i) + (1-p)0$, where r is the risk-free rate of return in the base country, i is the interest rate paid the risky borrowing country, and p is the probability of no default. They show that the absolute spread, $i-r$, is an increasing function of the base country's interest rate. It is also easy to show that the relative spread, $(i-r)/r$, is decreasing in the base country's interest rate.

[14] The analysis of this paper is not based on cointegration techniques: although there are only few instances in which formal testing (using conventional augmented Dickey-Fuller tests or Phillips-Perron

Common Component

To gauge the extent of co-movement of these spreads among countries in different sample periods, this section computes the percentage of variation accounted for by the first principal component in the sovereign bond yield spread series for the various emerging market countries considered. The overall result is that the proportion of variance in emerging market spreads accounted for by the first principal component was about ½ in 1877–1913, and about ¾ in the 1990s. Therefore, that proportion was high in historical times, but it is significantly higher in modern times, in both a statistical and an economic sense.

In historical times (1877–1913), and omitting Turkey from the sample,[15] the percentage of variation in the nine series accounted for by the first principal component is 52.0 percent—the standard error of that percentage is 2.0 percentage points.[16]

In modern times, the main sample considered is that of the eight emerging markets (Argentina, Brazil, Bulgaria, Mexico, Nigeria, the Philippines, Poland, and Venezuela) for which the EMBI spread data are available since November 1994. Monthly data are used for consistency with the estimates based upon historical data. The percentage of variation accounted for by the first principal component in the

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tests) rejects the null hypothesis of a unit root (probably owing to the limited length of our sample periods), our strong prior is that interest rate spreads are I(0). Cochrane (1991) points out that interest rates in ancient history were not much different from those observed today, suggesting that the likelihood that interest rates are I(1) rather than I(0) is infinitesimal. A fortiori, interest rate spreads should therefore be I(0) as well.

[15] The results are similar if the full crisis episode in Turkey is included in the sample. This requires extending the sample back to 1875, which implies that China and Egypt have to be excluded due to lack of data prior to 1877. The percentage of variation in the remaining eight series that is accounted for by the first principal component is 45.7 percent—the standard error of that percentage is 1.9 percentage points.

[16] See Appendix 1 for details on the calculation of the standard errors. The standard errors of the percentage of variation that is accounted for by the first principal component should be interpreted with caution, because they are based upon the assumption that the data are multivariate normally distributed— an assumption that is not fully warranted in this case.

sovereign bond yield spread series for these eight series is 80.0 percent. (The standard error of that percentage is 3.1 percentage points.)[17]

Using daily EMBI+ spread series for a larger sample of fourteen countries (Argentina, Brazil, Bulgaria, Ecuador, Korea, Mexico, Morocco, Nigeria, Panama, Peru, the Philippines, Poland, Russia, and Venezuela) since April 30, 1998, the percentage of variation accounted for by the first principal component is 72.2 percent.

Appendix 3 reports the percentage of variation accounted for by the first principal component when one or two countries at a time are dropped from any of the samples considered above. It shows that this does not alter the result that the percentage of variation accounted for by the first principal component is higher in modern times than in historical times.

The larger common component in emerging market spreads in modern times than in historical times does not seem to be accounted for by greater variation in interest rates in the base country in modern times than in historical times. To show this, we adopt two approaches. First, we estimate the amount of variation that is accounted for by the first principal component using, for each emerging market—instead of the spreads—the logarithm of the ratio of the interest rate in the emerging market to the interest rates in the base country. (For small spreads, this is approximately equal to the ratio of the spread to the interest rate in the base country.) This method ensures that the estimation ignores all instances in which the same multiplicative change affects both the interest rate in the base country and the interest rate in the emerging market. Using this method, the amount of variation that is accounted for by the first principal

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[17] Using daily data for the same sample, the results are similar. The percentage of variation accounted for by the first principal component in the sovereign bond yield spread series for these eight series is 81.3 percent.

component is 57.5 percent (standard error: 2.0 percentage points) in 1877–1913 excluding Turkey; 49.8 percent (standard error: 2.0 percentage points) in 1875–1913 including Turkey; and 81.0 percent (standard error: 3.0 percentage points) in 1994–2000.

Second, for each emerging market, we run a univariate regression of the emerging market yield on the interest rate in the base country (Britain in the historical sample and the United States in the modern sample), save the residuals, and then run the principal components estimation on the residuals for all of the emerging market countries. The rationale is to conduct the principal components analysis on that portion of emerging market yields that is orthogonal to the interest rate in the base country. Using this approach, the amount of variation accounted for by the first principal component is 55.8 percent (standard error: 1.9 percentage points) in 1877–1913 excluding Turkey; and 85.0 percent (standard error: 2.5 percentage points) in 1994–2000.

Beta coefficients and the benefits of Portfolio Diversification

Consistent with the higher common component in emerging market yields today compared with the past, we find that the benefits of holding a portfolio of bonds issued by a variety of emerging market countries rather than by only one country are smaller today than in the past. To show this, for each emerging market country we estimate a univariate regression with the ex-post return (capital gain plus coupon payments) on that country's bonds on the left-hand side and the ex-post return on a market-weighted[18] portfolio of bonds issued by all emerging market countries on the right-hand

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[18] Specifically, we use the EMBI+ "All Emerging Markets" return index for the modern sample and the average of the 1875 and 1905 relative market shares reported in Table 1 for the historical sample. The

side. We find that the beta coefficients tend to be considerably closer to one in the modern sample than in the historical sample (Table 5). On average (across countries), the absolute difference between one and a country's beta coefficient is 0.43 in the historical sample and 0.26 in the modern sample. (The standard errors for the various countries' beta coefficients range from 0.04 to 0.14). The R^2 coefficients are far larger in the modern sample than in the historical sample.

C. Emerging Market Crises, Then and Now

Financial crises are certainly not a new phenomenon. They occurred frequently and with severe consequences in the late 1800s and early 1900s. "Emerging market" countries often defaulted on their debts: Turkey's default on its foreign debt in the mid–1870s was associated with an increase in sovereign spreads of a magnitude not seen since then.[19] The crash of 1890 in Argentina (and Uruguay, not in our sample) led to the insolvency of Baring's, the famous London merchant bank. Lindert and Morton (1989) provide a detailed chronology of debt defaults and reschedulings in a very large sample of countries since 1820. As for the ten countries in our sample, they show that several defaults took place—Argentina in 1830 and 1888–1893, Brazil in 1898 and 1914, Egypt in 1876, Russia in 1839, and Turkey in 1876–1881.

Nevertheless, a systematic analysis of sharp changes in sovereign spreads suggests that crises (and sudden improvements in a country's spreads) were less frequent in 1870–1913 than in the 1990s. Specifically, in this section we compute the

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results are similar if we reweigh the portfolio every five years in the historical sample, and if we use daily data instead of monthly data in the modern sample.

[19] We are unable to compute the exact spreads for Turkey during this crisis and we report an overestimate in the figures and tables, but it is clear that they rose to extremely high values.

number of instances in which spreads changed sharply, in 1870–1913 versus 1992–2000, according to the following definitions:

1) Proportional change in the spread: the spread rises or falls by more than 10 percent (20 percent, 30 percent, or 40 percent) of its initial value.

2) Absolute change in the spread: the spread rises or falls by more than 100 basis points (200 basis points, or 300 basis points).

Each of these definitions has advantages and disadvantages. The "proportional change" definition is less sensitive to the fact that the absolute magnitude of spreads (in basis points) is higher during some periods than others; however, it will identify many episodes as "sharp" changes when the spread is close to zero. Conversely, the "absolute change" definition will tend to identify more episodes as "sharp changes" during times of large absolute spreads, but will not do so when the spreads are close to zero.

Using all the data available and a cutoff of 200 basis points, there are 79 sharp changes in the long historical sample and 151 sharp changes in the (much shorter) modern sample. Similarly, using a cutoff of 20 percent, there are 36 sharp changes in the historical sample and 165 in the modern sample (Table 6). The difference becomes even more pronounced considering that more than half of the sharp changes in the historical sample took place in Turkey. This result is confirmed when different cutoffs are used. It is also interesting to note that, especially using cutoffs of 30 percent or above, the number of sharp increases (crises) is much larger than that of sharp decreases, in both the historical and the modern sample. This is consistent with the notion that crises start abruptly but dissipate slowly and gradually, or that instances of panic take place more frequently than sudden improvements in investors' views regarding a given country.

The presence of far more sharp changes in our modern sample than in our historical sample suggests that emerging market crises (and sharp improvements in spreads) have been more common in the 1990s than at the time of the classical gold standard. This result is consistent with the findings of Bordo and Eichengreen (2000) who, using a different definition of crises as currency and banking crises, show that crises were less prevalent in 1880–1913 than in the post-Bretton Woods period (and at least as frequent in the 1970s–1980s as in the 1990s).

In addition, there is evidence that, today compared with the past, there are relatively more instances in which sharp changes (crises or sudden improvements in spreads) take place in several countries rather than in only one country. Specifically, the number of months when sharp changes take place *in more than one country* as a share of the number of months when sharp changes take place *in at least one country* is higher in the modern sample than in the historical sample (Table 7). This is the case using any of the cutoff points considered in this paper, although it is most clearly illustrated by focusing on the 10 percent cutoff for the historical sample and the 30 percent cutoff for the modern sample. Using these cutoffs, the proportion of months with sharp changes in only one country is roughly the same in the historical and the modern samples—10.2 percent and 10.4 percent, respectively. Nevertheless, in the historical sample the proportion of months with sharp changes in more than one country is 1.1 percent, compared with 7.5 percent in the modern sample.

Search for Breaks

Before attempting to identify the nature of events that cause sharp changes in spreads, we search for "structural breaks" in the spread series, using various techniques

based on Perron (1989).

An Iterative Search for Breaks

This method assumes no a priori knowledge of potential break dates. Instead, it is based on using all the available data for repeated estimations of the following equation:

$$\log (\text{Spread})_t = \beta_0 + \beta_1 \log (\text{Spread})_{t-1} + \beta_2 \, \Delta \log (\text{Spread})_{t-1}$$
$$+ \beta_3 \, \Delta \log (\text{Spread})_{t-2} + \beta_4 TREND + \beta_5 EVENT_{long} + \beta_6 EVENT_{short}, \qquad (1)$$

where $EVENT_{long}$ is a dummy variable that takes the value zero at all times prior to the proposed break and the value one from the time of the break onwards, and $EVENT_{short}$ takes the value one at the time of the event, and zero at all other times. If an event has a long-term impact on yields, then the "long" dummy variable will be different from zero (assuming the series is not unit root). A significant "short" dummy implies that an event creates only a short-term "blip."[20] The method involves repeated estimation of Equation (1) while moving the break date and the corresponding *EVENT* dummy variables one observation at a time and recording its statistical significance. The sample is then split in two at the point where the statistical significance of the $EVENT_{long}$ dummy is highest, and the process is repeated within each half of the sample until no statistically significant break points are detected in any sub-sample.

The "Moving Windows" Approach

An alternative method for searching for breaks at unknown dates in the spread series is based on the construction of a two-year window, which is then shifted by one

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[20] When the time series is unit root, the $EVENT_{short}$ dummy variable identifies one-time breaks that have a permanent effect.

month at a time. A modified version of Equation (1) is estimated within each "window," and the dates yielding $EVENT_{long}$ dummies with the highest statistical significance are recorded.[21] This method can identify "shorter" breaks more easily than the iterative search based on the whole sample period described in the paragraph above.

The Determinants of Changes in Spreads, "Then" versus "Now"

Consistent with our earlier results on the co-movement of spreads "then" versus "now," this section establishes that breaks in the spread series were determined by country-specific events in the historical sample, whereas they are largely associated with global events in the modern sample. Table 8 reports significant breaks in the historical spread series and describe the corresponding events. Evidently, most of the breaks took place at the time of important country-specific events that might be related to the country's ability to repay its external debt. Major political events such as news about the beginning or end of wars and rebellions feature very prominently, as do economic news. For example, a military campaign against indigenous rebels, the end of a civil war, and a domestic revolt were all associated with breaks in Argentina's spread series; similarly, an armed rising and the war against Sudan affected Egypt's spread. Banking crises affected Queensland's spreads. In several cases, changes in domestic monetary policy and regime were also associated with breaks in the spread series. The case of Japan is described in detail in Sussman and Yafeh (2000), who show that the adoption of the Gold Standard (1897) and Japan's victory over Russia (1905) improved Japan's "credit rating" significantly. Similarly, a break in the spread series is observed in Portugal at the time when that country left the Gold Standard. It is important to note

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[21] Because of the small number of observations within each "window," Equation (1) was estimated using "long" event dummies and "pulse" event dummies separately, but not with both dummy variables

that there are no historical instances in which breaks occur simultaneously in a large number of countries. Even the best-documented crisis in the nineteenth century, Baring's Crisis of 1890, did not result in significant breaks in more than two countries, and certainly not in distant countries.[22]

By contrast, in modern times global events had a far more pervasive impact on emerging markets' spreads than any country-specific events. In our sample of eight emerging markets during 1994–98, there is one major break—in August 1998, at the time of the Russian crisis—affecting all countries; in addition, the Mexican crisis of late 1994 also had a discernible impact on Mexico and Venezuela; otherwise, there are very few breaks associated with events taking place in the country under consideration (Table 9). The one country-specific break that we find convincing is that associated with the introduction of the currency board in Bulgaria (which formally took place on July 1, 1997). And of course, the countries in our 1990s sample did not experience any shortage of major political and economic events: these included coups, assassinations of key political figures, violent uprisings (in some cases by ethnic minorities), the suspension of existing constitutions, the adoption of new constitutions, major changes in the party in power, changes in the domestic currency, and the establishment of common trade areas.[23]

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together.

[22] See Eichengreen (1997) for a discussion of the crisis and its impact. Sussman and Yafeh (1999) examine the impact of this episode on Japanese yields using a "window" around the crisis peak (November 1890), and find that the Baring Crisis did not have *any* impact on Japanese spreads. If anything, there was a slight increase in the price of Japanese bonds, suggesting that investors may have shifted some of their money into Japanese bonds, rather than run away and spread the crisis. The effect of the Baring Crisis on Japanese bond prices remains positive albeit statistically insignificant even when *daily* data are examined around the peak of the crisis.

[23] A full list of such major events that might a priori have been considered capable of having a significant impact on spreads is available from the authors upon request. In this context it is also worth noting that one could make a case that the Mexican crisis and, to a lesser extent, the Russian crisis, were prompted in part by domestic political events.

The fact that we typically capture only one major break per country in the spread series in our modern sample is consistent with the finding in the earlier sections that sharp changes in the spreads are relatively frequent in the 1990s. In fact, our systematic search for breaks tends to pick only sustained changes in mean spreads, whereas most sharp changes are reversed after a short time.

Evidence from Two Case Studies

Before moving to discussion and interpretation of the results, we briefly summarize two case studies analyzed in detail by Sussman and Yafeh (1999).

A Historical Case Study: Events in China and Japanese Spreads, 1870–1913

The impact of events in China on Japanese spreads is examined by constructing "windows" around several important events that took place in China, and by using Equation (1) to estimate their impact on Japanese spreads. The results indicate that none of the major political and economic events that took place in China during the period (other than ones in which Japan was directly involved) had much impact on the risk British investors associated with Japanese sovereign debt (Table 10—reproduced from Sussman and Yafeh, 1999 for the convenience of the referee—could be dropped in the final version of this paper). The dramatic Boxer Rebellion, in the suppression of which Japan took part, had only a small and marginally significant impact on Japan's spread; that impact was short-lived, and lasted only for the duration of the rebellion (i.e., it was a "blip"). Similarly the Japan-China war, which affected Japan directly, only caused a short-term blip.

A Modern Case Study: Korean Spreads, 1996-1999

Next, *daily* movements in spreads on bonds issued by one emerging market, Korea, are examined. Considering the "worst twenty days" in which the spread on Korean sovereign bonds increased by the highest percentage, and "the best twenty days," (Tables 11a and 11b—reproduced from Sussman and Yafeh, 1999 for the convenience of the referee—could be dropped in the final version of this paper) a majority of the largest fluctuations in Korea's spread were associated with events that took place outside Korea, and often in countries whose fundamentals are not clearly related to Korea's. For example, rumors about Indonesia's president Suharto's health influenced Korean spreads, in sharp contrast with our historical case study.

IV. DISCUSSION AND INTERPRETATION

The picture that seems to emerge is one in which, today compared with the past, major breaks in the spread series are less related to events taking place in the country under consideration, and the co-movement of spreads across countries is higher. There are a number of possible explanations for this, ranging from differences in investor behavior to increased correlation of economic fundamentals among emerging markets.

We find evidence that the correlation among emerging markets' economic fundamentals is higher today than in the past. The closest proxy for economic fundamentals that we have been able to obtain for 1870–1913 is exports in pounds sterling—a variable clearly related to an emerging market's ability to repay its external debt.[24] We use the annual rate of change of exports in common currency to proxy for

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[24] Other variables, such as gross domestic product or industrial production, are not suitable for this exercise. Gross domestic product (or other measures of overall output) are available for a very limited number of countries; industrial production is also available only for a smaller sample and is not representative of economic activity in emerging markets, which consisted largely of agriculture and

news about each country's fundamental ability to repay its external debt. To obtain a comparable measure of the correlation of economic fundamentals at the annual frequency in modern times, we use exports in U.S. dollars during 1966–98 for our sample of countries.

For 1871-1913, the first principal component accounts for 29 percent (standard error: 4.8 percentage points) of the variation in the growth rate of exports of the 8 countries for which we have good data. For 1966–1998, the first principal component accounts for a significantly higher proportion—54 percent (standard error: 6.7 percentage points)—of the variation in the growth rate of exports of the 7 countries for which we have good data. The average correlation coefficient in the growth rate of exports in common currency across pairs of countries is 0.15 in 1871–1913 and, at 0.45, is much higher in 1966–1998.[25] We view this finding as evidence that higher co-movement of fundamentals may be one of the factors underlying today's greater co-movement of spreads than observed in the past.

The higher co-movement of export growth today is not inconsistent with the high degree of worldwide integration and trade openness of the emerging markets in 1870–1913 documented by previous studies (e.g., O'Rourke and Williamson, 1999). Although the degree of trade integration today is broadly similar to that observed in 1870–1913, the underlying shocks affecting the various emerging markets appear to be more closely correlated now than they were in the past, perhaps owing to greater similarity of industrial structures in today's emerging markets.[26]

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natural resource extraction.

[25] Dropping one or two countries at a time, whether in the historical sample or in the modern sample, does not affect the results much. These robustness tests are available from the authors upon request.

[26] In the past, each emerging market tended to specialize in a different commodity. For example, see Estevadeordal's (1997) analysis of the commodity composition of international trade for a number of countries in 1913.

However, trade relations are unlikely to be the reason why events in Indonesia today affect Korean spreads, whereas events in nineteenth century China did not influence Japanese spreads. Indeed, trade between Japan and China in the nineteenth century was far more important than trade between Korea and Indonesia is today.[27]

Our results, notably those on the nature of events associated with breaks in the spread series and the evidence from the case studies, therefore raise the possibility that investors today behave differently than investors in the past. We are unable to provide a full explanation for this possible change in behavior, and indeed this is beyond the scope of our paper. Nevertheless, we can confidently rule out one type of explanation: the reason is certainly not lack of information on the part of investors in the nineteenth century. For example, events in China failed to affect Japanese spreads even though investors located in London were well informed about them. Both the *London Times* and the *Economist* reported on events in Asia regularly and in detail (see Sussman and Yafeh, 1999, for a list of such news articles): not only did they report on events in China, but also they explicitly emphasized the potential costs for Japan of events in China, whether through commercial links or direct military involvement. For instance, the *Economist* expressed concern about the implications on Japan's economy of the 1911 Chinese Revolution, and of potential Japanese military intervention in China (December 23, 1911). On the whole, it seems that investors had all necessary information regarding events in one emerging market that might have consequences for other markets.[28] Moreover, we are skeptical about potential explanations relying on

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[27] Japan's trade with China as a share of Japan's GNP around 1900 was higher than Korea's trade with Indonesia is today as a share of Korea's GDP. (See the *Historical Statistics of Japan*, published by the Japan Statistical Association, and the International Monetary Fund's *Direction of Trade Statistics*.)
[28] Indeed, some investors devoted a phenomenal amount of highly qualified human resources to obtaining and analyzing information on the economic fundamentals of the various emerging market countries of the day. See Flandreau's (1998) fascinating account of such applied research activities by one important investor in emerging markets in 1870–1914, the *Crédit Lyonnais.*

differences in the speed with which information from emerging market countries reached investors in the advanced countries. International telegraph links to the emerging market countries in our sample were introduced in the 1870s, and most of our estimations rely on end-of-the-month data.

Our own interpretation (going beyond merely documenting facts as we have done in the previous sections) of why investors today seem to pay less attention to events taking place in the country under consideration than their predecessors did in the past is that while individual investors played the key role in the past (Suzuki, 1994), the bulk of investment in emerging market bonds is now undertaken through investment funds. From the point of view of individuals, investing in foreign countries through funds may reduce monitoring and transaction costs. Yet when a crisis emerges, these funds tend to liquidate their holdings of securities in several emerging markets so as to maintain a given risk and liquidity profile.

Regarding the issue of why the mean and volatility of the spreads in historical times are lower than today's, we conjecture that two factors could be at play. First, all of the emerging market countries in the modern sample had defaulted prior to the period considered whereas not all those in the historical sample had. As a result, emerging markets today might be viewed by investors as a relatively higher-risk group than our emerging markets in the past were.[29] Second, and more important, several

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[29] A complementary point of view could be that the modern sample period was immediately preceded by the debt crisis of the 1980s, with its related difficulties in working out a solution; by contrast, during the historical sample period, solutions to default crises may have been easier to work out because the creditors were organized in the Corporation of Foreign Bondholders (see Fishlow, 1985, pg. 398).

countries in our sample adhered to the gold standard and conducted policies consistent with it for at least part of the historical period we analyze. This may have reduced their spreads—a view corroborated by our finding that several structural breaks in the spread series (with the expected signs) take place around the time when countries go on or off the gold standard, and by Bordo and Rockoff's (1996) result (obtained using a different sample relying on annual data) that countries' commitment to the gold standard significantly lowered their interest rates.

V. Conclusions

In this study, we use a newly-collected data set on sovereign bond yields in emerging markets in 1870–1913, a golden era for international capital flows, together with the most widely used data on sovereign bond yields in emerging markets in 1992-2000. We establish a number of stylized facts regarding the spreads on sovereign bonds issued by emerging markets. Today compared with the past, sharp changes in spreads are more frequent; the proportion of sharp changes in spreads affecting more than one country is higher; co-movement of spreads among emerging markets is greater; the benefits to investors of portfolio diversification among emerging markets are smaller; and the relationship between country-specific events and breaks in the spread series is weaker.

We argue that these results may be accounted for by two factors: first, co-movement of fundamentals seems to be higher today than in the past; second, today's investors seem to place less emphasis on country-specific events than their predecessors did in 1870-1913.

The data on emerging market bond yields in historical times refer to the following bonds. For Argentina we use a 6 percent public works bond until 1884; thereafter we use another 6 percent bond issues in 1884 with maturity in 1922. The Brazilian series consists of 5 percent consols, which are replaced by 4 percent bonds in 1884. The Chinese series is based upon the yield of an 8 percent bond issued in 1876, replaced by a 7 percent bond issued in 1884, and later replaced by a 5 percent gold loan beginning in 1896. The Egyptian 4 percent bonds were issued in 1876 with a maturity of 65 years. For Japan, we use a 9 percent bond issued in 1870, then a 7 percent bond issued in 1873 and redeemed with the adoption of the Gold Standard in 1897; after 1897 we use a 5 percent bond with a maturity of 53 years. Portuguese bonds are 3 percent consols. Queensland issues have a redemption date in 1913. Russian and Swedish bonds are consols throughout our sample period. As for Turkey, the calculation of yields during the 1875-1883 period when Turkey suspended interest payments is based on the assumptions that coupon interest payments are made, reflecting the cost of capital to the Turkish government, rather than the interest earned by investors.

The data on British consols are drawn from the NBER MacroHistory Database; they are available from the Internet at

http://www.nber.org/databases/macrohistory/contents/chapter13.html, series code *m13041*.

The data on U.S. long-term interest rates are drawn from the U.S. Treasury's web site, series code *tcm30y*.

The data on exports in local currency for 1870–1913 are drawn from Mitchell's

International Historical Statistics (1750–1993), volumes for *Europe* (4th edition), *the Americas* (4th edition), and *Africa, Asia, and Oceania* (3rd edition).

The data on exchange rates in 1870–1913 are drawn from Schneider et al. (1991). They are also available from www.globalfindata.com.

The data on exports in U.S. dollars in 1966–1998 are drawn from *International Financial Statistics*, International Monetary Fund.

The data on the composition of emerging markets' debt by type of instrument are drawn from the *1999 Annual Debt Trading Volume Survey—Supplemental Analysis*, Emerging Markets Traders Association EMTA, New York, NY, and complemented using EMTA data available from the Internet at http://www.securities.com/.

The asymptotic standard errors of the percentage of total variation accounted for by the first principal component are computed using the routine PCA in the Stata Technical Bulletin, downloadable from http://www.stata.com/stb/stb37/.

Suzuki (1994) estimates that net foreign government loan issues on the London bond market between 1870 and 1913 amounted to £2.1–3.9 billion. Information on bond issues by countries included in our historical sample is presented in the Table A2.1.

Table A2.1. Net Proceeds from Bond Issues on the London Market, 1870–1913

Country	In Thousands of British Pounds	Total Proceeds 1/
Argentina	87,379	4.0
Brazil	119,065	5.5
China	41,774	2.0
Egypt	123,745	5.7
Japan	82,103	3.8
Portugal	22,517	1.0
Queensland	n.a.	n.a.
Russia	248,388	11.5
Sweden	15,503	1.0
Turkey	120,697	5.5

Source: Suzuki (1994).
1/ In percent of total net issues on the London market by all countries.

APPENDIX 3: ROBUSTNESS TESTS—PRINCIPAL COMPONENTS ANALYSIS

This Appendix reports robustness tests of the results of the principal components analysis. It shows that when any one or two countries at a time are dropped from the various samples considered, the results remain broadly the same.

When analyzing emerging market spreads in historical times (1877–1913), and omitting Turkey from the sample, the percentage of variation in the nine series accounted for by the first principal component is 52.0 percent—the standard error of that percentage is 2.0 percentage points (Table A3.1). When one country at a time is dropped from the sample, the percentage of variation accounted for by the first principal component in the remaining seven series ranges from 48.8 percent (when Argentina is dropped) to 57.8 percent (when Portugal is dropped). When two countries at a time are dropped from the sample, the percentage of variation accounted for by the first principal component in the remaining six series ranges from 45.1 percent (when Argentina and Sweden are dropped) to 65.2 percent (when Brazil and Portugal are dropped).

Table A3.1 shows that the percentage of variation accounted for by the first principal component remains broadly the same when dropping any one or two countries from each of the samples considered in the main text: the historical sample including the full crisis episode in Turkey; the main modern sample of the eight emerging markets (Argentina, Brazil, Bulgaria, Mexico, Nigeria, the Philippines, Poland, and Venezuela) for which the EMBI spread data are available since November 1994, using monthly data; the main modern sample, using daily data; and the larger sample of fourteen countries (Argentina, Brazil, Bulgaria, Ecuador, Korea, Mexico, Morocco, Nigeria, Panama, Peru, the Philippines, Poland, Russia, and Venezuela) for which EMBI+ spread series are available since April 30, 1998, using daily data).

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Figure 1A. Historical Spreads, 1877-1913 (in basis points)
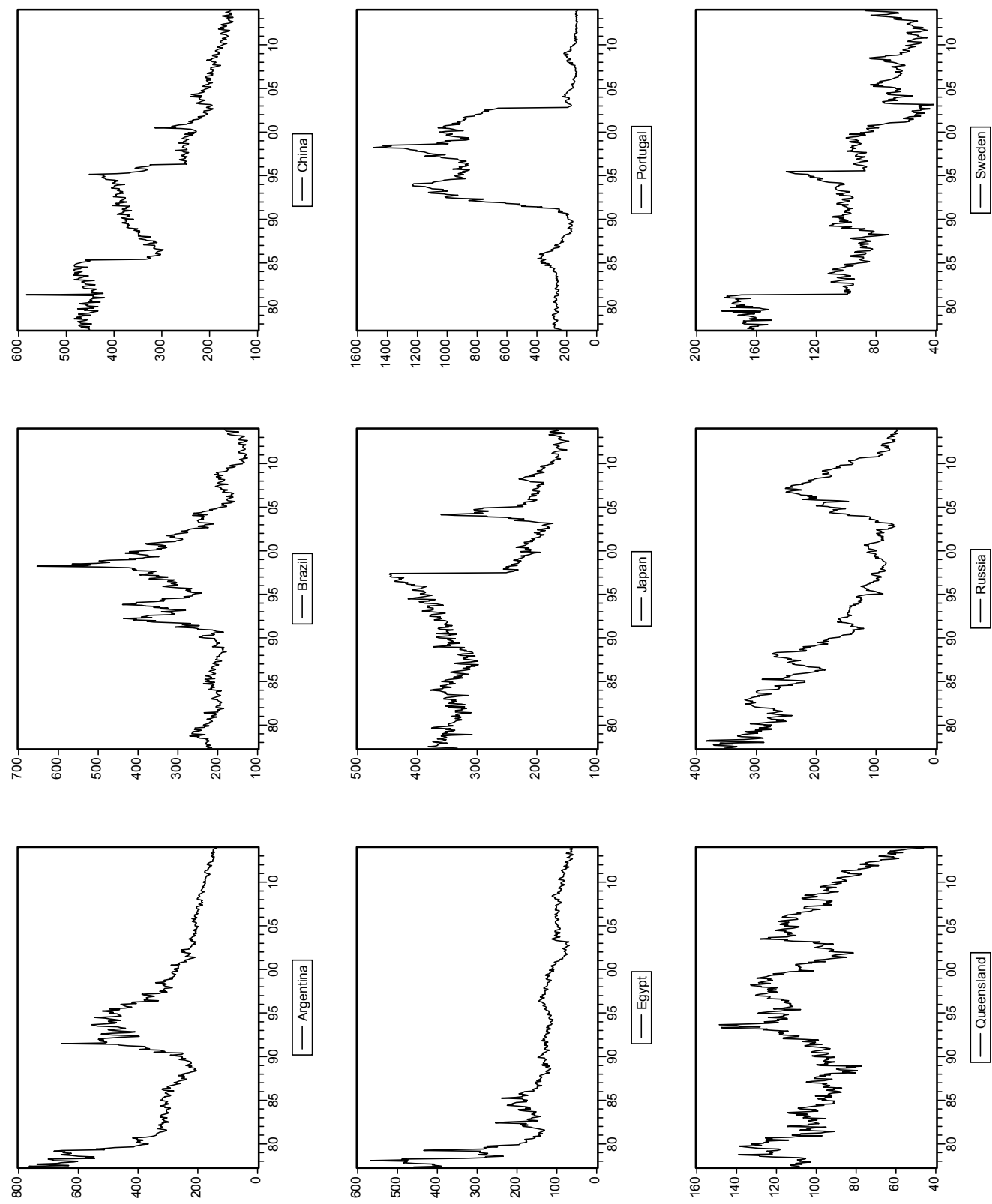
Data Source: The Economist
Spreads are yields on each emerging market's government bonds issued in British pounds minus yields on British government bonds.

Figure 1B. Historical Spreads (in basis points)
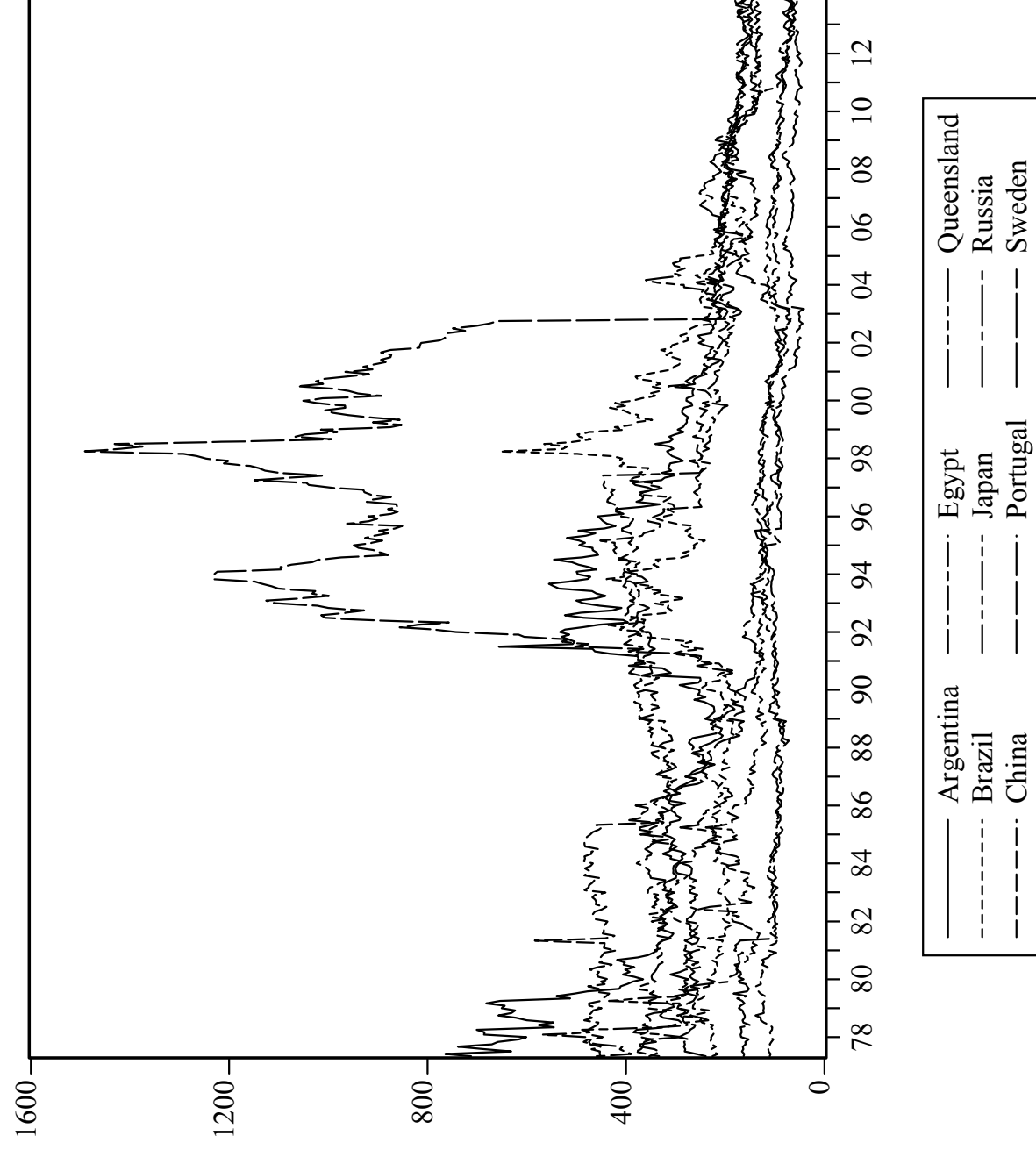
—— Argentina	——— Egypt	——— Queensland
····· Brazil	- - - Japan	····· Russia
- - China	—·— Portugal	—— Sweden

Data Source: The Economist
Spreads are yields on each emerging market's government bonds issued in British pounds minus yields on British government bonds.

Figure 2A. Modern Spreads, 1992-2000 (in basis points)
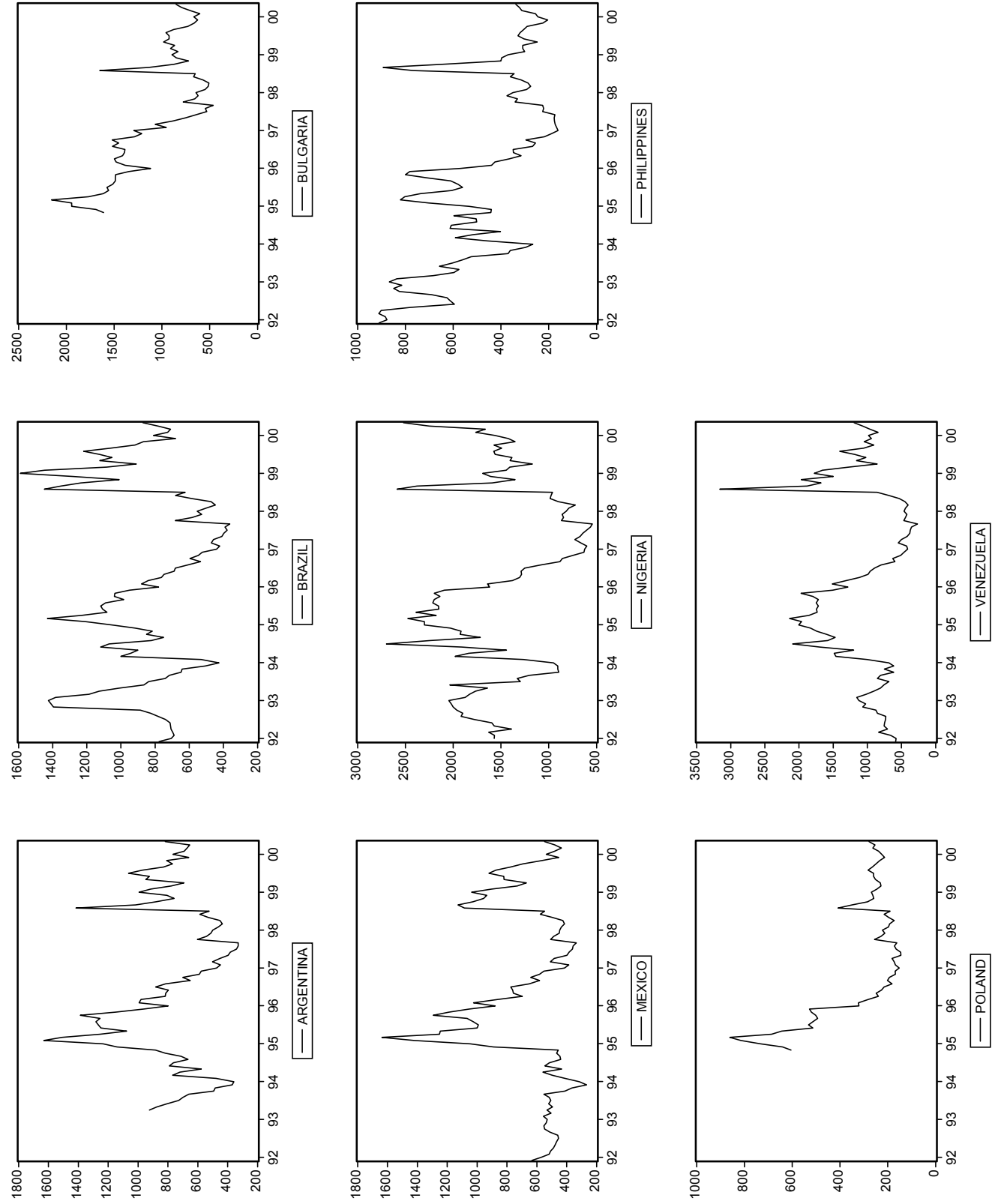
Data Source: J.P. Morgan
EMBI spreads (yields on government bonds issued in US dollars by each emerging market, minus US bond yields)

Figure 2B. Modern Spreads, 1992-2000 (in basis points)
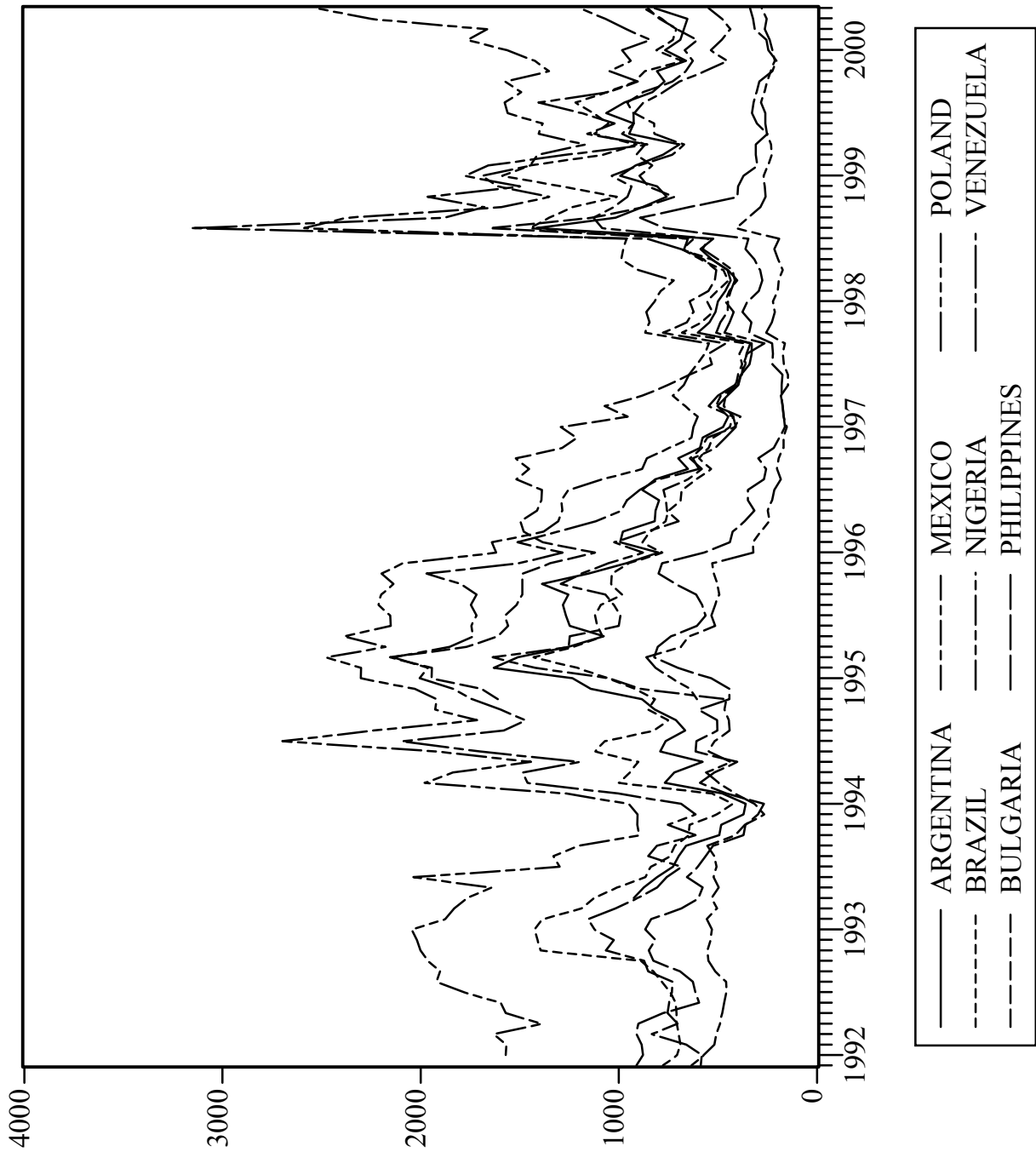
Data Source: J.P. Morgan
EMBI spreads (yields on government bonds issued in US dollars by each emerging market, minus US bond yields)

Table 1. Market value of all government bonds traded in London, 1875 and 1905.

	Total volume of debt (in millions of pounds)		In percent of total		In percent of total excluding Britain	
	1875	1905	1875	1905	1875	1905
* Argentina	16.07	70.33	0.53	1.73	0.69	2.18
* Australia	43.46	227.06	1.43	5.59	1.86	7.04
Austria	199.45	134.28	6.54	3.30	8.53	4.16
Belgium	27.27	n.a.	0.89	n.a.	1.17	n.a.
* Brazil	19.80	70.61	0.65	1.74	0.85	2.19
Britain	709.71	839.50	23.28	20.65	30.35	26.03
Bulgaria	n.a.	9.34	n.a.	0.23	n.a.	0.29
Canada	21.63	50.27	0.71	1.24	0.92	1.56
Cape of Good hope	0.93	38.74	0.03	0.95	0.04	1.20
Chile	7.99	17.42	0.26	0.43	0.34	0.54
* China	0.50	38.71	0.02	0.95	0.02	1.20
Cuba	0.28	7.20	0.01	0.18	0.01	0.22
Denmark	1.82	7.26	0.06	0.18	0.08	0.23
Ecuador	1.82	n.a.	0.06	n.a.	0.08	n.a.
* Egypt	56.06	86.93	1.84	2.14	2.40	2.70
France	756.74	734.96	24.83	18.08	32.36	22.79
Germany	n.a.	86.47	n.a.	2.13	n.a.	2.68
Greece	4.75	23.51	0.16	0.58	0.20	0.73
Hungary	23.14	65.23	0.76	1.60	0.99	2.02
India	84.48	145.57	2.77	3.58	3.61	4.51
Italy	35.93	322.78	1.18	7.94	1.54	10.01
* Japan	3.05	62.38	0.10	1.53	0.13	1.93
Mexico	27.47	46.95	0.90	1.16	1.17	1.46
Natal	0.31	19.12	0.01	0.47	0.01	0.59
Netherlands	79.79	98.02	2.62	2.41	3.41	3.04
Norway	n.a.	6.91	n.a.	0.17	n.a.	0.21
Peru	11.58	n.a.	0.38	n.a.	0.50	n.a.
* Portugal	66.15	20.79	2.17	0.51	2.83	0.64
Prussia	n.a.	246.94	n.a.	6.07	n.a.	7.66
* Russia	151.37	376.74	4.97	9.27	6.47	11.68
Spain	167.64	31.76	5.50	0.78	7.17	0.98
* Sweden	1.96	9.28	0.06	0.23	0.08	0.29
Switzerland	n.a.	13.80	n.a.	0.34	n.a.	0.43
* Turkey	147.24	57.24	4.83	1.41	6.30	1.77
United States	347.79	48.74	11.41	1.20	14.87	1.51
Uruguay	3.21	20.56	0.11	0.51	0.14	0.64
Venezuela	6.69	6.11	0.22	0.15	0.29	0.19
Other [1]	22.23	23.48	0.73	0.58	0.95	0.73
Total emerging markets in our sample	505.66	1020.07	16.59	25.09	21.62	31.63
Total	3048.30	4065.00	100.00	100.00	n.a.	n.a.
Total excluding Britain	2338.59	3225.50	76.72	79.35	100.00	100.00

Data Source: *The Economist's Investor Monthly Manual*

* Asterisks denote countries included in our sample of "emerging markets" for 1870-1913.
[1] "Other" includes Antigua, Barbados, Bolivia, British Columbia, British Guyana, Ceylon, Colombia, Costa Rica, Danubian Principalities, Gold Coast, Grenada, Guatemala, Honduras, Hong Kong, Jamaica, Liberia, Mauritius, Moorish territories, Nicaragua, Paraguay, San Domingo, Sardinia, Serbia, Sierra Leone, St. Lucia and Trinidad.

Table 2A. Secondary Market Transactions in Debt Instruments, Emerging Markets, 1993-1999[1]

	1993	1994	1995	1996	1997	1998	1999
	(In billions of US dollars)						
All instruments	1979	2766	2739	5297	5916	4174	2185
Brady Bonds	1021	1684	1580	2690	2403	1541	771
Total Non-Brady Bonds	177	165	211	568	1335	1021	626
Sovereign Bonds	88	77	112	327	924	740	431
Corporate and unspecified bonds	89	88	99	241	411	281	196
Total Local Markets Instruments	362	462	593	1274	1506	1176	599
Local Currency-denominated	207	371	461	851	977	869	460
US Dollar-denominated and unspecified	155	92	74	423	529	308	138
Loans	274	244	175	249	305	213	69
Options and warrants	57	142	179	471	365	223	119
Unspecified instruments	n.a.	12	n.a.	45	3	-	-

Source: Emerging Markets Traders Association

[1] All emerging markets surveyed by the Emerging Markets Traders Association

Table 2B. Secondary Market Transactions in Debt Instruments, Emerging Markets, 1993-1999

	1993	1994	1995	1996	1997	1998	1999
	(In billions of US dollars)						
All EMTA countries[1]							
Total	1,979	2,766	2,739	5,297	5,916	4,174	2,185
Brady Bonds	1,021	1,684	1,580	2,690	2,403	1,541	771
Non-Brady Sovereign Bonds	88	77	112	327	924	740	431
Other instruments[2]	870	1,005	1,047	2,280	2,590	1,893	983
Argentina							
Total	544	590	610	1,292	1,236	612	319
Brady Bonds	366	361	411	647	533	252	138
Non-Brady Sovereign Bonds	8	14	49	115	304	178	95
Other instruments[2]	170	216	149	531	399	182	85
Brazil							
Total	259	597	877	1,441	1,796	1,269	802
Brady Bonds	141	440	583	1,020	1,102	869	420
Non-Brady Sovereign Bonds	14	n.a.	15	28	130	80	49
Other instruments[2]	104	157	279	394	564	320	333
Bulgaria							
Total	n.a.	n.a.	59	106	109	37	20
Brady Bonds	n.a.	0	57	91	91	33	15
Non-Brady Sovereign Bonds	n.a.	n.a.	-	-	1	1	1
Other instruments[2]	n.a.	n.a.	3	15	18	3	4
Mexico							
Total	465	601	510	946	980	640	313
Brady Bonds	205	282	192	353	184	96	52
Non-Brady Sovereign Bonds	46	25	36	118	145	131	66
Other instruments[2]	214	295	282	476	650	414	195
Nigeria[3]							
Total	35	54	33	23	15	8	4
Philippines[3]							
Total	16	22	14	26	23	24	23
Poland							
Total	n.a.	n.a.	96	81	70	95	25
Brady Bonds	n.a.	n.a.	43	65	36	29	11
Non-Brady Sovereign Bonds	n.a.	n.a.	n.a.	1	2	2	3
Other instruments[2]	n.a.	n.a.	53	15	32	64	11
Venezuela							
Total	288	2	194	397	347	180	95
Brady Bonds	262	n.a.	173	355	248	89	60
Non-Brady Sovereign Bonds	6	2	1	3	46	70	24
Other instruments[2]	19	n.a.	20	39	53	21	11

Source: Emerging Markets Traders Association

[1] All emerging markets surveyed by the Emerging Markets Traders Association

[2] Including loans, options and warrants, and local market instruments in both domestic and foreign currencies.

[3] Breakdown by instrument not available.

Historical Sample (1870:1-1913:12)

Table 3. Spreads - Sample Statistics (in basis points)

	Argentina	Brazil	China	Egypt	Japan	Portugal	Queensland	Russia	Sweden	Turkey	Cross sectional mean, emerging markets	Cross sectional mean, excluding Turkey	Cross sectional median, emerging markets	Britain Bond yields (in percent)
Mean	330	244	310	139	312	438	104	184	104	1094	326	241	277	2.95
Median	306	217	313	123	336	273	105	177	96	252	220	216	234	2.96
Maximum	1624	653	584	600	623	1491	149	443	183	8107	1446	706	612	3.48
Minimum	137	125	151	59	146	125	46	64	41	-8	89	99	94	2.42
Standard Deviation	164	82	109	77	98	335	17	77	39	1738	274	111	90	0.23
Coefficient of variation	0.50	0.34	0.35	0.55	0.32	0.76	0.16	0.42	0.38	1.59	0.54	0.42	0.40	0.08
Skewness	2.64	1.31	0.17	2.98	0.31	1.10	-0.49	0.34	0.54	1.87	1.08	0.99	0.82	-0.37
Kurtosis	15.26	5.02	1.58	13.64	2.89	2.83	3.51	2.21	2.02	5.27	5.42	5.44	3.20	2.78
Jarque-Bera statistic	3923	214	39	2737	9	107	24	24	46	422	755	792	77	13
P-value of test for normality	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observations	528	467	440	442	523	528	474	528	528	528	499	495	526	528
Mean/Britain mean	1.12	0.83	1.05	0.47	1.06	1.48	0.35	0.62	0.35	3.70	1.10	0.82	0.94	1.00

Modern Sample (1992:01-2000:05)

	Argentina	Brazil	Bulgaria	Mexico	Nigeria	Philippines	Poland	Venezuela	Cross sectional mean, emerging markets	Cross sectional median, emerging markets	United States Bond yields (in percent)
Mean	779	848	1077	654	1509	475	309	1072	840	813	6.78
Median	767	814	926	547	1567	401	248	960	779	790	6.68
Maximum	1631	1589	2154	1637	2698	911	861	3161	1830	1634	8.42
Minimum	329	362	463	266	545	161	145	264	317	298	4.98
Standard Deviation	289	294	430	274	555	221	173	541	347	292	0.86
Coefficient of variation	0.37	0.35	0.40	0.42	0.37	0.46	0.56	0.50	0.43	0.41	0.13
Skewness	0.68	0.42	0.45	1.22	0.00	0.48	1.56	0.84	0.71	0.58	0.02
Kurtosis	3.14	2.44	2.10	3.95	2.04	1.99	4.51	3.68	2.98	2.79	2.15
Jarque-Bera statistic	7	4	5	29	4	8	34	14	13	7	3
P-value of test for normality	0.03	0.12	0.10	0.00	0.15	0.02	0.00	0.00	0.05	0.03	0.18
Observations	86	102	67	102	101	102	67	102	91	102	113
Mean/US mean	1.15	1.25	1.59	0.97	2.23	0.70	0.46	1.58	1.24	1.20	1.00

Data Sources: *The Economist* and J.P. Morgan website

Table 4. Correlation Matrices

Historical Sample (1877:5 - 1913:12)

	Argentina	Brazil	China	Egypt	Japan	Portugal	Queensland	Russia	Sweden	Turkey	Britain 1/
Argentina	1.00	0.40	0.72	0.72	0.71	0.37	0.57	0.37	0.78	0.50	-0.13
Brazil	0.40	1.00	0.12	0.02	0.27	0.90	0.61	-0.33	0.18	-0.16	-0.70
China	0.72	0.12	1.00	0.65	0.80	0.07	0.38	0.66	0.80	0.67	0.02
Egypt	0.72	0.02	0.65	1.00	0.50	-0.09	0.29	0.70	0.74	0.76	0.17
Japan	0.71	0.27	0.80	0.50	1.00	0.26	0.51	0.40	0.65	0.37	-0.31
Portugal	0.37	0.90	0.07	-0.09	0.26	1.00	0.52	-0.45	0.09	-0.24	-0.69
Queensland	0.57	0.61	0.38	0.29	0.51	0.52	1.00	0.16	0.49	0.21	-0.66
Russia	0.37	-0.33	0.66	0.70	0.40	-0.45	0.16	1.00	0.58	0.76	0.33
Sweden	0.78	0.18	0.80	0.74	0.65	0.09	0.49	0.58	1.00	0.71	0.01
Turkey	0.50	-0.16	0.67	0.76	0.37	-0.24	0.21	0.76	0.71	1.00	0.34
Britain 1/	-0.13	-0.70	0.02	0.17	-0.31	-0.69	-0.66	0.33	0.01	0.34	1.00

Average correlation in emerging markets   0.42

Modern Sample (1994:11 - 2000:05)

	Argentina	Brazil	Bulgaria	Mexico	Nigeria	Philippines	Poland	Venezuela	United States 1/
Argentina	1.00	0.82	0.77	0.92	0.87	0.79	0.84	0.89	0.19
Brazil	0.82	1.00	0.44	0.83	0.79	0.66	0.60	0.87	-0.25
Bulgaria	0.77	0.44	1.00	0.71	0.58	0.62	0.76	0.64	0.59
Mexico	0.92	0.83	0.71	1.00	0.77	0.85	0.79	0.85	0.04
Nigeria	0.87	0.79	0.58	0.77	1.00	0.79	0.79	0.88	0.04
Philippines	0.79	0.66	0.62	0.85	0.79	1.00	0.80	0.80	-0.02
Poland	0.84	0.60	0.76	0.79	0.79	0.80	1.00	0.76	0.42
Venezuela	0.89	0.87	0.64	0.85	0.88	0.80	0.76	1.00	-0.03
United States 1/	0.19	-0.25	0.59	0.04	0.04	-0.02	0.42	-0.03	1.00

Average correlation in emerging markets   0.77

Data Sources: *The Economist* and J.P. Morgan website.

1/ Correlations between British (or US) yields and emerging market spreads.

Table 5. Beta Coefficients on Returns in Modern and Historical Samples

	R^2	Beta	Standard error	Abs (1-Beta)
Historical Sample (1877 - 1913)				
Argentina	0.24	1.19	0.10	0.19
Brazil	0.20	1.04	0.10	0.04
China	0.03	0.27	0.08	0.73
Egypt	0.17	0.84	0.09	0.16
Japan	0.04	0.55	0.14	0.45
Portugal	0.27	1.57	0.12	0.57
Queensland	0.16	0.37	0.04	0.63
Russia	0.61	1.24	0.05	0.24
Sweden	0.02	0.14	0.05	0.86
Average	0.19	0.80	0.09	0.43
Modern Sample (1994 - 2000)				
Argentina	0.85	0.85	0.04	0.15
Brazil	0.88	1.10	0.05	0.10
Bulgaria	0.74	1.27	0.09	0.27
Mexico	0.74	0.62	0.04	0.38
Nigeria	0.71	0.92	0.07	0.08
Poland	0.47	0.65	0.08	0.35
Philippines	0.77	0.58	0.04	0.42
Venezuela	0.75	1.31	0.09	0.31
Average	0.74	0.91	0.06	0.26

Source: *The Economist's Investor Monthly Manual* and J.P. Morgan website

The beta coefficients are estimated by regressing each country's bond returns on the returns on a market-weighted portfolio of bonds issued by all emerging market countries.

Table 6A: Sharp changes in spreads, by country

	Sample	Number of observations	200 basis point changes			20 percent changes		
			Number of increases	Number of decreases	Share of observations (in %)	Number of increases	Number of decreases	Share of observations (in %)
Historical								
ARGENTINA	Jan 1870 - Dec 1913	527	3	2	0.95	3	2	0.95
BRAZIL	Feb 1875 - Dec 1913	466	0	0	0.00	1	0	0.21
CHINA	May 1877 - Dec 1913	439	0	0	0.00	0	0	0.00
EGYPT	Mar 1877 - Dec 1913	441	1	0	0.23	2	0	0.45
JAPAN	Jun 1870 - Dec 1913	522	0	1	0.19	0	1	0.19
PORTUGAL	Jan 1870 - Dec 1913	527	3	3	1.14	4	1	0.95
QUEENSLAND	Jul 1874 - Dec 1913	473	0	0	0.00	0	0	0.00
RUSSIA	Jan 1870 - Dec 1913	527	1	0	0.19	2	0	0.38
SWEDEN	Jan 1870 - Dec 1913	527	1	0	0.19	1	0	0.19
TURKEY	Jan 1870 - Dec 1913	527	34	30	12.14	15	4	3.61
Total Historical		4976	43	36	1.59	28	8	0.72
Modern								
ARGENTINA	Apr 1993 - May 2000	85	7	3	11.76	11	4	17.65
BRAZIL	Dec 1991 - May 2000	101	9	4	12.87	10	4	13.86
BULGARIA	Nov 1994 - May 2000	66	5	6	16.67	3	3	9.09
ECUADOR	Jun 1995 - May 2000	59	14	9	38.98	8	6	23.73
MEXICO	Dec 1991 - May 2000	101	5	2	6.93	10	5	14.85
NIGERIA	Jan 1992 - May 2000	100	14	17	31.00	9	6	15.00
PANAMA	Feb 1997 - May 2000	39	1	0	2.56	4	1	12.82
PERU	May 1997 - May 2000	36	2	0	5.56	5	0	13.89
PHILIPPINES	Dec 1991 - May 2000	101	2	3	4.95	11	11	21.78
POLAND	Nov 1994 - May 2000	66	1	1	3.03	2	4	9.09
VENEZUELA	Dec 1991 - May 2000	101	11	13	23.76	14	10	23.76
KOREA	Apr 1998 - May 2000	25	1	1	8.00	5	4	36.00
MOROCCO	Jan 1998 - May 2000	28	1	2	10.71	3	4	25.00
RUSSIA	Jan 1998 - May 2000	28	6	11	60.71	4	4	28.57
Total Modern		936	79	72	16.13	99	66	17.63

Source: *The Economist's Investor Monthly Manual* and J.P. Morgan web site.

Table 6B: Sharp changes in spreads, for different cutoffs

Cutoff	1870-1913 10 countries 4976 observations	1992-2000 14 countries 936 observations
100 basis points		
Sharp increases	78	154
Sharp decreases	65	171
Sharp changes	143	325
Sharp changes/Total observations (in %)	2.87	34.72
200 basis points		
Sharp increases	43	79
Sharp decreases	36	72
Sharp changes	79	151
Sharp changes/Total observations (in %)	1.59	16.13
300 basis points		
Sharp increases	32	44
Sharp decreases	26	39
Sharp changes	58	83
Sharp changes/Total observations (in %)	1.17	8.87
10 percent		
Sharp increases	76	211
Sharp decreases	53	233
Sharp changes	129	444
Sharp changes/Total observations (in %)	2.59	47.44
20 percent		
Sharp increases	28	99
Sharp decreases	8	66
Sharp changes	36	165
Sharp changes/Total observations (in %)	0.72	17.63
30 percent		
Sharp increases	12	52
Sharp decreases	5	9
Sharp changes	17	61
Sharp changes/Total observations (in %)	0.34	6.52
40 percent		
Sharp increases	7	37
Sharp decreases	3	2
Sharp changes	10	39
Sharp changes/Total observations (in %)	0.20	4.17

Source: *The Economist's Investor Monthly Manual* and J.P. Morgan web site.

Table 7. Number and type of crises, 1887-1913 and 1994-2000.

Number of months with characteristics listed	Historical Sample (1887:5 - 1913:12)							Modern Sample (1994:11 - 2000:5)						
	10%	20%	30%	40%	100 bps	200 bps	300 bps	10%	20%	30%	40%	100 bps	200 bps	300 bps
No sharp changes	390	434	438	439	415	435	439	4	26	55	63	11	35	50
Sharp changes in exactly one country	45	5	2	1	21	5	1	8	26	7	2	16	12	11
Sharp changes in exactly two countries	4	1	0	0	4	0	0	9	7	2	0	4	10	3
Sharp changes in three or more countries	1	0	0	0	0	0	0	46	8	3	2	36	10	3
Sharp increases in exactly one country	24	3	0	0	7	1	0	15	13	3	1	15	6	4
Sharp increases in exactly two countries	2	1	0	0	2	0	0	2	4	1	0	1	6	1
Sharp increases in three or more countries	0	0	0	0	0	0	0	20	4	3	2	15	4	2
Sharp decreases in exactly one country	21	2	2	1	14	4	1	9	16	4	1	15	8	7
Sharp decreases in exactly two countries	2	0	0	0	2	0	0	7	3	1	0	4	5	2
Sharp decreases in three or more countries	1	0	0	0	0	0	0	24	3	0	0	18	5	1
Proportion of months with characteristics listed (As a share of total months in sample period in percent)														
Sharp changes in exactly one country	10.2	1.1	0.5	0.2	4.8	1.1	0.2	11.9	38.8	10.4	3.0	23.9	17.9	16.4
Sharp changes in exactly two countries	0.9	0.2	0.0	0.0	0.9	0.0	0.0	13.4	10.4	3.0	0.0	6.0	14.9	4.5
Sharp changes in three or more countries	0.2	0.0	0.0	0.0	0.0	0.0	0.0	68.7	11.9	4.5	3.0	53.7	14.9	4.5
Sharp increases in exactly one country	5.5	0.7	0.0	0.0	1.6	0.2	0.0	22.4	19.4	4.5	1.5	22.4	9.0	6.0
Sharp increases in exactly two countries	0.5	0.2	0.0	0.0	0.5	0.0	0.0	3.0	6.0	1.5	0.0	1.5	9.0	1.5
Sharp increases in three or more countries	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.9	6.0	4.5	3.0	22.4	6.0	3.0
Sharp decreases in exactly one country	4.8	0.5	0.5	0.2	3.2	0.9	0.2	13.4	23.9	6.0	1.5	22.4	11.9	10.4
Sharp decreases in exactly two countries	0.5	0.0	0.0	0.0	0.5	0.0	0.0	10.4	4.5	1.5	0.0	6.0	7.5	3.0
Sharp decreases in three or more countries	0.2	0.0	0.0	0.0	0.0	0.0	0.0	35.8	4.5	0.0	0.0	26.9	7.5	1.5

Sources: *The Economist's Investor Monthly Manual* and J.P.Morgan web site.

Note: The historical sample includes 9 countries: Argentina, Brazil, China, Egypt, Japan, Portugal, Queensland, Russia, Sweden. The modern sample includes 8 countries: Argentina Brazil, Bulgaria, Mexico, Nigeria, Philippines, Poland, Venezuela. The sample periods were chosen to ensure that there are no missing observations.

Table 8. Breaks in Historical Sample

Country	Date	Break type	Sign	Significance	Event
Argentina					
Major breaks	3/76	event (long)	"+"	9	Period of revolution and crisis
	6/90	event (long)	"+"	5	Baring Crisis
	7/91	event (long)	"+"	6	Failure of national bank
	4/79	event (long)	"-"	5.8	Success against rebellion
	4/96	event (long)	"-"	5	?
Window breaks	10/72	event (long)	"+"	4.4	During Jordan invasions
	11/80	event (long)	"-"	4.25	End of civil war
	7/82	event (long)	"-"	4.4	Period of Monetary reform
	5/90	event (short)	"-"	4.5	pre-Baring
	7/93	event (long)	"+"	4.2	Rebellion
	6/97	event (long)	"-"	4.3	?
	1/08	event (long)	"+"	4.5	Convertibility crisis
Brazil					
Major breaks	4/98	event (long)	"+"; "-"	5.6	Following the crushing of Canuda rebellion
	10/90	event (long)	"+"	3.7	Going off Gold, Baring crisis
	9/95	event (long)	"+"	3.2	Between revolt of military school and dissolution of congress
Window breaks	5/76	event (long)	"+"	5.5	?
	7/78	event (long)	"+"	4	Conservatives lose power
	11/88	event (long)	"+"	4.7	? Following abolition of slavery
	10/95	event (long)	"+"	4.4	Between Revolution and dissolution of congress
	4/98	event (long)	"+"	5	Currency crisis
	5/98	trend change	"-"	4.2	Following the crisis
	4/11	event (long)	"+"	4	Period of bombings
China					
Major breaks	6/85	event (long)	"-"	8	change of bonds
	5/96	event (long)	"-"	6.7	end of war with Japan
	7/00	event (short)	"+"	6	Boxer rebellion
Window breaks	4/79	event (long)	"-"	5	?
	12/81	event (long)	"+"	4.5	?
	2/82	event (long)	"+"	4.3	?
	3/83	event (long)	"+"	4.2	?
	6/85	event (long)	"-"	11.8	replacement of bonds, end of war in Vietnam
	8/91	event (long)	"+"	6.9	?
	8/92	event (long)	"+"	4.9	?
	4/95	event (long)	"-"	4.9	end of war with Japan
	5/96	event (long)	"-"	6.6	Treaty with Russia; change of bonds
	6/00	event (long)	"+"	5.2	Boxer rebellion
	6/06	event (long)	"-"	4	?
	1/09	event (long)	"+"	4.4	?
Egypt					
Major breaks	5/79	event (long)	"-"	4	July, Ismail pasha deposed
	9/81	event (long)	"+"	3.5	Armed rising
	4/85	event (short)	"+"		War against Sudan
Window breaks	6/78	event (long)	"-"	5.4	? IPO effect?
	6/82	event (short)	"+"	4.7	Britain takes control of Egypt
	11/97	event (long)	"+"	4	?
	11/98	event (long)	"+"	4.1	?
	8/08	trend change	"-"	4.4	?
	5/10	event (long)	"+"	4.1	?
	9/12	event (short)	"-"	4	?
Japan					
Major breaks	8/97	event (long)	"-"	9.3	Going onto gold standard
	3/04	event (long)	"+"	4.8	War with Russia
	6/87	event (long)	"+"	3.3	?
Window breaks	4/73	event (long)	"-"	6.3	Agrarian reform
	6/86	event (long)	"-"	4.3	Silver standard
	8/97	event (long)	"-"	6.9	Going onto gold standard
	8/98	event (long)	"-"	4.8	?
	2/05	event (long)	"-"	4.6	Victory over Russia

Table 8. Breaks in Historical Sample (continued)

Country	Date	Break type	Sign	Significance	Event
Portugal					
Major breaks	7/02	event (long)	"-"	4.3	Renegotiation of debt
	3/91	event (long)	"+"	6.6	Going off gold standard; bank moratorium
	9/07	event (long)	"+"	4	Franco dictatorship; end of monarchy
Window breaks	1/73	event (long)	"+"	4.4	?
	5/80	event (long)	"+"	4	?
	5/81	event (long)	"-"	4.7	?
	8/98	event (long)	"-"	4.7	End of hostilities with Germany?, Treaty with Britain negotiated
	9/02	event (long)	"-"	15	new bond -following renegotiation of debt
	1/04	event (short)	"+"	4.5	
Queensland					
Major breaks	1/91	event (long)	"+"	3.6	Bank Crisis
	9/80	event (long)	"-"	3	?
	4/93	event (long)	"+"	3.5	Bank Crisis
Window breaks	7/78	event (long)	"+"	4.3	?
	11/86	event (long)	"+"	4.4	?
	1/89	event (long)	"+"	4.6	?
Russia					
Major breaks	4/77	event (long)	"+"	7.4	War with Turkey
	4/85				bond change
	2/03	event (long)	"-"	3.85	hostilities vs. Japan?
Window breaks	4/78	event (long)	"-"	4.8	end of war with Turkey
	5/79	event (long)	"-"	4.2	?
	11/81	event (long)	"+"	4.4	following assassination of Alexander II
	3/85	event (long)	"+"	5.1	?
	7/86	event (long)	"+"	5	attempted assassination of Tzar
	1/91	event (short)	"-"	4.6	Trans Siberian railway?, new bond
	10/93	event (long)	"-"	6.3	Treaty with France
	1/95	event (short)	"-"	5.5	?
	12/96	event (short)	"-"	4	?
	4/97	event (long)	"+"	4.1	?
	7/97	event (long)	"-"	4.1	Going onto gold standard
	9/05	event (short)	"-"	5.2	End of war with Japan
	11/10	event (long)	"-"	4	?
Sweden					
Major breaks	6/81	event (long)	"-"	8.4	? Change of bonds
Window breaks	9/79	event (short)	"-"	4.2	?
	7/81	event (long)	"-"	21	change of bonds
	10/83	event (long)	"+"	4.3	?
	4/94	event (long)	"+"	4.3	reduction of interest rate on 1880 bond
	8/95	event (long)	"-"	8	change of bonds
	11/99	event (long)	"-"	4.1	replaced existing bonds with new ones with lower coupon rate
	3/01	event (long)	"-"	4.1	replaced existing bonds with new ones with lower coupon rate
	8/08	event (long)	"-"	4.5	new bond
Turkey					
Major breaks	7/75	event (long)	"+"	3.54	Trouble in Bosnia
	5/78	event (long)	"-"	4.8	End of war with Russia, introduction of gold standard
	9/95	event (long)	"+"	4.4	War against Greece
	10/12	event (short)	"+"	6	war in Balkan
Window breaks	7/71	event (long)	"-"	4.1	?
	8/73	event (long)	"+"	4.8	moratorium on debt
	8/74	event (short)	"-"	4.3	?
	5/77	event (long)	"+"	5.9	war with Russia
	5/78	event (long)	"-"	8	End of war with Russia; going onto gold standard
	10/80	event (long)	"-"	4.5	Civil code, debt administration
	1/84	event (long)	"-"	16	reduction of interest rate on old debt
	9/85	event (long)	"-"	6.3	end of conflict over Egypt
	10/95	event (long)	"+"	5.1	Tensions in Crete leading to war with Greece
	5/97	event (long)	"-"	4.2	Conclusion of war with Greece
	5/98	event (long)	"-"	4.1	?

Sources: *The Economist Investor's Monthly Manual*
The breaks are identified through an iterative procedure as described in the text.

Table 9. Breaks in Modern Sample

Country	Date	Break type	Sign	Significance	Event
Argentina					
Major breaks	8/98	event (long)	"+"	5.5	
Window breaks	8/98	event (long)	"+"	4.8	
Brazil					
Major breaks	8/98	event (long)	"+"	4.9	
	3/94	event (long)	"+"	3	
Window breaks	8/98	event (long)	"+"	4.7	
Bulgaria					
Major breaks	8/98	event (long)	"+"	5.2	
	4/97	event (long)	"-"	3.6	currency board forthcoming
Window breaks	8/98	event (long)	"+"	6.9	
Ecuador					
Major breaks	8/98	event (long)	"+"	4.8	
Window breaks	8/98	event (long)	"+"	4.8	
Mexico					
Major breaks	8/98	event (long)	"+"	4.3	
	10/94	event (long)	"+"	4	
Window breaks	12/94	event (long)	"+"	5.6	Financial crisis - sharp devaluation
	8/98	event (long)	"+"	4.3	
Nigeria					
Major breaks	8/98	event (long)	"+"	6	
	1/94	event (long)	"+"	3.8	
Window breaks	8/98	event (short)	"+"	6	
Philippines					
Major breaks	8/98	event (long)	"+"	5.25	
Window breaks	8/98	event (short)	"+"	6.4	
Poland					
Major breaks	8/98	event (long)	"+"	5.6	
Window breaks	8/98	event (short)	"+"	5.3	
Venezuela					
Major breaks	8/98	event (long)	"+"	7.5	
	1/94	event (long)	"+"	4.6	
Window breaks	3/94	event (long)	"+"	4.4	Financial crisis
	8/98	event (long)	"+"	4.3	

Source: J.P. Morgan

The breaks are identified through an iterative procedure as described in the text.

Table 10. The Impact of Events in China on Japanese Spreads, 1870-1914

Date	Event	Long-term break?	Short-term "blip"?
December 1883	Outbreak of the Chinese-French War over Vietnam (Annam)	None	None
June 1896	Chinese-Russian military alliance	None	None
June 1900	Outbreak of the Boxer Rebellion	None	+0.05
May 1907	Instability and revolts in several regions of China	None	None
September 1911	The Chinese Revolution	None	None

Data Source: *The Economist's Investor Monthly Manual*, monthly data.
Note: Any long-term breaks and short-term blips are obtained from a 2-year window approach around major events as explained in the text.

Table 11a. The Largest Increases in Korean Spreads
(The Worst Twenty Days)

Rank	Date	Event	Increase in spreads (in percent)	Effect on other countries?
(1)	27/10/97	Bad economic news from Hong Kong*	27.53	Th, Indon
(2)	30/10/97	Bad economic news from Hong Kong	25.59	Th, Indon
(3)	02/06/98	Labor disputes?*	24.90	No
(4)	23/10/97	Bad economic news from Hong Kong	24.37	Th, Indon
(5)	10/12/97	Government suspends five cash strapped companies	23.48	Indon
(6)	23/12/97	Credit agencies downgrade Korean sovereign debt	22.95	No
(7)	21/08/98	Russian default*	21.59	Mal, Indon
(8)	19/03/97	?	21.26	Indon
(9)	22/12/97	Moody's lowers ranking of Korean sovereign debt to junk	20.18	Th, Indon
(10)	11/12/97	Moody's lowers ranking of Korean sovereign debt	19.79	Th, Indon
(11)	19/12/97	Korea Investors Service downgrades *chaebol* affiliates	17.97	No
(12)	16/06/98	55 firms about to fail	17.64	No
(13)	02/09/97	Trouble selling Kia*	14.78	No
(14)	10/09/98	Bad economic news from Brazil	14.29	Lat Am
(15)	09/12/97	Stocks and won plunge – "investor worries"	13.77	No
(16)	25/08/97	S&P may cut Thailand's rating	13.70	No
(17)	25/11/97	Non-performing loans bigger than expected	13.19	No
(18)	27/08/98	Russian default	13.16	Th, Lat Am
(19)	13/01/99	Bad day in the stock market	13.12	Lat Am, Th, Indon, Mal
(20)	12/12/97	Suharto's health problems	12.73	Th,Indon

Data Source: Deutsche Bank.
Th, Indon, Mal, and Lat Am denote instances in which a large change (by more than
10 percent) is observed also in the spread on Thai, Indonesian, Malaysian, and both
Argentinian and Brazilian bonds, respectively. Stars denote events that are found significant
in a 2-year window approach around them, as explained in the text. A question mark denotes
dates when no major events are reported.

Table 11b. The Largest Decreases in Korean Spreads
(The Best Twenty Days)

Rank	Date	Event	Decrease in premium (in percent)	Effect on other countries?
(1)	24/12/97	Overshooting the day before?*	-30.09	Th
(2)	21/11/97	Government to turn to the IMF for assistance	-24.17	No
(3)	21/12/98	Talk of debt upgrading	-24.09	No
(4)	10/10/96	Korea joins OECD	-20.99	No
(5)	19/01/99	Fitch upgrades Korean sovereign debt	-20.40	No
(6)	18/02/98	Conglomerates reach accord with foreign banks*	-19.10	No
(7)	04/11/97	Thai (and Korean) stocks rally	-18.40	Th
(8)	16/12/97	All three presidential candidates will abide by IMF deal	-18.35	Th, Indon
(9)	04/01/99	S&P upgrades Korean sovereign debt	-17.92	Th
(10)	29/07/98	Agreement with the IMF on revised economic goals	-17.52	No
(11)	26/12/97	Financial markets fully open to foreigners	-12.46	No
(12)	09/09/97	KDB issues m$750 bonds in US	-12.31	No
(13)	15/01/99	?	-11.45	Lat Am
(14)	23/01/98	?	-11.14	No
(15)	16/02/99	Successful negotiations with foreign creditors	-10.94	No
(16)	13/08/98	?	-10.66	Argentina
(17)	13/01/98	Government takes steps to ease cash crunch;	-10.05	No
(18)	18/12/97	Reforms and approval of 2nd part of IMF loan	-9.77	No
(19)	25/01/99	?	-9.74	No
(20)	15/09/98	Government to acquire 2 ailing banks	-9.72	Lat Am

Data Source: Deutsche Bank.
Th, Indon, Mal, and Lat Am denote instances in which a large change (by more than
10 percent) is observed also in the spread on Thai, Indonesian, Malaysian, and both
Argentian and Brazilian bonds, respectively. Stars denote events that are found significant
in a 2-year window approach around them, as explained in the text. A question mark denotes
dates when no major events are reported.

Table A3.1. Share of total variation accounted for by the first principal component (in percent)

Sample	Full sample	Minimum dropping one country	Maximum dropping one country	Minimum dropping two countries	Maximum dropping two countries
1877-1914 Monthly, 9 countries, Excluding Turkey	52.0 (2.0)	48.8 dropping Argentina	57.8 dropping Portugal	45.1 dropping Argentina and Sweden	65.2 dropping Brazil and Portugal
1875-1914 Monthly, 8 countries, Including Turkey	45.7 (1.9)	42.0 dropping Sweden	51.9 dropping Portugal	43.2 dropping Japan and Sweden	60.0 dropping Brazil and Portugal
1994-2000 EMBI Monthly, 8 countries	80.0 (3.1)	78.3 dropping Argentina	83.7 dropping Bulgaria	76.9 dropping Argentina and Venezuela	85.6 dropping Brazil and Bulgaria
1994-2000 EMBI Daily, 8 countries	81.3 (0.7)	79.7 dropping Argentina	84.7 dropping Bulgaria	78.3 dropping Argentina and Mexico	86.6 dropping Brazil and Bulgaria
1998-2000 EMBI+ Daily, 14 countries	72.2 (1.8)	69.9 dropping the Philippines	78.0 dropping Korea	68.2 dropping Peru and the Philippines	83.4 dropping Ecuador and Korea

The numbers in parentheses are standard errors of the percentage of total variation accounted for by the first principal component. The first principal component is computed using the correlation matrix (i.e., the spreads divided by their standard deviation).

Data sources: *The Economist*, and J.P. Morgan.