

The Value of International Equity Diversification: An Empirical Test

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Abstract

Three types of foreign equities traded in U.S. capital markets--American Depository Receipts, Direct Foreign Shares, and International Mutual Funds--were examined using active portfolio management strategy. These equities were studied from 1983 to 1986 to evaluate them empirically as a form of international diversification. The findings suggest that such foreign diversification, when guided by practitioner-feasible portfolio management, can substantially contribute to the performance of active portfolio management. However, not all foreign equities examined appeared to equally contribute to portfolio performance.

Introduction

Using foreign equity shares to provide international diversification has gained rapid acceptance by money managers. Foreign shares promise both diversification based on attractive covariance relationships between foreign and domestic returns and high returns from fast-growing foreign economies and/or exchange gains. In addition, such foreign equities as American Depository Receipts, Direct Foreign Shares, and International Mutual Funds are traded in U.S. capital markets. They represent an efficient way to achieve international equity diversification because they pose none of the hurdles usually encountered when investing abroad.

The support for international diversification appears overwhelming (1). Correlation analysis between returns of domestic and foreign securities or more directly, international diversification experiments based mostly on passive asset-allocation strategies, demonstrate improved performance from diversifying abroad. However, investment services, which promote themselves largely on the basis of active portfolio management, say active management outperforms passive strategies. In contrast, the challenge that investment managers face in outperforming simple passive investment strategies through active asset-allocation is apparent in the annual reports provided by various portfolio evaluation services. Many large, actively-managed portfolios often do not perform as well as passive portfolios such as stock market indices on a risk-adjusted basis (2). If picking domestic stocks is difficult for investment managers, will they pick foreign stocks more successfully? The lack of information about foreign equities suggests that this may not be

the case. Active foreign diversification strategies may not be as effective as passive foreign diversification strategies or domestic diversification strategies.

This paper reports the results of empirical tests of the performance of active international equity diversification. The equities examined are American Depository Receipts (ADRs), Direct Foreign Shares (DFSs), and International Mutual Funds that are readily available in American stock markets. To examine the contribution of this form of foreign diversification, active ex ante (practitioner-feasible) investment strategy is modeled using Markowitz portfolio selection techniques. The results suggest improved investment performance from investing abroad although substantial differences in contribution exist among different types of foreign equities.

Active International Portfolio Management; Sample and Methodology

In contrast to the passive approach which typically consists of some duplication of an international portfolio of all possible assets, active portfolio management requires the constant use of security- and country-specific information such as prospects of particular companies, foreign exchange rates, or foreign economies. In lack of a formal model, active portfolio management can be approximated under two rather realistic assumptions. These are that the investor's objective is performance domination in Markowitz' sense and that asset allocation decisions are based on actual recent return and correlation of return experience. Stated differently, next

period's portfolio choice is based on this period's desirable efficient portfolio. This method thus offers an ex ante test of a practitioner-feasible approach to active optimal asset allocation.

Short of acquiring shares of foreign firms traded in U.S. capital markets, money managers can achieve indirect international diversification by buying shares in large American firms with substantial business activities abroad. Representative samples of such firms are included in the major stock market indices. The S&P 100 firms, which are similar to the S&P 400 and 500 firms consist of 80 percent of industrial corporations and 20 percent of finance, utility, and transportation corporations, were chosen as the benchmark sample against which the performance of shares of foreign firms is measured (3).

The sample of foreign stocks consists of all foreign firms whose shares have continuously traded in the U.S. capital markets during the study period, January 1981 to September 1986. Twenty-six American Depository Receipts and fifteen Direct Foreign Shares traded in the NASDAQ system. Eighteen international mutual funds traded on the Over the Counter market and on the New York Stock Exchange.

Using each stock's dividends and capital gains, monthly returns were calculated for each of the 149 securities included in the domestic and foreign sample for the study period. Using the monthly returns, ex ante active asset management strategy was simulated as follows. First, Markowitz-efficient domestic and foreign portfolios (4) were formed based on 33 actual monthly returns from each security chosen from the sample of 100 domestic stocks and the sample of 149 domestic and foreign stocks, respectively (the formation period). Then the securities included in the efficient portfolios and their weights were employed to implement active portfolio management strategy over the following 12-months' investment holding period (the test period). Finally, using actual dividends and capital gains during the test period, monthly returns were calculated for each portfolio for the 12-months' investment period.

This process was repeated three times to obtain three 12-month investment holding periods: October 1983 to September 1984, October 1984 to September 1985, and October 1985 to September 1986. This repetition was done by moving the 33-month initiation period forward 12 months from January 1981 to September 1983 for the first investment period, to January 1982 to September 1984 for the second investment period, and to January 1983 to September 1985 for the third period.

Impact of Foreign Equity Diversification

Active asset allocation strategy for this empirical test

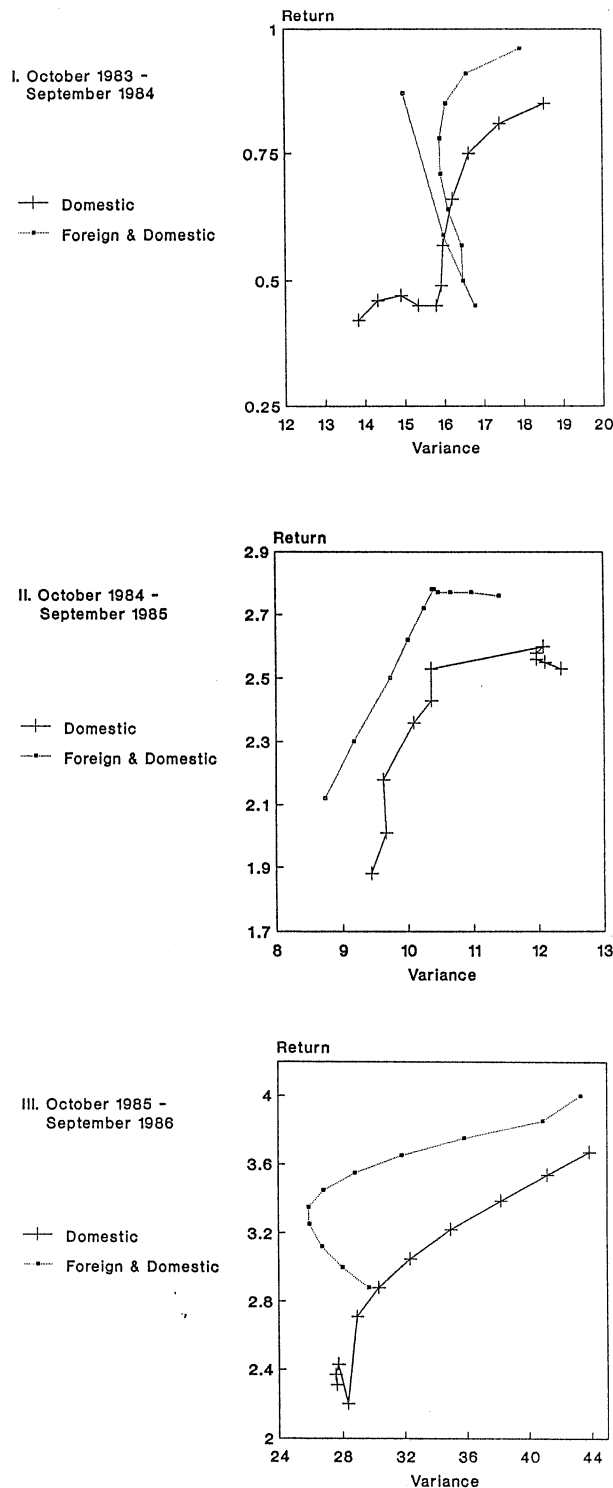
was modeled to examine money manager-oriented investment decisions of foreign diversification from January 1983 to September 1986. The effect of including foreign equities into a portfolio of domestic equities was examined in risk-return terms. The efficient frontiers in Figure 1 (5) show the improvements in portfolio performance caused by including foreign equities during each of the three investment periods, October 1983 to September 1984, October 1984 to September 1985, and October 1985 to September 1986. The picture for the second and third investment periods is clear. Diversification across foreign equities allows one to move the investment frontier to the left of the domestic investment frontier. At the same risk level, money managers during each of the three periods could have improved their monthly portfolio performance by increasing portfolio return. Or at the same return level, they could have reduced portfolio risk by investing abroad. During the first investment period, similar improvements in portfolio return and risk were possible only for high- and low-return target return portfolios, whereas international equity diversification did not pay for portfolios with midrange return levels.

The average monthly returns and variances of return of both domestic and foreign portfolios are reported in Table 1. The portfolio returns show, with one exception, the potential increases in performance that were possible in each test period by investing abroad. The average increase in portfolio return from foreign diversification was 25.3% in the first test period, 10.4% in the second test period, and 20.8% in the third test period. However, including foreign equities was not as effective in reducing investment risk. Portfolio variance that resulted from diversifying internationally increased for six out of eleven portfolios in the first period, for one out of eleven portfolios in the second period, and for two out of eleven portfolios in the third period. Overall, investing abroad led to an average percent increase in investment risk of 3.3% in the first period and an average decrease of investment risk of 6.9% and 4.8% in the second and third periods, respectively.

Next, to reconcile risk-return performance, the Sharpe composite measure of portfolio performance (6) was calculated for each portfolio. This index of investment performance which measures the return premium per unit of investment risk, is presented in Table 2. The portfolio return premium was higher for all foreign portfolios during each of the three investment periods. Also the increase in return premium was fairly consistent across the 11 foreign target return portfolios during the 1984--1985 and the 1985-1986 investment periods whereas, during the first investment period, 1983-1984, greater variations existed across portfolios. On average the portfolio return premium increased 57.6% per foreign portfolio in the first investment period, 18.5% per portfolio in the second investment period, and 28.8% in the third investment period.

Figure 1

Efficient Frontiers of Domestic and Foreign Portfolios for the Period October 1983 to September 1986



Source: Average monthly domestic and foreign portfolio returns and variances of return listed in Table 1.

In summary, the findings from Tables 1 and 2 suggest that substantial increases in portfolio return premium per unit of investment risk were possible during each of the three one-year investment periods and that, during 1983-1986, active money managers could have improved their investment performance by including foreign equities into their portfolios (7).

Next, the impact of the investment target return objective on the effectiveness of foreign diversification is examined. Will foreign equity diversification make a greater contribution to an aggressively managed portfolio or to a more conservatively managed portfolio? Examining differences in risk and return performance of high- and low-target return portfolios in Table 1 suggests that investing abroad on average generated greater improvements in portfolio return for lower-target return portfolios than for higher-target return portfolios. In contrast, the largest risk-reduction contribution from investing abroad in investment periods two and three was made by midrange target return portfolios and in investment period one was made by low-target return portfolios. The composite performance analysis presented in Table 2, however, suggests a canceling effect between risk and return contributions. Improvements in the Sharpe Index do not suggest that a particular investment strategy would consistently maximize the benefits accrued from investing abroad because improvements in performance are fairly consistent across portfolios with different target return objectives.

Finally, not all foreign equities studied performed equally well. Substantial differences in the contribution to international diversification exist among different types of foreign equities (8). The contribution from investing abroad as suggested by these findings was made by American Depository Receipt shares and Direct Foreign Shares. International Mutual Funds did not enter the optimal portfolio composition and therefore do not affect the asset allocation decision. International Mutual Funds typically consist of diversified portfolios of international securities and therefore may not have been chosen for the unique and valuable return correlation features typical to individual foreign stocks. As is, these funds do not appear to contribute to active international diversification.

In summary, the tests show that investing abroad through American Depository Receipts and Direct Foreign Shares would have offered money managers attractive portfolio risk and return improvements. The findings also suggest that the benefits were reasonably consistent over the three-year test period examined. Finally, no particular investment strategy such as aggressive vs. conservative appears more effective than other strategies when performance improvement is measured in terms of standardized investment return. Money managers would have gotten their money's worth from investing in foreign equities traded domestically.

TABLE 1

Average Monthly Domestic and Foreign Portfolio Returns, Variances of Return, and Changes in Portfolio Performance from Foreign Diversification for the Period October 1983 to September 1986

Port- folio	Target Return	Portfolio Returns		Percent Change		Portfolio Variances	
		Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
I.							
10/83	1.8	0.420	0.873	107.8	13.839	14.976	- 8.2
9/84	2.0	0.464	0.596	28.5	14.316	15.979	-16.6
	2.0	0.475	0.459	-3.4	14.906	16.768	-12.5
	2.4	0.452	0.500	10.6	15.347	16.469	- 7.3
	2.6	0.452	0.572	26.5	15.785	16.437	- 4.1
	2.8	0.496	0.642	29.4	15.912	16.106	- 1.2
	3.0	0.577	0.712	23.4	15.969	15.905	0.4
	3.2	0.665	0.781	17.4	16.216	15.885	2.0
	3.4	0.752	0.851	13.2	16.620	16.048	3.4
	3.6	0.813	0.916	12.7	17.409	16.572	4.8
	3.8	0.859	0.966	12.5	18.535	17.931	3.2
II.							
10/84-	1.8	1.887	2.120	12.3	9.444	8.736	7.5
9/85	2.0	2.017	2.306	14.3	9.666	9.178	5.0
	2.2	2.183	2.501	14.6	9.622	9.732	- 1.1
	2.4	2.360	2.626	11.3	10.090	10.005	0.8
	2.6	2.431	2.729	12.3	10.366	10.258	1.0
	2.8	2.539	2.786	9.7	10.367	10.419	8.3
	3.0	2.605	2.782	6.8	12.088	10.388	14.1
	3.2	2.588	2.778	7.3	11.974	10.470	12.6
	3.4	2.569	2.774	8.0	11.979	10.668	10.9
	3.6	2.551	2.770	8.6	12.105	10.980	9.3
	3.8	2.533	2.766	9.2	12.353	11.408	7.6
III.							
10/85-	1.8	2.318	2.884	24.4	27.625	29.719	- 7.6
9/86	2.0	2.374	3.005	26.6	27.553	28.005	- 1.6
	2.2	2.438	3.128	28.3	27.749	26.738	3.6
	2.4	2.200	3.250	47.7	28.344	25.916	8.6
	2.6	2.716	3.353	23.5	28.933	25.862	10.6
	2.8	2.886	3.453	19.6	30.336	26.831	11.6
	3.0	3.055	3.555	16.4	32.352	28.816	10.9
	3.2	3.224	3.656	13.4	34.980	31.820	9.0
	3.4	3.393	3.756	10.7	38.219	35.842	6.2
	3.6	3.543	3.858	8.9	41.173	40.883	0.7
	3.8	3.678	4.005	8.9	43.877	43.323	1.3

Source: Actual portfolio returns and variances of return from 36 "investment" months.

TABLE 2

Monthly Sharpe Indices for Domestic and Foreign Portfolios (October 1983 to September 1986)

Portfolio #	Oct. '83 - Sept. '84		Oct. '84 - Sept. '85		Oct. '85 - Sept. '86	
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
1	-0.107	0.014	0.405	0.499	0.316	0.434
2	-0.093	-0.055	0.442	0.549	0.353	0.470
3	-0.089	-0.088	0.497	0.596	0.363	0.505
4	-0.093	-0.078	0.540	0.624	0.316	0.537
5	-0.092	-0.060	0.556	0.652	0.408	0.557
6	-0.080	-0.044	0.563	0.666	0.429	0.567
7	-0.060	-0.026	0.564	0.665	0.446	0.566
8	-0.038	-0.009	0.562	0.659	0.458	0.556
9	-0.016	0.008	0.557	0.652	0.465	0.541
10	0.001	0.024	0.549	0.643	0.471	0.529
11	0.010	0.035	0.539	0.628	0.477	0.530
X̄	-0.059	-0.025	0.525	0.621	0.409	0.527
Change	57.6%		18.5%		28.8%	

Source: Ratios calculated from pairs of average monthly domestic and foreign portfolio returns and variances from Table 1. Sharpe's Index is defined as the mean excess portfolio return divided by the portfolio standard deviation.

TABLE 3

Average Monthly Returns, Variances of Return, and Sharpe Indices of Five Stock Market Indices, Domestic Portfolios, and Foreign Portfolios for the Period October 1983 - September 1986

Index/ Portfolio	I			II			III		
	October 1983 - September 1984			October 1984 - September 1985			October 1985 - September 1986		
	Monthly R	σ	Sharpe	Monthly R	σ	Sharpe Index	Monthly R	σ	Sharpe Index
AMEX	-0.397	5.695	-0.213	3.220	3.508	-0.091	1.426	4.206	0.216
NASDAQ	-1.299	4.919	-0.430	1.048	4.267	0.095	2.008	4.941	0.302
NYSE	0.032	3.871	-0.203	0.828	2.956	0.063	2.117	4.767	0.336
DJIA(30)	0.310	4.123	-0.123	1.236	2.317	0.256	2.857	4.945	0.473
S&P 100	0.010	4.002	-0.206	0.619	3.083	-0.007	1.925	4.742	0.297
DOMESTIC	0.584	3.984	-0.059	2.387	3.313	0.525	2.893	5.711	0.409
FOREIGN	0.715	4.034	-0.025	2.631	3.192	0.621	3.446	5.567	0.527

Source: Average monthly portfolio returns and standard deviations of return.

relatively poorly in the first investment period, reasonably well in the second period, and very well in the last period. In the first period, actual return averaged 76.4% below target return for each of the 11 portfolios, and the target was met unevenly in all cases. As was discussed in the previous section, investing abroad improved the shortfall from target on average by about 25% for each of the 11 portfolios examined.

In the second period, the average shortfall from target was only 11.6%. The lower-target-return portfolios met the target, and the performance gap widened with the increase in target return. In the third period, target return was exceeded on average by 4.5%. Lower-target-return portfolios exceeded target return more than higher-target-return portfolios. Again, when foreign diversification was taken into account, target returns were achieved and exceeded more often in the two later periods.

How successful was active portfolio management as modeled in this study in relation to passive portfolio management? Table 3 provides performance comparison between five domestic stock market indices and the actively managed domestic and foreign investment portfolios studied in this paper. Examining the Sharpe Index suggests that, with one exception, active asset allocation strategy led on average to superior investment performance over passive asset allocation strategies during each of the three investment periods. With the exception of the Dow Jones Industrial Average in 1985-1986, during all periods the reward-to-variability ratio for the domestic portfolio was at least 21.7% higher than for the highest performance stock index. In addition, comparing active portfolio management to passive portfolio management (the Standard & Poors 100 stock index) suggests that, at least during the three-year period studied, active management as modeled in this empirical study outperformed passive management. The Sharpe performance index increased from -0.206 to -0.059 in the first investment period, from -0.007 to 0.525 in the second investment period, and from 0.297 to 0.409 in the last period, indicating the effectiveness in improving investment performance of active portfolio management as modeled here.

In summary, these differences in performance between investment objective and outcome and between active and passive asset allocation strategies, on average, suggest that the model employed to simulate active domestic and foreign portfolio management is adequate for the tests conducted in this study and the conclusions drawn from the results.

Impact of Active Portfolio Management

Active portfolio management consists of setting investment objectives in the form of target levels of return and risk and then selecting securities with the greatest potential to accomplish the investment objective. The selection process used in this study is modeled based on optimization in Markowitz risk-return terms in which the investment objective is risk minimization at a specific target income level. How successful is active portfolio management as modeled in this study in achieving set goals for both domestic and foreign diversification strategies?

Differences between the target portfolio return and realized portfolio return suggest that the rate of success of achieving the target was not consistent over time. Comparing domestic portfolio returns to target returns in Table 1, active portfolio management performed

Conclusions

The study set out to examine empirically the value of international equity diversification to active portfolio management. Foreign equity diversification appears to offer improvements in investment performance to money managers. Of those foreign equities included in this study, American Depository Receipts (ADRs) and Direct Foreign Shares (DFSs) alike contributed substantially to improvements in investment return and to a lesser degree to reductions in investment risk when compared to domestic diversification strategies, even if pitted against the Standard & Poors 100 stocks of highly internationally diversified corporations. Improvements in investment return per unit of investment risk as composite measure of performance showed average increases ranging from 18.5% to 57.6% over the three-year investment period studied (October 1983 to September 1986). These results suggest that, even after considering transaction costs caused by active management performance, improvements through foreign diversification appear consistently possible for money managers hard pressed for marginal improvements.

Finally, the model employed to simulate active asset allocation decision making proved effective in making investment decisions that would be located ex post on the optimal investment frontier in risk-return terms in addition to offering attractive international diversification benefits.

Footnotes

- 1 Agmon (1972), Bergstrom (1975), Lessard (1976), Logue (1982), McDonald (1973), Officer and Hoffmeister (1987), Solnik (1974), and Swanson (1979).
- 2 See James A. White (1989).
- 3 The correlation coefficients of return between the benchmark portfolio chosen in this study and other selected indices based on index returns obtained from COMPUSTAT for the study period 1981 - 1986 were NYSE .96627, DJI30 .94744, S&P 400 .97383, and S&P 500 .96973, Which suggests that the indices are highly correlated to the benchmark index.
- 4 In this study, a solution to the quadratic programming problem in which the objective function is minimizing portfolio variance for a given level of return was sought. For a thorough discussion see Markowitz (1959), Chapter 8. The investment frontier consists of eleven portfolios with monthly target returns ranging from 1.8 percent to 3.6 percent in increments of 0.2 percent which represents the range of returns possible during the periods examined.
- 5 The efficient frontiers presented in Figure 1 were derived by calculating actual portfolio

returns during the test period for the efficient portfolios formed during the 33-month formation period. While the efficient frontiers, which consist of formation period portfolios, were "well-behaved," the less shapely test period efficient frontiers result from individual stocks volatility over the test periods.

- 6 See Sharpe (1981). The average monthly risk-free rates of 0.817 percent, 0.642 percent, and 0.517 percent for the first, second, and third investment period, respectively, employed to calculate the index were taken from the 1987 yearbook, *Stocks, Bonds, Bills, and Inflation*, published by Ibbotson and Associates, Chicago.
- 7 The results presented in this study are not adjusted for transaction costs. While active portfolio management strategies lead to more frequent trading, the following reasons suggest that an adjustment for transaction costs would not change the conclusions drawn from the findings. First, transaction costs of the foreign equities studied here do not differ from those of the domestic equities as they are traded in U.S. markets. Second, active domestic and foreign diversification did not lead to significant differences in the number of transactions. Finally, money managers' transaction costs are on average relatively low compared to those of individual investors.
- 8 A detailed list of all securities and their relative weights included in each optimal portfolio is available upon request from the authors.

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