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Abstract: We analyze foreigners' and domestic institutional investors' holdings of U.S. equities and find common preferences for large firms and firms that are diversified internationally. The domestic preference for internationally diversified firms implies that investors might obtain substantial international diversification by investing at home. Using an international factor model, we show that exposure to foreign equity markets is indeed greater for domestic firms that are more diversified internationally, suggesting that at least some of the home-grown foreign exposure translates into international diversification benefits. After accounting for home-grown foreign exposure, the share of 'foreign' equities in U.S. portfolios doubles to 24 percent, greatly reducing the observed home bias.

JEL Classification: G11, G15, G3
Keywords: home bias, international portfolio allocation, foreign exposure

1. Introduction

The home bias in asset holdings is one of the least contentious empirical findings in international finance. The international capital asset pricing model (CAPM), based on traditional portfolio theory developed by Sharpe (1964) and Lintner (1965), predicts that mean-variance optimizing investors should hold the world market portfolio of risky assets.[1] At the end of 2001, U.S. equities comprised 52 percent of world equity markets (Figure 1), implying that in an international CAPM world U.S. equities should have a 52 percent weight in investors' portfolios, regardless of the investor's country of residence. For U.S. investors, this benchmark implies a 48 percent weight on foreign equities. Because distortions in international equity markets imply departures from the perfect financial markets of Sharpe and Lintner, we expect to observe actual foreign allocations that are smaller than those predicted by the international CAPM. But the extent of the gap between the benchmark international CAPM prediction and actual portfolio holdings is striking: The share of foreign equities in U.S. portfolios, at only 13 percent (Figure 2), is far below 48 percent, and the share of U.S. equities in foreigners' portfolios is similarly low.

Researchers initially focused on direct barriers to international investment, such as capital controls and high transaction costs, as a likely cause of the home bias [Black (1974); Stulz (1981)]. Over the years, however, direct barriers fell and home bias persisted, leading researchers to consider indirect barriers such as information asymmetries [Merton (1987); Gehrig (1993)].[2] Early empirical research on portfolio allocations were hampered by data

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[1] The theory pertains to all risky assets, but in practice data limitations have limited most empirical work to one type of security, equities. Burger and Warnock (2004) and Buch, Driscoll, and Ostergaard (2003) analyze the home bias in bond and bank portfolios, respectively.
[2] Grubel (1968) and Levy and Sarnat (1970) are early papers that point out the potential benefits to international diversification. Karolyi and Stulz (2002) and Lewis (1999) are recent surveys of the home bias literature.

constraints. For example, data on foreign portfolios used in the French and Poterba (1991) and Tesar and Werner (1995) studies were based on capital flows data that are ill-suited for estimating positions, limiting their ability to analyze the determinants of foreign portfolio weights. More recently, high quality holdings data have improved our understanding of the home bias. Evidence from the better quality data suggests an important role for information asymmetries, although the exact nature of these asymmetries varies across studies. Kang and Stulz (1997) and Dahlquist and Robertsson (2001) stress unfamiliarity; Coval and Moskowitz (1999) point to poorer quality information on distant firms; and information asymmetries in Ahearne, Griever, and Warnock (2004) and Edison and Warnock (forthcoming) owe to investor protection regulations that vary across countries.

We extend the home bias literature in two ways. First, this is the only security-level empirical study of foreign holdings of U.S. stocks. While this in itself is an important contribution—it is based on comprehensive security-level survey data on foreigners' positions in over 5000 U.S. equities—it largely confirms findings in previous studies of foreigners' positions in Japanese equities [Kang and Stulz (1997)] and Swedish equities [Dahlquist and Robertsson (2001)]. As in these previous studies, our results are consistent with a role for information asymmetries in explaining foreign investment. We do, however, provide a somewhat different interpretation. Foreigners' preference for 'international' firms has been attributed to familiarity, a particularly simple form of information, but we believe it is plausible that this preference might also owe to a desire to diversify in non-U.S. markets through U.S. multinationals (MNCs), which would be attractive if investor protection regulations are weaker abroad than in the United States [La Porta et al. (2000)]. The data suggest that this could be true: The foreign operations of U.S.

firms are disproportionately in emerging markets, so German investors' propensity to hold U.S. multinationals could plausibly owe to a desire for exposure to South America.

Our second contribution to the home bias literature is that we also study domestic institutional investors' positions in U.S. stocks and uncover a preference for firms that themselves are internationally diversified. This contrasts sharply with the Dahlquist and Robertsson (2001) results for a sample of Swedish equities and implies that U.S. investors have substantial claims on cash flows that originate from non-U.S. operations. Errunza, Hogan, and Hung (1999) and Rowland and Tesar (2001) find that U.S. investors *could* obtain substantial international diversification by holding U.S. MNCs; we show that they do.

Figure 2 put the weight of foreign equities in U.S. investors' portfolios at about 12 percent in 2000. We attempt to quantify the amount of 'foreign' equities held through home-grown foreign exposure, the weighted holdings of domestic firms that themselves are diversified internationally. The ideal weighting scheme to measure the foreign exposure obtained through a U.S. MNC would be the proportion of market value represented by its non-U.S. operations and sales (Agmon and Lessard, 1977). However, this measure is not available, so we use a reasonable proxy, the proportion of a firm's sales that originates from foreign operations. That is, we estimate home-grown foreign exposure by weighting U.S. investors' holdings of individual U.S. stocks by the percentage of each firm's sales that originate from foreign operations. One estimate of the dollar value of home-grown foreign exposure as of March 2000 is $3,531 billion, almost twice the dollar value of direct U.S. holdings of foreign equities. This is, however, an upper bound estimate because returns tend to owe more to factors associated with its trading location rather than where its economic activity is centered [Chan, Hahmad, and

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Lau (2003); Grammig, Melvin, Schlag (2003)]. Using results from an international factor model that indicate that returns on U.S. equities are driven primarily by domestic factors but that the importance of foreign factors increases with the extent of foreign operations, our best estimate of home-grown foreign exposure is about half the upper bound, or $1,730 billion, similar in magnitude to U.S. investors' direct foreign exposure (through holdings of actual foreign equities). Summing the direct and home-grown foreign exposure puts the amount of 'foreign' equities in U.S. investors' portfolios far closer to the level implied by standard models of optimal portfolio choice than previously measured. Rather than the 12 percent in Figure 2, the share of foreign equities in U.S. portfolios is about 24 percent when home-grown exposure is included.

Our results also have implications for the literature on corporate international diversification. The question of whether it is advantageous for a firm to expand internationally spawned an entire literature on foreign direct investment that goes back at least to Kindelberger (1969), Caves (1971), and Dunning (1973). The debate on whether corporate international diversification is value enhancing has been going strong for three decades; see the surveys in Fatemi (1984) and Bodnar, Tang, and Weintrop (2003). Our study cannot settle this debate, but we do provide direct evidence that two important groups of investors recognize the value of foreign operations, a necessary (but not sufficient) condition for international diversification to be value enhancing (Agmon and Lessard, 1977).

The paper proceeds as follows. The next section describes the data sets on foreign and U.S. institutional holdings of U.S. equities and discusses factors that might affect the extent of their ownership. Evidence on the determinants of foreign and institutional ownership is provided in Section 3. Section 4 quantifies the home-grown foreign exposure that investors obtain

through holdings of domestic equities and shows that such exposure is comparable (in dollar terms) to the direct exposure obtained through holdings of foreign equities. Section 5 concludes.

2. Security-Level Equity Holdings

2.1 Data

Data on foreigners' holdings of U.S. stocks are from comprehensive benchmark surveys conducted by the U.S. Treasury Department and the Federal Reserve System as of December 1994 and March 2000.[3] The data are confidential and are collected from two types of reporters: issuers of securities and, because issuers typically do not have information on the ultimate owner of their securities, U.S. custodians that manage the safekeeping of U.S. securities for foreigners. Custodians—primarily banks but also some broker-dealers—are the main source of information, reporting 87 percent of the market value of foreign holdings of U.S. long-term securities measured on the 2000 survey; all U.S. custodians that held at least $20 million in U.S. securities for foreigners were required to submit survey data. Reporting on the survey is mandatory, and penalties may be imposed for noncompliance. Because most U.S. securities are in the possession of U.S. custodians for safekeeping and all significant U.S. custodians were included in the surveys, the survey data are the most comprehensive available.

The surveys provide high quality, security-level data, but they are less than ideal for two reasons. First, the data collection technique does not permit identification of the type of foreign investor beyond whether the investor is a government or a private entity. Since governments do

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[3] Results from the latest survey, as well as a detailed description of the methodology, are in Treasury Department et al. (2002), available at www.treas.gov/tic/fpis.html. For a primer on the surveys, see Griever, Lee, and Warnock (2001).

not typically hold other countries' equities, we can assume the foreign holdings in our sample are those of private investors. Moreover, it is likely that the representative foreign investor is an institution, but there is no concrete evidence supporting this. Second, the country attribution of foreign investment in U.S. securities is far from perfect, precluding an analysis of, say, Germans' investment patterns in U.S. equities. The distortion in country attribution in the survey is caused by instances in which multiple custodians are involved in the safekeeping of a security. For example, a resident of Germany may buy a U.S. security and place this security in the custody of a Swiss bank. To facilitate settlement and custody operations, the Swiss bank will then normally employ a U.S.-resident custodian bank to act as its foreign subcustodian for this security. When portfolio surveys are conducted, the legal authority to collect information extends only to U.S.-resident entities. The U.S. resident bank acting as the subcustodian of the Swiss bank will report this security on the survey, but this U.S. bank will typically know only that it is holding this security on behalf of a Swiss bank and will report this security as Swiss held. A prime example of this problem is Luxembourg, where a major operations center of one of the world's largest central securities depositories is located, causing the surveys to attribute a significant amount of holdings to Luxembourg that are actually holdings of residents of other countries. Because of this custodial center bias, we do not use information on the residence of the foreign investor in our empirical work.

Data on the holdings of domestic institutional investors—banks, insurance companies, mutual funds, pensions, and investment advisors—are from the Spectrum database and have been analyzed by Gompers and Metrick (2001), among others. The Spectrum data are compiled from SEC 13-F filings, which institutions with greater than $100 million of securities under

discretionary management are required to submit. The 13-F filings are quarterly; we use data on the two quarters that correspond with our survey data of foreigners' holdings, fourth quarter 1994 and first quarter 2000. See Gompers and Metrick (2001) for a complete discussion of the 13-F data.

To be included in our study, we require a firm to be listed on NYSE, Amex, or Nasdaq and have market capitalization data in CRSP as of a survey date. That leaves us with 5,980 firms for 2000 and 5,533 firms for 1994. To guard against data errors, we further require that the market capitalization from CRSP differs by no more than 20 percent from data provided through the benchmark survey, when available. That eliminated 163 firms in 2000 and 220 in 1994.[4] Foreign and institutional ownership that in sum exceeds 100 percent of the outstanding shares indicates a data error; this criterion eliminates no firms in 2000 and 67 in 1994. In multivariate regressions, we use data on firm characteristics from CompuStat, which reduces our sample slightly more; our largest sample with a parsimonious set of regressors is 5,330 in 2000 and 4,690 in 1994, comparable to the 5,199 firms in the end-1996 sample in Gompers and Metrick (2001). We gather data on the amount of a firm's sales that originate from foreign operations from Worldscope because it has greater coverage for this variable than Compustat's Geography file; including foreign sales reduces our sample by 802 firms in 2000 and 1,906 firms in 1994.[5]

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[4] To assist in the editing of the benchmark surveys, vendor data on prices, shares outstanding, and market capitalization are purchased. Not every record contains this information, however, so we cannot make this comparison with CRSP for every security.

[5] Our results do not hinge on whether we treat firms that have no foreign sales data as having zero foreign sales, or discarding them as we do in our regression analysis.

2.2 Foreign and Institutional Demand for Equities – Candidate Determinants

In analyzing foreign and institutional ownership, we select possible determinants of ownership from the empirical literature on the equity holdings of domestic institutions and foreigners. Kang and Stulz (1997), who analyze foreigners' holdings of Japanese equities, and Dahlquist and Robertsson (2001), who study foreigners' holdings of Swedish equities, provide a short list of factors that foreigners might prefer. The studies of Falkenstein (1996) and Gompers and Metrick (2001) provide factors that influence the composition of domestic institutions' investments in U.S. equities.

Liquidity and size are characteristics sought after by institutions, who typically turn over their portfolios often (Schwartz and Shapiro, 1992) and are themselves large relative to the size of many stocks. For example, CalPERs has a U.S. equity portfolio of $63 billion, greater than the total market capitalization of almost every firm in our sample. Foreigners, it has often been argued, prefer large stocks because information about them is more readily available. Not surprisingly, Gompers and Metrick (2001) find that both size and turnover are strongly positively related to institutional ownership, and size is an important factor in every study of foreign portfolios. The evidence on foreigners' preference for high turnover firms is a bit more mixed, with Dahlquist and Robertsson (2001) showing that foreigners prefer high turnover Swedish stocks, but Edison and Warnock (forthcoming) providing evidence that turnover is important in only some emerging markets. In our empirical work, we include *Size* (log market capitalization) and *Turnover* (value of trading over the previous twelve months as a percentage of market capitalization). We also include an *S&P 500* dummy, because there might be an index effect

above and beyond the effects of size and liquidity if institutions or foreigners attempt to mimic the index. It is also plausible that foreigners better recognize index firms.

Investors' preferences for characteristics such as systematic risk, volatility, growth or value, dividend yields, and past return performance are largely a matter of style. Some institutions cannot hold stocks that do not pay dividends and firms that pay a higher yield might be considered safer; Del Guercio (1996) has argued that for prudential reasons institutions might favor firms that pay a higher *dividend yield* (dividends per share over the year-end market price). An opposing effect is that firms with better growth prospects should pay lower dividends as they plow revenues back into the firm. Substantial demand for such high growth firms would result in a negative relationship between dividend yields and ownership, as found in Gompers and Metrick (2001) and Dahlquist and Robertsson (2001). Another prudence proxy is *Volatility*, the volatility of past returns as measured by the standard deviation of the residual from a market model estimated using monthly returns over a past-four-year period. From a prudence standpoint, institutional ownership should be greater in firms with lower volatility, but investors may seek high-risk high-reward stocks. Gompers and Metrick (2001) and Falkenstein (1996) find a positive (but sporadic) impact of volatility on U.S. institutions' domestic holdings, while Dahlquist and Robertsson (2001) find no evidence of a consistent relationship. *Book-to-market*, calculated as the book value per share over the year-end market price, can be viewed as a pure style variable; a tendency to hold low (high) book-to-market values indicates a preference for "growth" ("value") stocks; while Gompers and Metrick (2001) suggests that U.S. institutions favor domestic value stocks, foreigners in Japan and Sweden reveal a preference for growth stocks. *Beta*, which we calculate from the same market model as residual variance, measures the

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systematic risk of a stock; while Kang and Stulz (1997) note that in the presence of proportional barriers to investment foreigners should hold high beta stocks, such barriers should not pertain to the U.S. market. Our *Momentum* variable, which we calculate as cumulative monthly returns over the preceding one-year period, provides an indication of whether investors can be characterized as momentum traders. Past evidence of momentum trading by different groups of investors seems to be sample specific. Whereas Kang and Stulz, Falkenstein (1996), and Grinblatt and Keloharju (2000) find evidence of momentum investing, Gompers and Metrick (2001) show strong evidence that institutions do not chase past returns. We also include a measure of long-term financial health, *Leverage*, calculated as the ratio of total debt to total equity. Firms with higher leverage are more financially vulnerable and might attract less investment.

Finally, we include one variable from Worldscope, *Foreign Sales*, the percent of a firm's sales that are derived from foreign operations. We expect foreigners to exhibit a strong preference for firms with higher foreign sales, because the existing literature has argued that international firms are more known to foreign investors (for example, Dahlquist and Robertsson and Kang and Stulz). For domestic institutional investors, the ongoing debate on the value of corporate international diversification suggests that the effect of a large amount of foreign sales could be positive or negative.

Summary statistics for all of the variables used in this study are presented in Table 1. In our full sample of 5,330 firms, the median firm is a growth firm (book-to-market of 0.48) that pays no dividends; is not in the S&P 500; has 4 percent foreign ownership and 29 percent of its shares held by U.S. institutions; a market capitalization of $176 million ($= e^{5.17}$); a turnover rate

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of 0.89; and liabilities that are 112 percent of its equity. In the slightly smaller samples (due to data availability), the median firm does not have foreign operations; had 12-month returns of 6 percent with a beta and residual variance (calculated over a 48-month period) of 0.86 and 0.14, respectively.

3. The Determinants of Foreigners' and Domestic Institutional Investors' Portfolios

We define ownership as holdings divided by market capitalization as of the dates of the two benchmark surveys, end-March 2000 and end-December 1994. $ForOwn_i$ ($InstOwn_i$) is the dollar amount of foreigners' (domestic institutional investors') holdings of firm i's equity divided by firm i's market capitalization. The first two columns of Table 2 indicate that $ForOwn_i$ and $InstOwn_i$ are both positively related to size, liquidity, S&P inclusion, beta, and foreign sales, and negatively related to book-to-market and leverage, but that $ForOwn_i$ and $InstOwn_i$ differ in their relations to volatility, dividends, and momentum. Foreign holdings are greater in firms with higher volatility, lower dividends, and greater past returns, whereas domestic institutional ownership is greater in firms that paid higher dividends and had less volatile returns (consistent with the prudential considerations of Del Guercio (1996)), but is unrelated to past returns. One should not read too much into these bivariate relationships, though. Size, for example, is highly correlated with beta, so the relationship between beta and foreign ownership might owe to a size preference.

In our multivariate regressions we include industry dummies to capture any industry-specific preferences by foreigners and institutions. Table 3 shows ownership in the Campbell (1996) industry groups. Foreign ownership is highest in Basic Industry (8 percent) and Services

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(7 percent), while domestic institutional ownership is highest in Petroleum (42 percent) and

Transportation (41 percent). Financial firms (FIRE) attract the least foreign and domestic

institutional ownership.

Table 4 shows our multivariate regressions of ownership by foreign investors (left panel)

and domestic institutional investors (right panel) for our sample in 2000. We first report results

of regressions that include a parsimonious set of variables and maximum sample size (5,330

firms in columns 1 and 4) before adding variables with less coverage. The left-panel regressions

show a preference by foreign investors for the equities of U.S. firms with the following

characteristics: large, liquid, included in the S&P 500, volatile, high book-to-market, low

dividends, and high foreign sales. The right-panel regressions show some interesting evidence

not found in the study of 173 Swedish equities in Dahlquist and Robertsson (2001). Whereas

size is the only common preference in Dahlquist and Robertsson (2001), in our study of about

5,000 U.S. equities we also find a significant common preference for internationally diversified

firms, in addition to large firms.[6] For other characteristics, those favored by foreigners are not

preferred by domestic institutions. For example, controlling for size, domestic institutions prefer

less liquid firms that are not in the S&P 500, in contrast to foreigners' preferences.[7]

Table 5 presents the results of the same regressions for the 1994 sample and shows that

there were even more common preferences in 1994. Size and international diversification were

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[6] A common preference for high book-to-market (or value) firms is also evident in most
specifications.

[7] The unconditional correlations in Table 2 show that domestic institutional investors'
holdings are indeed positively related to turnover and S&P inclusion. Table 4 shows, however,
that a size preference dominates turnover and index inclusion. When volatility is included
(column 6), the coefficient on turnover is again positive (institutions avoid the most volatile
stocks, but those are also the most liquid).

preferred by both foreigners and domestic institutions, as in 2000, but so were high turnover and low dividend yield. A comparison of the right panels of Tables 4 and 5 shows that domestic institutional investors' revealed a preference for size, low volatility, high book-to-market, internationally diversified firms, and S&P exclusion in both 1994 and 2000. The left panels of the two tables indicate that foreigners revealed a consistent preference for size, turnover, volatility, low dividend yield, and internationally diversified firms. Thus, the only two characteristics that were preferred by both foreign and domestic institutional investors in both 1994 and 2000 are size and an international presence.

While both foreign sales and size are highly statistically significant in all regressions, their economic impacts are markedly different for foreign and domestic institutional investors. Table 6 shows the impact on ownership of a move from each characteristic's 25th percentile value to its 75th percentile value. The economic importance of size is very large on both foreign and domestic institutional ownership. Moving from the 25th percentile of size to the 75th percentile increases foreign ownership by 1.1 percentage points, a substantial amount given the median foreign ownership of 4 percent, and domestic institutional ownership by 23 percentage points (compared to median ownership of 29 percent). In contrast, the impact of foreign sales is clearly more important for foreign ownership (0.6 percentage points) than domestic institutional (0.6 percentage points).

Finally, we note that the foreign preference for size and an international presence has been previously put forward as evidence of a familiarity effect or of a role of information asymmetries. For size, this may well be true, but in our sample geography suggests that the preference for international firms might owe not only to a familiarity effect, but also to a

diversification incentive. Table 7 shows the country distributions of holdings by foreign investors and U.S. direct investment abroad. A disproportionate amount of U.S. firms' foreign activity is in emerging markets (21 percent), suggesting that foreigners might hold multinationals to get exposure to other foreign markets. Foreign exposure through multinationals could be preferred to direct foreign holdings if investor protection regulations are weak or weakly enforced in some countries, as suggested by the work of La Porta et al. (2000).

4. Corporate International Diversification and the Home Bias

The fact that domestic institutions tend to favor internationally diversified stocks raises the question of how much international diversification is obtained through these holdings. We address this question in two ways. First, we show that the foreign exposure that a domestic firm provides U.S. investors is indeed increasing with the share of its sales that originates abroad. Then, to make comparisons with the amount of foreign holdings that is typically referred to in the home bias literature (including our Figure 2), we attempt to quantify the dollar amount of home-grown foreign exposure.

4.1 The Exposure of Domestic Firms to Foreign Equity Markets

Recent evidence indicates that a security's returns are determined primarily by where the security trades, rather than by the location of the firm's operations [Chan, Hahmad, and Lau (2003); Grammig, Melvin, Schlag (2003)]. In light of this, it is conceivable that domestic firms with more foreign sales do not provide domestic investors with greater international diversification benefits. In this subsection, to ascertain the extent to which foreign factors

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influence the returns of U.S. equities, we first calculate each firm's foreign beta by estimating an international market model and then show how foreign betas vary with foreign sales.

To compute firm i's foreign beta ($\beta_{i,F}$), we follow Griffin (2002) and estimate an international market model with two components, a U.S. factor and a foreign factor. Specifically, for each stock in our sample, we estimate the following international market model using 48 months (April 1996 to March 2000) of returns data:[8]

$$International\,model\!: \quad r_{i,t} = \alpha_i + \beta_{i,US}r_{US,t} + \beta_{i,F}r_{F,t} + \epsilon_{i,t} \tag{1}$$

where r_i is firm i's stock returns, r_{US} is the return on a CRSP value-weighted U.S. equity portfolio, r_F is the return on a foreign equity portfolio, and $\beta_{i,US}$ is firm i's domestic beta.

A crucial choice in this analysis is the weighting scheme for the foreign factor. The *easiest* weighting scheme would be derived from data on market capitalizations, enabling the use of a readily available equity index such as the MSCI World ex US. However, this choice is inappropriate for a particular firm if the country distribution of its foreign operations differs greatly from the distribution of world equity market capitalization. A better weighting scheme would be derived from firm-specific information, perhaps on the distribution of the firm's foreign sales across countries. Such data are not available to us, so we rely instead on industry-specific trade weights developed in Goldberg (2003). For two-digit manufacturing SIC codes from 20-39 and ten non-manufacturing groupings, Goldberg (2003) provides the weight of each

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[8] To be included in this regression, the firm must have at least 36 months of returns data. Our results are similar if we restrict this regression to firms that have returns data for all 48 months.

foreign country in each sector's international trade.[9] The trade weights are more suitable than

market weights, but not ideal for our purposes. Weights of foreign operations would be better,

but public data on U.S. firms' direct investment abroad by country by industry is unusable for

our purposes because it is in many cases withheld for disclosure reasons.[10]

Table 8 (Panel A) presents average results from the international market model estimates.

To judge the home-grown foreign exposure that U.S. investors obtain through U.S. firms, we

focus on average estimates of domestic beta (β_{US}) and foreign beta (β_F).[11] Across all firms for

which data on foreign sales and at least three years of returns are available, the average domestic

beta (0.757) is almost 4 times greater than the average foreign beta (0.215), indicating that the

returns of these U.S. firms owe predominantly to U.S. factors. Foreign factors are, however,

more important for firms with greater foreign sales. The average foreign beta for firms with no

foreign sales is only 0.142, but for firms with sales that originate primarily in foreign countries

(i.e., foreign sales greater than 50 percent), the average foreign beta is 0.468, and much closer in

magnitude to their average domestic beta.

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[9] The ten non-manufacturing groupings in Goldberg (2003) are Business Services, Construction, Educational Services, Film and Tape Rental, Financial Services, Legal Services, Insurance, Passenger Fares, Installation and Repair Services, and Telecommunications.

[10] The industry-specific weights have also been used to form trade-weighted exchange rates that have been applied to studies of the effect of exchange rates on corporate profits (Goldberg, 2003) and of firms' exchange rate exposure (Ihrig and Prior, 2003).

[11] For completeness, we also provide information on average pricing errors (the average absolute value of α) and the amount of the time-series variation in returns explained by the international market model (Adj. R^2_I) and by a domestic market model (Adj. R^2_D), where the domestic market model is $r_{i,t} = \alpha_i + \beta_{i,US} r_{US,t} + \eta_{i,t}$.

Another indication of the effect of foreign sales on foreign beta is provided in Panel B of

Table 8, which presents regression results of the following model:

$$\hat{\beta}_{F,i} = \kappa + \gamma_{FS} ForeignSales_i + \zeta_i \qquad (3)$$

The full sample results indicate that firms with 10 percent greater foreign sales have foreign

betas that are about 0.049 higher, consistent with the results in the top panel. As a robustness

check, we investigate whether this result owes to a difference between firms with no foreign

sales and those with some foreign sales. It does not; the coefficient is very similar (0.533) for

firms with greater than median foreign sales.

Overall, the results in this subsection indicate that investors do obtain increased

international diversification benefits through U.S. firms that themselves are internationally

diversified. A firm's returns depends primarily on the local market, so there is not a one-to-one

relationship between foreign sales and foreign exposure, but home-grown foreign exposure is

substantial. As a rule of thumb, our regression reported in the bottom panel of Table 8 indicates

that for every one percentage point of foreign sales, the firm's foreign beta increases about half

that, or 0.005.[12] We use this rule-of-thumb estimate in the next subsection in an attempt to

quantify the dollar amount of home-grown foreign exposure.

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[12] For our sample of firms, we also find (but do not tabulate) that exchange rate exposure
is significantly related to foreign sales, consistent with evidence in Ihrig and Prior (2003) and
Doidge, Griffin, and Williamson (2003).

4.2 The Dollar Value of Home-Grown Foreign Exposure

We estimate the dollar value of home-grown foreign exposure by weighting the dollar value of U.S. investors' holdings of U.S. equities by the percent of each firm's sales that originate from foreign operations.[13] For the firms in our sample that do not have foreign sales data in Worldscope and for all firms not in our sample, we assume zero foreign sales. Weighting U.S. holdings of U.S.-based firms by the degree of internationalization gives an upper bound estimate of home-grown foreign exposure of \$3,531 billion in March 2000 (Table 9). Table 8 showed, however, that foreign exposure does not increase one-for-one with foreign sales. To form our best guess, we multiply domestic holdings not by the weight of foreign sales, but by γ_{FS} times foreign sales. From equation (3), the estimate of γ_{FS} is 0.49, thus our best guess of the dollar value of home-grown foreign exposure is 0.49 times our upper bound estimate, or \$1,730 billion.[14]

To gauge the importance of this magnitude, we also show in Table 9 the dollar value of U.S. investors' direct exposure to foreign equities. An upper bound estimate of this is the amount of foreign equities held by U.S. investors (\$2,065 billion). But, as with U.S. equities, the returns of some of those foreign equities will owe to U.S. factors and thus provide less than complete diversification benefits to U.S. investors. A lower bound estimate of the direct foreign exposure, formed by subtracting all of the foreign firm's market capitalization attributable to

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[13] The ideal measure–which, as noted in the introduction, is not available–would be weighted by the proportion of market value represented by a firm's non-U.S. operations and sales.

[14] As a check of the reasonableness of our estimates, note that the Bureau of Economic Analysis estimate of the market value of U.S. firms' foreign operations (\$2,817 billion) lies between our upper bound estimate and best guess of home-grown foreign exposure.

foreign sales, is $1,334 billion.[15] Our best guess for direct foreign exposure is $1,886 billion,

which assumes that 50 percent of the foreign sales of foreign firms originates in the United

States and that foreign firm's have the same γ_{FS} of 0.49 that U.S. firms have (i.e., returns are

predominately determined in the home market).

At $1,886 billion, foreign exposure through foreign equities (direct foreign exposure)

represents 12 percent of U.S. investors' equity portfolios. The international diversification that

U.S. investors gain through their holdings of U.S. multinationals is comparable; including home-

grown foreign exposure of $1,730 billion doubles the foreign component of U.S. equity

portfolios to 24 percent. Given that U.S. investors represent about 50 percent of global

investors, including home-grown foreign exposure results in a home bias that is much less severe

than previously reported.

5. Conclusion

We analyze foreigners' U.S. equity portfolios and find that foreigners prefer large, liquid,

internationally oriented firms, consistent with previous studies. Interestingly, we find that

domestic institutions also have strong preferences for large, internationally diversified firms,

implying that U.S. investors obtain substantial international diversification through their

holdings of U.S. multinationals. This is confirmed using an international factor model that

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[15] This lower bound estimate of direct foreign exposure is derived as follows. Data from Ammer, Holland, Smith, and Warnock (2004) indicate that U.S. holdings of foreign equities weighted by foreign sales anywhere (not just in the United States) totaled about $360 billion in 1997, or 35 percent of overall foreign holdings. If *all* of those sales were in the United States and the 35 percent rule still applied in 2000, $731 billion would be an appropriate estimate of the amount of U.S. investors' direct foreign holdings that owed to operations in the United States.

indicates that while U.S. factors are most important for the returns of U.S. firms, the influence of foreign factors increases with the extent of the firm's foreign sales. We use the relationship between foreign sales and foreign beta to inform our estimate of home-grown foreign exposure, the foreign exposure U.S. investors obtain by holding U.S. equities. The amount of home-grown foreign exposure is comparable (in dollar value) to direct foreign exposure (through holding foreign equities), implying that the international diversification of U.S. investors has been substantially underestimated.

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Table 1
Basic Summary Statistics

The sample size for all variables is 5,330, with the exception of Foreign Sales (N = 4,543) and Beta and Volatility (N=4,391). ForOwn and InstOwn are foreign holdings and U.S. institutional holdings, respectively, divided by market capitalization. Size is the log of market capitalization. Turnover is the average of twelve months of shares traded divided by beginning of month shares outstanding. S&P is equal to one if the stock is in the S&P500 index, zero otherwise. Book-to-market is book value over market value. Yield is dividends paid over a one-year period over beginning of period price. Leverage is total liabilities divided by total equity. Momentum is the cumulative returns over the preceding year. Foreign Sales is the proportion of the firm's sales that are abroad. Beta and Volatility are the systematic risk and residual variance from a market model calculated with monthly data for a four-year period. Book-to-market, dividend yield, leverage, and turnover are winsorized at the 1st and 99th percentiles. The value of each variable at its 25th, 50th, and 75th percentiles are presented in the columns labeled 25th, 50th, and 75th. Data are for 2000; statistics for 1994 are available upon request.

Variable	Mean	Std.Dev.	Min	25th	50th	75th	Max
ForOwn	0.054	0.062	0.00	0.01	0.04	0.07	0.79
InstOwn	0.334	0.250	0.00	0.11	0.29	0.54	0.97
Size	5.35	2.03	0.67	3.80	5.17	6.68	13.2
Turnover	1.57	1.79	0.01	0.44	0.89	1.93	9.48
S&P 500	0.080	0.270	0	0	0	0	1
Book-to-Market	0.740	1.05	-0.76	0.17	0.48	0.92	7.21
Yield	0.008	0.016	0	0.00	0.00	0.01	0.08
Leverage	2.64	4.65	-9.93	0.42	1.12	2.69	24.2
Momentum	0.684	2.15	-0.93	-0.23	0.06	0.75	58.7
Foreign Sales	0.124	0.204	0	0.00	0.00	0.20	1
Beta	0.919	0.694	-4.14	0.46	0.85	1.28	6.27
Volatility	0.165	0.107	0.033	0.09	0.14	0.20	1.353

Table 2
Cross-Sectional Correlations

The table shows the March 2000 cross-sectional correlation between ownership and firm characteristics and for all pairs of these characteristics. P-values for the correlation coefficients are italics. Definitions are provided in Table 1.

	ForOwn	InstOwn	Size	Turnover	S&P	Beta	Vol	BM	Yield	Lev	Momentum
InstOwn	0.1181										
	0.0000										
Size	0.1896	0.6261									
	0.0000	*0.0000*									
Turnover	0.3266	0.0414	0.2015								
	0.0000	*0.0170*	*0.0000*								
S&P	0.1252	0.3328	0.5500	-0.0314							
	0.0000	*0.0000*	*0.0000*	*0.0217*							
Beta	0.1843	0.2147	0.4513	0.4697	0.1807						
	0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*						
Volatility	0.0907	-0.2597	-0.1820	0.2986	-0.0968	0.0765					
	0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*					
Book-to-Market	-0.0822	-0.1530	-0.2882	-0.0942	-0.1007	-0.1565	0.0054				
	0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.6879*				
Yield	-0.1527	0.0325	0.0633	-0.2264	0.1200	-0.1467	-0.1431	0.1609			
	0.0000	*0.0151*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*			
Leverage	-0.0528	-0.0489	-0.0306	-0.0595	0.0147	-0.0458	-0.0407	0.0277	0.0841		
	0.0001	*0.0003*	*0.0227*	*0.0000*	*0.2742*	*0.0006*	*0.0024*	*0.0395*	*0.0000*		
Momentum	0.1409	0.0030	0.1673	0.3204	-0.0396	0.1603	0.1871	-0.1491	-0.1506	-0.0718	
	0.0000	*0.8259*	*0.0000*	*0.0000*	*0.0033*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	
Foreign Sales	0.2075	0.2598	0.2884	0.0929	0.1754	0.1417	-0.0346	-0.0890	-0.0863	-0.0667	0.1235
	0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0169*	*0.0000*	*0.0000*	*0.0000*	*0.0000*

Table 3
Ownership by Industry

The table shows, for the industry groups defined in Campbell (1996), foreign and institutional ownership expressed as a percent of market capitalization.

Industry	N	Foreign Ownership	Institutional Ownership
Petroleum	165	5	42
FIRE	881	3	26
Consumer Durables	760	6	36
Basic Industry	470	8	37
Food/Tobacco	145	5	35
Construction	90	3	34
Capital Goods	648	6	34
Transportation	111	4	41
Utilities	302	5	37
Textiles/Trade	431	5	36
Services	975	7	32
Leisure	292	5	33
Unclassified	66	7	33
Total	5330	5	33

Table 4

Determinants of Foreign and Institutional Ownership, 2000

Table 4 presents regression results where the dependent variable is the share of security *i* held by foreigners (columns 1 - 3) or by domestic institutions (columns 4 - 6) as of March 2000. Reported are parameter estimates, with p-values computed from robust standard errors in parentheses. Industry dummies corresponding to the Campbell (1996) grouping are included but not reported. See Table 1 for definitions of explanatory variables.

	Foreign Ownership			Institutional Ownership		
	(1)	(2)	(3)	(4)	(5)	(6)
Size	0.0030	0.0023	0.0039	0.0914	0.0910	0.0793
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Turnover	0.0095	0.0095	0.0083	-0.0101	-0.0095	0.0141
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
S&P	0.0212	0.0191	0.0159	-0.0613	-0.0667	-0.0793
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Book-to-Market	0.0022	0.0012	0.0018	0.0191	0.0212	0.0177
	(0.009)	(0.177)	(0.080)	(0.000)	(0.000)	(0.000)
Yield	-0.3087	-0.2945	-0.3325	0.1818	0.1902	-0.4027
	(0.000)	(0.000)	(0.000)	(0.277)	(0.293)	(0.041)
Leverage	-0.0004	-0.0002	-0.0002	-0.0011	-0.0008	-0.0018
	(0.000)	(0.397)	(0.462)	(0.105)	(0.257)	(0.025)
Momentum	-0.0001	-0.0003	-0.0007	-0.0124	-0.0139	-0.0104
	(0.876)	(0.547)	(0.169)	(0.000)	(0.000)	(0.000)
Foreign Sales		0.0346	0.0281		0.0498	0.0313
		(0.000)	(0.000)		(0.002)	(0.056)
Beta			0.0006			0.0291
			(0.712)			(0.000)
Volatility			0.0255			-0.7183
			(0.054)			(0.000)
No. of Observations	5330	4543	3743	5330	4543	3743
Adjusted R^2	0.522	0.532	0.557	0.801	0.802	0.837

Table 5
Determinants of Foreign and Institutional Ownership, 1994

Table 5 presents regression results where the dependent variable is the share of security *i* held by foreigners (columns 1 - 3) or by domestic institutions (columns 4 - 6) as of December 1994. Reported are parameter estimates, with p-values computed from robust standard errors in parentheses. Industry dummies corresponding to the Campbell (1996) grouping are included but not reported. See Table 1 for definitions of explanatory variables.

	Foreign Ownership			Institutional Ownership		
	(1)	(2)	(3)	(4)	(5)	(6)
Size	0.0078	0.0071	0.0077	0.0876	0.0833	0.0754
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Turnover	0.0065	0.0072	0.0058	0.0281	0.0320	0.0396
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
S&P	0.0017	0.0006	0.0001	-0.0460	-0.0515	-0.0483
	(0.535)	(0.856)	(0.986)	(0.000)	(0.000)	(0.000)
Book-to-Market	0.0004	0.0026	0.0030	0.0035	0.0091	0.0127
	(0.458)	(0.006)	(0.008)	(0.017)	(0.002)	(0.000)
Yield	-0.5548	-0.4633	-0.4284	-0.6589	-0.6797	-0.8796
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)
Leverage	-0.0001	0.0002	0.0001	-0.0013	-0.0015	-0.0023
	(0.540)	(0.443)	(0.632)	(0.005)	(0.027)	(0.002)
Momentum	-0.0132	-0.0140	-0.0165	-0.0087	-0.0135	-0.0163
	(0.000)	(0.000)	(0.000)	(0.113)	(0.108)	(0.117)
Foreign Sales		0.0363	0.0352		0.0442	0.0507
		(0.000)	(0.000)		(0.052)	(0.033)
Beta			0.0038			0.0077
			(0.011)			(0.195)
Volatility			0.0389			-0.3012
			(0.000)			(0.099)
No. of Observations	4690	2784	2216	4690	2784	2216
Adjusted R^2	0.478	0.531	0.537	0.811	0.827	0.849

Table 6
The Impact of Characteristics on Foreign and
Domestic Institutional Ownership

Impact is measured as the effect (in percentage points) on ownership of a shift from the characteristic's 25th percentile to its 75th percentile. Percentiles are given in Table 1. The coefficient estimates used to calculate impact are from the 2000 regressions with the full complement of explanatory variables, columns (3) and (6) of Table 4; blank cells indicate that the characteristic's coefficient is insignificantly different from zero in those regressions. Median ownership if 4 percent for foreigners and 29 percent for domestic institutions.

	Impact on Foreign Ownership	Impact on Institutional Ownership
Size	1.1	22.8
Turnover	1.2	2.1
S&P	na	na
Book-to-Market	0.1	1.3
Yield	-0.3	-0.4
Leverage		-0.4
Momentum		-1.0
Foreign Sales	0.6	0.6
Beta		2.4
Volatility	0.3	-8.0

Table 7

The Distribution of U.S. Direct Investment Abroad (USDIA)

and Foreigners' Holdings of U.S. Equities

USDIA is end-1999 data valued at historical cost from the Bureau of Economic Analysis; the data are available online at www.bea.gov/bea/di/di1usdbal.htm. Shown are percent of total USDIA and total foreigners' holdings of U.S. equities.

	USDIA	Foreigners' Holdings
Emerging Markets	21.4	6.1
Latin America	10.2	0.9
Emerging Asia	7.8	4.0
Other Emerging	3.2	1.2
Europe	50.4	57.9
Canada	9.8	10.2
Japan	4.5	8.5
Caribbean Financial Centers	10.7	10.5

Table 8

The Relationship between Foreign Exposure and Foreign Sales

Panel A shows the average regression results of the international factor model for each stock, as well as the average adjusted R^2 from the domestic model (Adj. R^2_D). The following regression models are estimated over the period from April 1996 to March 2000:

$$\text{International model}: \quad r_{i,t} = \alpha_i + \beta_{i,US}r_{US,t} + \beta_{i,F}r_{F,t} + \epsilon_{i,t}$$
$$\text{Domestic model}: \quad r_{i,t} = \alpha_i + \beta_{i,US}r_{US,t} + \eta_{i,t}$$

where r_i is individual stock returns, r_{US} is the return on a CRSP value-weighted US portfolio, and r_F is the return on a foreign (non-US) portfolio. The foreign portfolio is formed with a weighting scheme based on the Goldberg (2003) industry-specific trade weights. Panel B shows the coefficient estimate and, in parentheses, t-statistic for the independent variable (Foreign Sales) from the following cross-sectional regression:

$$\hat{\beta}_{F,i} = \kappa + \gamma_{FS} Foreign Sales_i + \zeta_i$$

where $\hat{\beta}_{F,i}$ is firm i's estimated foreign beta from the international model. The median level of foreign sales is zero.

Panel A	N	$|\alpha|$	β_{US}	β_F	Adj. R^2	Adj. R^2_D
Full Sample	2852	0.019	0.757	0.215	0.088	0.084
Subsamples with Foreign Sales						
above 50%	266	0.020	0.795	0.468	0.118	0.111
between 25% and 50%	558	0.018	0.781	0.322	0.119	0.112
between 0% and 25%	598	0.016	0.829	0.175	0.107	0.103
zero	1430	0.021	0.711	0.142	0.059	0.060

Panel B	N	γ_{FS}
Full Sample	2852	0.490
		(5.25)
Subsample with Foreign Sales		
greater than median	1422	0.533
		(4.20)

Table 9

The International Equity Exposure of U.S. Investors

Data are as of March 2000. For home-grown foreign exposure, the upper bound estimate is computed as U.S. holdings (that part of the market capitalization not held by foreigners) times the percent of sales that is generated by foreign operations. The best guess assumes, based on the result in Panel B of Table 8, that each percentage point of foreign sales contributes only 0.0049 to foreign exposure. For direct exposure to foreign stocks, the upper bound estimate is U.S. investors' portfolio holdings of foreign equities as constructed by Thomas, Warnock, and Wongswan (2004); the lower bound estimate subtracts the market capitalization of U.S. holdings of foreign equities that could owe to U.S. operations; and the best guess assumes that 50 percent of non-U.S. firms' foreign operations are in the US (and that the relationship between sales and foreign exposure is as in Table 8). The size of the US equity portfolio is calculated as US market capitalization minus foreigners' holdings of US stocks plus US holdings of foreign stocks.

		% of US Equity Portfolio
Home-Grown Foreign Exposure		
upper bound	$3531 billion	
best guess	$1730 billion	
Direct Exposure to Foreign Stocks		
upper bound	$2065 billion	
lower bound	$1334 billion	
best guess	$1886 billion	
Total Exposure (best guess)		% of US Equity Portfolio
Direct only	$1886 billion	12%
Direct and Home-Grown	$3616 billion	24%

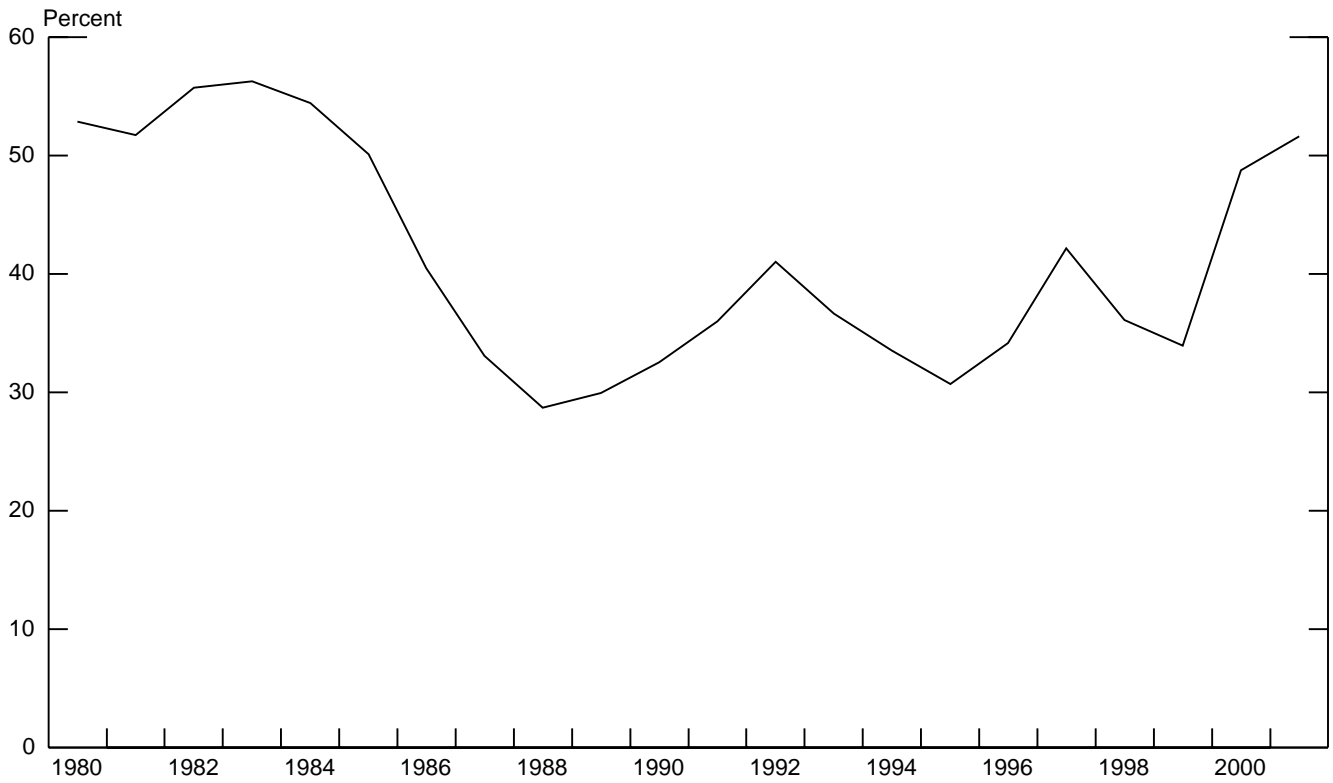**Figure 1. The Share of U.S. Equities in World Equity Markets**

Figure 2. The Share of Foreign Equities in Investors' Portfolios

Legend:
——— Foreign Equities as a Share of U.S. Portfolios
– – – U.S. Equities as a Share of Foreign Portfolios