

The Journal of FIXED INCOME FIXED INCOME

VOLUME 6 NUMBER 1

JUNE 1996

- ❑ The Influence of Political, Economic, and Financial Risk on Expected Fixed-Income Returns
— *Claude B. Erb, Campbell R. Harvey, and Tadas E. Viskanta*
- ❑ Estimating the Term Structure of Volatility and Fixed-Income Derivative Pricing
— *Franklin de O. Gonçalves and João Victor Issler*
- ❑ The Pricing of Bonds in Bankruptcy and Financial Restructuring — *Herbert S. Wagner, III*
- ❑ A New Tool for Portfolio Managers: Level, Slope, and Curvature Durations — *Ram Willner*
- ❑ Minimizing Basis Risk from Non-Parallel Shifts in the Yield Curve — *Eric Falkenstein and Jerry Hanveck*
- ❑ Forecasting Default Rates on High-Yield Bonds
— *Jón G. Jónsson and Martin S. Fridson*
- ❑ Analytical Approximations of the Term Structure for Jump-Diffusion Processes: A Numerical Analysis
— *Jamil Baz and Sanjiv Ranjan Das*
- ❑ A Closed-Form Formula for Calculating Bond Convexity
— *David Blake and J. Michael Orszag*
- ❑ Maximum Potential Change of a Portfolio
— *Kelly Au and Volf Frishling*

THE INFLUENCE OF POLITICAL, ECONOMIC, AND FINANCIAL RISK ON EXPECTED FIXED-INCOME RETURNS

CLAUDE B. ERB, CAMPBELL R. HARVEY, AND TADAS E. VISKANTA

CLAUDE B. ERB is managing director at First Chicago Investment Management Company in Chicago, Illinois.

CAMPBELL R. HARVEY is professor of finance in the Fuqua School of Business at Duke University in Durham, North Carolina, and a research associate at the National Bureau of Economic Research in Cambridge, Massachusetts.

TADAS E. VISKANTA is a vice president at First Chicago Investment Management Company in Chicago.

Much is known about measuring and monitoring the interest rate sensitivities of global fixed-income investments. Yet it is often the case that non-quantifiable factors like governmental policy play a key role in determining the level and volatility of interest rates within a country.

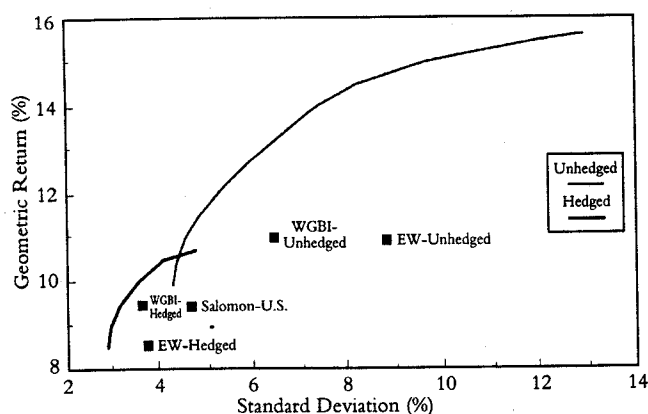
This article investigates the information in *ex ante* measures of political, financial, and economic risk with respect to future fixed-income returns. The data include yields and returns on the Salomon Brothers World Government Bond Indexes. These data are available on a monthly basis starting in 1985 for ten developed countries and expanding to twenty countries by 1995. We also examine a shorter sample of Brady bond returns for eight emerging markets.

We examine both the U.S. dollar (unhedged) and currency-hedged returns. This distinction is important. Much of the cross-sectional variation in unhedged returns is driven by currency movements.

Exhibit 1 presents efficient frontiers (without short-selling) for fifteen developed countries for 1991-1995. You can see that the average investment opportunities for currency-hedged bonds are more limited than the opportunities possible with unhedged returns. (These frontiers represent the returns to passive fixed investment weight strategies with five-year holding periods.)

The idea of our article is to examine active fixed-income strategies that use the information in risk ratings to determine the attractiveness of a country's fixed-income securities. We study the four risk measures produced by Political Risk Services' "International Country Risk Guide": political risk, financial risk, economic risk, and composite risk. The data are available on a monthly basis from 1984 for 117

EXHIBIT 1 ■ Efficient Frontiers
Salomon Brothers World Government Bond Indexes
15 Countries (1991–1995)



WGBI - Salomon World Government Bond Index.
 EW - Equal-Weighted Portfolio (by country).

countries. We also use the country risk ratings published by *Institutional Investor* on a semiannual basis for the same countries. Each measure is ex ante in that it reflects analysts' opinions about the future risks of an investment in each country. Some of these risk measures have been studied in the context of equity investments by Harlow [1993], Diamonte, Liew, and Stevens [1996], and Erb, Harvey, and Viskanta (EHV) [1996b].

Our results suggest that the world bond markets respond to both the level of and recent changes in various measures of country risk. Positive risk-adjusted returns seem to be available to those willing to take on incremental risk as defined by these measures. In addition, markets seem to adjust incompletely to changes in perceived market risk. These results should not be surprising in that these measures of risk are correlated with commonly used cross-market valuation attributes. These results generalize those found in EHV [1994].

I. DATA ANALYSIS

There are a number of services that measure country risk.¹ Each index or rating provider must amalgamate a range of qualitative and quantitative information into a single index or rating. They use different data and methodologies, so users must weigh which service or services best suits their purpose.

We review the methodologies of two of the

EXHIBIT 2 ■ "International Country Risk Guide"
Rating System

	% of Composite
Political	
Economic Expectations versus Reality	6
Economic Planning Failures	6
Political Leadership	6
External Conflict	5
Corruption in Government	3
Military in Politics	3
Organized Religion in Politics	3
Law and Order Tradition	3
Racial and Nationality Tensions	3
Political Terrorism	3
Civil War	3
Political Party Development	3
Quality of Bureaucracy	3
Total Political	50
Financial	
Loan Default or Unfavorable Loan Restructuring	5
Delayed Payment of Suppliers' Credits	5
Repudiation of Contracts by Government	5
Losses from Exchange Controls	5
Expropriation of Private Investments	5
Total Financial	25
Economic	
Inflation	5
Debt Service as a Percentage of Exports of Goods and Services	5
International Liquidity Ratios	3
Foreign Trade Collection Experience	3
Current Account Balance as Percentage of Goods and Services	8
Parallel Foreign Exchange Rate Market Indicators	3
Total Economic	25
Overall	100

more established providers, Political Risk Services' "International Country Risk Guide" (ICRG) and *Institutional Investor* (II).

Political Risk Services: International Country Risk Guide

Each month ICRG uses a blend of quantitative and qualitative measures to calculate risk indexes for political, financial, and economic risk, plus a composite index. Five financial, thirteen political, and six economic factors are used. Each factor is assigned a numer-

EXHIBIT 3 ■ Institutional Investor's Country Credit Ratings

Importance of Factor of OECD Countries:	1979	1994
Economic Outlook	1	1
Debt Service	5	2
Financial Reserves/Current Account	2	3
Fiscal Policy	9	4
Political Outlook	3	5
Access to Capital Markets	6	6
Trade Balance	4	7
Inflow of Portfolio Investments	7	8
Foreign Direct Investments	8	9

ical rating within a specified range. The specified allowable range for each factor reflects the weight attributed to that factor. A higher score represents lower risk. For

additional details see EHV [1996b].

Exhibit 2 presents the factors taken into account in the three subindexes and the composite index. The composite index is simply a linear combination of the three subindexes. Note that the weight of political risk is twice that of financial or economic risk.

ICRG, as well as many of the other providers, thinks of country risk as having two primary components: ability to pay and willingness to pay. Political risk is associated with a willingness to pay, while financial and economic risk are associated with an ability to pay.

Institutional Investor

Institutional Investor country credit ratings are based on a survey of leading international banks that rate each country on a scale from zero to 100 (where 100 represents the maximum creditworthiness). *Institutional Investor* averages these ratings, giving greater

EXHIBIT 4 ■ Specific Factors Included in Country Ratings

Index Subcomponent	Index Provider*									
	BoA	BERI	CRIS	EIU	EUROMY	INSTINV	MOODY	PRISICRG	PRSCOPL	S&P
Political and Policy		Qual		Qual	Qual	Qual	Qual	Qual		Quant/Qual
Financial	Quant				Quant	Qual	Quant	Quant/Qual	Quant/Qual	
Economic	Quant	Quant		Quant	Quant	Qual	Quant/Qual	Quant/Qual		Quant
Operations		Quant/Qual								
Remittances and Repatriation of Capital		Quant/Qual								
Security			Qual							
Lending and Trade				Quant/Qual						
Export									Quant/Qual	
Direct Investment									Quant/Qual	
Index Type	Ordinal	Scalar	Ordinal	Scalar	Scalar	Scalar	Ordinal	Scalar	Scalar	Ordinal
Data Source									X	
Expert Panel		X				X				
Survey				X	X		X	X		X
Staff Analysis			X	X	X		X	X	X	X
Published Data	X	X		X	X					

*Bank of America World Information Services (BoA); Business Environment Risk Intelligence, S.A. (BERI); Control Risks Information Services (CRIS); Economist Intelligence Unit (EIU); *Euromoney*; *Institutional Investor*; Moody's Investor Services; Political Risk Services: "International Country Risk Guide" (ICRG); Political Risk Services: Coplin-O'Leary Rating System (COPL); and Standard & Poor's Rating Group (S&P).

EXHIBIT 5 ■ Primary Components of Country Ratings

Factor	Index Provider (see Exhibit 4)								
	BoA	BERI	CRIS	EIU	INSTINV	MOODY	PR SICRG	PRSCOPL	S&P
Current Account/ Balance of Payments	X	X		X	X	X	X	X	X
Debt	X	X		X	X	X	X	X	X
Deficit	X	X		X	X	X		X	X
Economic Structure and Growth (export concentration, reliance on imports)	X	X		X	X	X		X	X
Foreign Exchange/ Currency Convertibility	X	X		X		X		X	X
GDPPC/GDP	X	X		X		X		X	X
Liquidity		X		X			X		
Parallel Market						X	X		X
Reserves	X			X	X	X			X
Savings Rate				X		X		X	X
Inflation		X						X	X
Access to Capital Markets		X			X	X			X
Factionalization (political, ethnic, religious, ideological, linguistic)		X	X	X	X	X	X		X
Social Conditions/Conflict/History Attitudes/Expectations		X		X	X	X	X	X	X
Coercive Regime/Legitimacy		X				X			
Bureaucratic/Technocratic Competence									
Corruption/Policy Flexibility		X	X	X		X	X		X
Criminal/Military Insurgency		X	X			X	X		X
International Commitment/ Integration		X			X	X	X	X	X
Legal Framework		X				X	X		
Nationalization		X				X	X		X
Policy Environment		X	X	X	X	X	X	X	X
Regional Politics		X				X	X		X
Infrastructure and Local Service Management		X				X			X
Labor Costs/Productivity		X				X		X	X

weights to respondents with more worldwide exposure and more sophisticated country analysis systems. These ratings have appeared in the March and September issues of *Institutional Investor* since 1979. The survey now covers over 135 countries. For additional details see EHV [1995, 1996a].

Whenever a survey or expert panel is used to

rate creditworthiness on subjective criteria, it is hard to define the exact parameters taken into account. At any particular time, an expert's recommendation is based on those factors the expert feels are relevant. Exhibit 3 demonstrates that the survey participants have ranked factors differently through time and across country groupings.

EXHIBIT 6 ■ Comparison of Sovereign Country Ratings and Other Risk Attributes — December 1995*

Country	S&P	Moody's	ICRGC	ICRGP	ICRGF	ICRGE	II CCR
Australia	AA	Aa2	82.0	83.0	44.0	36.5	71.2
Austria	AAA	Aaa	82.5	78.0	47.0	40.0	86.2
Belgium	AA+	Aa1	85.5	82.0	47.0	41.5	79.2
Canada	AA+	Aa2	83.0	81.0	46.0	39.0	80.3
Denmark	AA+	Aa1	87.5	84.0	48.0	42.5	79.9
Finland	AA-	Aa2	85.5	88.0	43.0	39.5	71.4
France	AAA	Aaa	78.5	74.0	44.0	39.0	89.1
Germany	AAA	Aaa	85.5	84.0	47.0	39.5	90.9
Ireland	AA	Aa2	84.0	85.0	44.0	39.0	73.4
Italy	AA	A1	76.5	73.0	41.0	38.5	72.3
Japan	AAA	Aaa	86.0	80.0	48.0	44.0	91.6
Netherlands	AAA	Aaa	86.0	84.0	47.0	41.0	89.3
New Zealand	AA	Aa2	83.0	84.0	46.0	35.5	69.4
Norway	AAA	Aa1	87.5	84.0	46.0	44.5	84.6
Portugal	AA-	A1	82.0	80.0	43.0	41.0	68.4
Spain	AA	Aa2	76.0	72.0	41.0	38.5	73.7
Sweden	AA+	Aa3	79.0	79.0	40.0	39.0	74.1
Switzerland	AAA	Aaa	88.5	84.0	50.0	43.0	92.2
United Kingdom	AAA	Aaa	80.5	80.0	46.0	35.0	87.8
United States	AAA	Aaa	83.0	80.0	48.0	38.0	90.7
Rank Correlation							
Standard & Poor's		0.84	0.31	-0.03	0.68	0.26	0.92
Moody's			0.45	0.21	0.78	0.21	0.85
ICRGC				0.83	0.77	0.62	0.38
ICRGP					0.46	0.20	0.01
ICRGF						0.38	0.71
ICRGE							0.35

*ICRGC International Country Risk Guide Composite Index

ICRGP International Country Risk Guide Political Index

ICRGF International Country Risk Guide Financial Index

ICRGE International Country Risk Guide Economic Index

II CCR *Institutional Investor* Country Credit Ratings

Index and Rating Provider Comparison

A wide range of groups provide country risk or country credit ratings. Although the factors they take into account and the audience they seek to inform vary, there are significant similarities across the providers of these measures.

Most of the providers transform widely used quantitative economic indicators in roughly the same

manner. The important differences are the extent of and the specific factors included in the qualitative component of the risk index measures. Exhibits 4 and 5 contrast the primary risk index products available from the indicated groups.

Exhibit 4 identifies the underlying analytical source (i.e., quantitative or qualitative information) for each major index subcomponent. The index measure is also categorized as ordinal or scalar, and the data sources

are identified.

Most firms use a mix of qualitative and quantitative analysis. The extremes are represented by Bank of America's "World Information Services," which is based wholly on quantitative information, and *Institutional Investor*, which is based wholly on a survey of banking professionals.

Note that surveys and staff analysis that strive for an overall recommendation are categorized as qualitative analysis on the basis that this form of recommendation takes many non-quantitative factors into account. At the same time, the analysts and experts certainly do take relevant quantitative factors into account, just not in a formulaic manner as is true for a purely quantitative index.

Exhibit 5 looks in more detail at the specific factors constituting each risk index. Moderately broad categories have been created to classify the many specific factors the providers use. Exhibit 5 helps to identify the mix of quantitative and qualitative factors used as well as the specific similarities and differences in the composition of the indexes.

It should therefore not come as a surprise that these country risk measures are in fact correlated. Exhibit 6 presents the 1995 year-end risk level of the countries in our sample. You can see that the numeric measures provide a wider stratification of risk than the S&P or Moody's ratings. The *Institutional Investor* country credit ratings are more highly correlated with the S&P and Moody's ratings, on a rank order basis, than any of the ICRG ratings. ICRG financial risk, however, has a high correlation with the credit-based rankings.

The relatively low correlation of the political and economic risk ratings with the other ratings tells us that they are measuring different risks, which could make them valuable instruments in describing cross-sectional returns: In a larger sample of countries that includes emerging markets, the correlations of the political and economic ratings with the credit ratings increase significantly (see EHV [1996b]).

II. SUMMARY DATA ANALYSIS

Data Sources and Calculations

The fixed-income data, for twenty developed countries, are from the Salomon Brothers World Government Bond Indexes. Salomon Brothers calculates local, hedged, and U.S. dollar returns for each

country's government bond market. To maximize the number of countries in our sample and for consistency across countries, we use for each country its "all maturities" index.

There are a number of providers of bond market indexes, but their return profiles are all very similar for developed markets.² Market capitalizations are the U.S. dollar value of government bonds as calculated by Salomon Brothers, which are used during the portfolio creation process. Salomon Brothers also reports a composite world bond index (WGBI) that is capitalization-weighted.

We use a fundamental variable, real yield, to help characterize the cross-section of global fixed-income returns. The yield for each market is the average yield to maturity of the all-maturity (one-year plus) index. Real yields are defined as the geometric difference between the yield to maturity for a country's bond index and the trailing annual inflation rate. The inflation rates are the consumer price indexes compiled by the International Monetary Fund lagged one quarter to allow for delays in reporting.³

A summary of the returns, volatilities, and betas relative to the Salomon World Government Bond Index for each country is in Panel A of Exhibit 7. Note the large differences between the realized returns for the unhedged, hedged, and local indexes. Over the sample period the U.S. dollar has depreciated against major foreign currencies.

Panel B of Exhibit 7 summarizes risk measures for the various countries. Switzerland is the highest-rated country, while among the larger countries Italy and Spain are the lowest-ranked. Research has already found that these ratings tend to be correlated with the overall level of equity returns (EHV [1996b]), but no one has studied fixed-income returns.

Risk Attributes and Returns

Before we examine the time series attributes of these risk measures, it is informative to look at a summary view of the relation between the risk attributes and average returns, volatilities, and betas. Exhibit 8 shows the correlation between the risk measures and the sample average returns, volatilities, and betas for the eleven countries whose returns start in 1985.

The returns story is a relatively simple one. Higher returns are generally related to higher risk (lower risk ratings). In the unhedged case, returns are negatively related to beginning levels of risk, and are positively related to changes in the risk attributes. In

EXHIBIT 7 ■ Summary Statistics

A. Return Statistics

Country	Sample Start	Unhedged U.S. Dollar Returns			Hedged U.S. Dollar Returns			Local Returns			Return to Forward FX		
		Geometric Return (%)	Standard Deviation (%)	Beta with WGBI	Geometric Return (%)	Standard Deviation (%)	Beta with WGBI	Geometric Return (%)	Standard Deviation (%)	Beta with WGBI	Geometric Return (%)	Standard Deviation (%)	Beta with WGBI
Australia	Jan-85	12.5	12.4	0.22	8.2	6.3	0.69	13.6	6.5	0.72	4.0	10.5	0.09
Austria	Oct-92	10.0	11.7	1.30	8.6	4.1	0.71	10.2	4.0	0.69	1.3	11.7	1.11
Belgium	Jan-91	12.1	13.6	1.42	7.7	4.8	0.60	11.0	4.5	0.58	4.1	13.9	1.25
Canada	Jan-85	11.5	9.0	0.51	9.5	6.9	1.22	11.8	6.9	1.22	1.7	4.6	0.01
Denmark	Apr-89	15.6	11.6	1.25	6.7	5.0	0.62	10.7	5.1	0.64	8.3	12.5	1.09
Finland	Jan-95	30.5	8.8	0.75	20.0	2.4	0.07	19.6	2.4	-0.01	8.8	10.7	0.73
France	Jan-85	18.0	13.8	1.41	8.0	5.7	0.83	11.0	5.8	0.85	9.2	12.6	1.05
Germany	Jan-85	15.8	14.8	1.46	8.0	4.0	0.65	7.8	3.9	0.63	7.3	13.5	1.12
Ireland	Oct-92	8.1	9.0	0.84	6.4	8.0	1.17	13.2	8.8	1.37	1.6	7.2	0.61
Italy	Jan-85	15.6	13.9	0.92	6.9	4.3	0.27	13.5	4.4	0.34	8.1	13.1	0.88
Japan	Jan-85	16.2	17.6	1.76	9.4	6.1	0.99	7.1	6.1	0.98	6.2	14.5	1.17
Netherlands	Jan-85	16.3	14.6	1.43	8.0	4.0	0.60	8.1	4.1	0.59	7.7	13.4	1.12
New Zealand	Oct-92	14.7	7.9	0.61	5.1	5.3	0.84	7.8	5.5	0.93	9.2	5.6	0.31
Norway	Jan-95	24.9	10.1	0.82	17.4	2.4	-0.91	16.7	2.5	-0.89	6.5	11.2	0.82
Portugal	Jan-95	27.9	9.4	0.71	15.8	4.0	-1.20	20.0	3.9	-1.10	10.4	11.7	0.85
Spain	Jan-91	8.1	12.2	1.00	5.8	6.2	0.63	13.3	6.7	0.70	2.2	13.0	1.00
Sweden	Jan-91	9.5	15.2	0.85	7.2	7.3	0.69	13.2	7.5	0.72	2.2	15.4	0.99
Switzerland	Jan-85	13.7	15.6	1.43	6.7	4.1	0.49	5.6	4.1	0.47	6.6	15.1	1.25
United Kingdom	Jan-85	14.6	16.0	1.39	7.6	7.9	1.15	11.6	8.0	1.18	6.5	12.2	0.91
United States	Jan-85	10.4	5.9	0.48	10.4	5.9	1.10	10.4	5.9	1.09			
WGBI	Jan-85	12.9	8.8	1.00	9.5	5.0	1.00	9.8	5.0	1.00	6.4	10.9	1.00

(continued on next page)

EXHIBIT 7 ■ Continued

B. Country Risk Measures

Country	Sample Start	ICRG Composite			ICRG Political			ICRG Financial			ICRG Economic			Credit Rating			Real Yield		
		Beg.	End.	Sample Average	Beg.	End.	Sample Average	Beg.	End.	Sample Average	Beg.	End.	Sample Average	Beg.	End.	Sample Average	Beg.	End.	Sample Average
		Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
Australia	Jan-85	84.5	82.0	80.0	88.0	83.0	80.5	43.0	44.0	42.4	37.5	36.5	37.0	84.2	71.2	72.2	9.3	2.7%	5.8%
Austria	Oct-92	89.5	82.5	86.5	90.0	78.0	84.8	49.0	47.0	47.8	39.5	40.0	40.1	84.3	86.2	85.4	3.8	3.6%	3.3%
Belgium	Jan-91	81.5	85.5	81.8	80.0	82.0	78.7	45.0	47.0	45.9	38.0	41.5	39.1	79.8	79.2	79.4	5.9	4.5%	5.1%
Canada	Jan-85	83.0	83.0	83.8	83.0	81.0	82.5	43.0	46.0	46.1	39.5	39.0	38.5	86.5	80.3	84.4	7.4	4.5%	5.6%
Denmark	Apr-89	82.0	87.5	84.0	85.0	84.0	83.9	41.0	48.0	44.6	37.5	42.5	39.2	71.8	79.9	74.7	4.5	4.2%	6.1%
Finland	Jan-95	83.5	85.5	83.9	83.0	88.0	84.5	44.0	43.0	43.5	39.5	39.5	39.5	69.6	71.4	70.3	6.8	5.7%	6.3%
France	Jan-85	80.5	78.5	80.8	81.0	74.0	79.3	41.0	44.0	44.5	39.0	39.0	37.5	79.3	89.1	85.7	4.0	4.3%	5.3%
Germany	Jan-85	85.5	85.5	86.5	84.0	84.0	82.9	45.0	47.0	48.6	42.0	39.5	41.2	93.1	90.9	92.1	5.2	3.4%	4.4%
Ireland	Oct-92	78.5	84.0	80.0	75.0	85.0	78.0	44.0	44.0	43.1	38.0	39.0	38.7	68.6	73.4	70.6	6.5	4.5%	5.9%
Italy	Jan-85	78.5	76.5	77.4	79.0	73.0	73.7	40.0	41.0	43.8	37.5	38.5	36.9	72.1	72.3	76.3	3.3	4.9%	5.7%
Japan	Jan-85	89.5	86.0	87.8	91.0	80.0	84.2	45.0	48.0	48.8	42.5	44.0	42.5	95.0	91.6	93.6	4.1	1.8%	3.5%
Netherlands	Jan-85	88.0	86.0	87.3	89.0	84.0	86.1	47.0	47.0	46.7	40.0	41.0	41.5	86.1	89.3	87.6	4.4	4.0%	5.2%
New Zealand	Oct-92	82.0	83.0	83.6	80.0	84.0	82.0	46.0	46.0	46.0	37.5	35.5	38.7	62.2	69.4	65.6	6.4	3.5%	5.6%
Norway	Jan-95	86.0	87.5	86.6	81.0	84.0	82.5	46.0	46.0	46.0	45.0	44.5	44.5	79.1	84.6	81.1	5.7	3.5%	4.8%
Portugal	Jan-95	79.5	82.0	79.9	76.0	80.0	75.8	42.0	43.0	42.3	41.0	41.0	41.4	67.2	68.4	67.6	6.5	5.4%	6.6%
Spain	Jan-91	71.5	76.0	75.3	67.0	72.0	71.2	42.0	41.0	41.8	34.0	38.5	37.3	76.6	73.7	75.2	7.2	5.0%	5.4%
Sweden	Jan-91	82.5	79.0	82.1	82.0	79.0	80.5	47.0	40.0	45.1	35.5	39.0	38.2	80.9	74.1	76.1	1.0	6.2%	4.6%
Switzerland	Jan-85	96.0	88.5	92.0	97.0	84.0	91.4	50.0	50.0	50.0	44.5	43.0	42.5	94.8	92.2	93.4	2.1	1.5%	2.2%
United Kingdom	Jan-85	83.0	80.5	82.0	86.0	80.0	80.1	45.0	46.0	47.7	34.5	35.0	35.9	89.5	87.8	86.6	6.2	3.4%	4.6%
United States	Jan-85	88.5	83.0	84.2	90.0	80.0	81.8	49.0	48.0	48.7	38.0	38.0	37.7	95.6	90.7	91.0	6.3	3.0%	3.9%

Return source: Salomon World Government Bond Indexes (WGBI).

Sample ends December 1995.

All statistics calculated from quarterly observations.

Returns and volatility annualized.

Betas calculated against respective index.

the case of local returns, the relation is even stronger. Local returns are highly related to risk and positive changes in the risk attributes. This is driven in part by the high correlation between inflation and the risk attributes (see EHV [1995]). The hedged returns are characterized by lower correlations.

The highest correlations are found with the ICRG financial variable and *Institutional Investor's* country credit rating. For the foreign exchange returns, there is a slightly positive relation between risk and return in the beginning sample correlations.

The picture that emerges from the volatilities and betas is easier to characterize than that for returns. Exhibits 9A and 9B show the relation between country risk and volatility and beta in the unhedged sample. In the unhedged and foreign exchange cases, there is a clear negative relation between the risk measures and both volatility and beta. It is also evident that lower volatility and betas are associated with countries whose risk measures improved; that is, their risk declined.

In the hedged and local return cases, the opposite relation is evident. Because country risk is associated with both inflation and risk premium, it should not come as a surprise that local return risk is highly correlated with country risk. Changes in risk, however, have the same sign as that of the unhedged case.

The summary data suggest opportunities to create portfolio strategies. Dynamic portfolio strategies that tilt toward higher-risk countries or toward countries that are experiencing decreasing country risk should experience returns that outstrip those of lower-risk countries and those that are becoming riskier.

III. PORTFOLIO STRATEGIES

A commonly used technique for examining the cross-sectional importance of a fundamental variable is to form unique portfolios on the basis of ranking. We will examine the country risk variables in two ways. The first is based on the risk level itself. The second tries to capture the returns from owning countries that are experiencing decreasing country risk. In each case, we examine returns to portfolios equally weighted by country and weighted by each country's bond market capitalization.

Risk-Level Portfolios

The summary analysis shows that there is a relation between average risk attributes and average total returns. We form two portfolios, a high-risk and a low-

risk portfolio, based on the lagged level of the risk attribute. For real yields, those countries with high real yields are categorized as high-risk countries; low levels for the other risk attributes represent high-risk countries. The portfolios are formed every quarter, and results for both hedged and unhedged U.S. dollar returns are presented. New countries are added to the portfolios as their returns enter the sample.

Exhibit 10 presents the results, which are consistent with the earlier analysis. In the unhedged case, the spread in raw returns for almost all attributes is positive, and the spreads in beta-adjusted returns are higher. Only the ICRG economic variable seems to fail this test on an unadjusted basis. One should note that the beta with respect to the world bond portfolio is higher for the low-risk portfolios, and substantially boosts the risk-adjusted returns.

For hedged portfolios, results are mixed. One can see from Panel B of Exhibit 10 that the risk-adjusted returns are somewhat positive, although insignificant, for all measures except economic risk. The results are driven by the nature of the hedging process itself. Hedging eliminates the foreign exchange risk inherent in holding foreign bonds, and it makes sense to expect that these risk measures are correlated with foreign exchange risk.

Currency Hedging as a Country Risk Swap

We have seen that higher levels of country risk are generally compensated in an unhedged context, while in a hedged context country risk is not clearly priced. This is due to the hedging process and the instrument most commonly used: the forward foreign exchange contract.

A hedge accomplished with a short forward foreign exchange contract involves swapping a short-term deposit in the foreign currency for a short-term deposit in the U.S. dollar. An investor is therefore receiving the domestic interest rate and paying the foreign interest rate, in contrast to the long foreign bond position. Basically this involves swapping the relative country risk premium through the forward foreign exchange contract.

If the hedge is rolled over on a consistent basis, the return advantage of the foreign bond position, from a U.S. perspective, is eliminated because almost all other countries are deemed riskier than the United States. For an investor based in a higher-risk country, like Italy, hedging foreign exchange risk could be a return-enhancing strategy.

EXHIBIT 8 ■ Correlation Between Risk Measures and Returns, Volatilities, and Betas*
Countries With Returns from Sample Start: 1985

Index	Moment	Average Risk Attribute				II CCR	REALYLD
		ICRGC	ICRGP	ICRGF	ICRGE		
Unhedged	Geometric Return	-0.02	-0.12	-0.10	0.25	0.11	0.07
	Volatility	0.26	0.19	0.14	0.42	0.18	-0.26
	Beta with WGBI	0.50	0.34	0.52	0.58	0.65	-0.48
Unhedged X-US	Geometric Return	-0.02	-0.17	0.08	0.17	0.32	-0.08
	Volatility	0.39	0.24	0.55	0.41	0.54	-0.66
	Beta with WGBI	0.55	0.36	0.73	0.56	0.83	-0.65
Hedged	Geometric Return	0.03	-0.01	0.14	-0.04	0.22	0.05
	Volatility	-0.34	-0.26	-0.14	-0.58	-0.17	0.20
	Beta with WGBI	0.03	0.05	0.24	-0.24	0.27	-0.01
Local	Geometric Return	-0.95	-0.85	-0.83	-0.91	-0.87	0.82
	Volatility	-0.38	-0.28	-0.19	-0.61	-0.23	0.24
	Beta with WGBI	-0.05	-0.03	0.18	-0.31	0.21	0.05
FX Return X-U.S.	Geometric Return	-0.03	-0.15	0.08	0.09	0.23	-0.17
	Volatility	0.34	0.23	0.38	0.43	0.39	-0.59
	Beta with Non-U.S.	0.48	0.30	0.61	0.53	0.68	-0.63

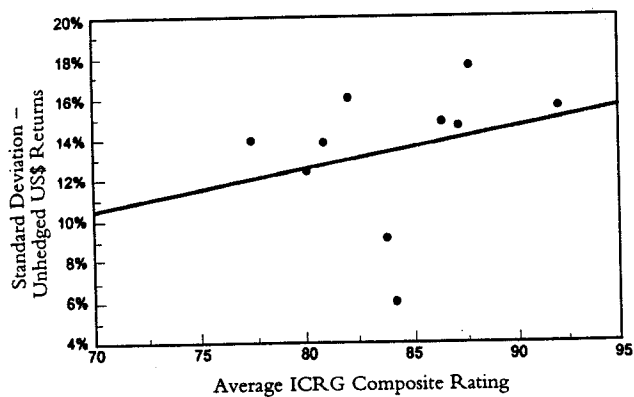
Index	Moment	Risk Attribute at Beginning of Sample				II CCR	REALYLD
		ICRGC	ICRGP	ICRGF	ICRGE		
Unhedged	Geometric Return	-0.23	-0.29	-0.38	0.18	-0.35	-0.57
	Volatility	0.13	0.13	-0.10	0.30	-0.02	-0.50
	Beta with WGBI	0.27	0.18	0.16	0.45	0.23	-0.73
Unhedged X-US	Geometric Return	-0.15	-0.21	-0.15	0.09	-0.17	-0.59
	Volatility	0.43	0.45	0.42	0.25	0.42	-0.57
	Beta with WGBI	0.39	0.30	0.43	0.42	0.44	-0.73
Hedged	Geometric Return	0.05	0.05	0.15	-0.08	0.40	0.49
	Volatility	-0.28	-0.11	-0.18	-0.60	0.10	0.61
	Beta with WGBI	-0.02	0.04	0.13	-0.29	0.44	0.51
Local	Geometric Return	-0.82	-0.68	-0.70	-0.84	-0.70	0.59
	Volatility	-0.31	-0.13	-0.22	-0.63	0.05	0.63
	Beta with WGBI	-0.10	-0.02	0.06	-0.36	0.38	0.53
FX Return X-U.S.	Geometric Return	-0.08	-0.13	-0.04	0.05	-0.25	-0.70
	Volatility	0.41	0.40	0.38	0.34	0.20	-0.69
	Beta with Non-U.S.	0.39	0.29	0.41	0.43	0.27	-0.85

Index	Moment	Change in Risk Attribute Over Sample				II CCR	REALYLD
		ICRGC	ICRGP	ICRGF	ICRGE		
Unhedged	Geometric Return	0.27	0.06	0.42	0.25	0.76	0.62
	Volatility	0.01	-0.13	0.30	0.14	0.30	0.32
	Beta with WGBI	-0.07	-0.22	0.25	0.18	0.63	0.56
Unhedged X-US	Geometric Return	0.02	-0.16	0.13	0.35	0.83	0.62
	Volatility	-0.51	-0.57	-0.23	0.26	0.27	0.24
	Beta with WGBI	-0.30	-0.40	0.02	0.22	0.62	0.53
Hedged	Geometric Return	0.08	0.01	0.11	0.17	-0.30	-0.48
	Volatility	0.12	0.01	0.27	0.24	-0.32	-0.57
	Beta with WGBI	0.12	0.04	0.26	0.13	-0.20	-0.50
Local	Geometric Return	0.42	0.39	0.08	0.19	-0.22	-0.25
	Volatility	0.13	0.02	0.27	0.25	-0.31	-0.58
	Beta with WGBI	0.15	0.06	0.28	0.17	-0.19	-0.50
FX Return X-U.S.	Geometric Return	-0.19	-0.25	-0.20	0.21	0.80	0.71
	Volatility	-0.57	-0.54	-0.42	0.09	0.38	0.42
	Beta with Non-U.S.	-0.42	-0.45	-0.22	0.14	0.65	0.65

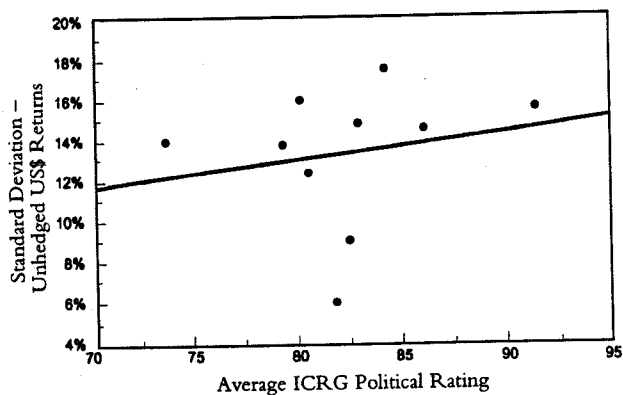
*ICRGC International Country Risk Guide Composite Index
 ICRGP International Country Risk Guide Political Index
 ICRGF International Country Risk Guide Financial Index
 ICRGE International Country Risk Guide Economic Index
 II CCR *Institutional Investor* Country Credit Ratings
 REALYLD Trailing Real Yields
 WGBI Salomon World Government Bond Index

EXHIBIT 9A ■ Volatility and Country Risk Ratings ■ Countries Existing From Sample Start

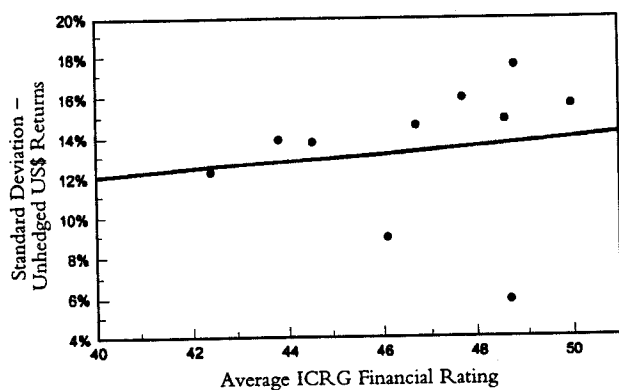
ICRG Composite Rating



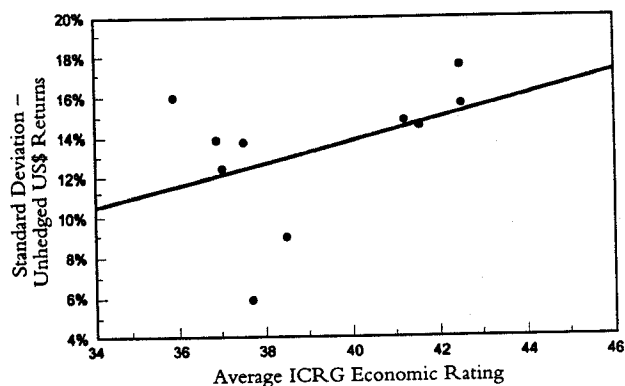
ICRG Political Rating



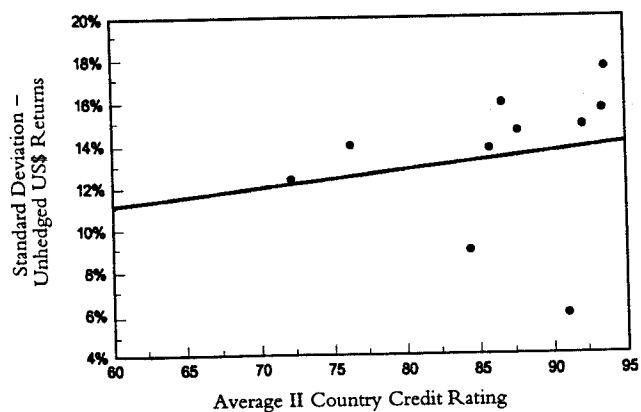
ICRG Financial Rating



ICRG Economic Rating



II Country Credit Rating



Real Yield

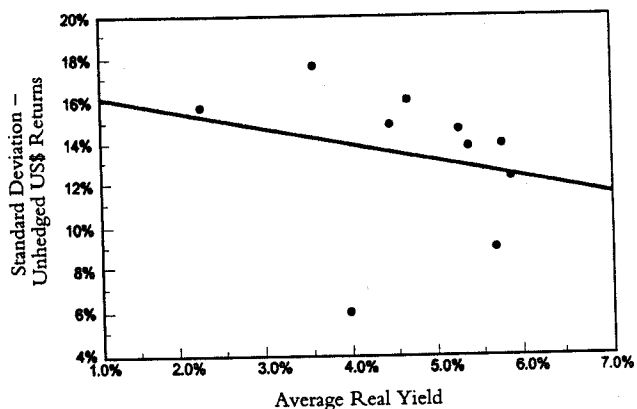
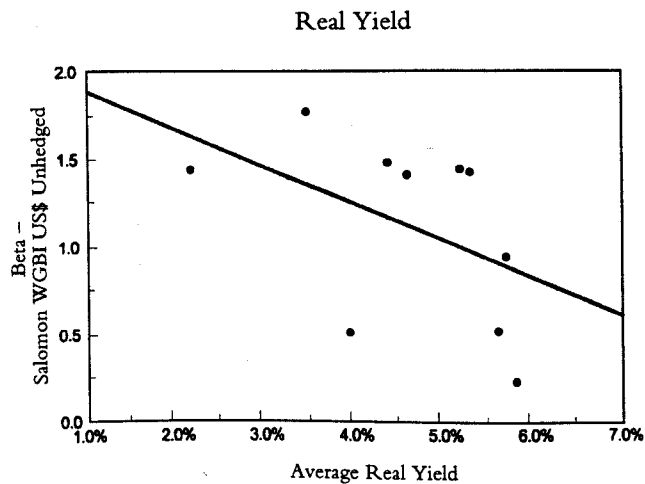
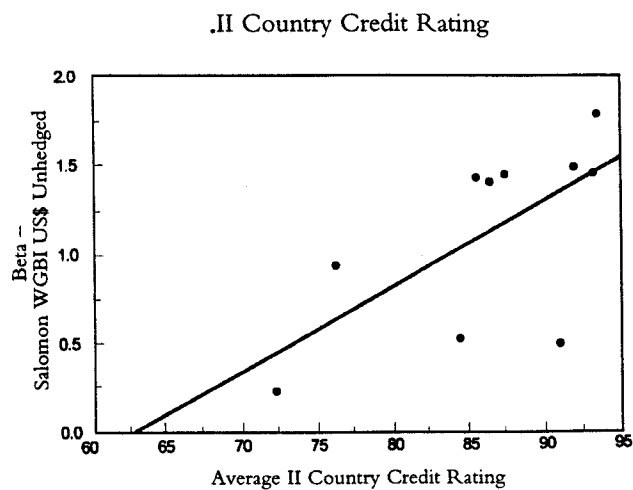
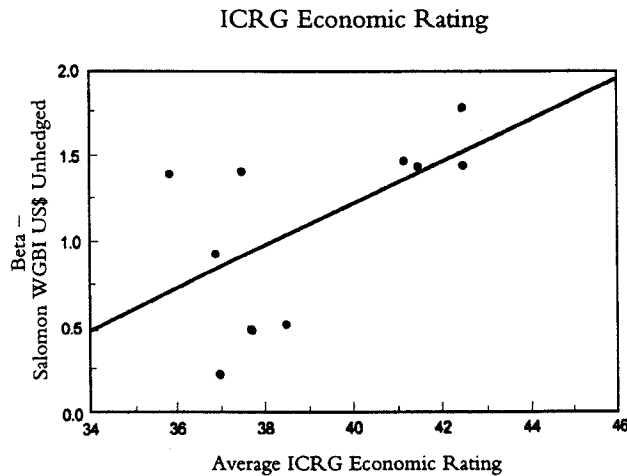
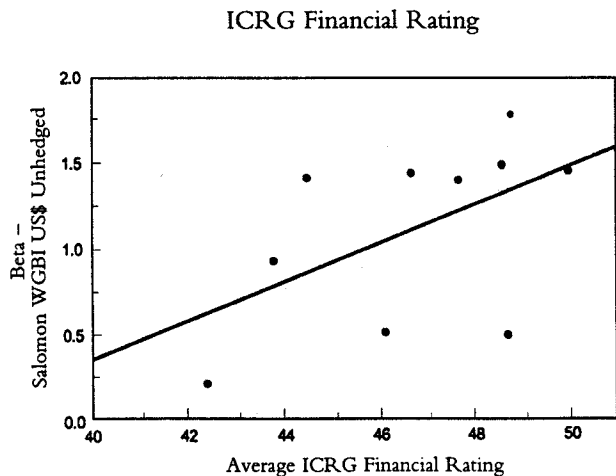
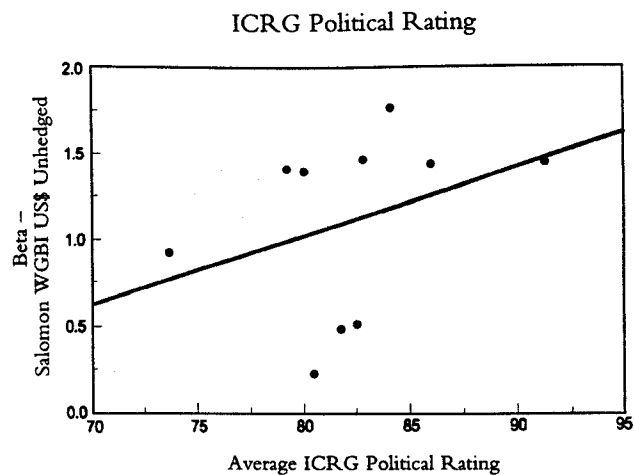
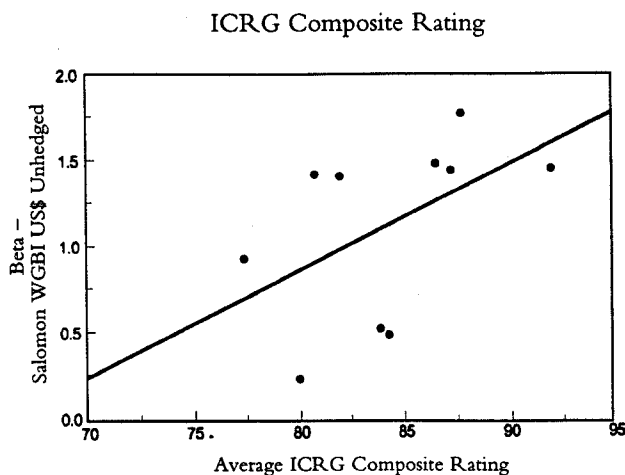


EXHIBIT 9B ■ Beta and Country Risk Ratings ■ Countries Existing From Sample Start



Therefore, the only way to judge the diversification benefits of international fixed-income is to use unhedged assets. The reason is that unhedged fixed-income investments reflect the widest array of country risk premiums, while hedged fixed-income represents only the home country risk premium. Although the unhedged portfolio is significantly riskier than the hedged portfolio, as we saw in Exhibit 1, an unhedged perspective allows the investor to access potentially diversifying assets, and consequently higher possible returns.

Changing Country Risk Portfolios

The results of Exhibit 8 suggest that there is a relation between changes in risk and subsequent returns. We thus form portfolios based on upgrades and downgrades in country risk, measuring the returns to both ex post and ex ante portfolio criteria. In other words, the ex post criterion means you have perfect knowledge of the country rating, one quarter in advance. With the ex ante criterion, we form portfolios after ICRG ratings are available to the public.

The two upgrade and downgrade portfolios are rebalanced quarterly. If the rating does not change, we keep the country in its respective portfolio. This reduces potential transaction costs and increases the number of countries in the portfolios.

Panels A and C in Exhibit 11 represent the results to the ex post strategy. The upgrade portfolios show uniformly higher returns than the downgrade portfolios. The ICRG composite measure seems to generate the highest returns.⁴ The risk-adjusted returns are generally positive, but there are significant differences in risk between the equal- and capitalization-weighted portfolio schemes.

Panels B and D in Exhibit 11 represent the results to an ex ante strategy, which is therefore an investable strategy. The positive returns are sustained for the spread portfolio and for the beta-adjusted portfolio. The predictive ability of upgrades is diminished in the hedged case, although risk-adjusted returns remain generally above zero. For example, the composite hedged strategy delivers 290 basis points of extra annual return.

While these portfolio exercises are useful in demonstrating the potential of these risk attributes on returns, these portfolios clearly deviate from the benchmark, and, in some cases, the number of countries in a portfolio comes close to zero (see Exhibit 12). Nor are transaction costs taken into account.

We have tried to minimize the transaction costs by two steps. First, a zero change in ratings does not induce any turnover in the portfolio. Second, our portfolios are rebalanced quarterly, rather than monthly. Nevertheless, it is interesting to note that all the risk attributes seem to add some value in the portfolio process, and some optimized combination of the variables might produce even more impressive results.

IV. CROSS-SECTIONAL ANALYSIS OF RISK

Our analysis suggests that grouping portfolios by certain attributes produces positive risk-adjusted profits on an ex ante basis for a simple two-portfolio experiment. Much information is potentially lost with such a coarse aggregation. More information can be obtained by trying to predict both the cross-section and time series of expected returns, given the risk attributes.

Panel A of Exhibit 13 presents attribute regressions of the form:

$$R_t = c_0 + c_1 A_{t-1} + \epsilon_t$$

where R represents a vector of quarterly returns from March 1985–December 1995 for all the countries in our sample (some markets' returns begin later), and A represents the risk attribute, which is lagged and matched to the country. For our full sample of all countries, there are 578 observations.

The first line of Exhibit 13 reports coefficients and t -statistics for five separate regressions of the returns on each of the attributes, with adjusted R -squares. T -statistics for all the regression results use a heteroscedasticity-consistent covariance matrix. Regressions are estimated on the lagged level of the attribute as well as lagged changes in the attribute.

Panel A reports the regressions using the lagged level of the attribute as an explanatory variable for the cross-section of expected returns. The ICRG financial variable is negatively correlated with returns; i.e., high financial risk is associated with higher expected returns. In fact, for local returns all the risk attributes have negative signs. Aside from the local returns, there are few significant regression results.

Panel B of Exhibit 13 reports the regressions using the lagged log changes in the attribute. For both the unhedged and foreign exchange case, the sign on all the attributes is positive, although only the ICRG financial and economic variables approach significance.

EXHIBIT 10 ■ Country Risk-Level Portfolio Strategy January 1985-December 1995*

A. Unhedged U.S. Dollar Return Portfolio Performance

Risk Attribute	Low Risk (%)			High Risk (%)			High Risk-Low Risk (%)		
	Portfolio Return	Standard Deviation	Salomon WGBI Beta	Portfolio Return	Standard Deviation	Salomon WGBI Beta	Portfolio Return	Standard Deviation	Salomon WGBI Alpha
Equal-Weighted									
ICRGC	14.8	12.6	1.34	15.5	9.5	0.87	0.6	7.3	6.3***
ICRGP	14.3	12.4	1.30	15.8	9.2	0.91	1.3	6.2	6.2***
ICRGF	14.2	11.6	1.25	14.7	10.2	0.95	0.5	6.0	4.3**
ICRGE	15.0	12.0	1.25	14.3	9.5	0.87	-0.6	7.0	4.1**
II CCR	14.4	12.1	1.31	15.8	9.4	0.90	1.3	5.8	6.3***
REALYLD	14.1	10.7	1.11	15.9	11.2	1.11	1.6	6.1	1.7
Capitalization-Weighted									
ICRGC	13.2	11.7	1.25	14.4	10.2	0.88	1.1	9.6	5.6
ICRGP	12.6	12.8	1.36	14.2	8.1	0.75	1.4	9.2	9.1***
ICRGF	11.8	8.9	0.99	14.0	11.6	1.08	2.1	7.5	1.3
ICRGE	14.2	13.5	1.42	11.9	8.9	0.79	-2.0	10.7	5.7
II CCR	12.6	9.0	1.01	14.4	10.5	0.98	1.6	6.6	2.2
REALYLD	13.6	10.0	1.04	14.1	11.4	1.12	0.5	8.1	-0.3
Salomon WGBI	12.9	8.8							

B. Hedged U.S. Dollar Return Portfolio Performance

Risk Attribute	Low Risk (%)			High Risk (%)			High Risk-Low Risk (%)		
	Portfolio Return	Standard Deviation	Salomon WGBI Beta	Portfolio Return	Standard Deviation	Salomon WGBI Beta	Portfolio Return	Standard Deviation	Salomon WGBI Alpha
Equal-Weighted									
ICRGC	8.1	4.2	0.78	8.1	4.4	0.74	-0.0	2.1	0.3
ICRGP	7.7	4.3	0.77	8.4	4.2	0.74	0.6	1.9	0.9
ICRGF	8.0	4.5	0.85	7.3	4.4	0.66	-0.8	3.0	1.0
ICRGE	8.1	4.1	0.75	8.0	4.6	0.77	-0.2	2.5	-0.3
II CCR	8.4	4.4	0.83	7.7	4.3	0.69	-0.6	2.6	0.7
REALYLD	7.6	4.1	0.73	8.5	4.6	0.79	0.8	2.6	0.3
Capitalization-Weighted									
ICRGC	9.3	5.1	1.00	8.2	5.2	0.88	-0.9	3.6	0.2
ICRGP	8.5	5.3	0.99	9.1	5.1	0.92	0.5	3.7	1.2
ICRGF	9.3	5.2	1.03	7.2	4.8	0.73	-2.0	3.7	0.8
ICRGE	9.1	4.9	0.91	9.0	5.3	0.96	-0.1	3.8	-0.5
II CCR	9.6	5.1	1.02	7.8	4.6	0.76	-1.7	3.1	0.6
REALYLD	9.3	5.1	0.96	8.5	5.1	0.86	-0.8	3.9	0.2
Salomon WGBI	9.5	5.0							

Alpha level of significance: *10%, **5%, ***1%.

Salomon World Government Bond Indexes (WGBI) in U.S. dollars: unhedged and hedged.

Risk portfolios are formed by sorting the samples in two portfolios; low-risk countries have the highest country ratings.

Portfolios are reformed quarterly.

*ICRGC International Country Risk Guide Composite Index
 ICRGP International Country Risk Guide Political Index
 ICRGF International Country Risk Guide Financial Index
 ICRGE International Country Risk Guide Economic Index
 II CCR Institutional Investor Country Credit Ratings
 REALYLD Trailing Real Yields

EXHIBIT 11 ■ Changing Country Risk Portfolio Strategy January 1985-December 1995*

A. Contemporaneous Ratings Changes and Unhedged U.S. Dollar Portfolio Performance

Risk Attribute	Downgrade (%)			Upgrade (%)			Upgrade-Downgrade (%)		
	Portfolio Return	Standard Deviation	Salomon WGBI Beta	Portfolio Return	Standard Deviation	Salomon WGBI Beta	Portfolio Return	Standard Deviation	Salomon WGBI Alpha
Equal-Weighted									
ICRGC	13.2	10.8	1.08	17.8	10.8	1.11	4.1	6.1	4.0
ICRGP	13.7	10.2	1.07	17.9	11.6	1.17	3.7	5.2	2.5
ICRGF	12.5	13.0	1.15	14.9	9.9	1.03	2.1	8.0	4.0
ICRGE	13.7	10.9	1.10	16.8	10.7	1.11	2.7	4.7	2.9
II CCR	14.7	11.2	1.03	15.0	11.6	1.17	0.2	8.7	-1.0
Capitalization-Weighted									
ICRGC	12.5	8.3	0.83	18.0	12.8	1.30	4.9	9.0	-0.4
ICRGP	11.6	7.9	0.80	18.3	14.3	1.49	6.0	9.5	-1.8
ICRGF	12.1	13.4	1.27	14.1	8.5	0.87	1.9	9.0	7.1**
ICRGE	11.9	10.8	1.05	15.1	11.7	1.19	2.9	9.7	1.9
II CCR	11.7	11.5	1.04	12.7	11.9	1.20	0.9	10.8	-0.4
Salomon WGBI	12.9	8.8							

B. Predictive Rating Change and Unhedged U.S. Dollar Portfolio Performance

Risk Attribute	Downgrade (%)			Upgrade (%)			Upgrade-Downgrade (%)		
	Portfolio Return	Standard Deviation	Salomon WGBI Beta	Portfolio Return	Standard Deviation	Salomon WGBI Beta	Portfolio Return	Standard Deviation	Salomon WGBI Alpha
Equal-Weighted									
ICRGC	14.2	11.3	1.16	16.6	10.1	1.00	2.1	6.7	4.3
ICRGP	13.0	11.0	1.16	17.2	10.8	1.01	3.8	6.5	5.8***
ICRGF	13.7	12.9	1.09	14.3	10.6	1.07	0.5	8.6	1.1
ICRGE	14.1	10.3	1.06	16.7	11.6	1.19	2.2	4.8	0.8
II CCR	13.4	11.3	1.03	14.9	11.8	1.20	1.3	9.0	-0.3
Capitalization-Weighted									
ICRGC	10.0	10.7	1.07	17.6	11.1	1.11	6.9	9.1	7.0**
ICRGP	10.0	9.3	0.95	18.2	12.1	1.17	7.5	9.2	5.2
ICRGF	12.3	13.3	1.20	13.2	10.2	0.95	0.8	10.5	4.3
ICRGE	9.9	10.4	1.02	16.8	11.6	1.15	6.3	9.8	5.3
II CCR	11.4	11.3	1.03	12.9	12.3	1.25	1.3	10.8	-0.7
Salomon WGBI	12.9	8.8							

(continued on next page)

It should be noted that the ICRG economic variable has a positive sign in all the return samples and is significant in the unhedged, local, and foreign exchange returns (an improvement in rating is associated with increased returns). In the hedged and local samples, there tends to be a negative relation between changes in risk and subsequent returns.

In Exhibit 14, we examine a small sample of emerging markets returns. The returns are quarterly returns from the Salomon Brothers Brady Bond Index for (eventually) eight countries (and 111 observations) from 1990 through 1995. The lagged level regressions all have negative signs, but there is little of statistical significance. The results from the lagged change in risk

EXHIBIT 11 ■ Continued
C. Contemporaneous Ratings Changes and Hedged U.S. Dollar Portfolio Performance

Risk Attribute	Downgrade (%)			Upgrade (%)			Upgrade-Downgrade (%)		
	Portfolio Return	Salomon		Portfolio Return	Salomon		Portfolio Return	Salomon	
		Standard Deviation	WGBI Beta		Standard Deviation	WGBI Beta		Standard Deviation	WGBI Alpha
Equal-Weighted									
ICRGC	7.1	4.0	0.71	9.3	4.8	0.85	2.1	2.5	0.8
ICRGP	7.6	4.1	0.74	9.0	5.0	0.85	1.3	2.9	0.3
ICRGF	7.2	4.7	0.62	7.9	4.7	0.82	0.7	3.7	-1.2
ICRGE	7.4	4.1	0.71	8.3	4.5	0.77	0.8	2.3	0.2
II CCR	8.3	5.5	0.90	8.3	4.3	0.77	0.0	3.5	1.3
Capitalization-Weighted									
ICRGC	8.1	5.7	1.04	10.0	4.8	0.88	1.7	3.7	3.2***
ICRGP	8.8	5.4	1.01	9.4	5.1	0.88	0.6	3.8	1.8
ICRGF	7.5	5.1	0.71	8.7	5.0	0.93	1.2	4.7	-0.8
ICRGE	9.0	5.6	1.03	8.9	4.7	0.84	-0.1	3.9	1.6
II CCR	8.9	5.9	1.02	9.5	4.8	0.88	0.6	4.2	1.9
Salomon WGBI	9.5	5.0							

D. Predictive Rating Change and Hedged U.S. Dollar Portfolio Performance

Risk Attribute	Downgrade (%)			Upgrade (%)			Upgrade-Downgrade (%)		
	Portfolio Return	Salomon		Portfolio Return	Salomon		Portfolio Return	Salomon	
		Standard Deviation	WGBI Beta		Standard Deviation	WGBI Beta		Standard Deviation	WGBI Alpha
Equal-Weighted									
ICRGC	7.8	4.2	0.75	8.1	4.5	0.78	0.3	2.5	−0.0
ICRGP	8.0	4.1	0.73	7.6	4.7	0.77	−0.3	2.9	−0.8
ICRGF	8.0	4.8	0.65	7.8	4.7	0.83	−0.1	3.8	−1.8
ICRGE	7.4	4.1	0.74	8.5	4.4	0.77	0.9	1.8	0.7
II CCR	8.1	5.4	0.88	7.9	4.3	0.75	−0.2	3.5	1.0
Capitalization-Weighted									
ICRGC	8.0	5.8	1.05	8.9	4.6	0.83	0.9	4.1	2.9**
ICRGP	9.0	4.9	0.92	8.3	4.7	0.80	−0.6	3.5	0.4
ICRGF	7.8	5.1	0.72	8.8	5.0	0.92	1.0	4.7	−0.7
ICRGE	7.8	5.2	0.96	9.3	5.3	0.95	1.4	3.9	1.5
II CCR	8.9	6.4	1.10	8.8	4.9	0.87	−0.1	4.7	1.9
Salomon WGBI	9.5	5.0							

Alpha level of significance: *10%, **5%, ***1%.

Salomon World Government Bond Indexes, unhedged U.S. dollar returns in Panels A and B, and hedged U.S. dollar returns in Panels C and D. Panel A portfolios formed with all countries that experienced a contemporaneous change in a country risk exposure.

Panel B portfolios formed with all countries that experienced either an increase or a decrease in a country risk exposure over the previous three months.

Portfolios are reformed quarterly.

*ICRGC International Country Risk Guide Composite Index

ICRGP International Country Risk Guide Political Index

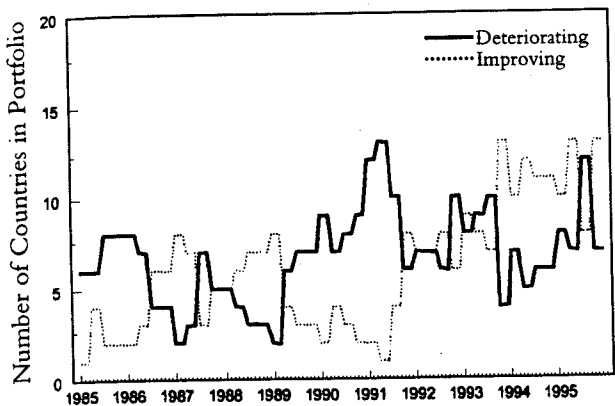
ICRGF International Country Risk Guide Financial Index

ICRGE International Country Risk Guide Economic Index

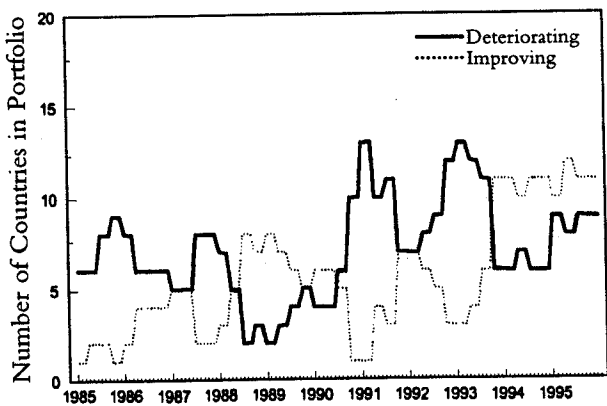
II CCR Institutional Investor Country Credit Ratings

EXHIBIT 12 ■ Composition of Country Risk Rating Portfolios

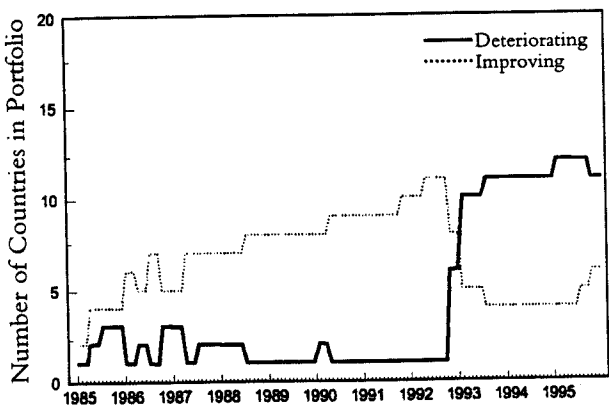
ICRG Composite Rating



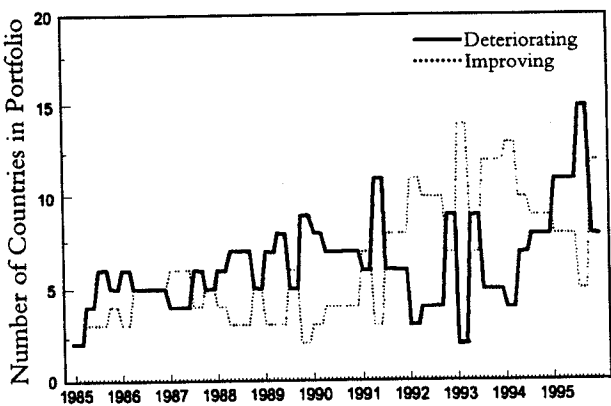
ICRG Political Rating



ICRG Financial Rating



ICRG Economic Rating



Institutional Investor Country Credit Rating

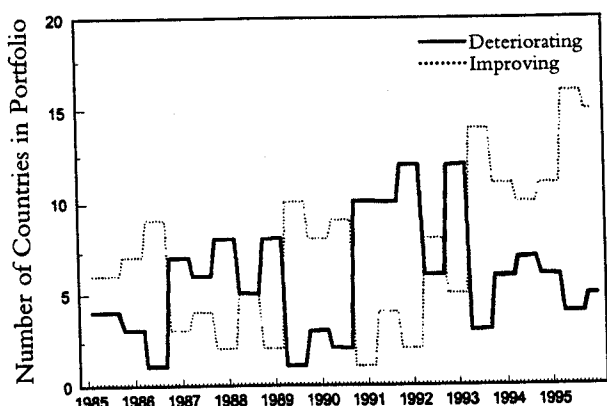


EXHIBIT 13 ■ Cross-Sectional Time Series Importance of Country Risk Attributes*

A. Lagged Level Regressions

Returns	Regression	ICRGC		ICRGP		ICRGF		ICRGE		II CCR		
		T-Stat	R-Sq	T-Stat	R-Sq	T-Stat	R-Sq	T-Stat	R-Sq	T-Stat	R-Sq	R-Sq
Unhedged	Univariate	0.0002 0.33	-0.15%	0.0004 0.79	-0.05%	0.0013 -1.45	0.18%	0.0014 1.16	0.13%	0.0001 0.32	-0.16%	
Unhedged	Multivariate			0.0006 0.96		-0.0024 -2.30		0.0018 1.33				0.70%
Unhedged	Multivariate			0.0004 0.63		-0.0034 -2.58		0.0016 1.24		0.0006 1.49		0.81%
Hedged	Univariate	-0.0001 -0.27	-0.16%	0.0000 -0.24	-0.17%	-0.0002 -0.55	-0.12%	0.0000 0.04	-0.17%	0.0001 0.50	-0.13%	
Hedged	Multivariate			0.0000 -0.08		-0.0002 -0.54		0.0001 1.33				-0.46%
Hedged	Multivariate			-0.0001 -0.39		-0.0007 -1.13		0.0001 0.15		0.0003 1.15		-0.36%
Local	Univariate	-0.0014 -5.93	4.77%	-0.0010 -4.98	3.31%	-0.0015 -3.76	2.30%	-0.0023 -5.31	4.22%	-0.0006 -3.76	2.36%	
Local	Multivariate			-0.0004 -1.75		-0.0006 -1.41		-0.0016 -2.78				5.06%
Local	Multivariate			-0.0004 -1.58		-0.0004 -0.75		-0.0015 -2.70		-0.0001 -0.53		4.95%
FX Return	Univariate	0.0000 0.09	-0.19%	0.0003 0.62	-0.12%	-0.0010 -1.14	0.06%	0.0006 0.66	-0.11%	0.0000 0.14	-0.19%	
FX Return	Multivariate			0.0005 0.89		-0.0018 -1.79		0.0009 0.78				0.14%
FX Return	Multivariate			0.0004 0.69		-0.0024 -1.94		0.0008 0.66		0.0004 0.81		0.07%

(continued on next page)

regressions show increased explanatory power, but again there are no coefficients that are significant at conventional significance levels.

Relation Between Real Yields and Risk Attributes

A common variable used to compare expected returns on national fixed-income markets involves adjusting yields to maturity for either trailing inflation or expected inflation. The incremental contribution of the risk ratings relative to real yields (RY) is presented in Exhibit 15. Univariate regressions are estimated in the form:

$$R_t = c_0 + c_1RY_{t-1} + c_2A_{t-1} + \varepsilon_t$$

for each attribute, A.

Exhibit 15 reports the coefficients and t-ratios of the various risk attributes. Comparing the results to Panel A of Exhibit 13 shows that real yields have an ability to discriminate between expected returns. The adjusted R-square statistics increase in all but the unhedged case, and the country risk attributes largely retain their signs and significance when used in conjunction with real yields. This implies that there is some incremental information in the risk measures that is not fully captured by the cross-section of real yields.

The panel at the foot of Exhibit 15 shows that the country risk attributes are all significantly related to real yields. That is, real yields are driven in part by market perceptions of various kinds of risk. Models that use

EXHIBIT 13 ■ Continued

B. Lagged Change in Level Regressions

Returns	Regression	ICRGC		ICRGP		ICRGF		ICRGE		II CCR		
		T-Stat	R-Sq	T-Stat	R-Sq	T-Stat	R-Sq	T-Stat	R-Sq	T-Stat	R-Sq	R-Sq
Unhedged	Univariate	0.3491	0.18%	0.0487	-0.16%	0.3646	0.42%	0.2980	0.64%	0.2212	-0.10%	
		1.40		0.32		1.84		2.38		0.73		
Unhedged	Multivariate			0.0198		0.3567		0.2958				0.88%
				0.13		1.85		2.36				
Unhedged	Multivariate			0.0183		0.3481		0.2964		0.1692		0.75%
				0.12		1.82		2.36		0.58		
Hedged	Univariate	-0.1101	0.02%	-0.0807	0.10%	-0.0244	-0.16%	0.0442	-0.07%	0.1067	-0.08%	
		-1.14		-1.37		-0.33		0.81		0.77		
Hedged	Multivariate			-0.0784		-0.0112		0.0426				-0.15%
				-1.32		-0.15		0.78				
Hedged	Multivariate			-0.0795		-0.0171		0.0430		0.1165		-0.22%
				-1.33		-0.23		0.79		0.83		
Local	Univariate	-0.2180	0.54%	-0.1598	0.84%	-0.1137	0.30%	0.0771	0.11%	-0.0443	-0.16%	
		-2.01		-2.54		-1.29		1.30		-0.29		
Local	Multivariate			-0.1487		-0.0885		0.0744				0.93%
				-2.42		-1.07		1.27				
Local	Multivariate			-0.1486		-0.0876		0.0743		-0.0170		0.76%
				-2.41		-1.06		1.27		-0.11		
FX Return	Univariate	0.4759	0.63%	0.1367	-0.01%	0.3808	0.65%	0.2592	0.58%	0.2031	-0.12%	
		2.09		0.97		2.12		2.02		0.61		
FX Return	Multivariate			0.1055		0.3595		0.2609				1.14%
				0.75		1.98		2.04				
FX Return	Multivariate			0.1053		0.3521		0.2613		0.1437		0.99%
				0.74		1.93		2.04		0.44		

All R-squares are adjusted for degrees of freedom.

Standard errors are calculated using a heteroscedasticity-consistent covariance matrix.

*ICRGC International Country Risk Guide Composite Index
 ICRGP International Country Risk Guide Political Index
 ICRGF International Country Risk Guide Financial Index
 ICRGE International Country Risk Guide Economic Index
 II CCR Institutional Investor Country Credit Ratings

real yields as a descriptor of cross-sectional fixed-income returns can be enhanced by adjusting for perceived country risk.

Trading Strategies Based on Risk Attributes

There are two disadvantages of the time series cross-sectional methodology. First, stacking the time series of returns together eliminates important information regarding the cross-sectional correlation of the returns. This could cause understatement of the stan-

dard errors. Second, the time series cross-sectional methodology imposes the sample slope coefficient for all time periods, and it is possible that the slope coefficient could change through time. Ferson and Harvey [1991, 1993] find that the variation in the slope coefficients is to some degree predictable in both equity and fixed-income markets.

Panel A of Exhibit 16 reports the results of estimating a cross-sectional regression at each three-month interval. The number of countries in each cross-sectional

EXHIBIT 14 ■ Cross-Sectional Time Series Importance of Country Risk Attributes in Emerging Fixed-Income Markets*

A. Lagged Level Regressions

Returns	Regression	ICRGC		ICRGP		ICRGF		ICRGE		II CCR		R-Sq
		T-Stat	R-Sq	T-Stat	R-Sq	T-Stat	R-Sq	T-Stat	R-Sq	T-Stat	R-Sq	
Emerging	Univariate	-0.0013	-0.10%	-0.0007	-0.58%	-0.0022	0.00%	-0.0039	0.23%	-0.0011	-0.28%	
		-0.84		-0.54		-0.98		-1.20		-0.81		
Emerging	Multivariate			0.0010		-0.0033		-0.0028				-1.11%
				0.47		-0.87		-0.83				
Emerging	Multivariate			0.0010		-0.0033		-0.0028		0.0000		-2.06%
				0.48		-0.69		-0.83		-0.01		

B. Lagged Change in Level Regressions

Returns	Regression	ICRGC		ICRGP		ICRGF		ICRGE		II CCR		R-Sq
		T-Stat	R-Sq	T-Stat	R-Sq	T-Stat	R-Sq	T-Stat	R-Sq	T-Stat	R-Sq	
Emerging	Univariate	-0.6098	2.33%	-0.3082	0.48%	-0.3087	0.39%	-0.1589	-0.21%	0.2851	0.00%	
		-1.81		-1.42		-1.28		-0.65		1.12		
Emerging	Multivariate			-0.2105		-0.1605		-0.1416				-0.49%
				-0.84		-0.56		-0.57				
Emerging	Multivariate			-0.1454		-0.2238		-0.1523		0.3065		-0.41%
				-0.56		-0.76		-0.62		1.16		

Emerging market returns from Salomon Brothers Brady Bond Indexes.

All R-squares are adjusted for degrees of freedom.

Standard errors are calculated using a heteroscedasticity-consistent covariance mix.

*ICRGC International Country Risk Guide Composite Index
 ICRGP International Country Risk Guide Political Index
 ICRGF International Country Risk Guide Financial Index
 ICRGE International Country Risk Guide Economic Index
 II CCR Institutional Investor Country Credit Ratings

regression grows from eleven in March 1985 to twenty in March 1995. The slope coefficients are averaged, and the standard error of the average is also presented. Although the statistical precision of the averages seems limited in all but the local return case, the unhedged coefficients are of the correct sign for a majority of the cases.

There is variation in the estimated cross-sectional slope coefficients through time as is evident in Exhibit 17, which presents the time series coefficients for the five country risk measures and real yields along with the time series of adjusted R-squares. The attributes remain of the correct sign the majority of the time, but when there is a negative payoff to country risk the effect seems to be large. Identifying those periods, and potentially forecasting them, could significantly

enhance any country trading risk strategy.

Panel B of Exhibit 16 assesses the incremental contribution of the risk attributes when real yields are included in the cross-sectional regression. While the coefficients are by and large negative, they are significant only in the local sample.

V. CONCLUSIONS

Our analysis of the economic content of country risk measures provided by *Institutional Investor* and Political Risk Services' "International Country Risk Guide" suggests that these measures convey information with regard to world bond market expected returns. For example, when we form portfolios based

EXHIBIT 15 ■ Incremental Contribution of Country Risk Attributes to Real Yields*

Sample	Regression	ICRGC T-Stat	R-Sq	ICRGP T-Stat	R-Sq	ICRGF T-Stat	R-Sq	ICRGE T-Stat	R-Sq	II CCR T-Stat	R-Sq	R-Sq
Unhedged	Univariate	0.0003 0.42	-0.31%	0.0005 0.87	-0.20%	-0.0016 -1.55	0.05%	0.0015 1.25	0.01%	0.0002 0.47	-0.31%	
Unhedged	Multivariate			0.0006 0.96		-0.0026 -2.24		0.0017 1.29				0.54%
Unhedged	Multivariate			0.0004 0.63		-0.0035 -2.55		0.0016 1.22		0.0006 1.44		0.64%
Hedged	Univariate	0.0004 1.41	2.78%	0.0002 0.86	2.59%	0.0006 1.43	2.84%	0.0005 1.12	2.70%	0.0004 2.47	3.56%	
Hedged	Multivariate			0.0000 -0.10		0.0005 1.12		0.0004 0.64				2.59%
Hedged	Multivariate			-0.0002 -0.65		-0.0001 -0.14		0.0003 0.51		0.0004 1.95		3.15%
Local	Univariate	-0.0009 -3.58	8.29%	-0.0007 -3.39	8.02%	-0.0005 -1.11	6.61%	-0.0017 -3.71	8.60%	-0.0002 -1.23	6.67%	
Local	Multivariate			-0.0004 -1.84		0.0003 0.52		-0.0013 -2.37				8.74%
Local	Multivariate			-0.0005 -1.90		0.0002 0.28		-0.0013 -2.36		0.0001 0.27		8.59%
FX Change	Univariate	-0.0004 -0.68	0.36%	0.0000 0.09	0.28%	-0.0021 -2.20	1.19%	0.0002 0.15	0.28%	-0.0003 -0.76	0.39%	
FX Change	Multivariate			0.0005 0.78		-0.0028 -2.54		0.0007 0.59				1.11%
FX Change	Multivariate			0.0004 0.69		-0.0030 -2.37		0.0006 0.54		0.0002 0.34		0.95%

Explaining Real Yields with Risk Attributes

Real Yields	Univariate	-0.0013 -10.10	12.99%	-0.0007 -5.79	5.72%	-0.0025 -11.15	19.93%	-0.0016 -6.57	6.31%	-0.0009 -12.55	18.59%	
Real Yields	Multivariate			0.0000 0.09		-0.0023 -8.82		-0.0007 -2.37				20.55%
Real Yields	Multivariate			0.0002 1.03		-0.0016 -5.01		-0.0006 -2.01		-0.0005 -5.07		22.91%

All regressions use real yields (plus listed risk attributes) as independent variables. Real yield coefficients not shown due to space constraints. All R-squares are adjusted for degrees of freedom. Standard errors are calculated using a heteroscedasticity-consistent covariance matrix.

*ICRGC	International Country Risk Guide Composite Index	ICRGE	International Country Risk Guide Economic Index
ICRGP	International Country Risk Guide Political Index	II CCR	Institutional Investor Country Credit Ratings
ICRGF	International Country Risk Guide Financial Index		

EXHIBIT 16 ■ Cross-Sectional Regression Results Quarterly Returns: January 1985 December 1995*

A. Quarterly Return versus Risk Attribute

Risk Attribute	Average Intercept	Ave Slope Coefficient	Standard Error	T-Stat	% Positive Coefficient	Average R-Square
Unhedged U.S. Dollar Returns						
ICRGC	0.0385	0.0000	0.0007	-0.01	31.8%	4.7%
ICRGP	0.0482	-0.0001	0.0005	-0.25	40.9%	0.4%
ICRGF	0.0310	0.0001	0.0010	0.14	43.2%	2.0%
ICRGE	0.0175	0.0005	0.0012	0.40	40.9%	7.4%
II CCR	0.0694	-0.0004	0.0003	-1.11	34.1%	3.8%
REALYLD	0.0312	0.1445	0.2188	0.66	54.5%	9.1%

(continued on next page)

Hedged U.S. Dollar Returns

ICRGC	0.0173	0.0000	0.0002	0.13	45.5%	1.7%
ICRGP	0.0253	-0.0001	0.0002	-0.41	47.7%	-1.4%
ICRGF	-0.0006	0.0004	0.0004	1.02	61.4%	5.3%
ICRGE	0.0159	0.0001	0.0004	0.22	47.7%	1.0%
II CCR	0.0108	0.0001	0.0001	0.73	47.7%	4.6%
REALYLD	0.0129	0.1451	0.0801	1.81	63.6%	4.6%

Local Returns

ICRGC	0.1299	-0.0012	0.0002	-5.12	15.9%	13.0%
ICRGP	0.1085	-0.0010	0.0002	-5.93	13.6%	8.6%
ICRGF	0.0835	-0.0013	0.0004	-2.94	22.7%	9.5%
ICRGE	0.1012	-0.0020	0.0004	-4.39	13.6%	9.6%
II CCR	0.0776	-0.0006	0.0002	-4.02	20.5%	10.8%
REALYLD	0.0079	0.3546	0.0872	4.07	75.0%	11.1%

Forward Foreign Exchange Returns

ICRGC	0.0188	0.0000	0.0005	0.02	46.5%	1.5%
ICRGP	0.0223	0.0000	0.0003	-0.09	44.2%	-2.9%
ICRGF	0.0027	0.0004	0.0009	0.42	51.2%	6.7%
ICRGE	0.0149	0.0001	0.0009	0.13	44.2%	2.2%
II CCR	0.0377	-0.0002	0.0003	-0.71	48.8%	4.5%
REALYLD	0.0310	-0.2587	0.1768	-1.46	48.8%	6.1%

B. Quarterly Return versus Real Yield and Risk Attribute

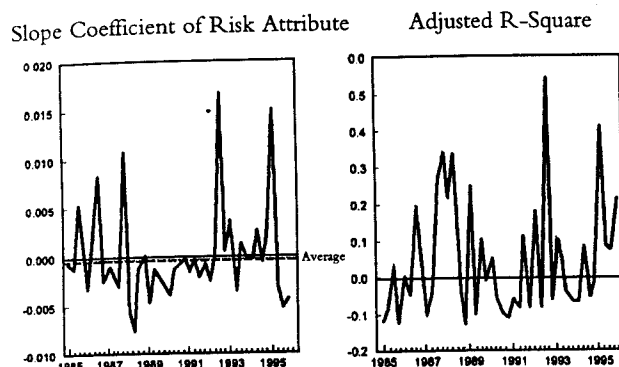
Risk Attribute	Real Yield				Risk Attribute					
	Average Intercept	Ave Slope Coefficient	Standard Error	T Stat	% Positive Coefficient	Ave Slope Coefficient	Standard Error	T-Stat	% Positive Coefficient	Average R-Square
Unhedged U.S. Dollar Returns										
ICRGC	0.0411	0.0284	0.2115	0.13	50.0%	-0.0001	0.0006	-0.08	36.4%	19.4%
ICRGP	0.0362	0.0660	0.2265	0.29	52.3%	0.0000	0.0005	-0.02	36.4%	17.9%
ICRGF	0.0276	0.0922	0.2267	0.41	54.5%	0.0001	0.0008	0.15	45.5%	16.6%
ICRGE	0.0348	0.0900	0.1912	0.47	52.3%	0.0000	0.0011	-0.03	43.2%	21.0%
II CCR	0.0730	0.0280	0.2315	0.12	52.3%	-0.0004	0.0003	-1.26	45.5%	21.3%
Hedged U.S. Dollar Returns										
ICRGC	-0.0149	0.1698	0.0789	2.15	59.1%	0.0003	0.0002	1.55	52.3%	13.8%
ICRGP	0.0041	0.1442	0.0823	1.75	59.1%	0.0001	0.0002	0.69	47.7%	11.8%
ICRGF	-0.0380	0.2173	0.0828	2.62	56.8%	0.0010	0.0004	2.35	61.4%	17.6%
ICRGE	-0.0067	0.1626	0.0720	2.26	63.6%	0.0005	0.0004	1.29	56.8%	13.2%
II CCR	-0.0146	0.2237	0.0845	2.65	54.5%	0.0003	0.0001	1.89	61.4%	18.5%
Local Returns										
ICRGC	0.0822	0.2257	0.0826	2.73	59.1%	-0.0008	0.0002	-3.61	27.3%	26.3%
ICRGP	0.0712	0.2457	0.0858	2.86	68.2%	-0.0007	0.0002	-4.42	18.2%	23.6%
ICRGF	0.0293	0.3167	0.0869	3.64	65.9%	-0.0004	0.0004	-1.03	43.2%	23.3%
ICRGE	0.0599	0.2764	0.0770	3.59	70.5%	-0.0012	0.0004	-3.07	29.5%	24.7%
II CCR	0.0384	0.3229	0.0930	3.47	61.4%	-0.0003	0.0002	-1.95	36.4%	27.0%
Forward Foreign Exchange Returns										
ICRGC	0.0724	0.0724	0.0486	1.49	60.5%	-0.0004	0.0005	-0.82	51.2%	16.8%
ICRGP	0.0521	0.0521	0.0319	1.64	58.1%	-0.0002	0.0003	-0.62	44.2%	14.1%
ICRGF	0.0351	0.0351	0.0538	0.65	58.1%	-0.0001	0.0010	-0.13	46.5%	20.9%
ICRGE	0.0800	0.0800	0.0454	1.76	62.8%	-0.0011	0.0010	-1.06	37.2%	17.4%
II CCR	0.0726	0.0726	0.0284	2.56	74.4%	-0.0004	0.0003	-1.47	34.9%	18.0%

All R-squares are adjusted for degrees of freedom. Standard errors are calculated using a heteroscedasticity-consistent covariance matrix.

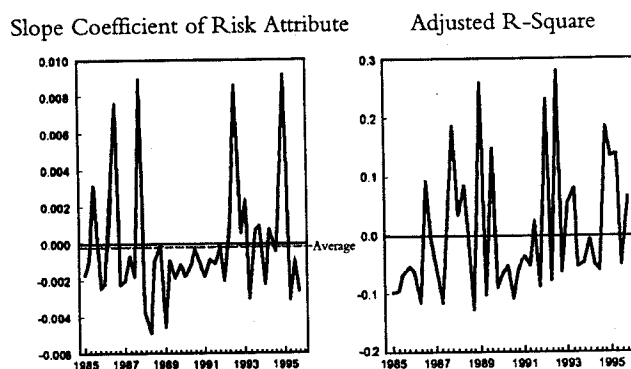
- *ICRGC International Country Risk Guide Composite Index
- ICRGP International Country Risk Guide Political Index
- ICRGF International Country Risk Guide Financial Index
- ICRGE International Country Risk Guide Economic Index
- II CCR Institutional Investor Country Credit Ratings
- REALYLD Trailing real yields

EXHIBIT 17 ■ Quarterly Cross-Sectional Regressions ■ Unhedged U.S. Dollar Return on Lagged Risk Level

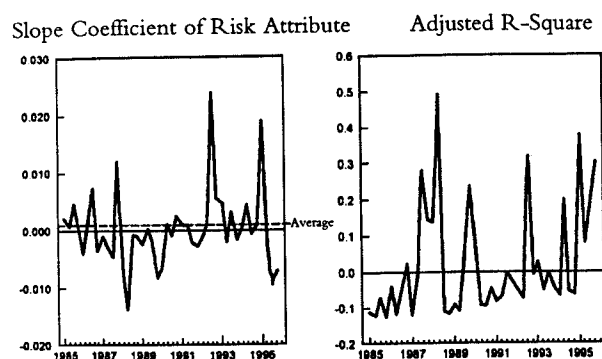
ICRG Composite Rating



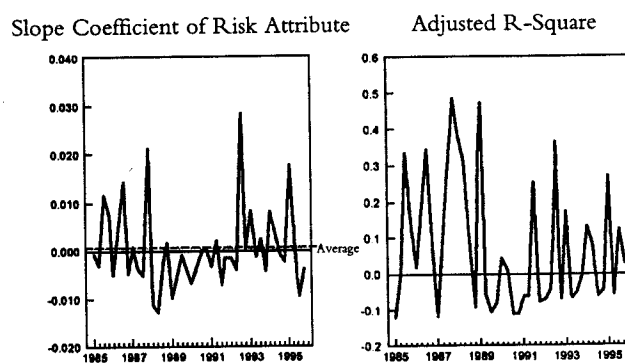
ICRG Political Rating



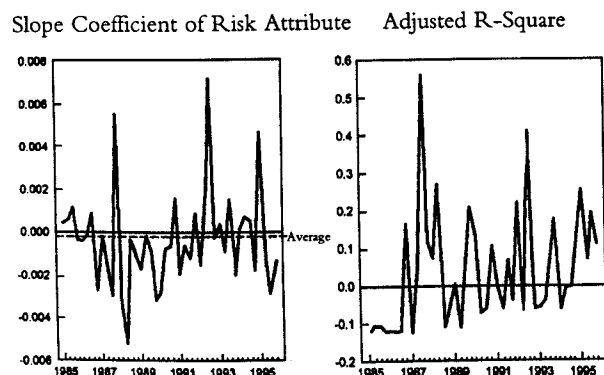
ICRG Financial Rating



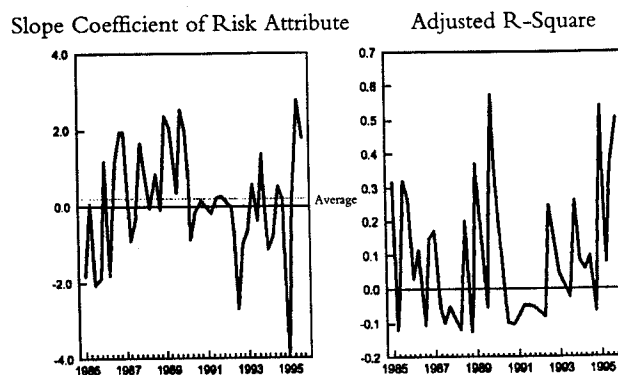
ICRG Economic Rating



II Country Credit Rating



Real Yields



on changes in risk ratings, we find risk-adjusted abnormal returns in the range of 500 basis points per year on unhedged returns.

The cross-sectional regressions do not always confirm the results of the portfolio analysis. We find

evidence that ex post real yields have an ability to predict the cross-section of returns. It is also the case that real yields are inversely correlated with the risk ratings (higher real yields imply lower ratings or higher risk).

Some 23% of the variation in real yields can be

described by a combination of risk measures, with the ICRG financial and *Institutional Investor* country credit ratings providing the most value. This provides insight on why value-oriented strategies might work.

A great deal of research has focused on the factors that determine fixed-income risk in a global setting (Harvey, Solnik, and Zhou [1996] and Ilmanen [1995, 1996]). Our research examines some new measures of country risk and attempts to analyze the expected return implications. A comprehensive process for managing global bond portfolios should integrate the insights of all these methods.

ENDNOTES

The authors thank Chris Rath and Political Risk Services for providing their data, and Salomon Brothers for providing data on their bond indexes. Rob Feldman provided valuable assistance in analyzing the various country risk providers. Some of this research is available on the World Wide Web at the Country Risk site: http://www.duke.edu/~charvey/Country_risk/couindex.htm.

¹A partial listing of providers includes: Bank of America World Information Services (BoA); Business Environment Risk Intelligence, S.A. (BERI); Control Risks Information Services (CRIS); Economist Intelligence Unit (EIU); *Euromoney*; *Institutional Investor*; Moody's Investor Services; Political Risk Services: "International Country Risk Guide" (ICRG); Political Risk Services: Coplin-O'Leary Rating System (COPL); and Standard & Poor's Rating Group (S&P). See Exhibits 4 and 5 for more detail on specific factors included in, and primary components of, country ratings.

²Besides Salomon Brothers, J.P. Morgan and Datastream provide indexes for the developed global bond markets. Use of the other providers will not dramatically alter the results found here. The "all maturity" U.S. dollar return correlations between the Salomon, J.P. Morgan, Datastream All Issue, and Datastream Tracker (most liquid bonds) country indexes do not fall below 0.96 for any country. The correlations between the Salomon and Datastream Tracker indexes are above 99% for seventeen of eighteen countries, and above 98% for the remaining two countries available between April 1991 and March 1996.

³Expectational inflation data could potentially add value. Their use should be a topic for further research.

⁴Harlow [1993] finds that countries that experience upgrades in political ratings have higher equity market

returns than downgrades up to six months after the change in rating. Diamonte, Liew, and Stevens [1996] and EHV [1996b] both find that contemporaneous changes in the ICRG political rating can be used to produce significant abnormal returns in a global equity sample.

REFERENCES

- Diamonte, Robin, John M. Liew, and Ross L. Stevens. "Political Risk in Emerging and Developed Markets." *Financial Analysts Journal*, 1996, forthcoming.
- Erb, Claude B., Campbell R. Harvey, and Tadas E. Viskanta. "Expected Returns and Volatility in 135 Countries." *Journal of Portfolio Management*, Spring 1996a, pp. 46-58.
- . "Inflation and World Equity Selection." *Financial Analysts Journal*, November/December 1995, pp. 28-42.
- . "National Risk in Global Fixed-Income Allocation." *Journal of Fixed Income*, September 1994, pp. 17-26.
- . "Political Risk, Financial Risk and Economic Risk." *Financial Analysts Journal*, 1996b, forthcoming.
- Ferson, Wayne E., and Campbell R. Harvey. "The Risk and Predictability of International Equity Returns." *Review of Financial Studies* 6, 1993, pp. 285-315.
- . "The Variation of Economic Risk Premiums." *Journal of Political Economy* 99, 1991, pp. 285-315.
- Harlow, W. Van. "Political Risk and Asset Markets." Fidelity Investments, Boston, 1993.
- Harvey, Campbell R., Bruno Solnik, and Guofu Zhou. "What Determines Expected International Asset Returns?" Working paper, Duke University, 1996.
- Ilmanen, Antti. "Time-Varying Expected Returns in International Bond Markets." *Journal of Finance* 50, pp. 481-506.
- . "When Do Bond Markets Reward Investors for Interest Rate Risk?" *Journal of Portfolio Management*, Winter 1996, pp. 52-63.