Investing in Emerging Stock Markets: Is It Worthwhile Hedging Foreign Exchange Risk?

Hedging currency risk is beneficial in developed, but not in emerging stock markets.

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Stock markets in developing areas such as the Far East and Latin America have been supported by fast-paced real and monetary growth. The high returns typical in these emerging markets continue to attract the attention of investors in developed financial markets who are looking to enhance the performance of their portfolios. A number of studies have demonstrated the advantage of international diversification emanating from the low correlations of stock returns in developed and emerging markets, an advantage expressed in terms of risk/return trade-off (e.g., Levy and Sarnat [1970], Eun and Resnick [1985], Bailey and Lim [1992], Divecha, Drach, and Stefek [1992], and Speidell and Sappenfield [1992]).

In this study we examine the role of exchange rate risk in determining the benefits from international diversification. While a number of studies conclude that the benefits from diversification in developed markets are enhanced by hedging the exchange rate risk (e.g., Eaker and Grant [1985], Eun and Resnick [1988], Lee [1988], Thomas [1989], and Hauser and Levy [1991]), we find that under certain conditions such hedging may not be beneficial. In fact, hedging the currency risk of high-risk emerging markets can decrease the gains from international diversification.

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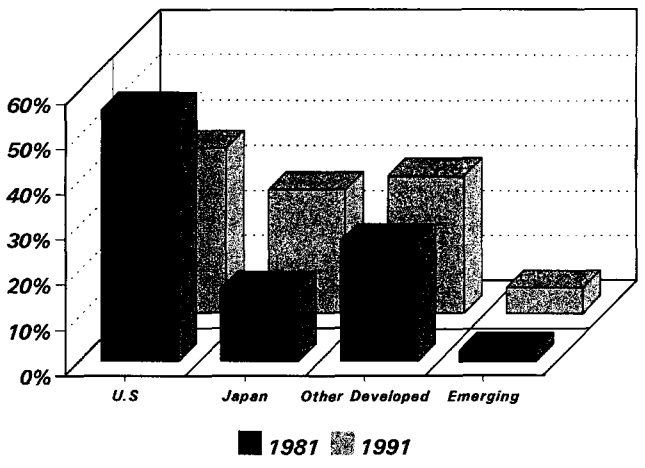
BACKGROUND

Interdependence of Equity Markets

The emergence of capital markets in developing

EXHIBIT 1
GEOGRAPHICAL SHIFTS IN EQUITY MARKETS



Source: *IFC Fact Book 1992.*

countries in the Far East, Latin America, and elsewhere is part of a general process of globalization of capital markets in the last decade. This development is, among other things, expressed in the economic growth of those countries and in their attempt to create security markets compatible with those of developed countries.

Exhibit 1 demonstrates the geographical shifts in the relative capitalization of security markets around the world. During the past decade, the U.S. market share of security markets has shrunk compared to that of other developed and emerging economies. The emerging markets attract international investors based in developed markets because of high yields typical of high-growth economies and low correlation coefficients. Apparently, these features provide a better risk/return trade-off for global investors through more efficient stock diversification within an expanded portfolio.

Exhibit 2 presents the correlation coefficients among a sample of emerging and developed security markets. The correlations are relatively low, indicating a potential for large gains from international diversification that includes securities of emerging markets.

Analysis of Return and Risk

Let R_i and e_i be the percentage change in the price of a stock and foreign currency, respectively, in country i. The dollar rate of return, $R_{\$i}$, represented by a linear approximation, is[1]

$$R_{\$i} = R_i + e_i \quad (1)$$

From Equation (1) we obtain the expectation and variance of returns in terms of the numeraire currency (dollars):

$$E(R_{\$i}) = \mu_i + \mu_{ei} \quad (2A)$$

$$Var(R_{\$i}) = Var(R_i) + Var(e_i) + 2Cov(R_i, e_i) \quad (2B)$$

where μ_i and μ_{ei} are the expected returns on a stock and foreign currency, respectively, and $Var(R_i)$ and $Var(e_i)$ are the parallel variance of returns.

Suppose now an international investor based in the U.S. chooses to hedge currency risk through a forward transaction. Eun and Resnick [1988] show that the rate of return on such a hedged investment strategy, $R_{\$ih}$, is given by:

$$R_{\$ih} = R_i + e_i + (1 + \mu_i)(h_i - e_i) \quad (3)$$

where h_i is the relative forward premium or discount, and $(1 + \mu_i)$ is the amount of short forward contracts per unit of foreign currency. From Equation (3) we obtain the expected return and variance of a hedged strategy:

$$E(R_{\$ih}) = \mu_i + h_i \quad (4A)$$

$$Var(R_{\$ih}) = Var(R_i) \quad (4B)$$

A comparison of Equations (2A) and (2B) with (4A) and (4B) reveals that when the forward rate equals the expected spot rate, the expected returns on the hedged and unhedged strategies are equal. Furthermore, if the covariance between the stock and currency returns is positive, the variance of the unhedged returns would exceed that of hedged returns. Namely, if $h_i > \mu_{ei}$, the fully hedged strategy is superior.

In other cases, the hedged strategy may or may

EXHIBIT 2
Correlation Coefficients of Monthly Rates of Return between Developed and Emerging Markets

	U.S.	Japan	Britain
Japan	0.290		
Britain	0.650	0.435	
Emerging Markets	0.292	0.131	0.387

EXHIBIT 3
Decomposition of Volatility of Rate of Return 1986-1991

Country	$E(R_{\$i})$	$SD(R_{\$i})$	Fraction (%) of Volatility Due to: U_1	U_2
Developed Countries				
Italy	−5.7	25.3	97.3	2.7
Canada	−3.6	30.8	30.3	69.7
Australia	−0.1	35.3	54.1	45.9
Switzerland	2.5	19.1	86.0	14.0
Sweden	2.7	9.2	0.1	99.9
Japan	5.4	21.1	72.7	27.3
Germany	5.5	20.1	89.9	10.1
Netherlands	6.9	16.3	108.7	−8.7
Spain	7.8	25.3	97.3	2.7
Britain	9.1	22.2	82.1	17.9
U.S.	9.4	14.2	100.0	0.0
Denmark	17.5	18.0	68.4	31.6
Average	5.0	21.1	79.6	20.4
Emerging Markets				
Turkey	7.8	57.2	21.8	78.2
Korea	8.3	29.1	93.0	7.0
India	15.6	28.8	120.2	−20.2
Greece	16.0	54.4	95.0	5.0
Malaysia	16.7	22.2	100.0	−0.0
Thailand	22.8	29.1	104.8	−4.8
Israel	27.6	26.7	113.4	−13.4
Taiwan	32.4	57.2	106.0	−6.0
Mexico	61.2	37.8	103.7	−3.7
Chile	39.6	27.0	97.5	2.5
Brazil	58.8	84.5	227.5	−127.5
Argentina	118.8	129.2	431.7	−331.7
Average	35.5	48.6	134.1	−34.1

$U_1 = Var(R_i)/Var(R_{\$i})$;

$U_2 = (Var(R_{ei}) + 2Cov(R_i, R_{ei}))/Var(R_{\$i})$

not be superior to the unhedged one, for the benefit from hedging depends upon the contribution of currency risk to the overall volatility. To examine this point we decompose the variance of monthly returns in Equation (2B) into two components

$$U_1 + U_2 = 1 \quad (5)$$

where $U_1 = Var(R_i)/Var(R_{\$i})$ and $U_2 = (Var(e_i) + 2Cov(R_i, e_i))/Var(R_{\$i})$.

Exhibit 3 displays the expected dollar return and standard deviation of a foreign stock held by an American investor, with a standard deviation decomposed into U_1 and U_2. This decomposition indicates that the dollar stock volatility in developed countries is largely attributable to exchange rate risk. The negative covariance between changes in stock and currency prices in emerging markets produces a *decreased* stock volatility in dollar terms. That is, an American investing in emerging foreign markets is faced with a lower volatility than domestic investors in those markets.

A possible explanation for this phenomenon is that emerging markets, especially in Latin American countries, are often plagued by high and volatile rates of inflation. In these countries, higher rates of inflation induce higher nominal rates of return on stocks (in the local currency), but also higher rates of depreciation of local currencies vis-à-vis the dollar. The two offsetting changes create a partial insurance in dollar terms to the American investor.

The numbers reported in Exhibit 3 suggest that currency risk captures a large portion of the overall risk in portfolios of developed stock markets, such that hedging currency risk is usually advantageous. These numbers are consistent with the findings of Eaker and Grant [1985], Eun and Resnick [1988], and Hauser and Levy [1991], who show that, in the past two decades, the hedging of exchange risk would have been beneficial even in well-diversified international portfolios that consist of stocks of the U.S. and other developed markets. Empirical studies of recent years that examine the benefits from investment in emerging markets do not address the issue of hedging currency risk.

HEDGING EXCHANGE RISK

Our analysis of the benefits of hedging currency risk is based on a sample of stock markets in twenty-five countries: thirteen developed markets and twelve emerging ones. In each market we estimate equity returns measured by the monthly percentage change of the stock index.[2]

To evaluate the benefits from hedging currency risk in internationally diversified portfolios, we construct six efficient frontiers:[3] 1) an unhedged frontier of developed markets; 2) a hedged frontier of developed markets; 3) an unhedged frontier of emerging markets; 4) a hedged frontier of emerging markets; 5) an unhedged frontier combining developed and emerging markets; and 6) a hedged frontier combining developed and emerging markets. The efficient frontiers are com-

EXHIBIT 4A
DEVELOPED MARKETS

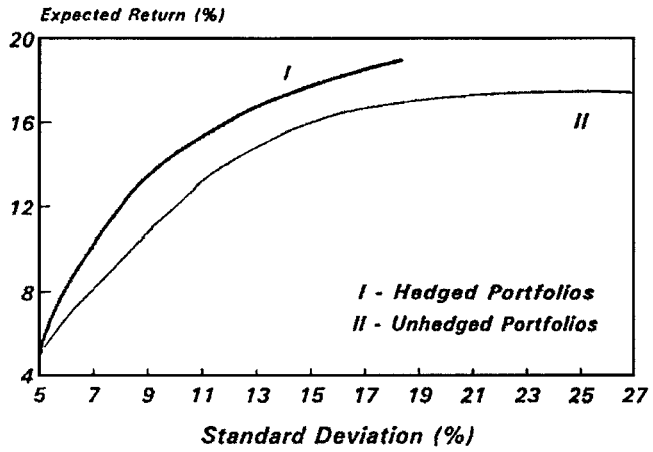
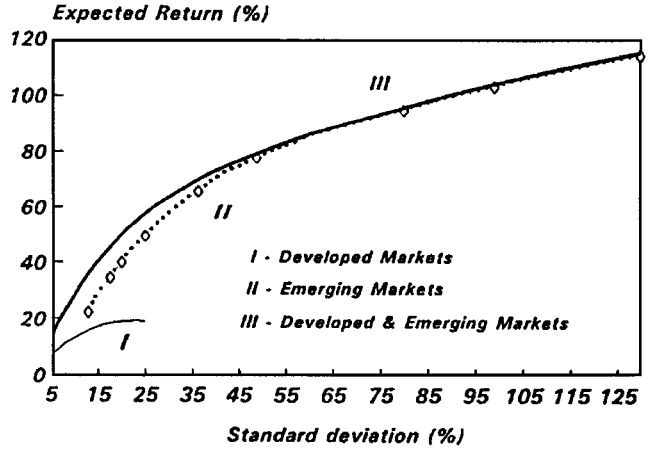


EXHIBIT 4C
UNHEDGED EFFICIENT FRONTIERS



pared in Exhibits 4A-4D.

Exhibit 4A shows that the performance of well-diversified portfolios made up of stocks of developed markets could be enhanced by hedging currency risk. Consistent with the evidence of earlier studies, this result is largely attributed to the removal of a currency risk that without hedging could more than offset the incremental risk reduction attained by international diversification.

A parallel display in Exhibit 4B of diversification among emerging markets reveals different results. First, unhedged portfolios diversified among emerging markets generally perform better than hedged ones.

Second, the level of the overall risk in emerging markets is considerably higher than that in developed ones. While in the developed markets the annual portfolio standard deviation (in dollar terms) is in the range of 9% to 35%, in emerging markets it is in the higher and wider range of 22% to 130%. These numbers are consistent with the findings of Harvey [1993] and Divecha, Drach, and Stefek [1992].

The latter finding suggests that — despite the low correlations between emerging and developed markets — only investors who can stand higher levels of risk may gain from including stocks of emerging markets in their portfolios. This conclusion is consistent with a recent study by Speidell and Sappenfield [1992], who show that, although the optimal proportion of investment in emerging markets is in the 10%-15% range, global investors today allocate less than 1% of

EXHIBIT 4B
EMERGING MARKETS

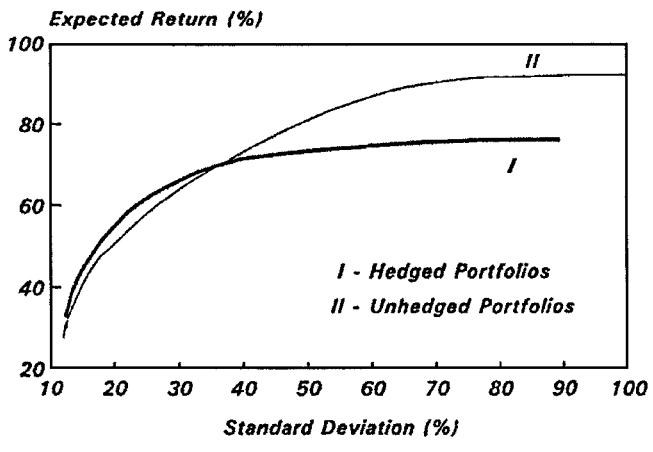


EXHIBIT 4D
HEDGED EFFICIENT FRONTIERS

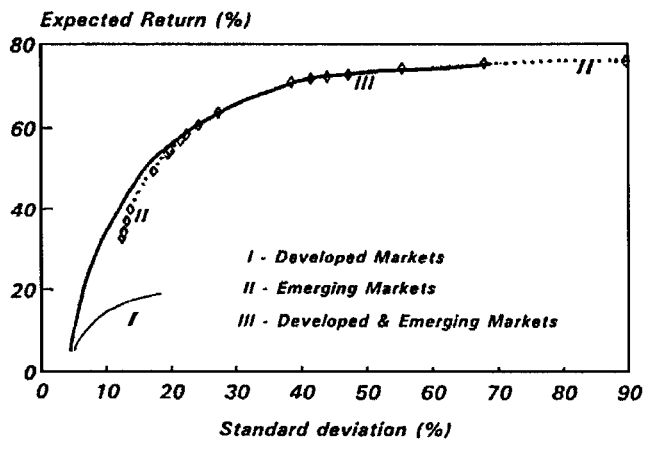
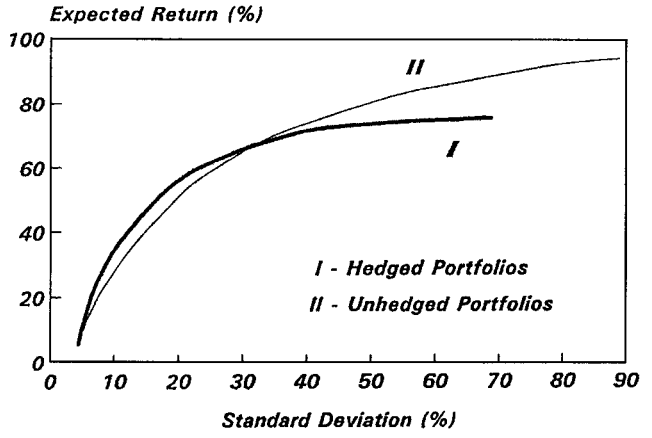


EXHIBIT 5
DEVELOPED AND EMERGING MARKETS



their funds to those markets.

A possible reason for this fact is the reduced liquidity that contributes to more price volatility in those markets. Only at the price of higher risk can investors based in developed countries enhance portfolio performance by investing in emerging markets.

Surprisingly, our results further show that such investors would be better off not hedging currency risk. This is partially explained by the fact that in developing countries rapid growth is often accompanied by a quicker monetary expansion and a high inflation rate, creating a pressure to depreciate the foreign exchange rate to avoid a deficit in the current account.

Exhibit 5 offers a summary of our findings. International investors with the lowest tolerance for risk would invest exclusively in a *hedged* minimum-variance portfolio of developed markets. At 18% expected portfolio return — the highest return attainable in developed markets (Denmark) — the optimal portfolio would be hedged, including 75% investment in developed countries and 25% in emerging ones. Starting at 71% expected return — the cross-over return of hedged and unhedged portfolios — the optimal portfolio would include 100% investment in emerging markets. Namely, all efficient portfolios designed for higher expected returns would be unhedged.

SUMMARY AND CONCLUSIONS

This study investigates the role of currency risk in determining the benefits from international diversification in developed and emerging stock markets. While previous studies examine the advantage of international diversification stemming from the low correlations between the returns of developed and emerging markets, they do not consider the unique effect of currency risk on the overall risk exposure in emerging markets.

Our findings indicate that only investors who tolerate high levels of risk can gain by diversifying into emerging markets. They further indicate that in such diversification, the hedging of currency risk is an inferior policy because of the negative correlations between the exchange rate and stock returns when measured in the local currencies of emerging markets.

Despite this effect of currency risk on the potential gain from international stock diversification, caution must be used in formulating an investment policy based on these findings. This study, like previous ones, does not take into account the special costs of buying stock in foreign markets in general, and in emerging markets in particular. Those costs are the result of dealing in a foreign currency in a distant market at a time difference, and subject to foreign regulations and tax rules under a foreign government. The result of ignoring those costs is an overstatement of the gains from international stock diversification, especially into emerging markets.

ENDNOTES

[1]Linear approximation is used for the purpose of presentation, and quadratic approximation is used for the actual calculations. Note that more accurate results are obtained under quadratic approximation. In such a case, the covariance term between the percentage change in foreign currency prices and the percentage change of equity prices denominated in local currency will also appear in the expected return formula.

[2]The sources of data are the *International Financial Corporation (IFC) Annual Fact Books* and the International Financial Statistics (IFS) publications.

[3]Short sales are not allowed, and currency hedging is limited to 100% of the value of the foreign stock.

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