Emerging Market Bonds: A Global Perspective

Financial Analysts Seminar
Association for Investment Management and Research
Northwestern University
July 24, 1997

Campbell R. Harvey
Duke University
and
NBER
Emerging Market Bonds: Questions and Answers

- How have emerging market bonds performed?
- What do the higher price moments look like?
- What do emerging market bonds most look like in a style analysis?
- What can country risk measures tell us about emerging market bond valuations?
- Is there a term premium to country risk, and why?
- Do intra-market stock-bond correlations differ across developed and emerging markets?
- Is there evidence of continued emerging market bond inefficiencies?
- Can we estimate expected returns for the emerging markets?
- Do emerging market bonds play a role in global portfolios?

- Very well, especially relative to emerging market equities.
- High volatility, low skewness, no kurtosis.
- Not surprisingly long term UStreasuries and emerging market equities.
- Country risk measures explain the vast majority of market observed spreads.

- There seems to be an upward slope to country risk in the emerging markets?
- Surprisingly there is little observable difference in intra-market stock-bond correlations.
- Continued bond spreads and good manager performance?
- A country risk model can help describe expected equity and bond returns.
- Yes. The only question is whether they are a stand alone asset class.
World Capital Markets: Risk and Return

Annualized Average Return

Annualized Volatility


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World Capital Markets: Risk and Return

Annualized Average Return vs. Annualized Volatility


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Emerging Market Bonds: Volatility
High Absolute Volatility

Volatility

Data: Monthly US$ Total Returns

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Emerging Market Bonds: Skewness
Negative Skewness

Skewness

Data: Monthly US$ Total Returns

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Emerging Market Bonds: Kurtosis
Surprisingly Low Kurtosis

Excess Kurtosis

Data: Monthly US$ Total Returns

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Emerging Market Bonds: Asset Class Correlations
Low and Stable Correlations

Correlation with JPM EMBI

Data: Monthly US$ Total Returns

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Emerging Market Bonds: "Sharpe" Style Analysis

- An interesting way of examining unfamiliar asset class returns is to run a Sharpe style analysis.
- Emerging market bonds have looked largely like a combination of long term government bonds and emerging market equities.
- However the explanatory value of these returns is low - only 49%.
- In the following slide one can see that the power of these two asset classes has increased at the expense of domestic high yield debt and equities.

Data: 1991:01-1997:05
Overall R-Squared: 49%
Emerging Market Bonds: Rolling Asset Class Attribution Analysis
36 Month Window

JPM EMBI

Weights

Time


IFCI Emerging Composite TR
SB Hi-Yld TR
SB Non-U.S. 1+ Yr Gvt TR
U.S. LT Gvt TR
U.S. IT Gvt TR
S&P 500 TR
MSCI World ex U.S. TR

Source: Ibbotson Associates Attribution

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Emerging Market Bonds: Rolling Asset Class Attribution Analysis
24 Month Window

JPM EMBI

Weights


Time

IFCI Emerging Composite T
SB Hi-Yld TR
SB Non-U.S. 1+ Yr Gvt TR
U.S. LT Gvt TR
U.S. IT Gvt TR
S&P 500 TR
MSCI World ex U.S. TR

Source: Ibbotson Associates Attribution
Emerging Market Bonds:
Spread over Treasuries and Country Ratings
(EMBI+ Country Universe)


Euromoney Country Risk Rating (1997:03)

R-Sq: 47%

R-Sq: 68%

Spread and Duration Data: JP Morgan (06/30/1997)
Emerging Market Bonds: Spread over Treasuries and Country Ratings
(EMBI+ Country Universe)

Spread and Duration Data: JP Morgan (06/30/1997)

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Emerging Market Bonds: Evidence for a Term Premium for Country Risk

Estimated Stripped Spread over Treasuries (in bp)

Spread and Duration Data: JP Morgan (06/30/1997)

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Emerging Market Bonds: Stock-Bond Correlations
Little Evidence of Higher Intra-Country Asset Class Correlations

Developed: MSCI vs. SBWGBI & Emerging: IFCI vs. JPM EMBI
Emerging Market Bonds: Stock-Bond Correlations
Little Evidence of Higher Intra-Country Asset Class Correlations

Monthly Data: 1991:01 (or inception if later)-1997:05
Developed: MSCI vs. SBWGBI & Emerging: IFCI vs. JPM EMBI
Emerging Market Bonds: Stock-Bond Correlations and Country Risk
Little Evidence of Higher Intra-Country Asset Class Correlations

Stock-Bond Correlation

Institutional Investor Country Credit Rating (1995:03)

Developed: MSCI vs. SBWGBI & Emerging: IFCG vs. JPM EMBI
Emerging Market Bonds: Stock-Bond Correlations and Country Risk
Little Evidence of Higher Intra-Country Asset Class Correlations

Stock-Bond Correlation

Institutional Investor Country Credit Rating (1990:09)

Monthly Data: 1991:01 (or inception if later)-1997:05
Developed: MSCI vs. SBWGBI & Emerging: IFCG vs. JPM EMBI
Emerging Market Bonds: Potential Inefficiencies Still Exist

Argentina

Brazil

Spread and Duration Data: JP Morgan (06/20/1997)
Emerging Market Bonds: Mutual Fund Manager Performance

Mutual Fund Beta vs. JP Morgan EMBI+

Data: JP Morgan, Morningstar (1994:01 (or inception if later)-1997:03)

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Emerging Market Bonds: Funds Generally Less Risky Than Index

Mutual Fund Downside Beta vs. JP Morgan EMBI+

Data: JP Morgan, Morningstar (1994:01 (or inception if later)-1997:03)
Emerging Market Bonds: Estimating Expected Returns

**Monthly Expected Excess Return**

<table>
<thead>
<tr>
<th>ICRG Composite Rating</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity</td>
<td>7.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bond</td>
<td>6.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equity Risk Premium</td>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Bond Return as % of Equity Return**

<table>
<thead>
<tr>
<th>ICRG Composite Rating</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity</td>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bond</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equity Risk Premium</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

EHV Model: (Estimated 1991:01-1997:05)
Returns in excess of UST-Bill

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### Emerging Market Bonds: Estimating Expected Returns

**Country Risk Model-Derived Expected Risk Premia**

<table>
<thead>
<tr>
<th>Country</th>
<th>Country Weight</th>
<th>IFCI</th>
<th>ICRG Composite</th>
<th>Bond Risk Premium</th>
<th>Equity Risk Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>22.3%</td>
<td>4.1%</td>
<td>73.5</td>
<td>0.7%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Brazil</td>
<td>28.4%</td>
<td>15.2%</td>
<td>68.0</td>
<td>0.9%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>2.1%</td>
<td>58.0</td>
<td>1.2%</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>5.9%</td>
<td>82.0</td>
<td>0.5%</td>
<td>0.9%</td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>0.7%</td>
<td>73.5</td>
<td>0.7%</td>
<td>1.5%</td>
<td></td>
</tr>
<tr>
<td>Colombia</td>
<td>1.2%</td>
<td>53.5</td>
<td>1.4%</td>
<td>3.1%</td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td>0.3%</td>
<td>85.0</td>
<td>0.4%</td>
<td>0.7%</td>
<td></td>
</tr>
<tr>
<td>Ecuador</td>
<td>2.4%</td>
<td>57.5</td>
<td>1.3%</td>
<td>2.7%</td>
<td></td>
</tr>
<tr>
<td>Greece</td>
<td>1.9%</td>
<td>77.0</td>
<td>0.6%</td>
<td>1.2%</td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td>0.6%</td>
<td>78.0</td>
<td>0.6%</td>
<td>1.2%</td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>2.2%</td>
<td>69.5</td>
<td>0.8%</td>
<td>1.7%</td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>4.2%</td>
<td>71.5</td>
<td>0.8%</td>
<td>1.6%</td>
<td></td>
</tr>
<tr>
<td>Jordan</td>
<td>0.1%</td>
<td>73.5</td>
<td>0.7%</td>
<td>1.5%</td>
<td></td>
</tr>
<tr>
<td>Malaysia</td>
<td>17.4%</td>
<td>82.0</td>
<td>0.5%</td>
<td>0.9%</td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>14.7%</td>
<td>10.7%</td>
<td>70.5</td>
<td>0.8%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Morocco</td>
<td>1.4%</td>
<td>70.5</td>
<td>0.8%</td>
<td>1.7%</td>
<td></td>
</tr>
<tr>
<td>Nigeria</td>
<td>2.5%</td>
<td>50.5</td>
<td>1.6%</td>
<td>3.3%</td>
<td></td>
</tr>
<tr>
<td>Pakistan</td>
<td>0.6%</td>
<td>62.0</td>
<td>1.1%</td>
<td>2.3%</td>
<td></td>
</tr>
<tr>
<td>Panama</td>
<td>1.6%</td>
<td>68.0</td>
<td>0.9%</td>
<td>1.8%</td>
<td></td>
</tr>
<tr>
<td>Peru</td>
<td>1.7%</td>
<td>1.2%</td>
<td>66.0</td>
<td>1.0%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Philippines</td>
<td>1.6%</td>
<td>2.4%</td>
<td>74.0</td>
<td>0.7%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Poland</td>
<td>2.4%</td>
<td>0.6%</td>
<td>81.0</td>
<td>0.5%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Portugal</td>
<td>2.4%</td>
<td>85.5</td>
<td>0.4%</td>
<td>0.7%</td>
<td></td>
</tr>
<tr>
<td>Russia</td>
<td>10.2%</td>
<td>67.0</td>
<td>0.9%</td>
<td>1.9%</td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td>12.4%</td>
<td>73.5</td>
<td>0.7%</td>
<td>1.5%</td>
<td></td>
</tr>
<tr>
<td>South Korea</td>
<td>2.2%</td>
<td>83.5</td>
<td>0.4%</td>
<td>0.8%</td>
<td></td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>0.1%</td>
<td>64.5</td>
<td>1.0%</td>
<td>2.1%</td>
<td></td>
</tr>
<tr>
<td>Taiwan</td>
<td>7.7%</td>
<td>86.5</td>
<td>0.3%</td>
<td>0.6%</td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>1.6%</td>
<td>80.5</td>
<td>0.5%</td>
<td>1.0%</td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td>3.2%</td>
<td>57.0</td>
<td>1.3%</td>
<td>2.7%</td>
<td></td>
</tr>
<tr>
<td>Venezuela</td>
<td>8.7%</td>
<td>1.2%</td>
<td>64.5</td>
<td>1.0%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>0.1%</td>
<td>60.5</td>
<td>1.2%</td>
<td>2.4%</td>
<td></td>
</tr>
</tbody>
</table>

**Weighted Average ICRG Fund**
- **Expected Return (own weights): 0.9%**
- **Expected Return (opposite weights): 0.7%**

Weights: JP Morgan EMBI+ (6/97), IFC Investables (6/97)
EHV Model Estimates (unadjusted), Monthly US$ Total Returns.

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Bond and equity estimates too high.
Emerging Market Bonds: High Country Risk Portfolios Outperformed

- High country risk portfolio outperforms index and low country risk portfolio.
- Consistent with prior research in emerging market equities and developed bonds and equity markets.

<table>
<thead>
<tr>
<th></th>
<th>JPM EMBI+</th>
<th>JPM EMBI+ (EW)</th>
<th>High Country Risk (EW)</th>
<th>Low Country Risk (EW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arithmetic Return</td>
<td>14.6%</td>
<td>18.3%</td>
<td>25.0%</td>
<td>10.9%</td>
</tr>
<tr>
<td>Geometric Return</td>
<td>13.9%</td>
<td>17.7%</td>
<td>24.5%</td>
<td>10.2%</td>
</tr>
<tr>
<td>Volatility</td>
<td>17.3%</td>
<td>19.5%</td>
<td>24.4%</td>
<td>15.5%</td>
</tr>
<tr>
<td>Skew</td>
<td>0.64</td>
<td>0.74</td>
<td>-0.62</td>
<td>-0.93</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>0.65</td>
<td>2.07</td>
<td>1.38</td>
<td>2.53</td>
</tr>
</tbody>
</table>
Emerging Market Bonds: Historical Efficient Frontiers

Annualized Average Return

Annualized Volatility

100% CSFB HY
100% JPM EMBI
100% IFCI
100% SB NU WGBI

High Yield  Non-US Bonds  Emerging Equities

Data: Monthly Total Returns (1991:01-1997:05)
Emerging Market Bonds: Where Do They Fit Into A Portfolio?

- The question we need to ask is where do emerging market bonds fit into a portfolio.
- One approach is to "carve-out" a portion of existing mandates for emerging market bonds.
- However the accompanying graph shows that this would induce serious benchmark tracking error issues.
- It is unlikely that this issue would go away over any reasonable length of time.

Annualized Tracking Error
JPM EMBI versus

Data: Monthly US$ Total Returns

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Further Reading

- Purcell, "Sovereign Risk in Emerging Markets", AIMR, 1996.(?)
- Nemerever, "Opportunities in Emerging Market Debt", AIMR, 1996.(?)
- Campbell Harvey's Country Risk Internet facility at: http://www.duke.edu/~charvey