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Country Risk and International Portfolio Diversification for the Individual Investor

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Abstract

The international financial markets have not been sufficiently incorporated in the typical portfolio of an American investor, regardless of whether the portfolio is directly or indirectly managed. This paper provides reasons for looking at the international financial markets as an essential ingredient in developing a portfolio strategy, examines the risk/return profile of international portfolios, offers a model for incorporating country risk in the allocation of individual investment funds across financial markets in the world, and shows a list of options in transforming domestic into international portfolios and for hedging their risk.

JEL classification: B41

Keywords: International diversification; Country risk; Hedging; IMF; Portfolio effects

1. Introduction

The American investor typically holds an undiversified portfolio of assets consisting largely of "the house." When looking exclusively at financial assets, the portfolio often consists of a large investment in the stock of the company where the investor works. This is certainly true of the retirement portfolio. The cases of Enron, World Com, and many others showed how undiversified and, hence, exposed to unnecessary risk, the typical American investor is.

Along with holding large percentages of employer stock, Americans also tend to invest most of their remaining financial assets in domestic stocks. The lack of diversification is

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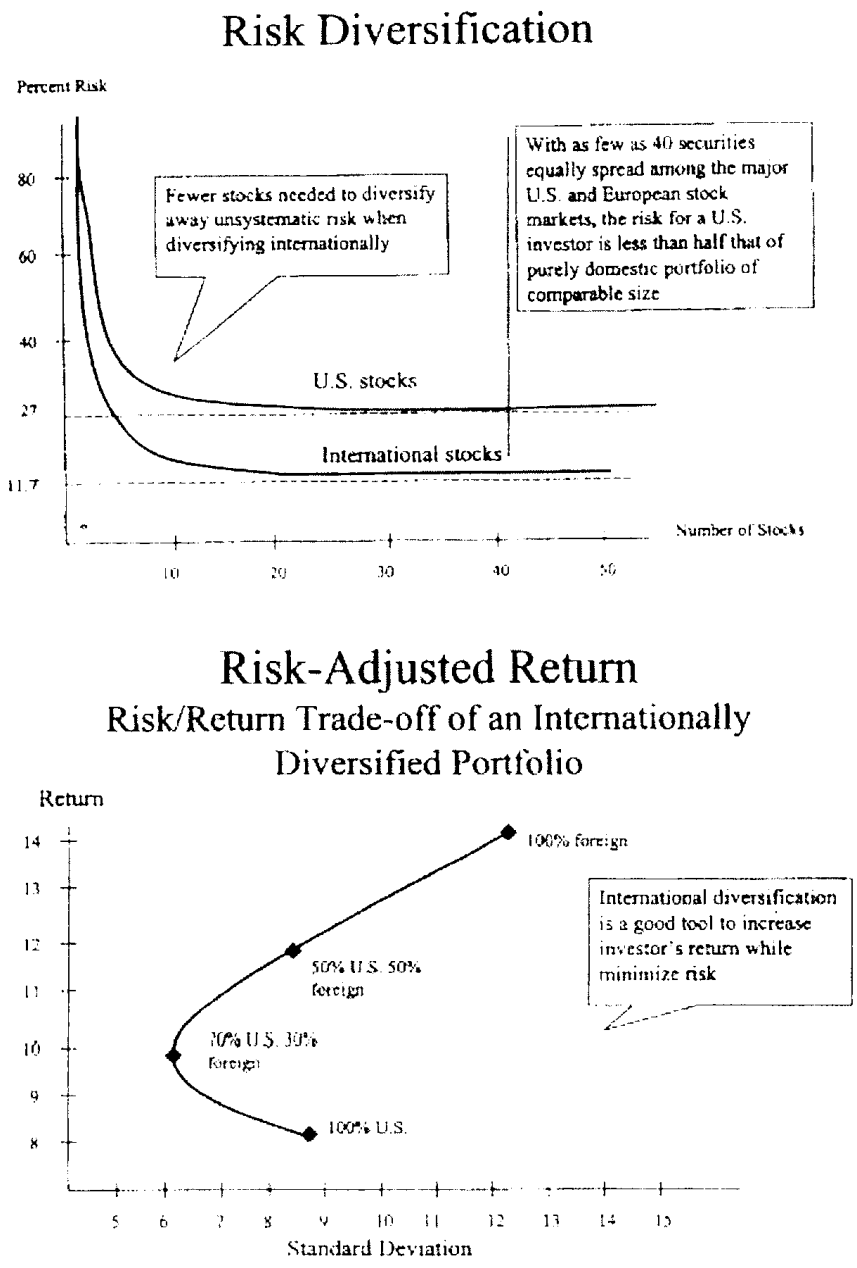

Fig. 1.

especially acute when considered from an international perspective. The recent crisis in Argentina, the default of Russia, and the South East Asia crisis have confused the individual investor and have given them the needed excuses to avoid the international markets altogether.

Solnik (1974a, 1974b) made the case for the legitimacy, the ease, and the significant advantages of international diversification. Portfolio risk is reduced significantly with the same number of international securities as opposed to domestic securities (Fig. 1). Yet the typical American investor has largely ignored the advantages of international diversification.

The payoffs from international diversification remain high, despite the increased integration of the global economy. The correlation structures across rates of returns in many countries remain low, despite rising trade and financial integration.

The professional money managers who have invested on behalf of the American investor have not gotten the message either. They continue to invest largely domestically (about 84%), whereas portfolio theory suggests a range of 40–60% for foreign securities in the typical portfolio. Many studies have tried to explain this underinvestment phenomenon, albeit without conclusive answers.

The recent performance of the U.S. stock market has led many to look to overseas investments. During 2002, the U.S. stock market had fallen by 13% as measured by the DJIA, 20% as measured by the S & P 500, and by 26.2% as measured by the NASDAQ. This is while Indonesia was realizing a 21.4% return for the same period, and Thailand a 26.9% return (Fig. 2).

Investors would pick the winning stock markets of the world (Russia, Czech Republic, and Hungary, e.g., in 2001) if they had perfect foresight. But, there is no free lunch in the financial markets. Risks, to include country risk, abound. This confirms further the need to study country risk before investing internationally.

The returns on international funds and country specific funds have also been largely higher than domestic funds in recent years. China funds have outperformed the U.S. averages in the last two years, and yet many American investors remain skeptical.

Looking at the risk measured by the variability of rates of returns, one is probably astonished that a fall in U.S. stock prices of 4% on September 4, and on subsequent dates barely made the headlines. This increased volatility and increased tolerance for it are not universal, however.

The positive aspects of international investing are typically ignored as the American investor is regularly treated to major negative surprises such as Mexico in 1994 and Argentina in 2002. All of these are considered illustrations of country risk.

The tools recommended in this paper to the typical, sophisticated investor are not significantly different from those used by professionals. We encourage the individual investor to make the choice: do your own analysis or let the "professionals" do it for you. In either case, international opportunities should not be ignored. On the contrary, they should become an integral part of the opportunity set considered by any investor, regardless of nationality.

This paper deals with country risk and how an individual investor can incorporate it in her international investment decision. We discuss the nature of country risk, the modeling problems, a method for including it in the portfolio selection model, and the direct and indirect ways for hedging it.

2. Overview of country risk

The meltdown in East Asia, in Russia, and in Latin America (partial) has compounded the concerns about systemic risk and about country risk. Country risk can exist without causing systemic failure. In fact, recent research by Khoury et al., (2002) demonstrated that systemic

MARKET INDICES- DEVELOPING COUNTRIES

	Currency units per $ Jan 15th	Currency units per $ year ago	Currency units per £ Jan 15th	Interest rates short-term % p.a.	Stockmarkets Jan 15th	% change on one week	% change on Dec 31st 2001 in local currency	% change on Dec 31st 2001 in $ terms
China	8.28	8.28	13.3	na	1,525.1	+6.4	- 10.9	- 10.9
Hong Kong	7.80	7.80	12.5	1.45	9,873.9	+1.9	- 13.4	- 13.4
India	47.9	48.3	76.9	5.39	1,357.7	nil	+ 2.9	+ 3.8
Indonesia	8,885	10,386	14,227	13.55	409.8	+4.2	+ 3.5	+ 21.4
Malaysia	3.80	3.80	6.10	3.10	648.2	+6.9	- 4.0	- 4.0
Philippines	53.5	51.3	85.8	6.75	1,075.5	+3.4	- 7.9	- 13.2
Singapore	1.73	1.83	2.78	0.81	1,586.6	+4.1	- 14.6	- 9.0
South Korea	1,173	1,311	1,883	4.74	648.3	-0.9	- 6.5	+ 4.6
Taiwan	34.4	35.0	55.2	1.70	5,017.7	+3.7	- 9.6	- 8.0
Thailand	42.7	43.9	68.5	1.87	371.8	+3.2	+ 22.4	+ 25.9
Argentina	3.23	1.89	5.18	6.40	587.0	+3.9	+ 98.1	- 38.2
Brazil	3.31	2.39	5.30	24.50	11,971.9	+1.6	- 11.9	- 38.4
Chile	715	670	1,154	2.76	9,058.8	+1.0	6.3	- 13.8
Colombia	2,911	2,257	4,673	7.70	1,689.6	+1.9	+ 57.8	+ 29.6
Mexico	10.49	9.20	16.8	8.19	6,398.9	+2.1	+ 0.4	- 12.2
Peru	3.49	3.46	5.59	3.61	1,491.7	+3.6	+ 26.9	+ 29.4
Venezuela	1,692	762	2,715	25.64	8,615.2[a]	nil	+ 22.0	- 49.4
Egypt	4.59	4.81	7.37	5.00	5,347.9	- 2.7	+ 1.4	+ 1.1
Israel	4.83	4.54	7.75	6.03	325.6	- 1.7	- 27.1	- 33.4
South Africa	8.8	11.7	14.1	13.55	5,529.8	+1.6	- 8.7	+ 24.7
Turkey	1,672,500	1,375,500	2,684,175	42.00	10,280.7	+1.2	- 25.4	- 35.1
Czech Republic	30.1	36.6	48.3	2.87	483.1	+4.1	+ 22.4	+ 44.6
Hungary	227	276	365	8.09	7,842.5	+0.4	+ 10.0	+ 36.5
Poland	3.80	4.12	6.11	6.59	15,061.8	+2.2	+ 8.2	+ 32.4
Russia	31.8	30.5	51.1	21.00	360.9	+1.7	+ 46.8	+ 38.8
EMF (MSCI)*	1.00	1.00	1.60	na	308.0	- 2.0	na	- 3.0
EM$$+	1.00	1.00	1.60	na	232.9	nil	na	+ 16.2

*Emerging Mkts Free. †J.P. Morgan Chase's Emerging Mkts Bond Index Plus. ‡In $ terms. § Nov 29th.

Sources: National statistics offices, central banks and stock exchanges; Thomson Datastream; Economist Intelligence Unit; Reuters; UBS Warburg; J.P. Morgan Chase; Hong Kong Monetary Authority; Centre for Monitoring Indian Economy; FTSE; EFG-Hermes; Bank Leumi Le Israel; Standard Bank Group; Gerard Klauer Mattison; Deutsche Bank; Russian Economic Trends.

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	Jan 15th	2002-03 high	2002-03 low	% change on one week	% change on record high	% change on Dec 31st 2001 in local currency	% change on Dec 31st 2001 in $ terms
Australia (All Ordinaries)	3,049.6	3,440.0	2,855.5	+ 0.2	- 11.3	- 9.2	+ 3.8
Austria (ATX)	1,173.4	1,557.2	1,203.7	+ 2.2	- 32.5	+ 7.9	+22.4
Belgium (Bel 20)	2,011.3	2,699.8	1,773.7	+ 1.3	45.4	-27.7	-14.0
Britain (FTSE 100)	3,887.8	5,373.8	3,671.1	- 0.9	-43.9	-25.5	-17.8
Canada (Toronto Composite)	6,801.4	7,958.1	5,695.3	+ 1.2	-40.3	-11.5	- 8.2
Denmark (KBX)	169.7	253.4	158.4	- 0.3	-43.8	-26.5	-10.2
France (SBF 250)	2,098.9	3,081.9	1,794.5	+ 1.2	-52.2	-29.6	-16.3
(CAC 40)	3,134.7	4,688.9	2,856.5	+ 1.3	-54.7	-32.2	-19.4
Germany (Xetra DAX)	3,049.4	5,462.6	2,597.9	+ 1.9	-62.2	-40.9	-29.7
Italy (BCI)	1,135.6	1,513.0	974.4	+ 1.1	-48.0	-20.8	- 5.8
Japan (Nikkei 225)	8,611.8	11,979.9	8,303.4	+ 1.1	-77.9	-18.3	- 9.2
(Topix)	855.7	1,139.4	760.1	+ 1.5	-70.3	-17.1	- 7.8
Netherlands (AEX)	330.7	551.2	291.4	+ 0.6	-52.9	-34.7	-22.4
Spain (Madrid SE)	880.1	848.1	568.5	+ 2.4	-40.7	-17.5	- 1.9
Sweden (Affarsvarlden Gen)	152.2	236.8	122.7	+ 2.8	42.9	-34.2	-20.4
Switzerland (Swiss Market)	6,860.0	8,694.1	6,435.0	- 0.5	-47.2	-24.3	- 8.0
United States (DJIA)	8,723.2	10,635.3	7,286.8	+ 1.5	-25.6	-13.0	-13.0
(S&P 500)	916.2	1,172.5	776.8	+ 0.9	-39.9	-20.9	-20.0
(NASDAQ Comp)	1,438.8	2,059.4	1,114.1	- 2.7	-71.5	-26.2	-26.2
Europe (FTSE Eurotop 300)*	869.3	1,279.7	797.2	- 0.2	-49.0	-31.1	-18.0
Euro area (FTSE Eblot 100)*	743.6	1,125.1	693.4	- 1.2	-52.0	-33.1	-20.5
World (MSCI)†	821.3	1,224.4	703.7	+ 1.5	-43.3	na	-18.2
World bond market (Salomon)‡	527.5	527.1	430.3	+ 1.1	+ 0.1	na	+20.0

*In euro terms. †Morgan Stanley Capital International World Index includes individual markets listed above plus eight others, in dollar terms. ‡Salomon Smith Barney World Government Bond Index, total return, in $ terms.

Fig. 2.

risk is largely a myth because the probability of systemic failure is practically zero under all conceivable circumstances. A physical model was used to "prove" the hypotheses of the model. This does not imply, however, that the country risk under discussion in this paper does not produce limited systemic risk, but rather that the nature of the systemic risk generated by a financial collapse, for example, reflects itself in a burst of the asset price bubble and/or in a significant reduction of liquidity. This was referred to by Bordo et al., (1995) as "pseudo systemic risk."

Country risk is the likelihood of a financial loss generated by macroeconomic, political, social, and/or natural disasters within a given country. It is produced, therefore, by natural or by manufactured (mismanagement) factors. Country risk is focused on the value of assets (portfolio and direct investment related) held by foreign entities within the country under examination, and is broader than sovereign risk. The latter deals with the inability of a sovereign borrower to pay back its debts to foreigners. The most recent suspension of payments on Russian debt is an example of sovereign risk, as were the suspensions of payments by a large number of countries in the early 1980s. The repudiation of debt by a sovereign country is the ultimate form of sovereign risk, as was the case of Cuba. The risk in all the cases may stem either from the country's or the country's institutions' inability to pay its debts under current conditions, or simply from its unwillingness to pay. The risk includes the inability of a privately owned firm to pay its debts as a result of economic setbacks in the home country.

The most often used definition of country risk is that of transfer risk (restriction on capital transfers and on currency convertibility). In the wake of the Asian crisis, default risk by private entities caused by macroeconomic conditions has been added to the concerns of a typical international banker.

3. A perspective on country risk models

The developments of 1997–1998, which followed the very critical developments in Mexico in 1994/1995 and the accompanying Tequila effects have heightened the need for rigorous models capable of generating a probability function for the estimation of country risk under various states of the world. This allows the lender to assess the risk and impose, consequently, a justifiable risk premium.

The uniqueness of the events of the late 1990s lies in the unexpected explosion in country risk outside any reasonable range that could have been incorporated in any analysis. The jump in riskiness of governments and institutions required dramatic actions by governments of developed countries, notably the United States, and by the IMF. A huge political controversy ensued in the United States as a result of the campaign by the Clinton administration to meet the commitment made to the IMF. The $18 billion commitment was finally approved in late 1998 as part of the budget deal, not without considerable rancor and acrimony. The critics argued that the IMF has not only wasted over $170 billion in loans, but also generated the necessary conditions for moral hazard. The latest $5 billion commitment to Russia in 1998 and the way it was squandered were used as the cause celebre. President Clinton got the G7 countries to agree to a new "reserve fund" to prevent country crises from

occurring. This will ultimately result in more regulations in the financial markets. The October 4, 1998 meeting of the G7 countries in Washington, D.C. called for, among other things, ". . . promotion of soundly based capital flows. . . . improved regulatory focus. . . stronger supervisory and regulatory regimes. . . sustainable exchange rate regimes in emerging market economies.. better transparency and disclosure." How all of this will be achieved and who will be responsible for it remains unclear, however.

All the activism by governments and the IMF has not diminished the call for better models to deal with country risk. The IMF internal models, interestingly, have failed to accurately predict many a crisis, however

4. Recent studies on country risk

A survey by the Export-import bank classified country risk models into four categories:

- Fully qualitative
- Structured qualitative with some statistical data
- Structured qualitative plus checklist qualitative with some quantitative techniques added
- Econometric approach—highly structured and mathematically based. An example of this is the Logit model, which predicts the probability of default.

The best known of the qualitative models is that offered periodically to the readers of Euromoney. It develops categories of factors to include sociological, political, and economic factors. Each category has a maximum score and a weight in the overall development of a country risk index. The weighted results are tabulated and a rank ordering from the highest (the best) to the lower score is reported. The last rankings available (Fig. 3) showed the tiny country of Luxembourg in the lead: the least risky. We now review other country risk models.

Under the broad title of "country risk analysis," numerous approaches to measuring country risk are used but many of the underlying concepts overlap, and the various methods often lead to the same conclusions. Each study developed the determinants of sovereign default, or measured the riskiness of a security or a loan or an asset in a foreign county. Some models look at the possibility of default by a country or a governmental unit, and others look at default on a specific instrument.

A simple, and well-known, approach to a country specific systematic risk is the Capital Asset Pricing Model developed by Sharpe (1964), Lintner (1965), and Black (1972). The original formulation defined systematic risk as the contribution to the variance of a well-diversified market portfolio (the beta). The market portfolio in these studies was assumed to be the U.S. market portfolio. The essence of these studies is that the beta approach has some merit when applied in developed markets. Betas, whether measured against a single factor or against multiple world sources of risk, appear to have less than convincing ability to discriminate between expected returns from different assets or financial markets.

Country Risk:

COUNTRY RISK RANKING BY EUROMONEY (SEPT 1998)

Rank Sept 98	Dec 97	Change Sept-Dec		Total score	Political risk	Economic performance	Debt indicators	Debt in default or rescheduled	Credit ratings	Access to bank finance	Access to short-term finance	Access to capital markets	Discount on forfaiting
			Weighting	100	25	25	10	10	10	5	5	5	5
1	2	1	Luxembourg	98.9	24.76	25	10	10	10	5	5	5	4.14
2	1	-1	United States	97.85	24.97	22.88	10	10	10	5	5	5	5
3	6	3	Germany	97.06	24.89	22.21	10	10	10	5	5	5	4.96
4	3	-1	Netherlands	96.92	24.84	22.57	10	10	10	5	5	5	4.5
5	10	5	Austria	96.79	24.19	22.65	10	10	10	5	5	5	4.95
6	7	1	Switzerland	96.43	25	21.45	10	10	10	5	5	5	4.99
7	11	4	France	95.87	24.22	21.69	10	10	10	5	5	5	4.96
8	4	-4	Norway	95.83	22.91	23.03	10	10	10	5	5	5	4.89
9	5	-4	United Kingdom	95.01	25	20.04	10	10	10	5	5	5	4.97
10	12	2	Ireland	94.87	23.02	22.61	10	10	9.57	5	5	5	4.68
11	13	2	Finland	94.52	22.54	22.47	10	10	9.57	5	5	5	4.93
12	14	2	Belgium	94.25	23.72	21.01	10	10	9.57	5	5	5	4.95
13	15	2	Sweden	93.39	23.25	21.49	10	10	8.72	5	5	5	4.93
14	8	-6	Canada	93.02	22.98	21.21	10	10	8.94	5	5	5	4.89
15	19	4	Spain	92.01	22.24	21.33	10	10	9.15	5	4.64	5	4.64
16	20	4	New Zealand	91.34	22.23	19.66	10	10	9.36	5	5	5	4.89
17	22	5	Italy	91.1	21.66	20.57	10	10	8.94	5	5	5	4.93
18	17	-1	Australia	90.91	22.6	20.51	10	10	8.72	5	5	5	4.07
19	21	2	Portugal	90.73	21.76	21.34	10	10	8.94	5	4.64	5	4.04
20	9	-11	Denmark	89.67	23.74	21.91	10	10	9.36	5	5	0	4.66
21	16	-5	Singapore	89.17	23.29	19.24	10	10	9.68	5	4.64	4.3	3.02
22	24	2	Iceland	89.03	21.38	21.17	10	10	7.77	5	4.64	5	4.07
23	18	-5	Japan	88.02	23.39	15.85	10	10	10	5	5	5	3.79
24	23	-1	Taiwan	86.49	22.28	19.52	10	10	8.72	5	4.64	3.3	3.02
25	26	1	Cyprus	81.92	18.69	18.22	10	10	7.45	5	4.64	5	2.92

Fig. 3.

The standard, basic model is:

$$Cost\ of\ equity = r_f + \text{equity Beta} * (E(R_m) - r_f) \quad (1)$$

where R_f = risk-free rate, $E(R_m)$ = expected return on the market index (diversified portfolio), assuming that the world financial markets are segmented. Should the world financial markets be considered as integrated, the $E(R_m)$ would be on a world index and R_f would reduce to the risk-free real rate of return.

The Goldman Model is another application of the CAPM to individual stocks in emerging markets. When regressing the company return (measured in U.S. dollars) on the benchmark return (either U.S. portfolio or the world portfolio), the beta is either indistinguishable from zero or negative, however. Given the correlations between many of the emerging markets and the developed markets are low and given the evidence in Harvey (1995a, 1995b), it is no surprise that the regression coefficient (betas) are small. The implication is that the cost of capital for many emerging markets is the U.S. risk-free rate or lower. This of course, is a problematic conclusion. Importantly, the fitted cost of capital is contingent on the market examined being completely integrated into the world capital markets. If this is not the case, then one has reason not to put much faith in the fitted cost of capital from the CAPM.

A popular modification is used by a number of prominent investment banks and consulting

firms. A regression is run of the individual stock return on the Standard & Poor's 500 stock price index return. The beta is multiplied by the expected premium on the S & P 500 stock index. Finally, an additional "factor" is added that is sometimes called the "country spread," which is the spread between the country's government bond yield for bonds denominated in U.S. dollars and the U.S. Treasury bond yield. The bond spread serves to increase an "unreasonably low" cost of capital into a number more palpable to investment managers.

Hauptman and Natella (1997) proposed the CSFB model for the cost of equity in Latin America. Their model is hard to fully justify. Consider the equation:

$$E[r_i] = Rf_i + \text{Beta}_i \{E[r_{US} - RF_{US}] * A_i\} * K_i \quad (2)$$

where $E[r_i]$ is the expected cost of capital; Rf_i is the stripped yield of a Brady bond, Beta_i is the covariance of a particular stock with the broad-based local market index, $E[r_{US} - RF_{US}]$ is the U.S. risk premium, A_i is the coefficient of variation in the local market divided by the coefficient of variation of the U.S. market (where coefficient of variation is the standard deviation divided by the mean), and K_i is an adjustment factor to allow for the "interdependence between the risk-free rate and the equity risk premium." In their application, Hauptman and Natella assume that $K = .60$. One can see why this is hard to explain. It has some similarity to the CAPM if we ignore the A and the K. However, the beta is measured against the local market return and the beta is multiplied by the risk premium on the U.S. market.

Ibbotson offers a number of different models to its customers. One early model was a hybrid of the world capital asset pricing model. The security's return minus the risk-free rate is regressed on the world market portfolio return minus the risk-free rate. The beta times the expected risk premium is calculated. An additional factor is also included. In this model, the additional factor is one half the value of the intercept in the regression. Half the value of the intercept plays a similar role to country spread in the previous model. The beta times the expected risk premium is "too low" to have credibility. When the intercept is added, this increased the fitted cost of capital to a more reasonable level.

Damodaran (1999) offers a novel approach to estimating the equity risk premium in emerging markets outside the general framework of the CAPM. His formula is:

$$\textit{Country equity premium} = \textit{sovereign yield spread}_i \times (\sigma_i\text{equity}/\sigma_i\text{bonds}) \quad (3)$$

In contrast to the model that just additively includes the sovereign yield spread, this model modifies the spread by multiplying by the ratio of equity to bond return volatility. For this model to be operational, a country needs an equity market and a U.S. dollar sovereign bond market.

A broader approach is needed. The essence of the Balkan model (1992, 1995), and of the Khoury and Zhou (2003) models we present below. The risk premium models could be used to supplant these models and make for a comprehensive country risk management system. We start with the Balkan model.

5. New modeling approaches

There are many quantitative approaches (e.g., Sachs (1983), Sachs et al., (1995), Balkan (1995) to the measurement of country risk. We believe that the most effective method uses the probit model, allowing for the contagion effects and for jump risk and currency risk. Balkan made a strong case for it, assuming independence of default risk between countries. Khoury and Zhou (2003) added jumps in currency risk, as well as contagion risk to the Balkan model. This is shown in the Appendix.

Balkan demonstrated the efficacy of the probit model in the prediction of country risk. Khoury and Zhou improved on the predictive power of the model.

Balkan developed a "probit" model, which estimates the default probabilities of sovereign countries based on a series of economic and political factors. Probit models are based on underlying quantitative variables and use the cumulative normal distribution. Logit models, by contrast, rely on qualitative variables and use binomial distributions. Although the two models typically yield the same results, probit models are easier to track and to interpret.

Balkan argued that country risk stems from both political and economic factors. Economic circumstances like current account deficits and economic downturns may create solvency problems for the borrowing country, whereas political turmoil may endanger debt repayment despite the country's ability to cover its payments.

The probit model was utilized to predict the likelihood of default of a nation in a given year. It is assumed that the probability of default is P_d is related to a vector of economic and political variables. The function that P_d follows is:

$$P_d = F(Z) = \frac{1}{(2\pi)^{1/2}} \int_{-\infty}^{Z} \exp(-u^2/2\_du = N(Z)$$

where $N(.)$ denotes the cumulative distribution function of the standard normal distribution and Z is a linear combination of the X_i:

$$Z = F^{-1}(P_d) = \alpha + \beta_i X_i \tag{4}$$

The value of Z in the preceding equation is a linear function of the exogenous variables X_i, but its rate of change is not constant. The coefficient β determines the direction in which each X_i will affect the default probability. The independent variables chosen may be divided in two categories: economic and political. The desire to meet the obligations is assumed to be explained in the political variables. Most variables were shown to be statistically significant by prior research.

The Balkan rankings were then compared with those of *The Institutional Investor* and *Euromoney*. In all cases, it was shown that the model's prediction is significantly better than the rankings given by these two publications.

We now look at a new model that extends and improves the Balkan model.

6. Summary of the Zhou/Khoury country risk model

Based on previous research results and our analysis, we believe that the following adjusted probit model is a more comprehensive model of country risk. The points marked with a star (*) are added by the author of this paper.

- Economic indicators—debt service capacity
- Debt service
- Reserves/imports
- Imports/gnp
- Amortization rate
- Interest/exports
- Debt outstanding/gnp
- Export growth
- GNP growth rate
- Current account deficit/exports
- Domestic saving/gnp
- OECD growth rate
- * Economic indicators—currency/financial crisis index
- * Seignorage
- * Real exchange rate misalignment
- * Soundness of banking system
- * Conditional volatility and/or jump probability in exchange rates. (This variable is related to the above economic variables.)

- Political indicators
- Democracy index
- Political instability variables

The Khoury/Zhou model is summarized in the Appendix. It deals with traditional economic and political variables and adds important dimensions to the traditional models: the contagion effect, and the effects of currency risk and jump risk in the currency markets. The contagion effects are incorporated in the model by letting the residual terms be correlated and governed by a factor model, and the jump and currency risk are incorporated in the probit model by assuming that exchange rates follow a jump-diffusion process.

Armed with the probability of country risk for a set of relevant countries, the investor would proceed in incorporating them in a portfolio allocation model. This will yield the modified weights for investing in each country selected by the investor.

7. Toward an integrated portfolio selection model

The representative investor is assumed to be a utility maximizer. His utility function reflects the trade-off between expected portfolio returns $\mu_p^2 = w'\Sigma w$ where w represents a vector of portfolio weights, u represents a vector of expected returns on all assets, and

represents the covariance matrix of returns. With normally distributed rates of return, and assuming constant absolute risk aversion, the investor's objective is to maximize:

$$U(w|\mu, \Sigma) = U(\mu_p - (1/2\lambda)\mu_p^2$$

where λ is the investor's risk tolerance ($\lambda > 0$), or the inverse of risk aversion.

The main assumptions of the model are as follows:

1. Risk-averse investors are expected utility maximizers
2. Asset returns are normally distributed
3. Inflation rates are nonrandom.
4. Perfect capital markets with short sales allowed; no transactions costs and no barriers to capital flows

From a derived mean-variance utility function, one can develop a portfolio (global) optimization model yielding those optimal weights for each country under consideration.

The mathematical representation of the portfolio optimization model is:

Minimize:

$$\sigma_p^2 = \sum_{i=1}^{n} w_i^2\sigma_i^2 + \sum\sum_{i=1, j\neq 1}^{n \quad n} w_i w_j \sigma_{ij}$$

Subject to: $\Sigma_i w_i = 1$,

$$\overline{R}_p = \sum_{i=1}^{n} wi\overline{R}i$$

and $w_i \geq 0$, for all $i = 1, 2, 3, \ldots\ldots, n$.

Assume that the probability of default (P) is nonzero. Assume that the recovery percentage is $= \delta$: $\delta \leq 1$.

Consider an asset with the following:

$\tilde{r}$ = assetreturn

$E(\tilde{r}) = r$

and

Variance $(\tilde{r}) = \sigma^2$.

Incorporating default, the default adjusted return $\tilde{r}_D$, will be as follows:

$$\tilde{r}_D \begin{cases} (1 - P) \rightarrow \tilde{r} & \{E(\tilde{r}) = r, \text{var}(\tilde{r}) = \sigma^2\} \\ P \rightarrow \delta - 1 < 0 & \left[\dfrac{SP - P}{P}\right] \end{cases}$$

We now can find $E(\tilde{r})$, $\sigma_D^2 = \text{var}(\tilde{r}_D)$ as follows:

$$E(\tilde{r}_D) = (1 - P)r + P(\delta - 1) = r_D$$

$$\text{var}(\tilde{r}_D) = \sigma_D^2 = E(\tilde{r}_D^2) - (E(\tilde{r}_D))^2 =$$

$$(1 - P)\,E(\tilde{r}^2) + P(\delta - 1)^2 - r_D^2 =$$

$$(1 - P(\sigma^2 + r^2) + P(\delta - 1)^2 - [(1 - P \cdot r + P(\delta - 1)]^2 \qquad (5)$$

If $P = 0$, then we have the return and the variance of a security with no country risk.

The application of this modified portfolio allocation model will yield the weights for assets allocation by the individual investor across countries.

8. Investing internationally by an individual

Armed with the risk-measurement tools detailed above and with the requisite adjustments for country risk to the standard portfolio selection model. The individual investor can develop a homemade portfolio, but has many other options. The array of possibilities include:

1. Buying a share in a multinational company (MNC) headquartered in the home country or in a foreign country. Figure 4 shows the top 12 global companies in the world and the location of their headquarters. MNCs can be viewed as diversifiers of portfolios on behalf of their shareholders.
2. Purchase equity-linked eurobonds or other convertible bonds. These bonds are basically eurobonds with warrants, or convertible eurobonds. These bonds are sensitive to both interest-rate changes and to changes in the underlying value of the stock.
3. Invest in a country mutual fund, typically a closed-end fund. A group of these funds is also an option. It can be selected systematically or randomly. Figure 5 shows the top 10 country funds in the world. These funds can be purchased just as easily as any stock in the United States.
4. Buying shares in internationally diversified funds. The top and bottom 10 performers are listed in Figure 5. These funds are well diversified across countries and across sectors.
5. Perform some homemade portfolio diversification. Here the investor picks whatever stock, from whatever sector, and from whatever country she wishes. The intent is to be at least on the international efficiency frontier or, preferably, above it. Foreign stocks may be purchased directly or through American depository receipts. The latter are traded in the local currency and are backed by the stocks of the issuing company to collateralize their issuance. The cross-listing of stocks across exchanges all over the world (GM is listed, e.g., on the NYSE, the London Stock Exchange, and the Tokyo Stock Exchange) facilitate trading in any currency and at any time. It allows certain stocks to span the 24-hour time zone with the ability to buy on one exchange and sell on another.

ANK	SALES RANK	COMPANY/INDUSTRY	COUNTRY	REVS ($MIL)	% CHANGE	NET INC ($MIL)	% CHANGE	ASSETS ($MIL)	MARKE CAP ($M
1	10	Citigroup / finance	US	112,022	0	14,284	6	1,051,450	22
		Controls more than 11% of global debt and equity underwriting.							
2	8	General Electric / multi-industry	US	126,913	-3	14,128	11	495,023	30
		Lost Jack Welch and a third of its market value.							
3	31	American Intl Group / insurance	US	62,510	36	5,499	-2	492,982	17
		Who will fill CEO Greenberg's shoes when he retires?							
4	2	ExxonMobil / oil & gas	US	187,510	-9	15,105	-6	143,174	27
		Processes more than 6 million barrels of crude a day.							
5	44	Bank of America / banking	US	53,116	-8	6,792	-10	621,764	11
		America's first coast-to-coast bank.							
6	4	BP / oil & gas	UK	174,218	18	8,010	-33	141,158	19
		Taking a chance on Russia, again.							
7	57	HSBC Group / banking	UK	47,710	-4	5,406	-18	695,147	11
		Now spreading its roots in China.							
8	50	Royal Dutch Shell / oil & gas	NE/UK	135,211	-9	10,852	-15	111,543	192,
		Shell is one of the most widely recognized brands; did its big merger in 1907.							
8	7	Fannie Mae / finance	US	50,803	15	6,067	37	799,791	7
		Has a hand in the financing of one in five U.S. home mortgages.							
10	19	ING Group / finance	NE	82,983	17	4,096	-63	620,120	5
		Still digesting $16 billion in U.S. acquisitions.							
11	1	Wal-Mart Stores / retail	US	217,799	14	6,671	6	83,375	24
		What recession? The world's biggest retailer is still growing.							
12	9	Toyota Motor / automobiles	JA	120,731	-1	4,922	15	145,824	9
		Doesn't have GM's sales, but GM doesn't have Toyota's profits.							

Source: Forbes Magazine

Fig. 4.

6. Place a certain amount of money with a private banker who will then place it internationally in a way consistent with your risk profile. This is a privatized form of professional management, and it can be costly.
7. Avoid international diversification by country altogether. The investor would simply diversify by sector and forget about country-related risk. The argument here is that industry forces, and not national forces, drive returns. The argument here is that industry-based diversification is a substitute for a country-based one. This is only partially the case, because there is more dispersion of returns from industry to industry than from country to country. Despite increased correlation across countries as a result of the integration of the world financial markets, country-base diversification remains an effective option; the correlation structures are far from perfect.

Choosing among these options would depend on the resources of the investor, on her knowledge base, on her willingness to spend time on research, and on the substitutability of one option for another.

A review of the current research suggests that some of the options above are substitutes, albeit imperfect ones. Errunza et al., (1999) provided strong evidence that gains beyond homemade diversification have become statistically and economically insignificant. Wright

and McCarthy (2002) found that investment in MNCs does not appear to provide international diversification benefits to Australian shareholders.

Russell (1998) found that the foreign U.S. listed securities "do not perform an international diversification role for U.S. investors." Direct investment in foreign equity was shown to be superior. Mishra and Gobeli (1998) found that greater multinationality "does not correlate to a significantly greater value." Lang and Stulz (1994) confirm this evidence. They found no evidence that companies that choose to diversify are "poor performers relative to firms that do not. We find no evidence that diversification provides firms with a valuable intangible asset." Bartram and Dufey (2001) found "weak evidence that U.S. multinationals provided global diversification benefits in the full 1984–1992 sample and in the post-1987 sample."

It can be said, in conclusion, that the evidence thus far seems to confirm that MNCs are not even close substitute for homemade diversification. The investor is advised to choose funds or to invest directly in foreign securities while remaining cognizant of the fact that he needs to worry about risks due to information quality, exchange rates, liquidity, and so forth.

Solnik (1998) addressed the issue of exchange risk. He found it to be significant, and "a critical component of the tactical asset allocation strategies and security valuation analysis." Currency risk is managed, typically, separately from traditional portfolio risk management

We now look at mechanisms for hedging international portfolio risk.

9. Hedging country risk

There are direct and indirect ways for investors to hedge partially or totally the risk of their international portfolios.

9.1. Direct hedging mechanisms

There are a few direct ways for an investor to hedge against portfolio risk (independent of source) or a specific asset risk in a portfolio. These are:

1. Using derivative contracts such as options and futures on a specific stock or on a market index in order to limit risk or eliminate it altogether. Derivative assets are an excellent vehicle for achieving any risk/return profile for any investor.
2. Diversify across countries, especially those that have low levels of correlations across their stock market returns. Additional diversification across asset groups and sectors will further reduce risk. One should keep in mind that the average international stock fund has a 66% correlation with the S & P 500.
3. Abandon countries where governments are in constant crises and where the penchant of the government to interfere in the operations of the financial, goods, and foreign exchange markets is strong indeed. One should note in this regard that there has been a well-established historical positive relationship between the level of democracy and economic performance.
4. Do more portfolio rebalancing than usual, especially when the world economy is softer than its historic average. Note also that globalization did not eliminate the local factors

Fund	Weekly Statistics (as of 1/10/2003)			Daily Statistics (as of 1/16/2003)			52-wk Market Return(%)
	NAV	Mkt Price	Prem/ Disc %	NAV	Mkt Price	Prem/ Disc %	
Aberdeen Australia Eqty (IAF)	7.03	6.30	-10.38	7.15	6.26	-12.45	15.19
Asia Pacific Fund (APB)	10.25	9.16	-10.63	10.45	9.55	-8.61	0.22
Asia Tigers Fund (GRR)	7.85	7.10	-9.55	N/A	7.13	N/A	-4.05
Brazil Fund (BZF)	14.58	12.58	-13.72	14.39	12.40	-13.83	-12.20
Brazilian Equity Fund (BZL)	4.06	3.76	-7.39	3.99	3.77	-5.51	-13.76
Canadian Gen Invmnts Ltd (CGI) [x]	12.56	8.62	-31.37	12.67	8.65	-31.73	-5.64
Canadian Wrld Fund Ltd (CWF) [cy]	3.83	2.70	-29.50	3.76	3.00	-20.21	-14.56
Central European Equity (CEE)	17.27	14.80	-14.30	17.46	15.03	-13.92	14.73
Chile Fund (CH)	8.59	7.63	-11.18	8.46	7.62	-9.93	-8.36
China Fund (CHN)	16.97	14.62	-13.85	N/A	15.10	N/A	16.29
Economic Invmnt Tr Ltd (EVT) [cy]	62.03	41.00	-33.90	N/A	40.50	N/A	-4.08
Emerging Mkts Telecomm (ETF)	7.05	5.86	-16.88	7.15	6.03	-15.66	-17.23
Europe Fund (EF)	8.36	7.38	-11.72	8.31	7.35	-11.55	-21.73
European Warrant Fund (EWF) [c]	2.55	2.24	-12.16	N/A	2.25	N/A	-48.51
First Israel Fund (ISL)	9.65	7.70	-20.21	9.58	7.56	-21.09	-27.62
First Philippine Fund (FPF)	2.75	2.34	-14.91	N/A	2.38	N/A	-15.22
France Growth Fund (FRF)	6.80	5.81	-14.56	6.76	5.84	-13.61	-22.01
Germany Fund (GER)	5.54	4.93	-11.01	5.61	4.88	-13.01	-33.24
Greater China Fund (GCH)	10.74	9.33	-13.13	N/A	9.50	N/A	6.02
Herzfeld Caribbean Basin (CUBA)	3.51	3.30	-5.98	3.52	3.16	-10.23	-5.60
India Fund (IFN)	12.63	10.72	-15.12	N/A	10.95	N/A	9.49
India Growth Fund (IGF) [d]	10.45	10.03	-4.02	N/A	10.10	N/A	19.98
Indonesia Fund (IF)	1.98	1.65	-16.67	1.98	1.60	-19.19	25.00
Italy Fund (ITA)	7.10	6.83	-3.80	7.09	6.87	-3.10	8.58
Japan Equity Fund (JEQ) [c]	4.61	4.54	-1.52	N/A	4.54	N/A	-4.62
Japan Small Cap (JOF)	5.77	6.42	+11.27	5.87	6.62	12.78	12.63
Jardine Fleming China (JFC)	8.10	6.80	-16.05	N/A	7.16	N/A	4.62
Jardine Fleming India (JFI) [c]	9.11	8.13	-10.76	N/A	8.06	N/A	5.58

Source: The Wall Street Journal

Top 10 International Funds (ranked by one-year performance)

	Assets	Returns			
	(In Millions)	1 YR	3 YR	5 YR	YTD
First Eagle SoGen:Os;A	840.0	14.07	30.42	75.15	1.95
MFS Vertex Intl;A	1.6	3.40	N/A	N/A	0.93
Forester:Discovery Fd	1.0	1.64	10.84	N/A	0.00
Quant:Foreign Val;Instl	1.0	0.49	-7.07	N/A	2.49
GMO:Intl Intrinsic;III	838.7	0.40	-11.91	14.45	0.54
Quant:Foreign Val;Shs	32.0	0.23	-8.80	N/A	2.50
Fidelity Canada	79.1	-0.10	5.77	24.86	2.59
AllianceBern:I Val;Adv	325.4	-0.14	N/A	N/A	2.29
GMO:Intl Eqty All;III	100.9	-1.14	-10.75	16.54	1.18
GMO:Tax-Mgd Intl Eq;III	97.7	-1.37	-12.18	N/A	0.77

Bottom 10 International Funds (ranked by one-year performance)

	Assets	Returns			
	(In Millions)	1 YR	3 YR	5 YR	YTD
Drey/Founders:Itl Eq;A	20.7	-25.98	-53.99	N/A	1.95
Ivy:Intl Growth;Adv	0.3	-26.37	N/A	N/A	2.34
Oppenheimer Intl Gro;A	360.1	-26.71	-44.81	-11.03	1.37
Sit International Growth	52.9	-27.52	-61.34	-36.32	2.39
ING:Intl Gro;A	38.6	-27.99	-55.23	-26.21	2.03
Simms:Intl Equity	21.4	-28.86	-51.46	N/A	0.32
MassMutual Inst:Intl;S	493.0	-29.63	-47.65	-17.64	1.25
Eaton Vance TM In Gr;B	30.9	-30.47	-60.13	N/A	1.54
Sm Barney Intl Ag Gr;B	46.2	-30.54	-66.31	-16.04	1.51
AMIDEX:35 Mutual Fd;NL	5.2	-40.27	-55.32	N/A	3.37

Source: DOW JONES NEWSWIRES

Fig. 5. World Equity Funds.

in determining the performance of a stock. In fact, domestic factors account for more than 50% of the riskiness of the stock.

5. If all fails or if it all overwhelms you, invest in a country fund, or in a group of country funds, or in a well-diversified international fund. One simply cannot purchase insurance against portfolio risk.

We now look at the various indirect ways that can reduce international portfolio risk.

9.2. *Indirect hedging methods*

An investor should consider not only the risk profile of a company, but its flexibility in dealing with international risk.

A company with a well-integrated investment process will be able to promptly adjust to changes in the market place as new information flows in.

Many companies have developed internal quasi-insurance schemes or purchased explicit insurance programs in order to mitigate international risk. An individual investor developing a homemade portfolio should be able to identify such companies.

We look at some of the major techniques using by companies to reduce international risk:

1. Matching assets in a given country with liabilities in the same currency. This allows, for example, the debtor to refuse payment unless the assets are unfrozen. There are other cash-management techniques that can be deployed in this regard as well.
2. Buying insurance through various agencies of federal governments. In the United States this is achieved through entities like the Overseas Private Investment Corporation (OPIC). The insurance applies to both direct investment and to portfolio investment.

OPIC is a self-supporting U.S. federal agency that sells investment services to small-, medium-, and large-size American businesses with operations practically anywhere in the world. Since 1971, OPIC has supported $121 billion worth of investments. OPIC insurance covers the following type of risks: currency inconvertibility, expropriation, political violence, and a range of special insurance programs. The insurance covers up to $200 million in project size. There is no minimum size investment requirement. With regard to financial transactions, OPIC covers bank loans, capital market transactions, cross-border leases, debt-to-equity investments, commodities price or interest-rate swaps, and gold loans. The currency inconvertibility coverage, for example, may insure earnings, returns on capital, principal and interest payments, technical assistance fees, and similar remittances.

The premium charged by OPIC is based on the active amount "which represents the insurance actually in force during any contract period." The amount cannot fall below the book value of the investment. The annual premiums are based on $100 of coverage. The latest premiums disclosed are: $0.30 for currency inconvertibility, $0.60 for expropriation, $0.45 for business income denied because of political violence.

Thousands of U.S. businesses have taken advantage of these insurance programs. Those eligible to purchase OPIC insurance are: "citizens of the United States; corporations, partnerships and other associations created under the laws of the United States, its states or territories; and

beneficially owned by US citizens, foreign corporations at least 95% owned by investors eligible under the above criteria, and other foreign entities that are 100% US owned."

The program is decidedly oriented to American individuals and firms. The EU has a similar program, as does Japan.

3. Focusing on countries that allow for unlimited capital flows and ownership by foreigners. All the dramatic actions that could have been taken by Estonia to undermine and irritate foreign investors in the wake of massive bank failures were avoided when Estonia allowed (contrary to the typical behavior of developing countries in difficulties) foreign investors to take over, essentially, the banking sector (foreigners own 80% of the banking sector in Estonia). The lesson here is that a country that has considerable foreign investment is more unlikely to act irrationally. Significant FDI acts, therefore, as a deterrent, and effectively as a form of insurance. One may not wish to be the only firm, or one of the very few foreign investors in a country, especially in an emerging market.
4. Implicit insurance. There has been significant and potent literature on how the IMF, for example, has acted as an "insurer," for foreign investors. Providing financial assistance and loans allow the investors considerable, if not complete, protection against certain actions by host countries. This "bail out" mechanism clearly allows those who otherwise will suffer major losses the necessary time to liquidate, or to assess the potential of their investment in light of the lifeline offered by the IMF and other world organizations. The 'conditionalities" that typically accompany the loans serve as constraints on irrational behavior, and have, on occasions, paved the way to appropriate economic policy targets and instruments by recipient countries.

The United States has also provided several rescue packages for many a country as well. These helped investors reduce their losses or eliminate them altogether. The $37 billion loan provided by the U.S. government to Mexico (which was dismissed earlier) in the wake of the Mexican crisis of 1994 reduced the portfolio risk of foreign investors in Mexico, and protected most of their rates of return.

Similarly, debt-restructuring mechanisms achieve the same objectives. The Brady bonds provided a floor of sort (in terms of foreign exchange risk) on Latin American debt, and allowed for the full backing of the United States to stand behind the principal on the bonds.

The changing role of the IMF since its inception in 1944 turned it into a major player in the resolution of major debt crises particularly in major economies. It was calculated that at one point the IMF was managing or directing the management of economies that influenced the livelihoods of over 500 million individuals. It is no wonder, therefore, that the efficacy of IMF strategies, and the consistency of its actions will come under scrutiny, especially when the long-term effects of IMF policies on economic performance are being examined.

The IMF has effectively acted as a lender of last resort, often at a great cost to the recipient country in terms of distorted incentive systems and considerable moral hazard, and a fall in the standards of living. The latest action by the IMF to deal with the financial crisis in Argentina in 2003 does not give much solace to current and perspective investors in Argentina. The *Wall Street Journal* reported on the January 16, 2003 that the IMF was attempting a self-rescue by borrowing $1 billion in order to send "at least $5 billion to Argentina" so that Argentina "can pay back" debts due to IMF, the World Bank, and the Inter

American Development Bank. This merry-go-round allows the IMF to establish that Argentina did not "default" on its debt.

Sebastian Edwards (1989) likened the actions of the IMF in Latin America to a participation "in a big charade." Rudi Dornbusch (1995) referring to the same region noted that "the IMF set itself up to save the system, organizing banks into a lender's cartel and holding the debtor countries up for a classical mugging." Anna Schwartz (1999) argued that "the intervention of the official players has prolonged and worsened the debt problem." Ian Vasquez (1998) writing for the Cato Institute concluded that:

"The rise of IMF lending and crisis mediation since the early 1980s reflects, in large part, the development of a dysfunctional relationship between lenders and borrowers in international finance. Repairing that relationship requires that moral hazard be reduced and that crisis prevention and management be more effective. The IMF's new initiatives to deal with crises, however, are likely to be ineffective. An approach based on greater reliance on two-party negotiations holds more promise in stabilizing the international financial system than the current approach, in which the IMF too often becomes a burdensome third party."

Fratianni and Pattison (2002) in their paper "The Bank of International Settlement as a Crisis Manager" found that the record of the IMF is mixed indeed. They argued that the IMFs role has been seriously tarnished by the Asian crisis. Fratianni and Pattison discussed the effectiveness of the IMF by relevant region and country. They recommend that reliance on direct creditor–debtor negotiations would eliminate many of the conflicts now facing the IMF. They deplored the moral hazard that is inherent in IMF policies across the globe.

10. Other quasi-insurance programs

Other forms of indirect insurance are reflected in a new and strong domestic economic policy, strong signals from the marketplace in terms of bond ratings and risk premia, a sound domestic banking system and an adequate regulatory structure.

The safety and soundness of the banking systems and the stability of the indigenous currency are important components of any strategy to mitigate country risk.

The failure of banks—in view of their central role in the payment system—can have a strong adverse effect on the real economy, in comparison with the failure of other firms. The closure of a bank freezes a portion of an economy's means of payments (whose importance varies with the size of the bank) in so far as the insured deposits are not likely to be reimbursed immediately. Indeed, the deposit insurance officials in several countries conduct legal investigations and assessment of assets and liabilities, prior to the compensation of insured deposits. This, along with the destruction of noninsured deposits, is bound to affect national consumption and investment.

The principal aim of legislation and regulation of the financial sector is to protect the general welfare and to improve market efficiency, notably with respect to the four areas of consumer protection, transparency, systemic risk, and moral hazard. In so doing, they protect local and international investors to some degree.

Financial regulation aims to protect individual consumers against malpractice, fraud, and other offenses of financial institutions. Consumer protection is also needed against a possible abuse of market power by dominant financial intermediaries. Intermediaries have sought to increase their size for multiple declared reasons, notably to achieve greater efficiency and higher returns through economies of scale.

Institutions encountering transient difficulties often receive assistance on the assumption that they can have rapid turnaround and that they possess strong underpinning in sound policies and safe practices to justify investor/lenders interests, whether they are domestically or internationally based.

Competitive markets could assume—as they are in fact doing—an increasingly larger role in prompting participants to behave with greater financial responsibility. Financially delinquent participants are bound to encounter enduring reluctance from private sector lenders or investors, and from international institutions that depend for their funding on private capital. Already, the World Bank and other multilateral institutions use private financing to support their programs.

It is generally acknowledged that in a world where national sovereignty is the rule, governments cannot be forced to change readily their policies by sole reliance on market signals, however.

11. Conclusion

This paper sought to present a rigorous and relevant analysis for the individual investor to consider international diversification and to incorporate country risk in the decision-making process. The paper defines country risk, shows the various ways for modeling it, and develops a technique for incorporating it in a portfolio allocation model. The paper, then, shows the various international diversification possibilities, and direct and indirect mechanisms for hedging international financial risk.

It is fair and accurate to conclude that the paper finds no excuse for an investor to ignore international diversification. This is true independent of the conditions in the marketplace. As the U.S. stock market deteriorated in the 2000–2002 period, international diversification, despite the presence of substantial country risk, would have saved many a portfolio from massive losses or from a total calamity altogether.

The investor is always reminded that the rules of investing remain the same:

- Diversify, diversify, and diversify
- There is no model that is the best and permanently so, no matter how strongly it is advocated and used.
- Each and every stock market has its own personality and quirks. Generalities must, therefore, be avoided.
- There is no such thing as too much homework in stocks.
- There is no portfolio that is optimal for all investors and for all times.

The investor may have heard all of this before. We hope that this paper has allowed us to speak louder on the issue of country risk and international diversification.

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Appendix

The extension of the probit model of country risk

The probit model

$$y_{it} = 0 | X = X_{it} \text{ if } \alpha + \beta_I \cdot X_{it} + \varepsilon_{it} \leq 0 \text{ and}$$

$$y_{it} = 1 | X = X_{it} \text{ if } \alpha + \beta_I \cdot X_{it} + \varepsilon_{it} > 0,$$

where X_{it} is the vector of economic and political indicators listed in Exhibit II.

Adjustment for jump risk and currency risk

Exchange rate following jump-diffusion process:

$$\frac{dE}{E} = \mu \cdot dt + \sigma \cdot dW + \delta \cdot dq.$$

The estimates of the parameters in the above jump-diffusion process are used as input variables (X_{it}) in the probit model.

Adjustment for contagion effect

The contagion effect is incorporated in the probit model by letting the residual terms a_{it} be correlated and governed by a factor model:

$$\varepsilon_{it} = \gamma_{it} u_{it} + \cdots + \gamma_{im} u_{mt} + e_{it}.$$

The residual term e_{it} is assumed to be i.i.d over t, be independent of $u_{it}, \cdots u_{mt}$, and be independent of e_{jt} for all $j \neq 1$.

References

Balkan, E. M. (1995). *International bank lending and country risk*. Commack, NY: Nova Science Publishers.

Balkan, E. M. (1992). Political instability, country risk and probability of default. *Applied Economics, 24*, 999–1008.

Bartram, S., & Dufey, G. (2001). International portfolio investment: theory, evidence, and institutional framework. Economics Working Paper, archive at WUSTL.

Black, F. (1972). Capital market equilibrium with restricted borrowing. *Journal of Business, July*, 444–455.

Bordo, M. D., Mizrach B., & Schwartz, A. J. (1995). Real versus pseudo-international systemic risk: some lessons from history. National Bureau of Economic Research, Working Paper no. 5371.40052361198.

Damodaran, A. (1999). Estimating equity risk premiums. Unpublished working paper, New York University, New York, NY.

Dornbush, R., Goldfajn, I., & Valdes, R. (1995). Currency crises and collapses. *Brookings Papers on Economic Activities, 1,* 219–270.

Edwards, S. (1989). Real exchange rates, devaluation and adjustment: exchange rate policy in developing countries. Cambridge, MA: MIT Press.

Errunza, V., Hogan, K., & Hung, M.-W. (1999). Can the gains from international diversification be achieved without trading abroad? *Journal of Finance, 54,* 2075.

Fratianni, M., & Pattison, J. (2002). International financial architecture and international financial standards. *The Annals of the American Academy of Political and Social Science, 17,* 183.

Harvey, C. R. (1995a). Predictable risk and returns in emerging markets. *Review of Financial Studies, 8,* 773–816.

Harvey, C. R. (1995b). The risk exposure of emerging markets. *World Bank Economic Review, 9,* 19–50.

Hauptman, L., & Natella, S. (1997). The cost of equity in Latin America: the eternal doubt. Credit Swiss First Boston, Equity Research.

Khoury, S. J., & Zhou, C. (2003). Country risk: existing models and new horizons. In V. Murinde, A. Mullineux (Eds.), *Handbook of international banking* (pp. 327–365). Edward Edgar.

Khoury, S. J., Gould, S., & Naftilan, S. (2002). Systemic risk: a more rigorous and realistic simulation. In L. Jacques (Ed.), *Financial innovations and the welfare of nations* (pp. 00–00). Bostown: Tufts University, Kluwer Academic Press.

Lang, L. H. P., & Stulz, R M. (1994). Tobin's q, corporate diversification, and firm performance. *Journal of Political Economy, 102,* 1248.

Lintner, J. (1965). The valuation of risky assets and the selection of risky investments in stock portfolios and capital budgets. *Review of Economics and Statistics, 47,* 587–615.

Mishra, C. S., & Gobeli, D. H. (1998). Managerial incentives, internationalization and market valuation of multinational firms. *Journal of International Business Studies, 29,* 583–598.

Russell, J. W. (1998). The international diversification fallacy of exchange-listed securities. *Financial Services Review, 7,* 95–106.

Sachs, J. D. (1984). *Theoretical issues in international borrowing.* Princeton: International Finance Section, Dept. of Economics, Princeton University.

Sachs, J. D., Tornell, A., & Velasco, A. (1996). Financial crisis in emerging markets: the lessons from 1995. Brookings Papers on Economic Activity.

Schwartz, A. (1999). Is there a need for an international lender of last resort? *The Cato Journal, 19,* 1(6)

Sharpe, W. (1964). Capital asset prices: a theory of market equilibrium under conditions of risk. *Journal of Finance, 19,* 425–442.

Solnik, B. H. (1974). An equilibrium model of international capital markets. *Journal of Economic Theory, 8,* 500–524.

Solnik, B. H. (1974). Why not diversify internationally instead of domestically. *Financial Analysts Journal,* 00, 00–00.

Solnik, B. (1998). Global asset management. *Journal of Portfolio Management, 24,* 43(9).

Vasquez, I. (1998). The Asian crisis: why the IMF should not intervene. *Vital Speeches, 64,* 399(3).

Wright, S. M. (2002). Does purchasing stock in Australian multinational corporations create international portfolio diversification? *Multinational Business Review, 10,* 79–83.