

NBER WORKING PAPERS SERIES

INVESTOR DIVERSIFICATION  
AND  
INTERNATIONAL EQUITY MARKETS

Kenneth R. French

James M. Poterba

Working Paper No. 3609

NATIONAL BUREAU OF ECONOMIC RESEARCH  
1050 Massachusetts Avenue  
Cambridge, MA 02138  
January 1991

We are grateful to the NSF, CRSP, the Alfred P. Sloan Foundation, and the John M. Olin Foundation for research support, to Michael Howell and Vincent Koen for data assistance, and to Cole Kendall, Richard Thaler, and Richard Zeckhauser for helpful comments. A data appendix for this project is available from the ICPSR in Ann Arbor, MI, or from the authors. This paper is part of NBER's research program in Financial Markets and Monetary Economics. Any opinions expressed are those of the authors and not those of the National Bureau of Economic Research.

NBER Working Paper #3609  
January 1991

INVESTOR DIVERSIFICATION  
AND INTERNATIONAL EQUITY MARKETS

ABSTRACT

The benefits of international diversification have been recognized for decades. In spite of this, most investors hold nearly all of their wealth in domestic assets. In this paper, we construct new estimates of the international equity portfolio holdings of investors in the U.S., Japan, and Britain. More than 98% of the equity portfolio of Japanese investors is held domestically; the analogous percentages are 94% for the U.S., and 82% for Britain. We use a simple model of investor preferences and behavior to show that current portfolio patterns imply that investors in each nation expect returns in their domestic equity market to be several hundred basis points higher than returns in other markets. This lack of diversification appears to be the result of investor choices, rather than institutional constraints.

Kenneth R. French  
Graduate School of Business  
University of Chicago  
1101 East 58th Street  
Chicago, IL 60637

James M. Poterba  
Department of Economics  
Massachusetts Institute  
of Technology  
Cambridge, MA 02139

Since the fortunes of different nations do not always move together, investors can diversify their portfolios by holding assets in several countries. The benefits of international diversification have been recognized for decades. In spite of this, most investors hold nearly all of their wealth in domestic assets. In this paper we use a simple model of investor preferences and behavior to show that current portfolio patterns imply that investors in each nation expect returns in their domestic equity market to be several hundred basis points higher than returns in other markets. The lack of diversification appears to be the result of investor choices, rather than institutional constraints.

### 1. International Asset Ownership Patterns

Most corporate equity is held by domestic investors. The domestic ownership shares of the world's five largest stock markets are: United States, 92.2%, Japan, 95.7%, United Kingdom, 92%, Germany, 79%, and France, 89.4%.<sup>1</sup> This information, and other data on cross-border equity transactions, can be used to estimate the international equity holdings of investors in each country. Table 1 presents crude estimates of the equity portfolio allocation for investors in the U.S., U.K., and Japan.<sup>2</sup>

The estimates show little cross-border diversification for U.S. and Japanese investors. At the end of 1989, Japanese investors had only 1.9% of their equity in foreign stocks, while U.S. investors held 6.2% of their equity portfolio overseas. The British, by comparison, hold 18% of their portfolio abroad,

divided almost equally among the United States, continental Europe, and Japan.

Since the U.K. is a smaller share of the total world equity market, it is not surprising that its investors hold more equity outside their own borders. However, the diversification of U.K. portfolios is a recent phenomenon. At the end of 1979, U.K. pension funds, which today hold 21% of their assets in foreign equities, held only 6% of their portfolios abroad [Michael Howell and Angela Cozzini (1990, p.30)]. The growth of international equity investments followed Prime Minister Thatcher's relaxation of capital controls.

## 2. Is Incomplete Diversification Costly?

The gains from diversification depend on the correlation of returns in different equity markets. We compute real returns from the perspective of a U.S. investor, assuming the the investor uses three-month forward contracts to lock in an exchange rate for the amount of his initial investment each quarter. The average pairwise correlation between quarterly returns on the equity markets in the U.S., Japan, the U.K., France, Germany, and Canada, for the 1975-1989 period is .502. This suggests that nontrivial risk reduction is available from cross-border holdings. The correlations are similar if the returns are measured in yen or pounds, and whether or not the exchange rate risk is hedged.

To measure the costs of incomplete diversification, we assume that a representative investor in each country has a constant

relative-risk-aversion utility function defined over wealth,  $U(W) = -e^{-\lambda W/W_0}$ , and that he maximizes expected utility.<sup>3</sup> For a given set of portfolio weights  $w$  associated with a vector of mean returns  $\mu$  and a covariance matrix  $\Sigma$ , this implies an expected utility of

$$(1) \quad E[U(w)] = -e^{-\lambda(w\mu - \lambda w'\Sigma w/2)}.$$

In this setting, optimal portfolio weights  $w^*$  satisfy

$$(2) \quad \mu = \lambda w^{*\prime} \Sigma.$$

With limited historical data on international equity returns, it is difficult to measure expected returns,  $\mu$ , or to infer the optimal portfolio weights,  $w^*$ , with any precision. We can, however, make reasonable estimates of the covariance matrix,  $\Sigma$ . Under the assumption that investors put all their wealth in the equity of the six largest stock markets, we can ask what set of expected returns,  $\mu^*(w, \Sigma)$ , would explain the pattern of international portfolio holdings we observe. We use equation (2) to calculate the expected returns implied by the actual portfolio holdings of U.S., Japanese, and British investors. We also compute the expected returns implied by an international "value-weighted" portfolio strategy for investors in each nation. The last column of Table 1 shows the value weights, based on market capitalization data from Morgan Stanley Capital International but with corrections for intercorporate equity holdings as in French and Poterba (1991). The adjustment reduces the importance of the Japanese and German markets.

The first panel of Table 2 shows that substantial differences in expected returns across countries for investors in a given nation are needed to rationalize observed portfolio holdings. In the most extreme case, British investors must expect annual returns in the U.K. market more than five hundred basis points above those in the U.S. market to explain their 82% investment in domestic shares. This large implied differential reflects the substantially higher standard deviation of returns on the British market, relative to returns on the U.S. and Japanese markets. For U.S. investors, the annual expected return on U.S. stocks must be 250 basis points above the expected return on Japanese stocks. In contrast, for Japanese investors, the expected return on Japanese stocks must be 350 basis points above the expected return on U.S. stocks.

The differences in expectations for different investors judging the same market are also striking. Our estimates suggest that Japanese investors, for example, expect returns from Japanese stocks which are more than 300 basis points greater than the returns U.S. investors expect. There are similar differences in the expectations of foreign and domestic investors in both the U.S. and U.K. equity markets.

Although these differences in expected returns are striking, the implied alternative of equal expected returns across all markets may not be an appropriate benchmark. As another alternative, we estimate the expected returns that would induce investors in each country to hold an international value-weighted

stock portfolio. The difference between the expected return vector implied by each country's actual investment pattern, and that implied by a value-weighted strategy, is shown in the lower panel of Table 2. The results again suggest that investors expect domestic returns that are systematically higher than those implied by a diversified portfolio. The differences between the two sets of implied returns for U.S. and British investors, however, are rarely larger than one hundred basis points. For example, U.S. investors' concentrated holdings of U.S. stocks can be explained by "optimistic" expectations of roughly ninety basis points. A similar "pessimism" of about 110 basis points is needed to justify U.S. investors' underweighting of the Japanese market. Both Japanese and British investors require more "optimism" regarding their own market: 250 basis points for the Japanese, and over 400 basis points in the U.K.

### 3. Institutional & Behavioral Accounts for Underdiversification

What explains the apparent tendency for portfolio investors, particularly in the U.K. and Japan, to over-weight their own equity market? There are two broad explanations. First, institutional factors may reduce returns from investing abroad or they may explicitly limit investors' ability to hold foreign stocks. It is difficult, however, to identify such constraints. Institutional barriers such as taxes or transaction costs are unlikely to explain the low level of crossborder equity investment today, even though capital controls substantially restricted equity

flows in the 1970s. Tax burdens that are higher on foreign than domestic equity income should lead investors toward holding domestic equity. There is little difference, however, between foreign and domestic tax burdens for most investors. Although all of the nations we examine impose a dividend withholding tax on payments to foreign shareholders, typically these payments can be credited against taxes in the investors' home country.<sup>4</sup>

Transaction costs also appear unable to explain limited international diversification. The cost of trading may be lower in more liquid markets such as New York than elsewhere, but this should incline all investors toward the most liquid market, not toward their own domestic market. Since all shares must be held by someone, differences in transaction costs should be reflected in differences in expected returns. The large gross equity flows across borders also suggests that transaction costs cannot explain why investors specialize in their home markets. For the United States in 1989, gross foreign equity purchases were fifty times net purchases (see our 1990 paper).

Explicit limits on cross-border investment could also affect portfolio holdings, although few of them appear to bind at present. In France, for example, a foreign investor may not hold more than 20% of any firm without authorization from the Ministry of Economy and Finance. In Japan, insurance companies cannot hold more than thirty percent of their assets in foreign securities. Many U.S. pension funds traditionally interpreted the "prudent man" rule as limiting their degree of international exposure.



The current level of international portfolio investment seems to be well below any institutional constraints. In the mid-1980s, for example, foreign investors were substantial net sellers of Japanese shares. Similarly, foreigners were net sellers of U.S. equities in 1988. Such reductions in international equity investments suggest that constraints on foreign holding are not binding, implying that incomplete diversification is the result of investor choices.

A second class of explanations for imperfect diversification focuses on investor behavior. One important possibility is that return expectations vary systematically across groups of investors. Robert Shiller, Fumiko Kon-Ya, and Yoshiro Tsutsui (1990) report direct evidence on this question. In early 1990, they surveyed portfolio managers in Japan and the United States. U.S. investors expected an average return of -0.3% on the Dow Jones Industrial Average over the next twelve months, compared with an expected return of -9.1% on the Nikkei. In contrast, Japanese investors expected an average return of 12.6% on the Dow, and 10.8% on the Nikkei. While the Japanese investors were more optimistic than their U.S. counterparts with respect to both markets, they were relatively more optimistic about the Tokyo market.

The statistical uncertainties associated with estimating expected returns in equity markets makes it difficult for investors to learn that expected returns in domestic markets are not systematically higher than those abroad. The standard error

of the estimated mean annual return on the U.S. stock market, based on sixty years of data, is two hundred basis points. Thus, the 95% confidence interval for the mean return spans eight hundred basis points. Because it is difficult to estimate ex ante returns, investors may follow their own idiosyncratic investment rules with impunity.

Another important behavioral insight concerns the perception of risk in equity markets. Investors may not evaluate the risk of different investments based solely on the historical standard deviation of returns. They may impute extra "risk" to foreign investments because they know less about foreign markets, institutions, and firms.<sup>4</sup> Country-specific closed end mutual funds, popular in the United States during the late 1980s, may overcome these fears [see Catherine Bosner-Neal, et al. (1990) for a discussion].

Although the level of cross-border equity investment is low, it is growing and with time the international diversification puzzle may recede. Cross-border equity investment patterns may nevertheless provide important insights on how investors value risk and how they select portfolios. The evidence of incomplete diversification presented here is consistent with evidence from many other markets. Ronald Lease, Wilber Lewellen, and Gary Schlarbaum (1974) show that in the late 1960s, many individuals held relatively few stocks. Both the mean and median in their sample of investors were close to eleven different securities. The rise of index mutual funds in the last two decades has

improved the diversification of individual investors, but directly-held equity still accounts for two and a half times as much of household wealth as all mutual funds, of which index funds are only a small part. Perhaps the most striking example of incomplete diversification is the tendency of most households to own residential real estate near where they work. The returns on their human and physical capital may consequently be highly correlated. This generates a much less diversified portfolio than holding, for example, a real estate investment trust with a national real estate portfolio.

## ENDNOTES

1. These estimates cumulate the net purchases of equity by investors in each country, with adjustments for both stock market and exchange rate movements. Ian Cooper and Costas Kaplanis (1986) also estimated cross-border equity holdings, but their calculations were largely imputations which did not rely on country-by-country equity flows.

2. We set  $\lambda = 3$ ; see our (1990) paper for more detail on calibration.

3. Tax-exempt investors may face a burden from such taxes, since they have no tax liability against which to claim the credit. Even for these investors, however, the tax would only reduce expected after-tax returns in foreign markets by about 50 basis points.

4. I. Gatti and Amos Tversky (1990) present evidence that households behave as though unfamiliar gambles are riskier than familiar gambles, even when they assign identical probability distributions to the two gambles.

## REFERENCES

- Bosner-Neal, Catherine, Gregory Brauer, Robert Neal, and Simon Wheatley, "International Investment Restrictions and Closed End Country Fund Prices," Journal of Finance, June 1990, 45, 523-547.
- Cooper, Ian and Costas Kaplanis, "Costs to Crossborder Investment and International Equity Market Equilibrium," in J. Edwards et al. eds., Recent Advances in Corporate Finance (Cambridge: Cambridge University Press, 1986).
- French, Kenneth R., and James M. Poterba, "Japanese and U.S. Cross-Border Common Stock Investments," Journal of the Japanese and International Economies December 1990, 4.
- \_\_\_\_\_, "Were Japanese Stock Prices Too High?," Journal of Financial Economics, 1991, forthcoming.
- Gatti, I. and Amos Tversky, "A Differential Weighting of Common and Distinctive Components," Journal of Experimental Psychology: General, 1990, 30-41.
- Howell, Michael and Angela Cozzini, International Equity Flows - 1990 Edition, London: Salomon Brothers European Equity Research, 1990.
- Lease, Ronald, Wilbur Lewellen, and Gary Schlarbaum, "Individual Investor Attributes and Attitudes," Journal of Finance, May 1974, 29, 413-433.
- Shiller, Robert J., Fumiko Kon-ya, and Yoshiro Tsutsui, "Speculative Behavior in the Stock Markets: Evidence from the U.S. & Japan," mimeo, Yale University, 1990.

Table 1: Equity Portfolio Weights: British, Japanese, U.S. Investors

	U.S.	Portfolio Weight Japan	U.K.	Adjusted Market Value
United States	.938	.0131	.059	\$2941.3
Japan	.031	.9811	.048	1632.9
United Kingdom	.011	.0019	.820	849.8
France	.005	.0013	.032	265.4
Germany	.005	.0013	.035	235.8
Canada	.010	.0012	.006	233.5

Estimates correspond to portfolio holdings in December, 1989. They are based on the authors' tabulations using data from the US Treasury Bulletin and Howell and Cozzini (1990). Adjusted market values exclude intercorporate cross-holdings from total market value, and correspond to June 1990 values.

Table 2: Expected Real Returns Implied by Actual Portfolio Holdings

	U.S.	Japan	U.K.
A. Returns Needed to Justify Observed Portfolio			
United States	5.5%	3.1%	4.4
Japan	3.2	6.6	3.8
United Kingdom	4.5	3.8	9.6
France	4.3	3.4	5.3
Germany	3.6	3.0	4.8
Canada	4.7	3.0	4.0
B. Deviation Between Implied Returns for Actual & Value-Weighted Portfolios			
United States	0.9	-1.5	-0.2
Japan	-1.1	2.5	-0.3
United Kingdom	-0.7	-1.4	4.4
France	-0.3	-1.2	0.7
Germany	-0.2	-0.8	1.0
Canada	0.5	-1.2	-0.2

See text for further description of calculations.