Is There a Free Lunch in Emerging Market Equities?

In some markets, but investors need to be more selective going forward.

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In the early 1990s, people began to refer to investments in emerging markets as a "free lunch." It was argued that emerging equity markets reduce risk and increase expected returns, rendering significant diversification benefits for globally minded investors. Speidell and Sappenfield [1992] even advocated portfolio allocations of 10% to 15% for quantitative asset managers who maximize expected return for a given risk tolerance. In 1993, as foreign capital flows to emerging markets reached an all-time high, most markets gave an unprecedented performance as measured by the International Finance Corporation's (IFC) global indexes, providing some measure of support for the "free lunch" doctrine (see Exhibit 1).

Since 1994, two severe financial and economic shocks have afflicted emerging markets, one following the collapse of the Mexican peso, and the other the collapse of the Thai baht. The result has been slower economic growth, lower average equity market returns, and greater market volatility in emerging markets as a whole. Yet emerging markets still seem to have found a place in many institutional portfolios as a strategic asset class, not just an asset to be exploited tactically.

Several characteristics of emerging markets support the argument of a free lunch. Emerging markets exhibit higher average returns than developed markets (when measured over the medium to long term), but also higher volatility as represented by standard market indexes. More important, they tend to have low correlations with most developed markets, as well as low cor-

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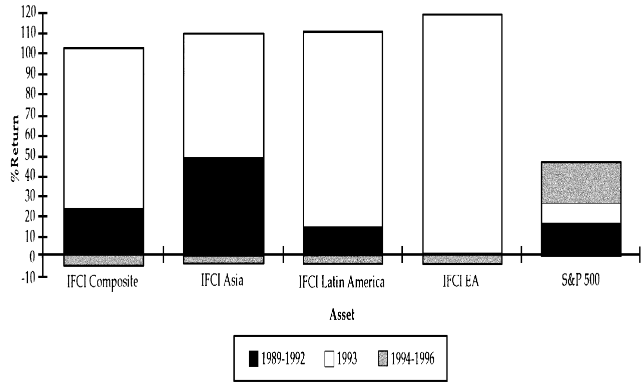
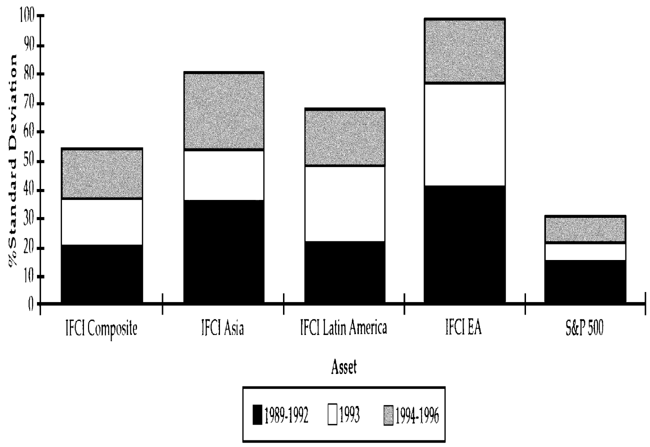
EXHIBIT 1

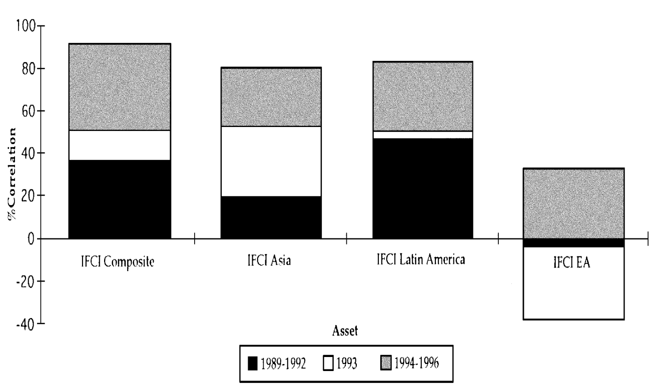
Annualized Returns 1989-1996



Annualized Volatility 1989-1996



Correlation with S&P 500 1989-1996



relations among themselves.[1] Low correlation means that adding emerging markets to a portfolio can actually reduce risk and still provide the benefits of higher average returns.

These conclusions depend critically on the investor's ability to achieve the performance of the market indexes used in the calculation of means and correlations.[2] Most recent studies of emerging markets are based on the IFC global indexes, which may not always accurately reflect the costs of emerging market investments relative to developed markets, or the restrictions that affect such investments.

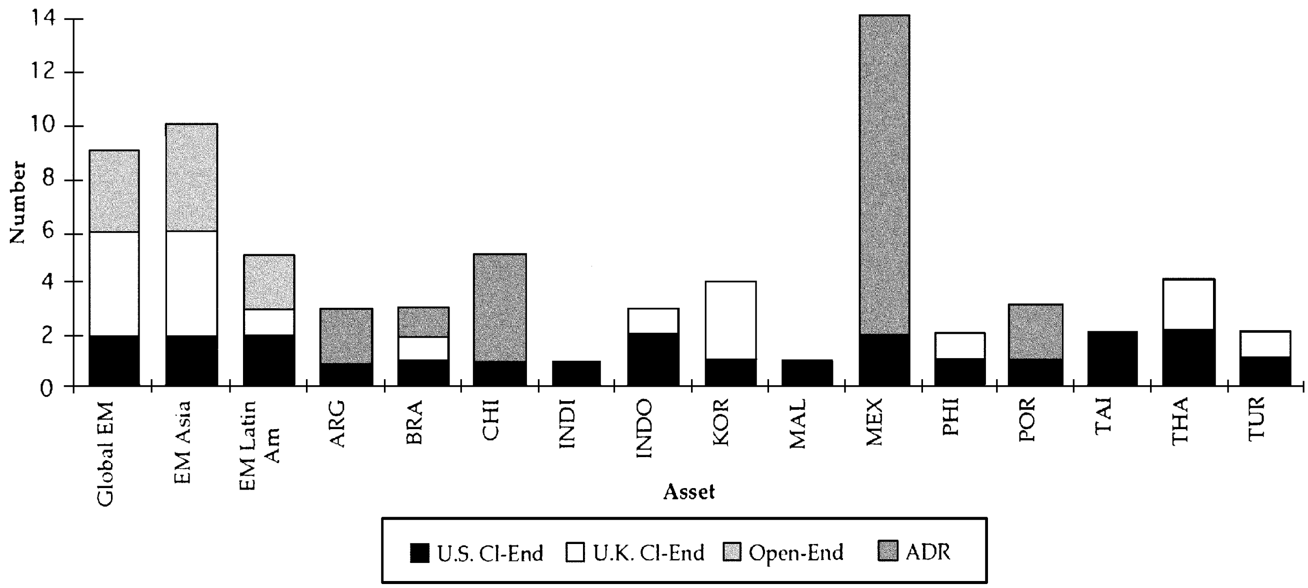
For example, according to Bekaert et al. [1997], the bid-ask spreads in Argentina imply an average cost of approximately 155 basis points for foreign investors, considerably higher than the cost of trading stocks in most developed markets. Markets such as South Korea and Taiwan have foreign ownership restrictions that are often binding. Index providers attempt to correct for ownership restrictions in the weights applied to stocks or countries in certain indexes, but the prices often do not represent those faced by most global investors. In some cases, such as the Alien Board in Thailand, a different set of prices apply to foreigners dealing in restricted stock from those applying to local investors (see Bailey and Jagtiani [1994]).

Once investments are made, moreover, the free flow of capital can also be restricted, such as in Chile, where foreign investors cannot repatriate invested capital for one year. Furthermore, factors such as poor liquidity and currency and macroeconomic instability can impact emerging market performance in ways not reflected by benchmark indexes.[3]

An important implication is that, although indexes provided by the IFC, Morgan Stanley Capital International, and others have enabled researchers to gain valuable insights into emerging equity markets, the performance of direct investment in emerging markets as represented by such benchmarks may not always be achievable. Hence the "free lunch" doctrine should be qualified, particularly for retail investors. A more realistic picture of the true diversification benefits from emerging equity markets is available from three investment vehicles that provide access to emerging market returns, while circumventing many of the restrictions and costs described above.

We focus on the benefits from holding closed-end mutual funds, ADRs, and open-end mutual funds in a global equity portfolio. Closed-end country funds

EXHIBIT 2
SAMPLE OF ADRS, OPEN-END FUNDS, AND CLOSED-END FUNDS



were among the earliest investment vehicles providing access to emerging markets, beginning with the New York-traded Mexico Fund in 1981. They often trade at prices different from their portfolio value (known as net asset value or NAV), since they generally do not redeem or issue new shares. Often, country funds that invest in closed or restricted markets will trade at a premium. There are a sizable number of emerging market closed-end funds trading in the U.S. and the U.K.

Since the early 1990s, U.S.- or U.K.-traded receipts representing emerging market shares have been available. ADRs trade close to parity with the underlying foreign shares they represent, because they can be redeemed or created from the foreign shares by paying a fee to the depository bank. Nevertheless, it still may be difficult to build a portfolio of ADRs that adequately tracks the local market.[4]

Like ADRs, open-end funds representing the emerging markets are a relatively new phenomenon. Open-end mutual funds (ignoring transaction costs) trade at prices that are the same as their portfolio values because they redeem or issue new shares periodically. Because of this, managers may tend to invest in more-liquid emerging market issues than they otherwise would. Moreover, because they are actively managed, open-end funds may offer protection in down markets that other investment vehicles do not.[5]

The goal of this article is a better understanding of the rewards and risks from holding emerging markets in a global equity portfolio. While closed-end funds, open-end funds, and ADRs provide emerging market returns that are actually attainable, they may sacrifice some of the benefits of direct access to the local markets they represent.[6]

Any assessment of the rewards and the trade-off between investable performance and benchmark index performance is inherently ex post and constrained by the data at hand. Our analysis attempts to shed light on these matters from several angles. We begin with a discussion of expected returns, correlation, and tracking error using the different investment vehicles. Finally, we attempt to use robust statistical tests to evaluate the diversification benefits of emerging markets in a mean-variance framework.

THE DATA

Exhibit 2 shows the geographic coverage of emerging market closed-end funds, open-end funds, and ADRs in our sample. The sample also includes the IFC investable country and regional indexes, and FT-Actuaries indexes to represent the developed equity markets.

The sample of closed-end funds consists of twenty-three U.S. funds and nineteen U.K. funds that invest in emerging markets as defined by the IFC. The sample attempts to include all publicly traded U.S. and U.K. emerging market funds with initial offerings prior to 1992.[7]

The sample of open-end emerging market funds is limited to U.S. funds that target a particular region: Asia, Latin America, or the world. In the test period there were no available open-end emerging market funds targeting individual countries.

Finally, the ADR sample represents equities trading in five emerging markets as early as September 1993. It is restricted to ADRs that trade on a U.S. exchange as opposed to over-the-counter or in the institutional market, in order to avoid stale pricing.[8]

The empirical analysis focuses on two sample periods, September 1990 through August 1993 for the closed-end funds, and September 1993 through August 1996 for the closed-end funds, open-end funds, and ADRs. All the analysis uses weekly dollar total returns.

EXPECTED RETURNS ON CLOSED-END FUNDS, OPEN-END FUNDS, ADRS, AND EMERGING MARKET INDEXES

The traditional practice of portfolio optimization requires estimates of expected returns and the covariance and volatility of returns for a set of candidate investments. Much of the portfolio management business is driven by decisions based in some way on expected return estimates, usually relative to a benchmark. Unfortunately, it is well known that estimating expected returns from the mean of historical returns is problematic. The noise and short time series of equity returns in typical applications result in very poor estimates of expected returns from historical means. Estimates of the covariance of asset returns from historical data tend to be somewhat more precise.

Exhibit 1 illustrates the relative stability of the historical volatility and correlations of emerging equity market returns with the S&P 500 index.

If we are willing to use historical estimates of the covariance of equity market returns, we can infer expected returns in the mean-variance paradigm. Specifically, it is possible to construct expected excess returns that correspond to hypothetical "efficient" portfolios using these covariance estimates. Given the limitations inherent in our data, this may be a good place to start understanding the potential benefits of emerging equity markets under different scenarios, and the trade-offs between different investment vehicles that access these markets.

Let Σ_R denote the covariance matrix of the developed world equity market index return and a portfolio of emerging market investment returns, and let δ represent the market price of risk. The market price of risk can be interpreted as the ratio of the required return in excess of the riskless return by the marginal investor in risky assets, and the variance of that return.[9]

Then, for an optimal portfolio (one that lies on the efficient frontier of asset returns) of developed and emerging market equities, ω, the expected excess returns are given by

$$ER - r_f = \delta \Sigma_R \omega \tag{1}$$

where ER is the vector of expected returns, and r_f is the riskless rate of return. This relation assumes no borrowing or lending by the marginal or representative investor.

The expected excess returns can be viewed as those implied by an efficient portfolio, ω, held in a world where Σ_R describes the riskiness of the assets. A long investor who thinks that 20% is the efficient amount to put to work in emerging markets can think of $ER - r_f$ as the expected excess returns consistent with such a portfolio.

Exhibit 3 shows required excess returns of candidate emerging market portfolios when the optimal allocation to emerging markets ranges between 5% and 20%. The excess return of the emerging market portfolio over the FT-Actuaries developed world market return is given in parentheses. The table assumes that the market price of risk is 3.5.[10] The covariance matrix is estimated using weekly returns data from the 1993-1996 sample period.

The results indicate higher expected returns for the U.S. and the U.K. closed-end funds than for the open-end funds, ADRs, and IFC investable composite index, at all allocation levels. In most cases, the expected excess return for the emerging market assets exceeds that of the developed world equity market index for optimal portfolios with at least 10% invested in emerging markets.

From Equation (1), higher expected excess returns for the closed-end funds than for the open-end funds, ADRs, and IFC investable index can be explained by their higher covariance with the devel-

EXHIBIT 3
COMPARING CLOSED-END FUNDS, ADRS, AND OPEN-END FUNDS (REQUIRED EXCESS RETURNS FROM OPTIMAL ALLOCATION TO EMERGING MARKET)

	Allocation		
Asset	5%	10%	20%
U.K. Closed-End Fund Index	2.07	3.41	4.30
	(0.35)	(0.80)	(1.70)
U.S. Closed-End Fund Index	3.76	4.48	5.93
	(1.12)	(1.82)	(3.22)
ADR Index	1.20	2.11	3.95
	(-1.21)	(-0.27)	(1.80)
Open-End Fund Index	2.58	2.86	3.44
	(-0.03)	(0.27)	(0.88)
IFC Composite	2.39	2.73	3.40
	(-0.20)	(0.16)	(0.90)

Annualized expected return of the candidate emerging market portfolio in excess of the riskless rate, in U.S. dollars. Numbers in parentheses are the expected return of the emerging market portfolio in excess of the expected excess return of the developed world market. Calculations are based on returns from 1993-1996.

oped world market portfolio. Investors therefore demand higher returns for closed-end funds when holding them in optimal portfolios in the 1993-1996 period. This result is consistent with the costliness of arbitrage between closed-end funds and their underlying assets, resulting in a high correlation of closed-end funds with the markets where they trade in the U.S. and the U.K. (and thus the developed world market).

By contrast, there are cases where investors are willing to hold open-end funds, ADRs, and the IFC investable index in their portfolios even though expected returns are lower than for the developed world market. Exhibit 3 shows this to be the case for optimal allocations to emerging markets of 5% and 10%. An interpretation of this result is that open-end funds, ADRs, and the IFC investable index are desirable in optimal portfolios, even with inferior returns, for risk reduction purposes alone.

Under the assumptions of the experiment in Exhibit 3, on an expected return basis, investment vehicles like closed-end funds, open-end funds, and ADRs appear more attractive than the IFC investable index. Of course, the risk reduction benefits from emerging markets in a global equity portfolio must be balanced with the potential for higher returns, and on that basis the IFC investable indexes may be superior, although full attainability of the index performance is difficult.

HISTORICAL TRACKING ERROR OF CLOSED-END FUNDS, OPEN-END FUNDS, AND ADRS

Exhibit 4 reports the tracking error from several portfolios of closed-end funds, open-end funds, and ADRs with respect to the IFC investable composite, Asia, and Latin America indexes. Tracking error is defined as the annualized standard deviation of the difference between the portfolio return of the funds or ADRs and the return on the IFC index.

The table reports results for equally weighted portfolios of funds and ADRs using returns for the 1993-1996 sample period. While analytically determined weights that vary with time may provide better tracking, equally

EXHIBIT 4
TRACKING THE IFC INDEXES — WEEKLY RETURNS 1993-1996

	Asia	Latin America	Composite
U.K. Closed-End Funds	19.47%	18.66%	23.26%
U.S. Closed-End Funds	14.61	29.41	13.60
ADRs	NA	35.40	NA
Open-End Funds	9.35	7.02	5.92

Annualized tracking error for the best-tracking portfolio of funds or ADRs in each category. Tracking error is defined as the standard deviation of the difference in the returns on the portfolio and the target index. NA indicates not available.

weighted portfolios give us a sense of the opportunity for smaller or unsophisticated investors.

Strikingly, by far the lowest tracking error is achieved by the open-end funds. The U.K. closed-end funds track the IFC indexes better than the U.S. funds, with the exception of the Latin America index, where there is only one U.K. fund in the sample. ADRs do not seem to cover enough of the local market to provide close tracking of the IFC indexes. The ADR tracking errors are somewhat greater than those reported by Jorion and Miller [1997], who use optimization techniques to improve tracking.

To sum it up, during the 1993-1996 sample period, equally weighted portfolios of open-end funds were the superior investment vehicle for matching the performance of the IFC indexes.

TESTING FOR DIVERSIFICATION BENEFITS

Mean-Variance Spanning Tests

We measure diversification benefits in the standard mean-variance framework. The mean-standard deviation frontier depicts the highest expected return that is attainable from a portfolio of assets for a given level of risk, where risk is measured as standard deviation of return (the square root of the variance). It has the familiar hyperbolic shape in expected return-standard deviation space.

We begin with a set of developed market returns a global investor might hold, which we call the benchmark assets. We can construct the frontier from the means and covariances of the historical returns. Suppose we add emerging market assets to our benchmark, and recompute the mean-standard deviation frontier. It will always be true that the frontier either stays the same or shifts to the left; that is, for each level of expected return, the expanded set of assets means you will be able to do at least as well as before in terms of risk.

The inputs to the calculation are very important here. Even with a reasonably long time series of historical data, there may be little confidence in a statistical sense that the risk-return trade-off is truly better when emerging markets are added. This is the essence of what we formally test: Is there a statistically significant leftward shift in the mean-standard deviation frontier?

The test examines whether the frontiers intersect at two prespecified points along the benchmark frontier. We identify one of the points using a "riskless" asset, which defines a tangency portfolio.[11]

The test, formally called a mean-variance spanning test, was first described by Huberman and Kandel [1987]. We use a modern, more robust version of the test that builds on recent results in dynamic asset pricing theory developed by Hansen and Jagannathan [1991].

The main intuition for the test can be seen using the following notation. Let $R_e(t)$ represent an emerging market asset return or "test" asset return, and let $R_b(t, j)$ represent the return on the j-th benchmark asset, where j is indexed from 1 to K. Then $R_e(t)$ is spanned by the K benchmark returns if it can be written as a portfolio of the benchmark returns with the weights summing to one, plus an uncorrelated, mean-zero error term, $\upsilon(t)$:

$$R_e(t) = a + w_1 R_b(t, 1) + \ldots + w_K R_b(t, K) + \upsilon(t) \quad (2)$$

with

$$a = 0$$
$$w_1 + \ldots + w_K = 1$$

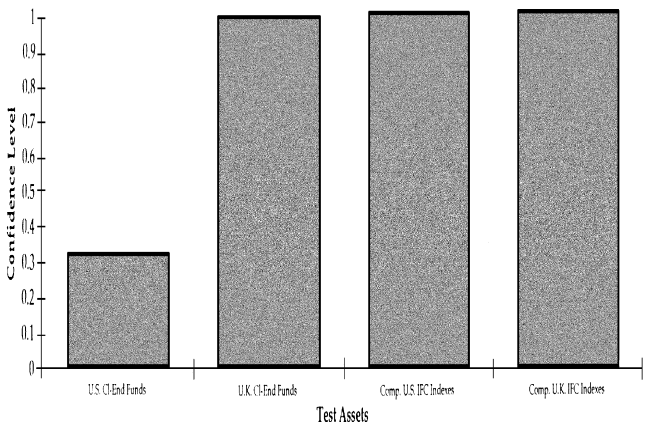
In effect, Equation (2) says that the emerging market return is spanned by the benchmark if we can use the benchmark returns to mimic the return on the emerging market fund. The emerging market return does not offer real diversification benefits if that is the case, and hence we cannot reject that the frontier of the benchmark plus emerging market returns is the same as the frontier generated by only the benchmark returns. The mean-variance spanning test we employ is equivalent to a test of the econometric restrictions given by Equation (2).

Our test is robust to the non-standard features of equity market data such as fat tails and the fact that we are using a relatively short time series to infer market relationships. Nevertheless, the turbulent period in emerging markets from 1990 to 1996 significantly complicates our tests by increasing the difficulty of estimating expected returns and covariance from the historical data. In the end, we hope to be able to say something about the diversification benefits of emerging equity markets going forward, despite the limitations of the data.

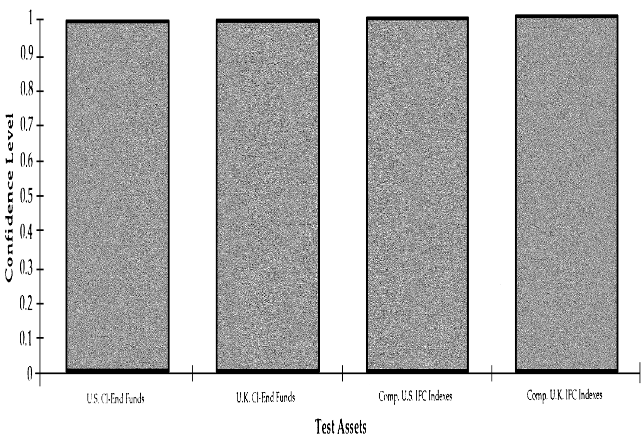
The appendix describes the method we employ in more detail.

EXHIBIT 5

Confidence Levels 1990-1993:
Closed-End Funds and IFC Indexes



Confidence Levels 1993-1996:
Closed-End Funds and IFC Indexes



Summary of Evidence from Closed-End Funds, Open-End Funds, and ADRs: 1990-1996

We report the results of mean-variance spanning tests using a set of benchmark returns that consists of the FT-Actuaries U.S. index, U.K. index, Europe less U.K. index, and Pacific index, a possible benchmark for a well-diversified global investor in the developed markets. The test assets are sets of emerging market closed-end funds in the U.S. and the U.K., U.S. open-end funds, and U.S.-traded ADRs. For comparison, we examine the diversification benefits of investing in the corresponding IFC investable indexes — e.g., if the test assets include a Chilean closed-end fund, we include the IFC's Chile index in our set of investable indexes.

Test results are shown for two periods: September 1990 through August 1993 for the closed-end funds, and September 1993 through August 1996 for the closed-end funds, open-end funds, and ADRs. The first period includes the top of the performance cycle for emerging markets this decade, and the second period includes the global selloff in 1995 but avoids the more recent Asian crisis beginning in 1997.

The bars in Exhibits 5 through 8 show confidence levels from the mean-variance spanning tests. The confidence level is a number between zero and one. A confidence level of 95% means that, given the data inputs to the test, we are 95% sure that spanning is rejected, and consequently that emerging markets offer diversification benefits.

Closed-End Funds. The full sample of closed-end fund test assets consists of twelve individual U.S. emerging market funds and six individual U.K. funds. The sample includes funds that target specific countries as well as regional funds.[12]

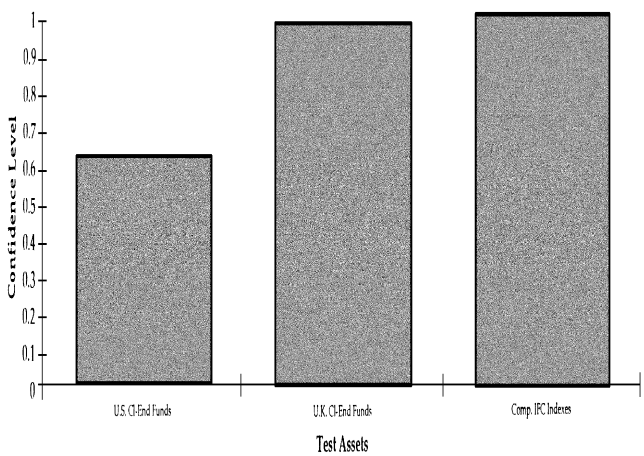
For the 1990-1993 test period, we find strong evidence of diversification benefits for the U.K. funds. The confidence level for the U.S. funds is about 33%, but over 99% for the U.K. funds (see Exhibit 5). The confidence level for the IFC investables is greater than 99% in the 1990-1993 period.

For the 1993-1996 test period, the confidence level for both the U.S. and the U.K. closed-end funds is greater than 99% (Exhibit 6). The confidence level is greater than 99% for the corresponding IFC investable indexes in 1993-1996. It therefore appears that both the U.S. and the U.K. closed-end funds provided significant diversification benefits in 1993-1996, but the benefits are less pronounced in the earlier 1990-1993 test period, with a confidence level greater than 95% only for the U.K. funds. The IFC investable indexes provided significant benefits in both periods.

We carry out a number of robustness checks to ensure the validity of the closed-end fund results. In several cases, more than one fund targets the same emerging market country or region. We find that the pattern of results is robust to whichever fund is chosen in these cases. Furthermore, since there is broader country coverage in the U.S. sample, and this full available coverage is used for the U.S. test assets, we exam-

EXHIBIT 6

Confidence Levels 1990-1993:
Closed-End Funds and IFC Indexes, Restricted Sample



Confidence Levels 1993-1996:
Closed-End Funds and IFC Indexes, Restricted Sample

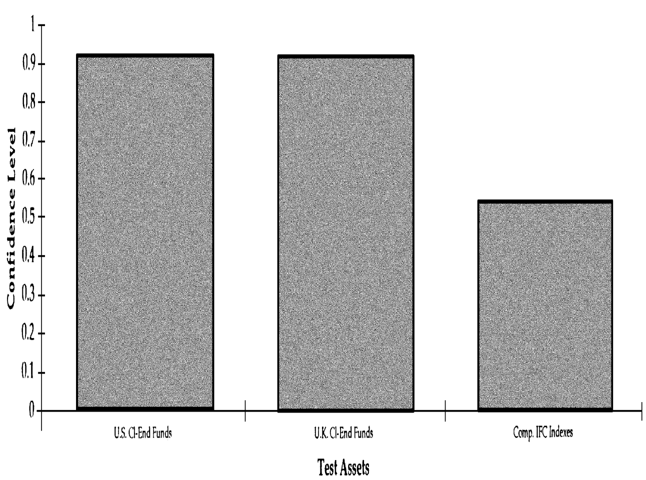
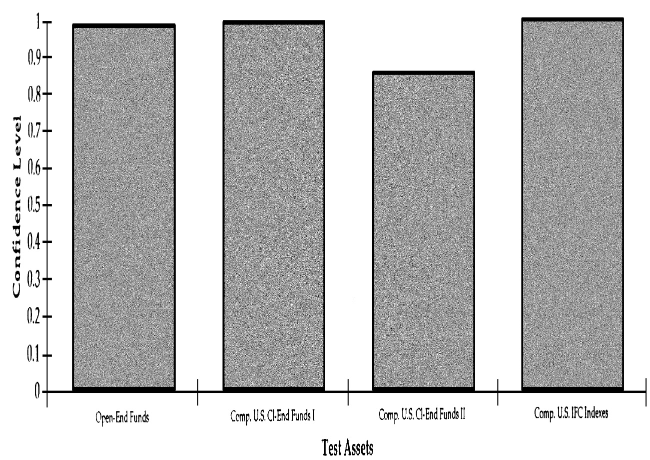
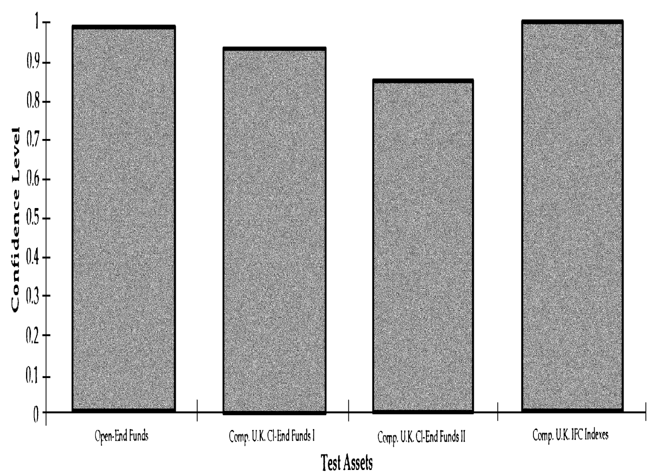


EXHIBIT 7

Confidence Levels 1993-1996 (Asia):
Open-End Fund, Closed-End Funds, and IFC Incexes



Confidence Levels 1993-1996 (Asia):
Open-End Fund, Closed-End Funds, and IFC Indexes



ine whether requiring common coverage by U.S. and U.K. funds alters the results.

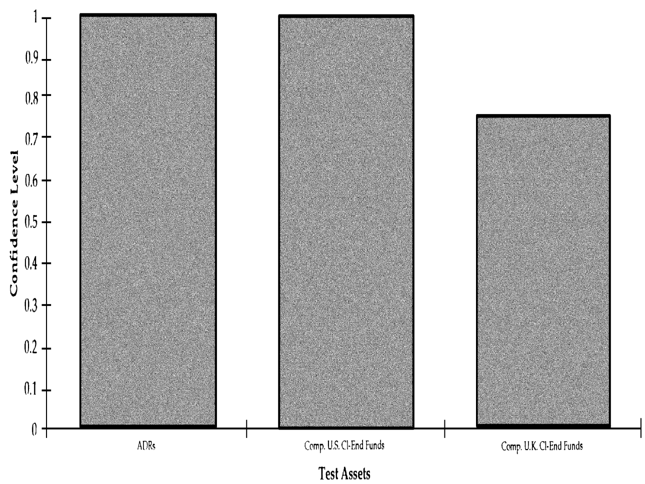
Overall, both U.S. and U.K. emerging market closed-end funds provided significant diversification gains in the 1993-1996 period, and the U.K. funds provided benefits in some combinations in the earlier 1990-1993 period.

Open-End Funds. Exhibit 7 presents results from mean-variance spanning tests using global and Asian open-end funds and the FT-Actuaries benchmark of four indexes (Latin American open-end funds are examined with the ADR results). The open-end funds provide clear diversification benefits, with a confidence level near 99%. Robustness checks confirm that the particular choice of funds does not affect the results when there is duplicate coverage.

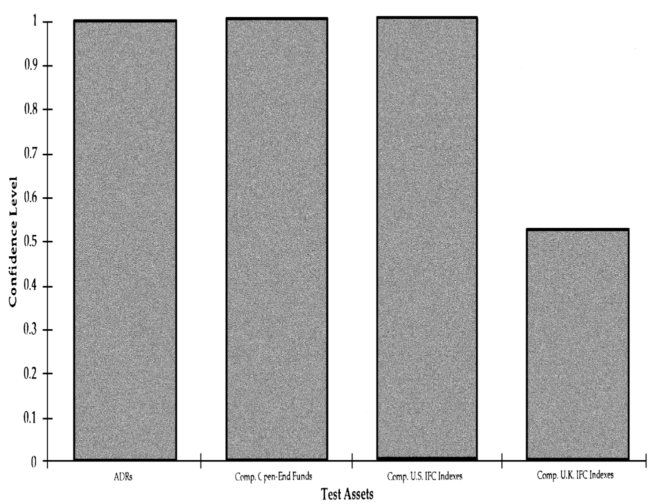
The results for closed-end funds from the U.S. or the U.K. covering the same regional markets are

EXHIBIT 8

Confidence Levels 1993-1996 (Latin America): ADRs and Closed-End Funds



Confidence Levels 1993-1996 (Latin America): ADRs, Open-End Funds, and IFC Indexes



ambiguous, and depend on the particular funds chosen when there is duplicate coverage. (Exhibit 7 shows the worst case for the U.S. and U.K. funds.) The corresponding IFC investable indexes provide strong evidence of diversification benefits from Asian markets during the test period, with a confidence level greater than 99% for the indexes.

ADRs. For the ADRs, equally weighted indexes of eligible ADRs in each of the five markets constitute the test assets, and the benchmark is the same FT-Actuaries benchmark of four indexes. In Exhibit 8, the confidence level for the ADR indexes is close to 100%.

The ADR results are compared with tests using open-end and closed-end funds from the U.S. or the U.K. covering the same markets. The confidence level for the comparable U.S. closed-end funds is 99%, but only 75% for the comparable U.K. closed-end funds. These levels are robust to the choice of funds when there is duplicate coverage. The U.S. closed-end funds therefore appear to offer diversification benefits in line with comparable ADRs during the test period (only one Latin American U.K. closed-end fund was available).

Comparing a set of four global and Latin American open-end funds to the ADR sample, there are significant diversification benefits for the open-end funds, at a confidence level greater than 99%. Here again the results are robust to the particular open-end fund chosen when there is duplicate coverage. The IFC investable indexes corresponding to the ADR coverage provide significant diversification benefits, at a confidence level of more than 99%.

How Practical are Our Tests?

Recall that a mean-variance spanning test is equivalent to examining whether the frontier of benchmark assets intersects the frontier of benchmark and test assets at two points. The two-fund separation principle then guarantees that if the frontiers intersect at two points, they intersect at all points (i.e., the frontiers are the same). Of course, the asset frontiers in the test depend on the historical time series we use to estimate them.

When we reject the null hypothesis that the benchmark assets span the test assets, it is relevant to ask whether the portfolios at which we test for intersection are realistic. In fact, in some cases the portfolio implied by the frontier of benchmark and test assets and the riskless rate has negative weights, since our mean-variance spanning tests do not constrain the weights of assets in the tangency portfolio to be positive. Results based on these portfolios may suggest diversification benefits that are not available when shorting is disallowed or prohibitively costly.

To assess the importance of shorting in our results, in Exhibit 9 we report the change in the Sharpe ratio implied by the addition of the test assets when shorting more than 10% of an asset is allowed and when it is not, for groups of test assets where short positions

EXHIBIT 9
THE IMPACT OF SHORTING ON MEAN-VARIANCE SPANNING TESTS (1993-1996)

Test Assets	Sharpe Ratio Change Shorting	Sharpe Ratio Change No Shorts < -10%
U.K. Closed-End Fund Index	0.0061	0.0015
U.S. Closed-End Fund Index	0.0398	0.0111
ADRs	0.0971	0.0601
Open-End Funds	0.0978	0.0386

are a problem.[13]

Shorting was most in evidence for the closed-end funds during the 1993-1996 period, and for tests using the open-end Asian and Latin American funds. Exhibit 9 suggests that excluding funds that are shorted in the original tests reduces the incremental Sharpe ratio obtained from the emerging market assets, but for some investors this loss may be reasonable compared to the costs of undertaking short positions.

CONCLUSION

On an expected return basis, it is possible to compare the advantages of emerging market investments in the context of a mean-variance efficient portfolio. Our experiment shows that, if we are willing to accept the integrity of estimates of the covariance between emerging and developed equity market returns from historical data, we can distinguish among closed-end funds, open-end funds, ADRs, and the IFC investable indexes. The higher correlations between closed-end fund returns and developed market equity returns imply that higher expected returns are required to justify emerging market closed-end funds in optimal portfolios compared to the other emerging market investment vehicles. With optimal allocation levels greater than 10%, emerging market open-end funds, ADRs, and the IFC index may actually have lower expected returns than developed equity markets owing to low correlations with the developed markets. Open-end funds offer the best tracking of the IFC investable index from 1993-1996 using equally weighted portfolios.

As for evidence of diversification benefits from emerging equity markets, using mean-variance spanning tests, we find that benefits are sensitive to the time period of the tests and, in some cases, to the particular investment vehicle. Direct exposure to emerging market indexes almost always gives benefits at least as strong as those from managed funds (both publicly traded and not) or ADR portfolios. Closed-end funds, open-end funds, and ADRs provided statistically significant diversification benefits in the 1993-1996 test period.

When accessing emerging markets through closed-end funds, performance may depend on who manages the portfolio. In the earlier 1990-1993 test period, it appears that U.K. fund managers as a whole provided benefits superior to the U.S. managers. These test results rely on estimates of both expected returns and covariance from the historical data.

Are the benefits we document likely to persist? Clearly, as the equity markets in emerging economies mature, the restrictions and costs associated with investing will be reduced. The diversification potential reflected in market indexes will gradually become a more attainable benchmark for all types of investors.

Global capital market integration is likely to continue, however, and in the process the correlations between emerging and developed markets are likely to strengthen. Bekaert and Harvey [1997a] show how correlations between the world market and emerging markets increase over time as the degree of integration increases. Furthermore, the returns investors can expect to earn in emerging markets are likely to fall as integration proceeds. Specifically, the integration process may lead to one-time, discrete price hikes that bring about lower expected returns going forward (see Bekaert and Harvey [1997b] for a formal discussion).

This does not mean that emerging markets are not attractive from a return perspective. Many still are, but investors will need to be more selective going forward, and entertain the prospects of unfamiliar new markets as well. Before the large influx of capital in the early 1990s, most emerging equity markets were small relative to the size of their economies and had ample room to grow. Their market capitalization as a proportion of GDP is approximately 17% today, according to MSCI in December 1997.

As these markets mature, more sophisticated asset management approaches may have value. For example, some Latin American markets offer liquid local stocks that are affiliated with ADR programs as well as illiquid local shares with less international visibility. Urias [1996] shows that these two categories of stocks should exhibit different expected return and correlation characteristics, although the presence of ADRs should lead to some international influence on the pricing of the less-liquid local shares.

Finally, as the Mexican peso and Asian currency crises demonstrate, even with increasing integration of world and emerging capital markets, certain risks specific to emerging markets remain. Occasional calamities suggest that asset allocation models need to be improved to accommodate the asymmetric return distributions that characterize equity markets, especially emerging markets. Risk management systems must incorporate expectations of low-probability negative events. Forecasting such calamities is an important topic for future research.

APPENDIX
Mean-Variance Spanning Tests

Our test for mean-variance spanning relies on the asset pricing framework of Hansen and Jagannathan [1991] and is equivalent to the restrictions on the regression coefficients in Equation (1) in the text. The primary advantage of our test is its robustness to non-standard characteristics of asset return data like conditional heteroscedasticity and autocorrelation. Here we provide some intuition for the test by establishing the connection between mean-variance spanning and changes in the Sharpe ratio (see Sharpe [1994]). Bekaert and Urias [1996] provide a more formal development of the test and its equivalence with the Huberman and Kandel [1987] test described in Equation (1).

We begin with the fundamental asset pricing equation that, under very general conditions, relates the price of any asset today to its payoff next period. The equation says that the asset's price today is equal to the mathematical expectation of its price plus payoff next period times a stochastic discount factor. This can be written as

$$E\{[R(t+1)+\iota]m(t+1)\} = \iota \qquad \text{(A-1)}$$

where $R(t + 1)$ represents a vector of net security returns at time $t + 1$, $m(t + 1)$ is the stochastic discount factor, and ι is a vector of ones.

The distinguishing feature of an asset pricing model is its specification for the discount factor, $m(t + 1)$. Equation (A-1) assumes frictionless markets and that the law of one price holds. It turns out that any asset pricing model, including the CAPM, multifactor models, or Black-Scholes, can be written according to Equation (A-1).

Hansen and Jagannathan [1991] show that the linear projection of $m(t + 1)$ onto the set of asset returns being priced has minimum variance in the class of all discount factors that satisfy Equation (A-1). For example, the discount factor:

$$m^{\alpha}(t+1) \equiv \alpha + [R(t+1) - ER(t+1)]'\beta^{(\alpha)} \qquad \text{(A-2)}$$

formed from the projection of $m(t + 1)$ onto one-period returns also satisfies Equation (A-1). The discount factor depends on a prespecified value for α, which equals $Em(t + 1)$.

Now partition $R(t + 1) \equiv [R_b(t + 1)', R_e(t + 1)']'$ and $\beta^{(\alpha)} \equiv [\beta_b^{(\alpha)\prime}, \beta_e^{(\alpha)\prime}]$. Hence $R_b(t + 1)$ can be thought of as the benchmark asset returns in Equation (1), and $R_e(t + 1)$ can be thought of as the emerging market test asset returns.

We use this framework to test whether the benchmark vector of returns, $R_b(t + 1)$, spans the vector of benchmark and test returns, $R(t + 1)$. The mean-variance spanning restriction in this framework amounts to:

$$\beta_e^{(\alpha)} = 0 \qquad \forall \qquad \text{(A-3)}$$

in Equation (A-2), and is equivalent to the restriction described in Equation (2). The test asks whether the test assets $R_e(t + 1)$ are needed to "price" the benchmark and test assets in $R(t + 1)$.

Suppressing time subscripts and assuming $m^{(\alpha)}$ is the fitted value from Equation (A-2), we can calculate $\beta^{(\alpha)}$ using standard regression theory as:

$$\beta^{(\alpha)} = \Sigma_R^{-1}[\iota - (Em)(ER)] \qquad \text{(A-4)}$$

where Σ_R^{-1} is the inverse of the variance-covariance matrix of the returns, and $Em = Em^{(\alpha)}$. Substituting $\beta^{(\alpha)}$ into Equation (A-2), it follows that the volatility of the true discount factor, σ_m^2, is bounded below by the volatility of the discount factor $m^{(\alpha)}$:

$$\sigma_m^2 \geq \sigma_{m^{(\alpha)}}^2 = [\iota - (Em)(ER)]'\Sigma_R^{-1}[\iota - (Em)(ER)] \qquad \text{(A-5)}$$

Finally, using the fact that Em equals one divided by the riskless rate, $1/r_f$ [substitute a riskless return into Equation (A-5)], we see that the discount factor volatility, scaled by its mean, is bounded below by the Sharpe ratio:

$$\frac{\sigma_m}{Em} \geq \{[ER - r_f]'\Sigma_R^{-1}[ER - r_f]\}^{1/2} \qquad \text{(A-6)}$$

Note that the right-hand side of Equation (A-6) is the Sharpe ratio for the mean-standard deviation frontier formed by the benchmark and test asset returns $R(t + 1)$. It is the slope of the line emanating from the point $(0, r_f)$ that intersects the frontier. Thus

Equation (A-6) says that changes in the volatility of the discount factor correspond to changes in the Sharpe ratio. For example, when the discount factor in Equation (A-6) is restricted to be a function of a smaller set of returns [e.g., $R_b(t + 1)$ instead of $R(t + 1)$], the change in its volatility corresponds to a change in the Sharpe ratio.

Testing the restriction in Equation (A-3) when $\alpha = 1/r_f$ can then be viewed as a test that the mean-standard deviation frontiers formed by $R_b(t + 1)$ and $R(t + 1)$ intersect at one point. Equation (A-3) requires that the frontiers intersect at every point (for any α), including that corresponding to $\alpha = 1/r_f$. Mean-variance spanning therefore implies that the change in the Sharpe ratio resulting from adding the test assets to the benchmark assets is zero at all points.

ENDNOTES

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[1]There is some evidence, however, that the correlations are higher in down markets. See Harvey [1995] for a summary of emerging equity market characteristics.

[2]Another important consideration, although not developed in this article, is the stability of correlations over time as the relationship between emerging and developed markets changes. Bekaert and Harvey [1997a] study this issue.

[3]Bekaert [1995] provides a classification of the various costs associated with emerging market investments.

[4]More recently, publicly traded shares representing the performance of a basket of equities built to track a market index have been introduced. One such product, known as WEBS, has been trading since 1996.

[5]A more recent open-end alternative is Vanguard Group's International Equity Index Fund Emerging Markets Portfolio, which tracks the MSCI Select Emerging Markets Free index.

[6]Comparing the costs of different emerging market investments is a complex subject that we do not fully address here. Our interest is the direct or indirect impact of these costs on the realized and expected performance of alternative investments.

[7]U.K. closed-end funds are known as investment trusts, and while they are technically equivalent to their U.S. counterparts, there are a number of institutional differences. The most important are that U.K. funds are held mainly by institutions, and fund expenses are deductible from taxable income for U.K. trusts (see Bekaert and Urias [1996] and Ammer [1990] for details). In the U.S., closed-end funds are largely the province of retail investors, and fund expenses are not tax-deductible. The capitalization of U.K. trusts also tends to be more complex than for U.S. funds, with multiple classes of shares and warrants common in the U.K.

[8]Urias [1996] describes the differences in regulatory and other costs associated with the different categories of ADRs.

[9]It also corresponds to the coefficient of relative risk aversion for an investor with constant relative risk aversion preferences who invests in assets with normally distributed returns.

[10]This number is obtained by computing the price of risk using the historical excess return and volatility of the world market return.

[11]The return on this asset is the average of the U.S. dollar LIBOR for the period of the test.

[12]The two sets of funds include only funds that are available in both test periods and have corresponding IFC investable indexes.

[13]Variants of our mean-variance spanning test that correct for shorting exist, but discussion of them is beyond the scope of our investigation. See deRoon, Nijman, and Werker [1996] for an analysis.

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