

New Perspectives on Emerging Market Bonds

Looking beyond the current crisis.

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Emerging market bonds have attracted considerable interest for their very high average returns. Indeed, from 1991 through early summer 1997, the average returns on emerging market bonds exceeded return on the Standard & Poor's 500 index. Since August 1997, however, the value of these bonds has plummeted along with equity market values. We argued in the summer of 1997 that any judgment on the viability of emerging market bonds as an asset class is difficult, given 1) the short history of data, and 2) that characteristics were being measured over a long bull market (Erb, Harvey, and Viskanta [1997b]).

Nemerever [1996], Dahiya [1997], and Froland [1998] all argue the case for investment in emerging market bonds, but there is very little research on emerging market debt. Emerging market equities, on the other hand, have garnered far more attention. Harvey [1995] finds that standard asset pricing models fail when applied to these markets. He attributes the failure of these models to a lack of integration of emerging capital markets with global capital markets. Bekaert and Harvey [1995, 1997] propose and test models of expected returns in emerging markets that explicitly take the degree of market integration into account. Erb, Harvey, and Viskanta [1996a] propose a model of expected returns based on risk ratings in emerging market countries.

With more data from both up and down cycles, it is now more appropriate to examine the characteris-

tics of EM bonds. We have several objectives. First, we explore the yields of these bonds over U.S. Treasury bonds in the context of a country risk model. Second, we consider the risk and expected return characteristics of these bonds, broadening the view of risk to include conditional skewness risk. Third, we explore the shifting cross-asset class correlations of emerging market bonds. Finally, we conduct an analysis of style to determine to what degree these bonds figure in other asset classes.

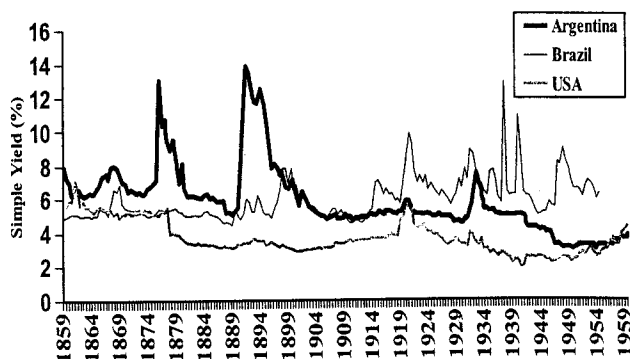
HISTORICAL PERSPECTIVE

Although many of the discussions about emerging market bonds apply only to the last decade, global bond investing has a long history. Through at least the first World War, London was the center of global finance. Latin American lending had already become quite widespread in the nineteenth century. The sale of foreign bonds to individual investors, and the subsequent losses, played a role in enactment of the Glass-Steagall Act in 1933 (see Chernow [1990]).

Volatility has been a hallmark of emerging market bonds throughout time. Exhibit 1A shows yields on Argentine and Brazilian bonds from 1859 through 1959.¹ One can clearly see periodic bouts of distress and volatility. This long-term historical perspective allows us to put recent experience into context.

Exhibit 1B shows the stripped yields over U.S. Treasuries for Argentina and Brazil from 1991

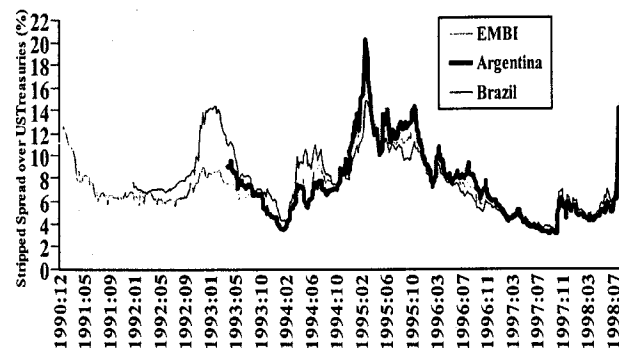
EXHIBIT 1A
EMERGING MARKET BONDS —
LONG-TERM HISTORICAL YIELDS



Semiannual observations.

Source: Global Financial Database.

EXHIBIT 1B
EMERGING MARKET BONDS —
RECENT HISTORICAL YIELDS



Weekly observations.

Source: J.P. Morgan Securities.

through mid-1998. Again we see both high yields and ample volatility.

DATA

Data on emerging market bonds are limited in large part by the short history of many of these instruments. J.P. Morgan Securities, however, provides an impressive source of data on emerging market bonds, and we use its data throughout.

The two major indexes are EMBI (Emerging Market Bond Index) and EMBI+. EMBI consists of U.S. dollar-denominated Brady bonds.² EMBI+ expands on EMBI by including other non-local currency-denominated bonds and has more restrictive liquidity requirements. As of September 30, 1998, the EMBI included bonds from thirteen countries.

A problem in regard to emerging market equities is market survivorship. Goetzmann and Jorion [1996] demonstrate that emerging equity markets that rebound after a period of dormancy have higher returns for some initial period than their long-term expected return. Such an upward bias should be evident in emerging market bond markets as well. The effects of debt renegotiation and market liberalization drove returns over this period above their sustainable long-term average. Therefore, these data likely need to be interpreted with great care.

J.P. Morgan also produces the ELMi+ (Emerging Local Market Index), a local currency-denominated

money market index that covers twenty-four countries. It differs from the earlier indexes in a number of respects. First, it comprises securities denominated in each country's local currency. Second, the index has a short duration (forty-day average life as of September 30, 1998). Third, the country composition differs materially from the hard currency indexes. To date most foreign emerging market investment has been in the longer-duration hard currency bonds. It is likely, however, that local currency bonds will become increasingly important.

EMERGING MARKET BOND CAPITALIZATION

Emerging market bonds remain a relatively small part of the world capital markets. In September 1998, the market capitalization of J.P. Morgan's EMBI was U.S. \$71 billion. This compares to \$252 billion for the CS First Boston high-yield index. The Lehman long-term U.S. government index has \$748 billion in capitalization, while the Lehman U.S. intermediate and aggregate indexes have \$1.828 trillion and \$5.408 trillion, respectively. The Salomon Smith Barney non-U.S. bond index has \$4.336 billion in capitalization. Clearly, emerging market bonds are a very small fraction of the fixed-income market.

The emerging market bonds are also small compared to equity capitalization. The International Finance Corporation Global index has \$668 billion in market capitalization while the IFC Investables index has \$482 billion. The Morgan Stanley Capital International EAFE has \$6.063 trillion in capitalization and the Standard & Poor's 500 has \$8.153 trillion.

Through 1997, local currency bonds seemed to be expanding their market presence. Hinchberger [1997] cites estimates that the market capitalization of local currency emerging market fixed-income instruments is two times the hard currency market. Even at this size, there remain some concerns for foreign investors. The market is dominated by short-term (shorter than one year) instruments, as represented in J.P. Morgan's ELMI+. Other issues related to an expanding local currency debt market include potential illiquidity and complex regulatory issues in certain countries.

Emerging market bonds were initially viewed by many market participants as high-yield substitutes. Indeed, for a time in 1997, emerging market bonds appeared to be approaching U.S. high-yield bonds in

terms of market capitalization. If local currency-denominated securities are taken into account, then emerging market debt might surpass the size of the U.S. high-yield market.

The Asian financial crisis has pointed out the danger for countries and companies of relying on debt issues denominated in hard currencies (see Harvey and Roper [1998]).

RISK AND EXPECTED RETURNS OF EMERGING MARKET BONDS

We need to exercise some caution in any historical analysis of emerging market bond performance. The J.P. Morgan EMBI dates back only to January 1991. There are great dangers in drawing inferences on the basis of such short samples. For example, in the summer of 1997, the average performance of the EMBI was better than that of the S&P 500 and considerably better than the U.S. high-yield index. Such return differentials are often used to promote investment in emerging market bonds.

One year makes a huge difference. Both emerging market equities and bonds were subject to massive selloffs beginning in August 1997. Average returns decreased, and volatility increased.

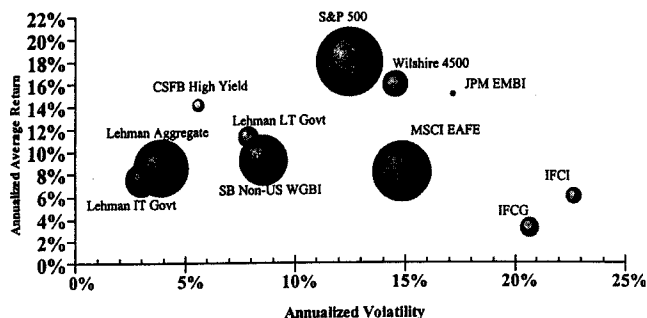
Exhibits 2A and 2B show that emerging market bonds (JPM EMBI) stand out in terms of both return and volatility. Over the January 1991 to September 1998 period, emerging market bonds have higher returns than emerging market equities (IFCG and IFCI) and U.S. high-yield corporate debt (CSFB High Yield). The return advantage, however, comes at the cost of higher volatility, which we will see for emerging market bonds is largely idiosyncratic.

DISTRIBUTIONAL CHARACTERISTICS OF EMERGING MARKET BONDS

Research into the distributional characteristics of emerging market equities has shown significant deviations from normality. Bekaert and Harvey [1997] and Bekaert et al. [1997] demonstrate that emerging market equities exhibit skewness and excess kurtosis. They show that, given a typical investor's preferences, optimal investment weights should reflect the asset's contribution to portfolio skewness.

The intuition for this is straightforward. People like assets that deliver high positive skewness and are

EXHIBIT 2A
WORLD CAPITAL MARKETS:
RISK, RETURN, AND RELATIVE
CAPITALIZATION IN SEPTEMBER 1998



Data: Monthly U.S.\$ total returns (1991:01-1998:09).

willing to accept low (or even negative) expected returns for these assets (viz. lottery tickets, option pay-offs). Investors do not like negative skewness. To take on negative skewness, investors demand a higher expected return.³

One difficulty with measuring skewness is that it likely changes through time. That is, past data may give no indication of future expected skewness. This is the so-called peso problem in economic theory. Looking at past currency movements, you may see little variation in rates during a managed float regime. Yet there is a probability of a devaluation that you cannot detect from looking at past data. This is the definition of negative skewness.

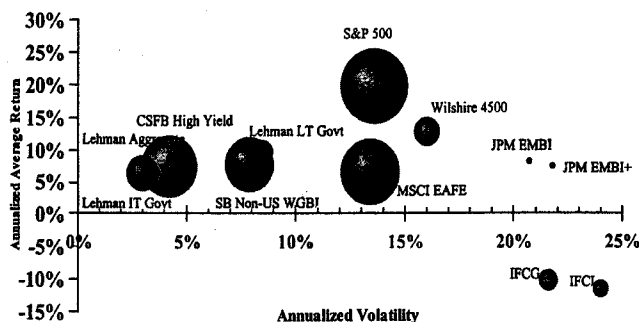
The inability to detect negative skewness using past data does not appear to be relevant for emerging market bonds. For example, in the January 1991 through May 1997 period, the EMBI has a negative skewness of -0.7 . In the January 1994 to May 1997 period, the negative skewness is -0.5 . During the same period, the EMBI+ has a negative skewness of -0.06 . There was considerable evidence — before the emerging market meltdown — that emerging market bonds possessed negative skewness. This negative skewness is consistent with the high expected returns.

The events beginning in the summer of 1997 caused an even greater measured negative skewness. Exhibit 3 shows that the skewness of the EMBI portfolio in the January 1991 through September 1998 period is -2.1 .

Bonds and Equities

Are emerging market equities and bonds sub-

EXHIBIT 2B
WORLD CAPITAL MARKETS:
RISK, RETURN, AND RELATIVE
CAPITALIZATION IN SEPTEMBER 1998

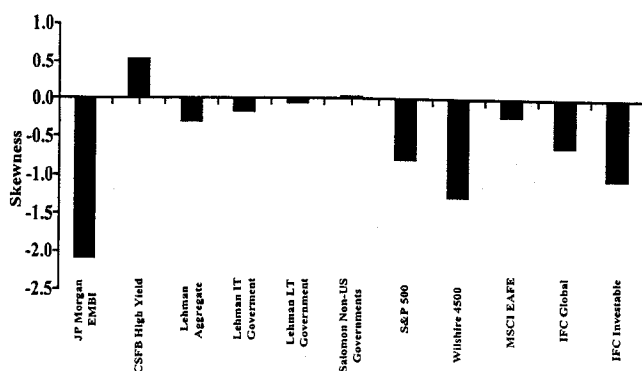


Data: Monthly U.S.\$ total returns (1994:01-1998:09).

Abbreviation	Index
CSFB High Yield	Credit Suisse First Boston High Yield Bond Index
IFCI	International Finance Corporation Investable Composite
IFCG	International Finance Corporation Global Composite
JPM EMBI	J.P. Morgan Emerging Market Bond Index
JPM EMBI+	J.P. Morgan Emerging Market Bond Index Plus
Lehman Aggregate	Lehman Brothers Aggregate Bond Index
Lehman LT Government	Lehman Brothers Long-Term Government Bond Index
Lehman IT Government	Lehman Brothers Intermediate-Term Government Bond Index
MSCI EAFE	Morgan Stanley Capital International Europe, Australasia, and Far East Index
S&P 500	Standard & Poor's 500 Index
SB Non-U.S. WGBI	Salomon Brothers Non-United States World Government Bond Index (Unhedged)
Wilshire 4500	Wilshire Associates 4500 Stock Index

stitutes? Intuition suggests that high-yield bonds should behave much like equities — especially in times of distress. Our intuition is that emerging market stocks and bonds should have higher intramarket correlations than those in the developed markets because of their country-specific risk. This would

EXHIBIT 3 WORLD CAPITAL MARKETS: SKEWNESS



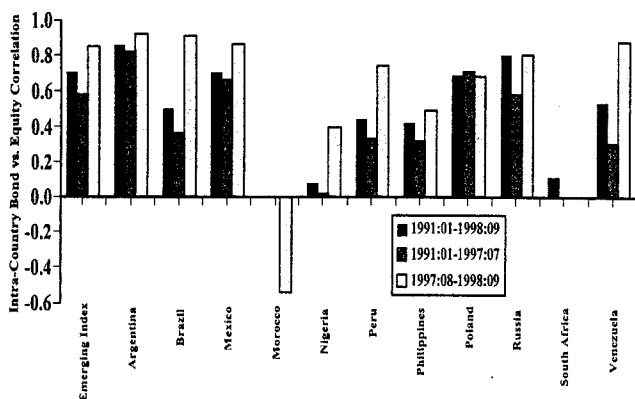
Data: Monthly U.S.\$ total returns (1991:01-1998:09).

allow an investor the chance to more readily substitute bonds and stocks within an emerging country. This could be very helpful in markets where liquidity or investability are issues.

Exhibit 4 details the equity-bond correlations for eleven countries. We report three subperiods: January 1991-September 1998, January 1991-July 1997, and August 1997-September 1998. The third period isolates the emerging market selloff. The correlations are generally very high, which is consistent with intuition.

The most striking pattern in Exhibit 4 is the dramatic increase in the intramarket correlations during

EXHIBIT 4 EMERGING MARKET BONDS: INTRACOUNTRY BOND VERSUS EQUITY INDEX CORRELATION



Data: Monthly U.S.\$ total returns.

Equities: IFC Investable; Bonds: J.P. Morgan EMBI+.

the most recent year. Argentina, Brazil, Mexico, Russia, and Venezuela all have intramarket correlations around 0.8. For the index as a whole, the correlation increases from 0.55 in the period up to July 1997 to 0.82 over the last fourteen months of the period.⁴

Asset Class Correlations

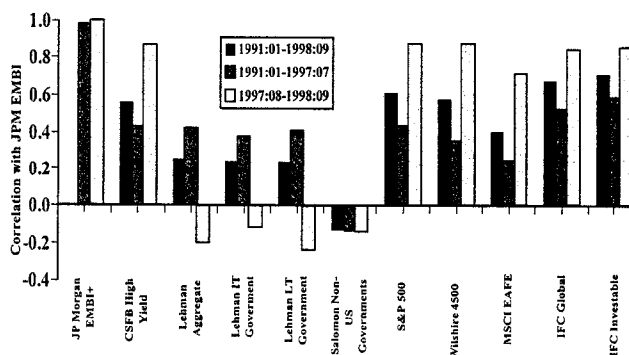
Exhibit 5 presents the correlation of J.P. Morgan's EMBI with other asset classes. The time periods correspond to the start of the EMBI and the EMBI+. The correlation between EMBI and EMBI+ is very high at 0.98.

Examining the data through July 1997, one notices that the highest correlations are with the two IFC emerging market indexes. Correlations against other U.S. dollar bond indexes are in the 0.35 to 0.50 range up to July 1997. A first glance at the data suggests that emerging market bonds are unique in their return patterns, but there is an extraordinary shift in the patterns when the most recent data are examined.

In the fourteen months after July 1997, the correlation with the CSFB high-yield index doubles. The correlation with the S&P 500 is higher than 0.8 and surprisingly higher than the correlation with the IFC indexes. The correlation with the government bond indexes shifts from positive in the earlier period to negative in the most recent period.

Another way of approaching this question is to examine emerging market bond returns in a multivariate setting. We use a Sharpe-style attribution methodology to examine both the overall and time series

EXHIBIT 5 EMERGING MARKET BONDS: ASSET CLASS CORRELATIONS



Data: Monthly U.S.\$ total returns.

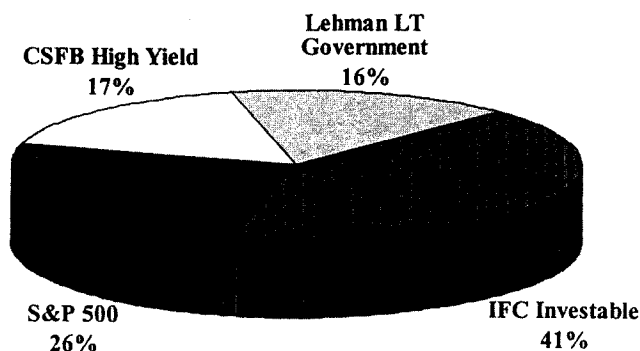
properties of the asset class.⁵ If we can determine which asset classes emerging market bonds correlate with, we gain a better understanding of how they might fit into a portfolio.

Exhibits 6A-6C show the results for an analysis from January 1991 through September 1998 and subsamples of the last two years and the last year. Over the full sample, the greatest contributor to variation in emerging market debt returns is the IFC index. The S&P 500 is the second-most important, followed by the high-yield index and long-term U.S. government bonds.

Examining more recent data reveals a different story. Over the past two years, the contribution of the IFC investables shrinks from 41% to 30% while the contribution of the S&P increases from 26% to 37%. Over the past year, the emerging market bond returns are explained by two factors: the S&P 500 and the IFC index. The S&P accounts for 64% of the variation. One can also see this pattern in the rolling style analysis presented in Exhibit 7.

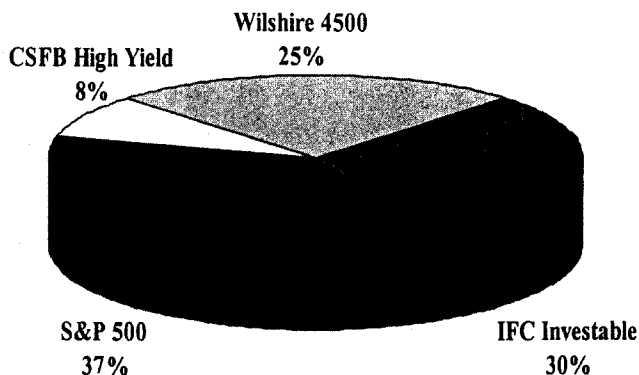
Another pattern is the degree of explanatory power. In the overall period, the style analysis can account for 60% of the variation in the emerging market debt with four asset classes. In the most recent period, 87% of the returns can be accounted for using only two asset classes. The message here is that the effect of emerging market debt can be gained through other asset classes more recently.

EXHIBIT 6A EMERGING MARKET BONDS: OVERALL STYLE ANALYSIS



Emerging market bonds: J.P. Morgan EMBI.
Data: 1991:01-1998:09.
R-squared: 60%.

EXHIBIT 6B EMERGING MARKET BONDS: TRAILING TWENTY-FOUR-MONTH STYLE ANALYSIS

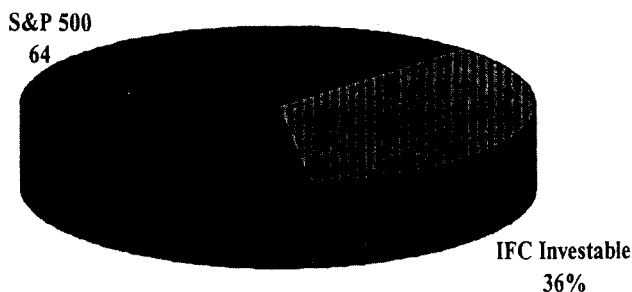


Emerging market bonds: J.P. Morgan EMBI.
Data: 1996:10-1998:09.
R-squared: 83%.

COUNTRY RISK RATINGS AND CREDIT SPREADS

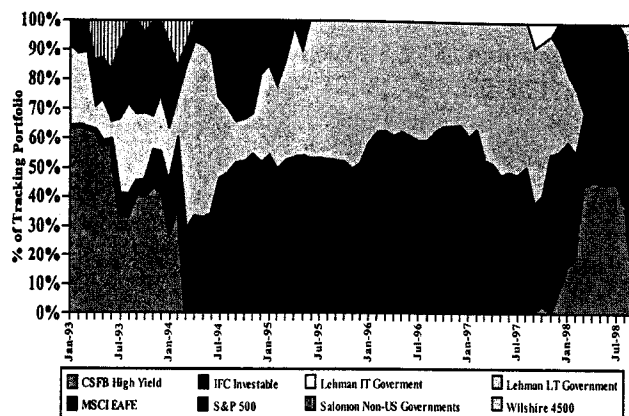
Investors in the emerging markets face three primary sources of risk. The first is interest rate risk. This is a non-trivial issue in regard to some emerging market bonds. Some bonds issued through loan restructurings have complex structures that must be properly modeled to capture the interest rate sensitivities. This is particularly important because many emerging market bonds have relatively long durations.

EXHIBIT 6C EMERGING MARKET BONDS: TRAILING TWELVE-MONTH STYLE ANALYSIS



Emerging market bonds: J.P. Morgan EMBI.
Data: 1997:10-1998:09.
R-squared: 87%.

EXHIBIT 7
EMERGING MARKET BONDS —
ROLLING STYLE ANALYSIS: J.P. MORGAN EMBI



Source: Ibbotson Associates EnCorr Attribution, twenty-four-month rolling window.

Data: 1997:10–1998:09.

Overall R-squared: 60%.

The second risk is currency risk. We have not focused on currency risk because most of our analysis focuses on U.S. dollar-based debt. As local currency bond issuance increases, the management of currency risk will undoubtedly become more important over time.

The third type of risk is sovereign or country risk. Emerging markets represent not only a wide geographic area, but also cover a wide range of situations. Most observers, for example, would recognize that the issues facing Brazil are quite different from those facing Russia or the Philippines. Accordingly, researchers must focus more on explaining the pricing of sovereign risk and how various services rate and rank sovereign risk.

Eichengreen and Mody [1999] study the fundamental determinants of yield spread on emerging market debt. They determine that sentiment has played a key role in determining emerging market bond spreads in 1991–1996. Cantor and Packer [1996] examine the factors that go into determining sovereign ratings. They find that macroeconomic factors are able to explain a large amount of the variation in commonly used sovereign ratings. They also examine the impact of changes in ratings on sovereign credit spreads. Dym [1997] also uses a model to derive credit sensitivities for a number of emerging markets and uses them to create a credit model investment strategy.

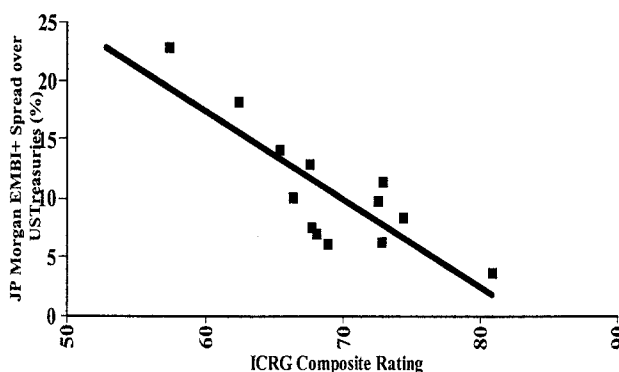
Purcell [1996] examines the sources of sovereign risk and their role in emerging market bond investing. Erb, Harvey, and Viskanta [1997a] model various commercial rating services' country risk ratings using macroeconomic variables, and examine their use in the portfolio management process.

Given this research, we should not be surprised to see that perceptions of country risk are reflected in sovereign yields and country bond returns. Erb, Harvey, and Viskanta [1996b] show that commonly used country risk ratings do an impressive job in explaining the cross-section of real yields in a sample of developed market bonds. In the emerging markets we study bonds denominated in U.S. dollars. This allows us to directly examine cross-country yield spreads over the appropriate (maturity-adjusted) Treasury yields.

Exhibit 8 shows the relation between Political Risk Services' *International Country Risk Guide* (ICRG) composite rating and the spread over U.S. Treasuries for the EMBI+ universe of countries. To simplify the analysis, and to keep it in two dimensions, we estimate for each country the spread over Treasuries for a five-year spread duration.⁶

Exhibit 9 presents regression analysis of the spread over Treasuries on the difference between the country rating and the U.S. ICRG composite rating. The regression analysis, which uses 618 monthly observations, confirms the graph in Exhibit 8. There is a

EXHIBIT 8
EMERGING MARKET BONDS
SPREADS VERSUS COUNTRY RISK



Estimated five-year spread durations for EMBI universe (x–Russia). Data (9/98): J.P. Morgan Securities, International Country Risk Guide.

EXHIBIT 9
EMERGING MARKET BOND SPREADS
AND COUNTRY CREDIT RISK

PANEL A. DEPENDENT VARIABLE: JPM EMBI
COUNTRY SPREAD OVER U.S. TREASURIES (IN %)

Independent Variable	Coefficient	Standard Error	t-Statistic
Constant	4.19	0.48	8.81
$ICRGC(EM)_t - ICRGC(US)_t$	-0.24	0.03	-8.52
Observations	618		
R-Squared	0.12		
Adjusted R-Squared	0.12		
Standard Error of Regression	4.87		
F-Statistic	84.15		
Prob (F-Statistic)	0.00		

PANEL B. DEPENDENT VARIABLE: MONTHLY
DIFFERENCE IN JPM EMBI COUNTRY SPREAD
OVER U.S. TREASURIES (IN %)

Independent Variable	Coefficient	Standard Error	t-Statistic
Constant	0.02	0.08	0.27
$(ICRGC(EM)_t - ICRGC(US)_t) \times ICRGC(EM)_{t-1} - ICRGC(US)_{t-1}$	-2.35	5.31	-0.44
Observations	607		
R-Squared	0.00		
Adjusted R-Squared	0.00		
Standard Error of Regression	1.98		
F-Statistic	0.17		
Prob (F-Statistic)	0.68		

ICRGC: International Country Risk Guide Composite Rating.

EM: Emerging market.

Data period: January 1991-September 1998.

Standard errors use a heteroscedasticity-consistent (White) covariance matrix.

highly significant negative relation between country risk and spread to Treasuries.

Exhibit 10 provides fitted bond spreads for a number of countries based on the September 1998 ICRG composite rating. The model predicts, for example, that the Brazilian debt should be trading at 1,160 basis points above the Treasury. There are fitted values for a number of countries that do not have U.S. dollar debt actively traded in the market. We can apply this model to any country that has a risk rating.

EXHIBIT 10
COUNTRY RISK MODEL-DERIVED
BOND SPREADS (OVER U.S. TREASURIES IN %)

Country	Country Weight in: EMBI+	IFCI	ICRG Composite	Fitted Bond Spread
Argentina	28.4	4.9	74.3	6.7
Brazil	24.5	10.2	67.5	11.6
Bulgaria	2.3		72.8	7.7
Chile		5.8	78.3	3.9
China		0.6	78.3	3.9
Colombia		0.9	60.0	17.7
Czech Republic		0.3	77.3	4.6
Ecuador	2.1		62.3	15.8
Egypt		1.2	71.0	9.0
Greece		5.2	77.5	4.4
Hungary		1.5	78.5	3.8
India		2.4	64.5	14.0
Indonesia		0.9	43.0	35.0
Israel		3.4	69.0	10.5
Jordan		0.3	74.3	6.7
Malaysia		5.8	67.3	11.8
Mexico	19.7	11.9	67.8	11.4
Morocco	1.6	1.9	72.5	7.9
Nigeria	1.1		57.3	20.2
Pakistan		0.5	53.3	23.9
Panama	2.4		72.8	7.7
Peru	1.5	1.2	66.3	12.6
Philippines		1.3	69.0	10.5
Poland	4.0	1.1	80.8	2.3
Portugal		5.2	84.3	0.1
Russia	2.7	0.7	55.8	21.5
Slovakia		0.1	76.8	4.9
South Africa		12.6	68.8	10.7
South Korea	3.2	5.1	68.0	11.2
Sri Lanka		0.1	62.3	15.8
Taiwan		10.0	81.0	2.1
Thailand		1.1	66.8	12.2
Turkey		3.2	53.0	24.2
Venezuela	6.6	0.7	65.3	13.4
Zimbabwe		0.0	54.8	24.5

Data: J.P. Morgan EMBI+ (9/98), IFC Investables (9/98), ICRGC (9/98).

Spreads fitted on EMBI+ universe (five-year constant spread duration).

CONCLUSIONS

The pricing of emerging market bonds is an important issue not only for its own sake, but also for our understanding of other emerging market assets. All financial valuation models require some estimate of the discount function. Understanding the dynamics of

emerging market interest rates will help in accurately discounting cash flows in the emerging markets.

One unanswered question is the nature of the term structure of emerging market interest rates. There is evidence for an upward-sloping term structure of credit spreads (interest rates over comparable U.S. Treasuries) in many of the emerging markets. The market is demanding higher compensation for out-year risk, and cash flow models need to take this observation into account.

There is much left to learn about emerging market bonds. We believe that it is premature to debate whether emerging market bonds are a new asset class. Indeed, our analysis suggests that the characteristics of these bonds change through time.

In relatively good times, the emerging market bonds seem unique in return characteristics. They have very high tracking error with known asset classes. In times of crisis, they are highly correlated with equity markets. The bonds have negative skewness that needs to be compensated for in terms of higher expected returns.

It is also important to look beyond the current crisis in emerging markets. Most observers believe that the capital needs of these countries will continue to grow. This implies growth in both sovereign and corporate debt in these markets. Our work provides some insights on the role of emerging market debt in global portfolios. Currently, the price of emerging market debt is low, and expected returns are high. This is a logical consequence of the perceived negative skewness risk.

ENDNOTES

Some of this material was presented at the Association for Investment Management and Research 1997 Financial Analysts Seminar. The authors would like to thank Brian Mitchell at J.P. Morgan Securities for his helpful comments.

¹One can argue that Argentina was at the time a relatively well-developed country. Its equity market capitalization in the early 1920s exceeded England's.

²Brady bonds are bonds issued under a Brady Plan debt restructuring. Named after former U.S. Treasury Secretary Nicholas Brady, a Brady Plan generally exchanges debt for freely traded bonds, reduces the overall level of debt and interest payments, and often offers new bonds with a pledge of U.S. Treasury zero-coupon bonds.

³In the context of a portfolio, we measure the contribution to the skewness of a portfolio, or coskewness. This measure is analogous to the beta for contribution to variance. See Harvey and Siddique [1998].

⁴We tested to see if non-synchronous trading affects the

results for the emerging markets. We find some limited evidence for data lags lowering correlations, but it is concentrated in two observations: Nigeria and South Africa.

⁵The asset class factor model seeks to explain the target returns using a predefined set of asset class returns. This can give us some insight into the strength of the relationship between asset classes. See Sharpe [1992] for an introduction to the style measurement process.

⁶For each country we use the spread over Treasuries and spread duration for a number of sovereign bonds in each country. We then fit a linear regression for each country and calculate the spread over Treasuries for a five-year duration. We choose five years because that approximates the overall spread duration on the J.P. Morgan EMBI+.

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