Board of Governors of the Federal Reserve System

INFORMATION COSTS AND HOME BIAS:
AN ANALYSIS OF U.S. HOLDINGS OF FOREIGN EQUITIES

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Abstract: We test extant hypotheses of the home bias in equity holdings using high quality cross-border holdings data and quantitative measures of barriers to international investment. The effects of direct barriers to international investment, when statistically significant, are not economically meaningful. More important are information asymmetries that owe to the poor quality and low credibility of financial information in many countries. While a direct measure of information costs is not available, some foreign firms have reduced these costs by publicly listing their securities in the United States, where investor protection regulations elicit standardized, credible financial information. A proxy for the reduction in information asymmetries—the portion of a country's market that has a public U.S. listing—is a major determinant of a country's weight in U.S. investors' portfolios. Foreign countries whose firms do not alleviate information costs by opting into the U.S. regulatory environment are more severely underweighted in U.S. equity portfolios.

JEL Classification: G11, G15, M40, K00
Keywords: information asymmetries, investor protection, accounting standards, portfolio choice

I. Introduction

  The international version of the classical capital asset pricing model (ICAPM), based on traditional portfolio theory developed by Sharpe (1964) and Linter (1965), predicts that to maximize risk-adjusted returns investors should hold the world market portfolio of risky assets. It is well known, however, that domestic assets are heavily weighted in investors' portfolios. The term used to describe this phenomenon—home bias—suggests that investors are irrational when they eschew the potential gains to diversification.[1] But the underweighting of foreign assets may well be due to rational reasons, such as direct and indirect barriers to international investment.

  As shown in Figure 1(a), foreign equities are now about 12 percent of U.S. investors' equity portfolios, a substantial increase from their one percent share two decades ago, but far smaller than their relative size in world market capitalization. Figure 1(b) condenses this information into a measure of equity home bias—the deviation from the ICAPM benchmark— defined as one minus the ratio of the share of foreign equities in the U.S. and world portfolios. The home bias measure varies from zero (if the weight on foreign equities is given by their relative market capitalization) to one (if no foreign equities are held). As the graph shows, the home bias in U.S. equity portfolios has decreased substantially over the past two decades, but remains quite high.

  In our view, biased is not an apt descriptor of U.S. investors' behavior. The underweighting of foreign stocks apparent in Figure 1 is likely rational; the literature, however, has not succeeded in quantifying the relevant factors.[2] This failure owes to the lack of reliable data on both cross-border holdings and possible barriers to international investment. Without accurate holdings data, researchers have greatly underestimated foreign portfolio positions, which greatly hampered the analysis of home bias.[3] Without quantitative measures of barriers to investment, the literature has had to rely on the following logic: direct barriers such as capital controls and transaction costs have fallen and the home bias is still severe, so such barriers could not cause the home bias.

  This paper is the first to use high quality cross-border holdings data and include in the analysis quantitative measures of direct barriers to international investment. As such it provides evidence on extant hypotheses on home bias. It finds, as the literature has surmised, that direct barriers, when statistically significant, are of second-order importance. For example, if capital controls were completely eliminated in every country, U.S. investors' home bias would fall

slightly from 0.80 to 0.79. We also show that transaction costs play a statistically significant but economically insignificant role.

That direct barriers to international investment are of second-order importance does not leave us without an explanation for the home bias. The model of Merton (1987) suggests that an indirect barrier, information costs, may affect investor behavior: Investors hold stocks that they know, in effect thinking that the riskiness of stocks they do not know is very high. Recent empirical studies provide indirect evidence that information costs do indeed affect the composition of investors' portfolios. For example, foreign equity portfolios are skewed towards the equities of large firms (Kang and Stulz, 1997); information flows are an important determinant of cross-border equity transactions (Portes and Rey, 1999); and, even within countries, investors tend to hold stocks of local companies (Coval and Moskowitz, 1999).

These studies suggest that asymmetric information between local and non-local investors may be an important factor for investment decisions, but they leave open the question of what type of information. Information in these studies ranges from a concept of simple information flow (e.g., telephone traffic) to some idea of familiarity.

In this study, we offer striking direct evidence of an important role for a specific type of information—the information content inherent in U.S. investor protection regulations. When firms issue public debt in the United States ("Yankee bonds") or list equity on U.S. exchanges, barriers to U.S. investors are reduced. There is some reduction in direct barriers, as such securities have increased investor recognition and U.S.-listed equities have lower transaction costs, better settlement, and may find their way into domestic mutual funds. More important, though, is the fact that these firms have opted into the U.S. environment of investor protection regulations: its accounting standards, disclosure requirements, and regulatory environment. This compels the firm to produce higher quality financial information, which reduces information costs.[4] This reduction in information costs, in turn, makes the firm more attractive to U.S. investors.[5] Hence, the larger the share of a country's firms that publicly lists securities in the United States, the larger is its relative weight in the U.S. equity portfolio, and the less is U.S. investors' bias against its stocks.

Our findings suggest that if all foreign firms were publicly listed in the United States—

instead of the 20 percent (value weighted) as of end-1997—the home bias presented in Figure 1(b) would fall from 0.80 to 0.50. Put another way, assuming that foreign markets maintain their 50 percent share of the world portfolio, the share of foreign equities in the U.S. portfolio would increase from 10 to 25 percent. Home bias would be greatly reduced, but would still exist.

To conduct this analysis we exploit the cross-sectional variation of the holdings of U.S. investors—the largest group of international investors in the world—across a wide range of countries.[6] Indeed, the main goal of this paper is to explain the distribution of U.S. investors' home bias across countries. We show, for example, that U.S. investors underweight German stocks much more than Dutch stocks, and Chilean stocks much more than Argentinian ones. The most significant factor in explaining this is the extent firms from a country list publicly in the United States: only 18 percent of the German market is cross-listed in the United States, compared to 81 percent of the Dutch market.

The remainder of the paper is organized as follows. The next section describes in greater detail our data set on U.S. investors' holdings of foreign equities. Section III discusses measures of direct barriers to international investment. Section IV discusses how public U.S. listings can alleviate information costs incurred by U.S. investors. The statistical analysis of U.S. investors' holdings of foreign equities is presented in Section V. Section VI concludes.

II. Holdings Data

A major hindrance in research on home bias using holdings data has been the poor quality of cross-border holdings estimates. In the past, holdings were estimated using accumulated capital flows and valuation adjustments; see, for example, Tesar and Werner (1995). Warnock and Cleaver (2002) show, however, that capital flows data are ill suited to estimate bilateral holdings. Capital flows data are designed for balance of payments purposes to track the flow of money between countries. To that end, the foreign country identified in flows data is that of transactor or intermediary, not the issuer of the security. When the countries of the intermediary and issuer differ—as is often the case due to trades through financial centers such as the United Kingdom—capital flows data will produce distorted holdings estimates.

Recently, the United States has conducted two comprehensive surveys of U.S. residents' holdings of foreign securities, one as of March 1994 and another as of December 1997. By

gathering security-level data from the major custodians and large end-investors, these surveys provide higher quality holdings data.[7] Reporting to the surveys was mandatory, with penalties for noncompliance, and the data received were subjected to extensive analysis and editing. Importantly, the country attribution of each security was determined using both commercial and respondent data, correcting a major shortcoming of the capital flows data.

A sense of the significance of these surveys can be gained from Figure 2, which shows the current official estimate of the dollar value of foreign equities held by U.S. residents, along with official estimates prior to receiving data from the 1994 and 1997 surveys. The more accurate information from those surveys raised the holdings estimates by $263 billion in 1994 and $200 billion in 1997. Inaccuracies in bilateral holdings estimated from flow data are also large: Even starting with known 1994 amounts, the mean absolute error in the Warnock and Cleaver (2002) end-1997 bilateral holdings estimates is 38 percent.

Since the benchmark survey data provide the best measures of U.S. holdings of foreign equities, we limit our study of home bias to the dates of the surveys, March 1994 and December 1997. Specifically, for these two dates we form a variable, BIAS, that measures the degree of bias of U.S. investors across a wide range of countries, similar to the variable for U.S. investors' foreign portfolios that was presented in Figure 1(b). BIAS is equivalent to normalizing U.S. holdings in a country by the country's market capitalization and then dividing by a constant (the share of overall U.S. holdings in the worldwide market capitalization), so its cross-country variation is due entirely to variations of the relative importance of U.S. holdings across markets, or U.S. holdings scaled by market capitalization. By better understanding this cross-country variation, we hope to gain insight into the home bias puzzle.

Table 1 presents the components of BIAS for the 48 countries in our sample as of one of our sample dates, December 1997. Column 1 of the table shows the strong preference by U.S. investors for domestic equities—almost 90 percent of the U.S. equity portfolio consists of U.S. stocks. For foreign equities, the United Kingdom was the country of choice for U.S. investors, with U.K. stocks comprising almost 2 percent of the U.S. equity portfolio, followed by Japan, the Netherlands, France and Canada. U.S. holdings of foreign equities are quite concentrated, with the top 15 countries accounting for almost four-fifths of total U.S. holdings of foreign equities.

The second column in Table 1 presents the share of each country in the world portfolio, which corresponds to the share predicted by standard portfolio theory. That is, it shows the shares of U.S. equity holdings by country under the assumptions that global capital markets are complete and investors in all countries have identical preferences and choose portfolios optimally based on standard portfolio theory.

Comparing the shares of each country in the U.S. and world portfolios gives an indication of the degree to which U.S. investors underweight individual foreign countries. As expected, for all countries other than the United States, U.S. holdings are less than those predicted by ICAPM. The extent of the underweighting is shown in column 3, which presents each country's weight in the U.S. portfolio relative to its weight in the world portfolio. If the size of the foreign market was the only determinant of the country distribution of U.S. holdings, this measure would not vary across countries. Interestingly, though, there is a significant amount of variation in values across countries. For example, the relative weight in U.S. portfolios for both the Netherlands and Mexico is roughly 0.44, indicating that U.S. investors' holdings of stocks from these countries at end-1997 were 44 percent of what traditional portfolio theory would have predicted. On the other hand, the degree of underweighting is more severe against countries such as Japan and Germany, where U.S. investors hold 12 and 15 percent, respectively, of the ICAPM levels.

Our measure of U.S. investors' home bias against each country, shown in column 4, is defined as one minus the relative weight in the U.S. portfolio, or one minus the ratio of the share in U.S. to world portfolios. Hence, a greater value of this measure corresponds to a lower weight in U.S. relative to world portfolios and, thus, a higher degree of bias. In our sample, BIAS varies from 0.98 for China, where U.S. holdings are 2 percent of the benchmark, to 0.44 for Ireland, where U.S. holdings are 56 percent of the benchmark. As we have noted, the main goal of this paper is to explain the distribution of this measure of U.S. investors' home bias across countries.

III. Measures of Direct Barriers to International Investment

The ICAPM prediction that individuals hold equities from around the world in proportion to market capitalizations is based on several assumptions, including that there are no barriers to international investment. In practice, although many have fallen substantially over the past few

decades, barriers do exist and may influence the observed home bias.[8] In this section we discuss two direct barriers to international investment, capital controls and transaction costs.[9]

Capital Controls

Although capital controls have been greatly reduced in many countries, they can still affect cross-border investment. It is not a coincidence that some of the countries U.S. investors underweight most (for example, China) maintain substantial barriers to foreign investment.

Empirical work on the effects of capital controls on portfolios has been hampered by the lack of a widely accepted cross-country measure of the *intensity* of capital controls. There are many measures of capital controls in the economics literature, but most are dummy variables based on restrictions reported in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions*; see the survey by Eichengreen (2001). In the finance literature, researchers have dated liberalizations—see, for example, Bekaert and Harvey (2000)—but provide no measure of the intensity of controls.

In this paper we use the measure of the intensity of capital controls developed in Edison and Warnock (2001). The measure, constructed using data from International Finance Corporation (IFC) indexes, is one minus the ratio of the market capitalizations of a country's Investable (IFCI) and Global (IFCG) indices. IFCI is comprised of all stocks *or portion of stocks* in IFCG that are available to foreign investors, where availability is determined mainly by legal restrictions at the country, industry, and firm levels. For example, the market capitalization behind a country's IFCI index that has a 20 percent aggregate limit on foreign ownership of individual stocks would be 20 percent of its IFCG market capitalization; in this case our measure of capital controls, RESTRICT, would be 0.80. If the country also has a stricter 10 percent limit for banking sector stocks, RESTRICT would be between 0.80 and 0.90 (depending on the relative weight of the banking sector in its stock market). When there are no restrictions, the market capitalizations of the two indexes are equal and the measure equals zero. Restrictions vary greatly across developing countries, with about 90 percent of China's market unavailable to foreigners in 1997, compared to only 2 percent of South Africa's.[10]

High Transaction Costs

Another possible cause of home bias is high transaction costs associated with trading foreign equities. We use the Elkins-McSherry Co. measure of transaction costs across 41 foreign markets; see Domowitz et al. (2001) for an analysis of these data. The measure is comprised of three components: commissions, fees, and market impact costs. Market impact costs, or liquidity costs, are intended to measure the deviation of the transaction price from the price that would have prevailed had the trade not occurred. In 1997, total costs ranged from a low of 20 basis points (bp) on the Paris Bourse to 220bp on the Korean Stock Exchange.

The role of transaction costs in home bias has been downplayed in the literature, because they would have to be implausibly high to explain the observed home bias (French and Poterba (1991), Cooper and Kaplanis (1986)) and they do not deter investors from turning over foreign portfolios more frequently than domestic portfolios (Tesar and Werner (1995)).[11] None of these studies, however, use actual data on transaction costs or cross-border holdings.

IV. Indirect Barriers and the Role of Public U.S. Listings

Investors also face implicit costs, including costs that arise from informational disadvantages vis-a-vis local residents. For example, when considering which stocks to purchase in a particular foreign country, investors will want to differentiate between firms in that country with good profit prospects and those whose prospects are poor. To the extent that lax disclosure requirements—or lax enforcement of disclosure requirements—make such differentiation difficult, these investors may end up holding more foreign "lemons" than local insiders who have better information.

Information asymmetries can arise from differences in accounting standards, disclosure requirements, and regulatory environments across countries. When investors contemplate purchasing equity in a foreign company, they must glean from published accounts information that is based on accounting principles and disclosure requirements that may differ greatly from those in their home country. Moreover, the credibility of this information is determined to a large extent by the regulatory environment, which also varies considerably from country to country.[12] Cross-country differences in accounting principles, disclosure requirements, and regulatory environments—which together can be thought of as investor protection regulations—

give rise to information costs that must be borne by foreign investors. Information costs associated with investing in some countries may be significantly higher than in others.

Direct Measures of Information Asymmetries

As we noted in the previous section, measures of direct barriers to cross-border investment are available for many countries. Information asymmetries arising from differences in investor protection regulations, however, are not directly measurable. None of the necessary components—meaningful numeric scores of accounting standards, disclosure requirements, and regulatory environments—are readily available across a wide range of countries.

A numeric measure of accounting standards for about 40 countries, used in La Porta et al. (1998), are available from the Center for International Financial Analysis and Research, but they are somewhat outdated. Moreover, any numeric scoring of accounting standards across countries is likely inadequate for our purposes. For example, these measures do not include information on disclosure requirements and are calculated based on the inclusion or omission of certain items, but these items vary in importance across sectors. Morever, it is not just the information itself that matters—Harris (1998) compares information generated from different accounting standards—but its credibility (Fuerst (1998)).

Credibility of financial information comes from the laws on the books but also, importantly, their enforcement. As noted in Gebhardt (2000), whereas the SEC reviews filings on a systematic basis and regularly imposes effective sanctions, the U.K.'s Financial Reporting Review Panel reacts only on tips and takes companies to court only as a last resort. Moreover, in Germany, not only is noncompliance vague, but sanctions are weak. Finally, the evidence from Bhattacharya and Daouk (forthcoming) is telling. The introduction of insider trader laws—which in many countries occurred only in the 1990s—does not affect the cost of equity in a country, but their enforcement does. Prosecution, however, has occurred in less than half the countries that have insider trading laws.

An Indirect Measure of Information Asymmetries

While direct measures of information asymmetries do not exist, there is a proxy for their reduction. Some foreign firms have effectively alleviated costs facing U.S. investors by listing

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their stocks on U.S. exchanges, either directly or as Level II or Level III American Depositary Receipts (ADRs), or by issuing public debt ("Yankee bonds") in the United States.[13] To publicly issue debt or list equity on U.S. exchanges, a foreign firm must reconcile its accounts with U.S. generally accepted accounting principles (GAAP), meet the SEC's stringent disclosure requirements, and subject itself to the associated regulatory burden, tasks that are not costless.

Reconciling to U.S. GAAP allows investors to compare companies more easily across industries, irrespective of geography; without this requirement U.S. investors would be confronted with financial statements prepared under at least 40 different sets of accounting principles. The strict U.S. disclosure rules help level the playing field for outsiders. Finally, the regulatory powers of the SEC improve the likelihood that the firm's financial information will be of passable quality. Each of these reduces information costs to U.S. investors.

The case of Daimler Benz's listing on the NYSE in 1993, discussed in Breeden (1994), is illustrative. Under German GAAP the firm can, with few restrictions, substantially understate or overstate earnings by creating hidden reserves, or provisions; under U.S. GAAP, a reserve may only be booked for probable and estimable events. To list on the NYSE, Daimler-Benz had to reconcile its financial statements going back three years. In doing so, the DM200 million profit for the first half of 1993 it had reported under German GAAP became a DM1 billion loss under U.S. GAAP. The difference was an *undisclosed* release of DM1.5 billion in provisions into income, clearly shown in Daimler's reconciliation to U.S. GAAP. Under German GAAP, only insiders such as the firm's board members—which typically include managers from German banks—knew its true financial condition without the smoothing out by provisions.

Our indirect measure of the reduction in information asymmetries is USLISTED, the share of a country's stock market that was publicly listed in the United States as of end-1997 (Table 1, last column). These shares vary widely by country, with the Netherlands leading the way at 81 percent, followed by Ireland, Portugal, and Argentina, which are each over 50 percent.

Cross-Listing Reduces Direct Costs, Too

We note that by listing equity on a U.S. exchange, foreign firms also alleviate direct costs to U.S. investors. The Bank of New York (BONY), the depositary bank that has the biggest share of the ADR business, states that investing in ADRs rather than the underlying security can

save investors 10 to 40 bp annually in custodial fees. Moreover, transaction costs are lower on the NYSE than on most foreign stock exchanges and settlement is likely better. Firms that list publicly in the United States are also more visible to U.S. investors (Baker et al. (forthcoming)). To the extent this makes information more readily available, the cost of gathering information on foreign firms is reduced through a cross-listing.

Our USLISTED variable picks up these reductions in direct costs, in addition to reductions in information costs.[14] To disentangle these effects, we use a group of foreign firms that has lowered the direct costs to cross-border investment, but has not necessarily improved the quality of information. This group consists of firms that have Level I ADR programs. Such firms are not subject to the SEC's disclosure requirements, nor must they reconcile to U.S. GAAP, so such programs do not improve the quality of financial information. However, these programs do reduce the direct costs to U.S. investors through lower custodial fees, potentially lower transaction costs, and lower costs to gathering information.

As with USLISTED, we form a LEVEL I ADR variable that measures the portion of the foreign market that has a sponsored Level I ADR program.[15] Including this variable in our multivariate regressions will help differentiate the effects from cross-listing of reducing direct costs and reducing information asymmetries.

V. Statistical Analysis

We regress BIAS, the degree of U.S. investors' home bias against each country, on a vector of explanatory variables that includes direct and indirect barriers to international investment, discussed in the previous sections, as well as control variables (discussed below) such as trade links and historical risk-adjusted returns.

The skeptic will note that the portion of the foreign market that is cross-listed on U.S. exchanges or has issued Yankee bonds might be endogenous. Due to the high costs involved with listing in the United States, only firms that anticipate that the listing will be met by strong investor demand will choose to list. For example, the listing fee alone can be $2 million on the NYSE, on top of which must be added the considerable costs of reconciling financial accounts with U.S. GAAP, costs that can amount to greater than $1 million for large firms from industrial

countries. Hence, it could be argued that the causality goes from prospective U.S. demand to U.S. listings.

We would argue, however, that this prospective demand is conditional on listing on a U.S. exchange. Supporting our view is the evidence that foreign stocks experience abnormal returns just after the announcement of a U.S. listing (Miller,1999) and during the process of regulatory and exchange approval (Foerster and Karolyi, 1999); if U.S. demand was already present, abnormal returns should not be evident. Moreover, the stock price reaction of Yankee bond offerings is positive and significant, especially for first-time issuers (Miller and Puthenpurackal, forthcoming). Finally, in the case of equity holdings, those who argue that the listing satisfies unmet demand must explain exactly why the demand was unmet. Absent the information content of the U.S. listing, these securities were available to U.S. investors—many as Level I ADRs—long before the public listing.

It may also be that third factors determine both bias and listing. For example, firms that have high ratios of U.S. to total sales may be more likely to list in the United States, and U.S. investors may naturally have more information on these firms and hence may be more likely to hold their stocks. Evidence supporting the first link, from high foreign sales to cross-listing, is provided by Pagano et al. (forthcoming) and Sarkissian and Schill (1999). We control for this familiarity effect by including a measure of trade links.

We also consider the role of historical risk-adjusted returns. If portfolio decisions are based partly on past returns, then U.S. investors might tend to underweight countries whose stock markets have performed poorly. To capture this type of momentum or "returns-chasing" behavior à la Bohn and Tesar (1996), we construct a reward-to-risk ratio, the mean monthly return over its standard deviation.[16]

Summary statistics on the main explanatory variables for the 1997 sample are presented in Table 2. The statistical significance of the relationship of each variable with BIAS is given by the t-statistics from bivariate regressions. The bilateral relationships between BIAS and two variables—USLISTED and RESTRICT—are highly statistically significant; the relationship between BIAS and USLISTED is also shown graphically in Figure 3. There is also evidence that one other variable, REWRISK, is significantly related to BIAS. The other variables—TRADE, Level I ADRs, and SIZE—do not exhibit a significant bilateral relationship

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with BIAS. In summary, bivariate regressions suggest that countries are likely to be less underweight in U.S. portfolios if they have a larger share of their firms listed on U.S. exchanges, lower capital controls, and a higher historic reward-to-risk tradeoff.

Main Regression Results for 1997

Our full sample multivariate results for 1997 are presented in the top half of Table 3a. The table is arranged such that regressions using variables for which we have complete coverage are in column 1. In subsequent columns, variables with incomplete coverage are added.

The most striking feature of our results is that in every specification of our regression equation, there exists a strong negative relationship between BIAS and USLISTED. Since we control for the effect of lowering direct costs by including the Level I ADR variable—whose coefficient is also negative but smaller and not always significant—it follows that the effect being picked up by USLISTED is associated with the reduction in information asymmetries. We can conclude that the reduction in information costs associated with conforming with the U.S. regulatory regime is an important determinant of the distribution of U.S. investors' bias across countries. Countries whose firms do not alleviate information asymmetries by publicly listing in the United States are more severely underweighted in U.S. equity portfolios.

Roughly speaking, the estimated value of the coefficient on the USLISTED variable implies that if German firms were publicly listed in the United States to the same extent as Dutch firms, we would expect the bias against Germany to be significantly lower, falling from 0.85 to 0.57. Moreover, if all foreign firms were publicly listed in the United States—instead of 20 percent as of end-1997—we would expect overall U.S. bias to fall from 0.80 to less than 0.50. Put another way, assuming that foreign markets maintain their 50 percent share of the world portfolio, the share of foreign equities in the U.S. portfolio would increase from 10 to 25 percent.

Focusing first on the full sample 1997 results in column 1, we find that U.S. investors have less of a bias against smaller countries and countries with more extensive foreign ownership restrictions.[17] While capital controls affect the distribution of international portfolios in a statistical sense, the small size of the coefficient on RESTRICT verifies the view of the existing literature that capital controls are no longer a likely cause of home bias. For example, if

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restrictions were completely eliminated in every country, BIAS would fall only slightly from about 0.80 to 0.79.

The measure of trade links, TRADE, has the expected sign, but with a t-statistic near zero. While it is true that U.S. investors are less underweight against the two countries most closely linked to the United States, Mexico and Canada, on average we find no significant relationship between trade and home bias.[18]

In columns 2 and 4 of the top panel we include REWRISK, our measure of risk-adjusted returns. Whereas the t-statistic from Table 2 suggested that U.S. investors are less underweight countries with higher return-to-risk ratios, the coefficient on REWRISK is statistically insignificant in the multivariate regressions.

The Role of Transaction Costs

In columns 3 and 4, we get the counterintuitive result that U.S. investors are *less* biased against high transaction costs countries. Because this is the first study that uses both high quality holdings data and actual data on transactions costs, we further explore the link between the two in column 5. Trading costs are low on the NYSE—the U.S. exchange on which over 80 percent (by market capitalization) of non-U.S. stocks are listed—so firms from high cost countries can lower trading costs in their stock by listing in the United States. To capture the effect of the reduction in trading costs associated with a U.S. listing, we include an interaction term combining (one minus) costs and listings. Costs are positive (but not significant) in this regressions. The significant positive coefficient on the interaction term is, however, evidence that high cost countries with a high portion of U.S. listings are less underweight in U.S. portfolios. That is, countries whose firms tend to list on U.S. exchanges are less underweight in U.S. portfolios and high cost countries get an extra boost in U.S. portfolios from the listing. Overall, the results in column 5 indicate that one way that listing on a U.S. exchange, particularly on the NYSE, reduces home bias is through reduced transaction costs.

1994 Results

Our full sample results are robust across the two sample dates. Our 1994 regressions are based on smaller samples and include fewer variables because we do not have 1994 data for

Level I ADRs and TCOSTs. These differences notwithstanding, the 1994 results in the bottom panel of Table 3a are very similar to the 1997 results. In particular, USLISTED, SIZE, and RESTRICT are significant, but trade links do not matter. The only substantial difference is that REWRISK is now negative and significant: in 1994 U.S. investors were less underweight countries that had high historical return-to-risk ratios.

Split Samples: Emerging Markets and Industrial Countries

The results in our emerging markets and industrial countries regressions (Table 3b) should be interpreted cautiously because the sample sizes are quite small.   In all four regressions, however, the coefficient on USLISTED remains highly significant and is about the same magnitude as in the full sample regressions. Across the other variables there is less consistency. The only (tentative) conclusion we can make is that the effect of Level I ADRs appears to be greater and more significant for emerging markets. SIZE is larger (although not statistically so) for emerging markets in 1997, but is insignificant in the 1994 emerging market regression. RESTRICT is insignificant in 1997, but large and highly significant in 1994.[19]

The Changes in Bias from 1994 to 1997

In Table 4 we examine the extent to which we can explain *changes* in home bias from 1994 to 1997. In particular, we regress the change in BIAS on the initial level of BIAS, as well as the initial levels of and changes in USLISTED, SIZE, and RESTRICT—variables that were significant in the full sample regressions. Some evidence of catching up is apparent: Countries that in 1994 were more underweight in U.S. portfolios tended to see the largest increases in their relative weightings. Neither the level of restrictions or size in 1994 nor their subsequent changes affected the change in bias. Importantly, the greater the increase in public U.S. listings between 1994 and 1997, the greater is the reduction in bias.

The Role of Accounting Standards

Subject to our doubts about the usefulness of available numeric scores of accounting standards, discussed in Section IV, we attempt to directly test the role of accounting standards in home bias. Since the accounting standards measure, ACCT, is only available for 1990 and

standards have changed in many countries in the 1990s, we analyze the 1994 level of BIAS in this section. The first two columns of Table 5 indicate that while there is weak evidence that higher accounting standards are associated with lower BIAS, the evidence is stronger that countries with higher scores on rule of law (ROL) are less underweight in U.S. portfolios. When we include USLISTED (column 3), the t-statistics on ACCT and ROL fall toward zero. In the fourth column we include interaction terms. The story that emerges is that countries that are less underweight in U.S. portfolios (i) tend to list on U.S. exchanges, (ii) have both high accounting standards and high scores on rule of law, or (iii) have low accounting standards but list on U.S exchanges. That the interaction of high standards and high rule of law is associated with lower bias, but that by themselves accounting standards and rule of law have positive coefficients, underscores the importance of the credibility of the information, not just the quantity.

VII. Conclusion

The results presented in this paper suggest that an indirect barrier to international investment, information costs, is an important factor behind the home bias phenomenon. To list on a U.S. stock exchange or issue public debt in the United States, a foreign firm must opt into U.S. investor protection regulations by reconciling its financial statements with U.S. GAAP, complying with stringent SEC disclosure requirements, and subjecting itself to the strict U.S. regulatory environment. Doing so alleviates a significant information cost to the U.S. investor, and countries with a greater share of firms that have public U.S. listings, either equity or debt, are less severely underweighted in U.S. equity portfolios.

We also provide for the first time estimates of the effects of many direct barriers to international investment on home bias. When direct barriers are statistically significant, their economic importance is small. Finally, we find some evidence that firms from countries with low accounting standards or high trading costs can improve their prospects with U.S. investors by listing on a U.S. exchange.

We restricted our focus in this paper to the determinants of U.S. investors holdings of foreign *equities*. One avenue for future research is to consider a broader class of assets, including, for example, U.S. investors holdings of foreign bonds, both sovereign and corporate.

Along these same lines, an even more wide-ranging study of U.S. investors' exposure to foreign economies might include cross-border bank lending as well as U.S. investors' holdings of equities of U.S. multinationals. Moreover, while our focus was on U.S. portfolios, it would also be interesting to explore other countries' foreign portfolios.

Bibliography

Baker, H.K., J. Nofsinger, and D. Weaver, forthcoming. International cross listing and visibility. *Journal of Financial and Quantitative Analysis*.

Bekaert, G., and C.R. Harvey, 2000. Foreign speculators and emerging equity markets. *Journal of Finance*, 55(2): pp. 565-613.

Bhattacharya, U., and H. Daouk, forthcoming. The world price of insider trading. *Journal of Finance*.

Black, F., 1974. International capital market equilibrium with investment barriers. *Journal of Financial Economics*, 1.

Bohn., H., and L. Tesar, 1996. U.S. equity investment in foreign markets: Portfolio rebalancing or return chasing? *American Economic Review Papers and Proceedings*.

Bordo, M., B. Eichengreen, and D. Irwin, 1999. Is globalization today really different than globalization a hundred years ago? in S. Collins and R. Lawrence, eds., *Brookings Trade Forum 1999*, Brookings Institution Press.

Breeden, R., 1994. Foreign companies and U.S. securities markets in a time of economic transformation. *Fordham International Law Journal*, 17: S77-96.

Britten-Jones, M., 1999. The sampling error in estimates of mean-variance efficient portfolio weights. *Journal of Finance*, 54: 655-671.

Cooper, I., and E. Kaplanis, 1986. Costs to crossborder investment and international equity market equilibrium. in J. Edwards, J. Franks, C. Mayer and S. Schaefer (eds.), *Recent Developments in Corporate Finance*. Cambridge University Press, Cambridge.

Cooper, I., and E. Kaplanis, 1994. What explains the home bias in portfolio investment? *Review of Financial Studies*, 7: 45-60.

Coval, J., and T. Moskowitz, 1999. Home bias at home: Local equity preference in domestic portfolios. *Journal of Finance*, 54(6).

Dahlquist, M., and G. Robertsson, 2001. Direct foreign ownership, institutional investors, and firm characteristics. *Journal of Financial Economics*, 59: 413-440.

Doidge, C., A. Karolyi, and R. Stulz, 2001. Why are foreign firms listed in the U.S. worth more? *NBER Working Paper #8538*.

Domowitz, I., J. Glen, and A. Madhaven, 2001. Liquidity, volatility, and equity trading costs across countries and over time. *International Finance*, 4(2): 221-255.

Edison, H., and F. Warnock, 2001. A simple measure of the intensity of capital controls. *IMF Working Paper* WP/01/180.

Eichengreen, B., 2001. Capital account liberalizations: What do cross-country studies tell us? *World Bank Economic Review*, 15(3): 341-365.

Foerster, S., and G.A. Karolyi, 1999. The effects of market segmentation and investor recognition on asset prices: evidence from foreign stocks listing in the U.S. *Journal of Finance*, 54(3).

French, K., and J. Poterba, 1991. Investor diversification and international equity markets. *American Economic Review*, Papers and Proceedings, 222-226.

Fuerst, O., 1998. A theoretical analysis of the investor protection regulations argument for global listing of stocks. International Center for Finance at Yale.

Gebhardt, G., 2000. The evolution of global standards in accounting. in R. Litan and A. Santomero, eds., *Brookings-Wharton Papers on Financial Services*, Brookings Institution Press.

Griever, W., G. Lee, and F. Warnock, 2001. The U.S. System for Measuring Cross-Border Investment in Securities: A Primer with a Discussion of Recent Developments. *Federal Reserve Bulletin*, 87(10): 633-650.

Grinblatt, M., and M. Keloharju, 2001. How distance, language, and culture influence stockholdings and trades. *Journal of Finance*, 56(3): 1053-73.

Harris, T., 1998. Overcoming Accounting Differences: A stockpicker's guide to the numbers that count. Apples to Apples Series, Morgan Stanley Dean Witter.

International Finance Corporation, 1998. *Emerging Markets Factbook*.

Kang, J., and R. Stulz, 1997. Why is there a home bias? An analysis of foreign portfolio equity ownership in Japan, *Journal of Financial Economics*, 46:3-28.

Karolyi, G.A., and R. Stulz, forthcoming. Are financial assets priced locally or globally? in Constantinides, G., M. Harris, and R. Stulz, eds. *Handbook of the Economics of Finance*, North-Holland.

Lang, M., K. Lins, and D. Miller, 2002. ADRs, analysts, and accuracy: Does cross listing in the U.S. improve and firm's information environment and increase market value? mimeo.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny, 1998. Law and finance. *Journal of Political Economy*, 106: 1113-1155.

La Porta, R., F. Lopez-de-Silanes, and A. Shleifer, 1999. Corporate Ownership Around the World. *Journal of Finance*, 54(2).

Lewis, K., 1999. Trying to explain the home bias in equities and consumption. *Journal of Economic Literature* , 37:571-608.

Lintner, J., 1965. The valuation of risky assets and the selection of risky investment in stock portfolio and capital budgets. *Review of Economics and Statistics*, 47: 103-124.

Merton, R., 1987. A simple model of capital market equilibrium with incomplete information. *Journal of Finance*, 42: 483-510.

Miller, D., 1999. The market reaction to international cross-listings: evidence from Depositary Receipts. *Journal of Financial Economics*, 51: 103-123.

Miller, D., and J. Puthenpurackal, forthcoming. The costs, wealth effects, and determinants of international capital raising: Evidence from public Yankee bonds. *Journal of Financial Intermediation*.

Obstfeld, M., and K. Rogoff, 2001. The six major puzzles in international macroeconomics: Is there a common cause? in *NBER Macroeconomics Annual, 15 (2000)*. National Bureau of Economic Research and the Massachusetts Institute of Technology.

Pagano, M., A. Roell, and J. Zechner, forthcoming. The geography of equity listing: Why do European companies list abroad? *Journal of Finance*.

Portes, R., and H. Rey, 1999. The determinants of cross-border equity flows: the geography of information. NBER Working Paper 7336.

Sarkissian, S., and M. Schill, 1999. The overseas listing decision: New evidence of proximity preference. Working paper, McGill University.

Sharpe, W., 1964. Capital asset prices: A theory of market equilibrium under the condition of risk. *Journal of Finance*, 19: 425-442.

Stulz, R., 1981. On the effects of barriers to international investment. *Journal of Finance*, 36: 923-934.

Stulz, R., 1999. Globalization of equity markets and the cost of capital. Paper prepared for the SBF/NYSE Conference on Global Equity Markets.

Tesar, L., and I. Werner, 1995. Home bias and high turnover. *Journal of International Money and Finance*, 14: 467-493.

Treasury Department and Federal Reserve Board, 2000. United States Holdings of Foreign Long-Term Securities as of December 31, 1997 and December 31, 1999.

Warnock, F., forthcoming. Home bias and high turnover reconsidered. *Journal of International Money and Finance*.

Warnock, F., and C. Cleaver, 2002. Financial centers and the geography of capital flows. Federal Reserve Board International Finance Discussion Paper #722.

White, H., 1980. A heteroskedasticity-consistent covariance matrix estimator and direct test for heteroskedasticity. *Econometrica*, 48: 817-838.

Data Appendix

We include the 48 largest foreign **countries** by 1997 market capitalization. The smallest country in the sample is Pakistan ($11 billion); the largest country excluded is Oman ($7 billion). Data exist for most variables for each of these countries, unless noted.

U.S. holdings of foreign equities are available at www.treas.gov/fpis/ .

Data on **worldwide market capitalizations of non-U.S. stocks listed on U.S. stock markets** are compiled from various sources. For NYSE-listed firms, year-end data were provided by the NYSE, compiled from data from FactSet and Bloomberg. For the 1994Q1 regressions, we use end-1993 NYSE values. Data for non-U.S. firms listed on Nasdaq and Amex are from CompuStat. For all ADRs in the 1997 sample, cross-checks were made using Bank of New York (BONY) ADR Index data for 1998. Data on **Yankee bond issuances** are from Securities Data Corporation, Inc. (SDC). **Level I ADRs** as of end-1997 were identified from a list provided by BONY; market capitalizations, where available, are from Worldscope.

Country-level market capitalization data, which are of domestic firms listed on the domestic market, are from IFC Emerging Markets Factbook 1998 and the International Federation of Stock Exchanges (www.fibv.com). The coverage of IFC is better; FIBV data were used as a cross-check. Differences between the two sources were for the most part small or nonexistent, except for in the data for Ireland, Australia, and New Zealand, where the IFC number was based on an incorrect currency conversion.

Trade data are from IMF *Direction of Trade Statistics Yearbook*, 1999.

The measure of **foreign ownership restrictions** is one minus the ratio of the market capitalizations of the IFC Investable and Global Indexes (IFC, 1998). The measure is assumed to be zero for industrial countries that do not have IFCI indexes. See Edison and Warnock (2001).

Transaction costs for 41 countries are from Elkin-McSherry Co. (www.elkins-mcsherry.com).

Reward/risk is the mean return over the standard deviation of returns, where returns are changes in the country's MSCI Price Index calculated over the periods of 15 quarters preceding 1994Q1 and 1997Q4. Data were obtained from www.mscidata.com.

Accounting standards are for 1990 as compiled by the Center for International Financial Analysis and Research. **Rule of law** is for 1982 to 1995 as compiled by the International Country Risk rating agency. Both are taken from La Porta et al. (1998).

Table 1. U.S. Portfolio Holdings and International Stock Market Measures, 1997

Country	Share in U.S. Equity Portfolio 1	Share in World Market Capitalization 2	Relative Weight in U.S. Portfolio (relative to market capitalization) 3 (1/2)	BIAS 4 (1 - 3)	U.S. Listed (% of market capitalization) 5
Major industrial countries					
United States	89.9	48.3	1.86		100.0
United Kingdom	1.82	8.5	.21	0.79	38.7
Japan	1.14	9.4	.12	0.88	27.2
France	0.71	2.9	.25	0.75	29.3
Canada	0.59	2.4	.25	0.75	44.4
Germany	0.54	3.5	.15	0.85	17.6
Italy	0.35	1.5	.24	0.76	42.5
Other advanced countries					
Netherlands	0.89	2.0	.45	0.55	80.7
Switzerland	0.52	2.5	.21	0.79	1.3
Sweden	0.32	1.2	.28	0.72	34.0
Spain	0.21	1.2	.17	0.83	39.2
Ireland	0.12	0.2	.56	0.44	64.2
Finland	0.12	0.3	.40	0.60	32.4
Norway	0.08	0.3	.28	0.72	23.1
Denmark	0.07	0.4	.19	0.81	21.5
Portugal	0.06	0.2	.35	0.65	61.9
Israel	0.06	0.2	.31	0.69	41.5

Table 1. U.S. Portfolio Holdings and International Stock Market Measures, 1997 (continued)

Country	Share in U.S. Equity Portfolio 1	Share in World Market Capitalization 2	Relative Weight in U.S. Portfolio (relative to market capitalization) 3 (1/2)	BIAS 4 (1 - 3)	U.S. Listed (% of market capitalization) 5
Belgium	0.05	0.6	.09	0.91	7.2
Luxembourg	0.04	0.1	.31	0.69	26.0
Austria	0.03	0.2	.20	0.80	0.0
Greece	0.01	0.2	.09	0.91	0.4
Australia	0.26	1.3	.21	0.79	42.7
Hong Kong	0.23	1.8	.13	0.87	10.0
Singapore	0.09	0.5	.19	0.81	4.5
New Zealand	0.04	0.1	.35	0.65	42.7
Latin America					
Mexico	0.29	0.7	.44	0.56	33.6
Brazil	0.26	1.1	.24	0.76	24.1
Argentina	0.11	0.3	.43	0.57	56.5
Chile	0.04	0.3	.12	0.88	38.9
Peru	0.02	0.1	.26	0.74	38.6
Venezuela	0.02	0.1	.27	0.73	13.3
Colombia	0.01	0.1	.07	0.93	10.2

Table 1. U.S. Portfolio Holdings and International Stock Market Measures,1997 (continued)

Country	Share in U.S. Equity Portfolio 1	Share in World Market Capitalization 2	Relative Weight in U.S. Portfolio (relative to market capitalization) 3 (1/2)	BIAS 4 (1 - 3)	U.S. Listed (% of market capitalization) 5
Emerging Asia					
India	0.05	0.6	.09	0.91	0.0
Malaysia	0.04	0.4	.10	0.90	0.0
Indonesia	0.02	0.1	.17	0.83	20.0
Korea	0.04	0.2	.21	0.79	24.5
Phillippines	0.02	0.1	.18	0.82	6.5
China	0.02	0.9	.02	0.98	1.3
Taiwan	0.04	1.2	.03	0.97	5.5
Thailand	0.02	0.1	.18	0.82	0.0
Pakistan	0.01	0.1	.21	0.79	0.0
Central and Eastern Europe					
Russia	0.07	0.5	.13	0.87	0.7
Hungary	0.03	0.1	.46	0.54	33.3
Czech Republic	0.01	0.1	.12	0.88	0.0
Poland	0.01	0.1	.26	0.74	0.0
Other Developing Countries					
South Africa	0.08	1.0	.08	0.92	12.2
Turkey	0.05	0.3	.19	0.81	0.0
Egypt	0.01	0.1	.07	0.93	0.0
Morocco	0.01	0.1	.04	0.96	0.0

Sources: Treasury Department and Federal Reserve Board (2000); International Finance Corporation (1998); NYSE; CompuStat; authors' calculations. See Data Appendix for further details on sources.
Notes: *U.S. Listed* refers to share of country's stock market that is listed on U.S. exchanges—either directly or as a Level II or III ADR—or has issued public debt in the United States.

Table 2. Summary Statistics

	Mean	Standard Error	Minimum	Maximum	Number of Observations	t-stat	Correlations					
							US Listed	Restrict	Trade	Rew Risk	Level I ADRs	Size
USListed	0.219	0.207	0.000	0.807	48	-7.55						
Restrict	0.124	0.225	0.000	0.898	48	+5.72	-0.36					
Trade	0.095	0.116	0.012	0.540	48	-0.75	-0.07	+0.09				
RewRisk	0.080	0.205	-0.329	0.502	43	-2.62	+0.47	-0.53	-0.19			
Level I ADRs	0.081	0.119	0.000	0.420	48	+0.43	-0.34	-0.17	+0.23	-0.05		
Size	1.029	1.860	0.047	9.416	48	+1.26	+0.13	-0.19	-0.08	+0.17	+0.05	
TCosts	73.79	38.77	30.02	219.58	41	-0.28	-0.10	+0.41	+0.19	-0.47	-0.20	-0.34

Notes. All summary statistics are for 1997; 1994 statistics available upon request from the authors. *USListed* refers to share of country's stock market that is listed on U.S. exchanges—either directly or as a Level II or III ADR—or has issued public debt in the United States. *Restrict* is the Edison and Warnock (2001) measure of foreign ownership restrictions. *Trade* is the relative importance of trade with the United States; that is, a country's total trade with the United States as a proportion of its GNP. *RewRisk* is a historical reward-to-risk ratio calculated over a 15-quarter period. *Level I ADRs* is the portion of the foreign market that has a Level I ADR program. *Size* is the share of a country's stock market in world market capitalization. *TCosts* are Elkins-McSherry transaction costs. T-statistics are based on White (1980) standard errors from a bivariate regression of *Bias* on the explanatory variable and a constant. See Data Appendix for more information on data sources.

Table 3a. Full Sample Results

	(1)	(2)	(3)	(4)	(5)
	1997				
USLISTED	-0.445*** (0.063)	-0.414*** (0.065)	-0.479*** (0.059)	-0.457*** (0.062)	-1.013*** (0.246)
LEVEL I ADRs	-0.144 (0.089)	-0.127 (0.097)	-0.206** (0.099)	-0.209** (0.095)	
SIZE	0.018*** (0.004)	0.017*** (0.004)	0.014*** (0.003)	0.014*** (0.004)	
RESTRICT	0.080** (0.040)	0.084* (0.048)	0.059 (0.056)	0.011 (0.061)	
TRADE	-0.038 (0.093)	-0.053 (0.100)	-0.023 (0.094)	-0.064 (0.103)	
REWRISK		-0.004 (0.067)		-0.066 (0.074)	
TCOSTs			-0.093 (0.088)	-0.054 (0.084)	0.133 (0.108)
(1-TCosts)*USLISTED					0.844** (0.349)
N	48	43	41	39	41
Adjusted R^2	0.59	0.56	0.57	0.57	0.54
	1994				
USLISTED	-0.455*** (0.070)	-0.428*** (0.063)			
SIZE	0.009*** (0.002)	0.009*** (0.002)			
RESTRICT	0.119*** (0.035)	0.147*** (0.041)			
TRADE	0.070 (0.133)	0.057 (0.089)			
REWRISK		-0.219* (0.123)			
N	39	31			
Adjusted R^2	0.56	0.64			

Notes. Dependent variable is BIAS. Constants are included but not reported. See Table 2 for definitions of variables. White (1980) standard errors are in parentheses. ***,**, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 3b. Split Sample Results

	Emerging Markets	Industrial Countries
	1997	
USLISTED	-0.507*** (0.075)	-0.374*** (0.065)
LEVEL I ADRs	-0.394*** (0.118)	-0.008 (0.106)
SIZE	0.083** (0.036)	0.018*** (0.004)
RESTRICT	0.009 (0.044)	
TRADE	-0.156 (0.103)	0.043 (0.072)
N	25	23
Adjusted R^2	0.63	0.51
	1994	
USLISTED	-0.555*** (0.107)	-0.467*** (0.085)
SIZE	0.027 (0.051)	0.008*** (0.002)
RESTRICT	0.187*** (0.068)	
TRADE	-0.342 (0.303)	0.035 (0.061)
N	20	19
Adjusted R^2	0.47	0.62

Notes. Dependent variable is BIAS. White (1980) standard errors are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. See Table 3a for further information.

Table 4. Change in Home Bias from 1994 to 1997

BIAS 1994	-0.268** (0.112)
USLISTED 1994	0.080 (0.076)
SIZE 1994	0.008 (0.005)
RESTRICT 1994	0.050 (0.043)
ΔUSLISTED	-0.145** (0.067)
ΔSIZE	0.012 (0.009)
ΔRESTRICT	0.059 (0.074)
N	39
Adjusted R^2	0.34

Notes. Dependent variable is the change in BIAS from 1994 to 1997. The changes in RESTRICT, SIZE, and USLISTED are also from 1994 to 1997. See notes to Table 2 for more complete descriptions. Constants are included but not reported. White (1980) standard errors are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 5. Effects of Accounting Standards and Rule of Law on Bias

	(1)	(2)	(3)	(4)
	1994			
ACCT	-0.16 (0.15)		0.08 (0.13)	-0.37 (0.33)
ROL		-0.02*** (0.01)	-0.01 (0.01)	0.04* (0.03)
USLISTED			-0.49*** (0.08)	-1.46*** (0.31)
ACCT * ROL				-0.08* (0.04)
ACCT * USLISTED				2.55*** (0.85)
ROL * USLISTED				-0.57* (0.42)
N	37	39	37	37
Adjusted R^2	0.0	0.13	0.48	0.50

Notes. ACCT is 1990 accounting standards as compiled by the Center for International Financial Analysis and Research. ROL is 1982 to 1995 rule of law as compiled by the International Country Risk rating agency. Both ACCT and ROL are taken from La Porta *et al* (1998). Dependent variable is the level of BIAS in 1994. Constants are included but not reported. White (1980) standard errors are in parentheses. ***,**, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

1. Surveys of the home bias literature include Lewis (1999) and Karolyi and Stulz (forthcoming).

2. That home bias is irrational is argued in papers that use historical returns to form optimal portfolios. Lewis (1999), for example, shows large unexploited gains from international diversification. The evidence in Britten-Jones (1999) suggests, however, that the confidence intervals around optimal portfolio weights are wide enough to make home bias rational.

3. Warnock (forthcoming) shows the implication of underestimated international holdings for the Tesar and Werner (1995) home bias and high turnover puzzle.

4. That cross-listed firms produce higher quality financial information is consistent with Lang et al. (2002),who find that such firms have increased forecasting accuracy, as well as Stulz (1999) and La Porta et al. (1999).

5. Consistent with this is the recent finding of a cross-listing premium by Doidge et al. (2001).

6. Home bias has been addressed using data on foreigners' investments in the equities of Japan (Kang and Stulz, 1997), Finland (Grinblatt and Keloharju, 2001), and Sweden (Dahlquist and Robertsson, 2001).

7. Smaller custodians and smaller institutional investors were sampled, but 99 percent of the data was from the major reporters. Holdings of U.S. private investors were included to the extent they were through U.S. mutual funds or are entrusted to U.S.-resident custodians for safekeeping. For a primer on U.S. surveys of cross-border holdings and U.S. data on international securities transactions, see Griever et al. (2001).

8. Papers modeling the effects of barriers to international investment include Black (1974), Stulz (1981), and Cooper and Kaplanis (1986).

9. A direct barrier that our analysis does not address is regulations on U.S. institutions. Such regulations, however, do not appear to contribute to U.S. equity home bias. For example, life insurance companies in Connecticut do not have limits on foreign investments; in New York they could conceivably hold a quarter of the equity portfolios in foreign stocks (National Association of Insurance Commissioners Chart CF-50). Moreover, the largest pension funds exhibit surprisingly little home bias: CalPERS and the New York State Common Retirement Fund both target a greater than 25 percent weighting on foreign stocks in their equity portfolios.

10. The IFC does not publish Investable indexes for industrial countries. Absent other information, we assume that for these countries the Investable and Global indexes are identical and, therefore, that foreign ownership restrictions are zero in industrial countries.

11. High turnover rates on foreign equity portfolios are not evident using updated holdings estimates; see Warnock (forthcoming).

12. Bordo et al. (1999) note that the U.S. railroad industry received a disproportionately large share of portfolio investment flows from Britain in the late 19th century. They argue that this was

because information about the railroad sector was more readily available and of better quality, due in large part to standardized accounting principles, disclosure requirements of the New York Stock Exchange (NYSE), and regulation by the Interstate Commerce Commission, a precursor to the Securities and Exchange Commission (SEC).

13. We will refer to both the issuance of Yankee bonds and the listing of stocks or ADRs on U.S. exchanges as listing publicly in the United States, or a public U.S. listing, differentiating debt and equity only where necessary. See Miller (1999) for a discussion of ADR programs.

14. It is often argued that a public U.S. listing obviates foreign investment regulations on U.S. institutions. It is true that U.S.-listed foreign equities can be held by domestic mutual funds, and there are eight foreign stocks in the S&P 500 (but no more will be added). It is less certain, however, that pension funds use ADRs to obviate foreign investment limits. For any legal list fund, like New York's, for the purposes of limits on foreign investment it is the country of incorporation that matters, not where the security trades.

15. Unlike our USLISTED variable, which includes *every* non-U.S. stock listed on U.S. exchanges, coverage on sponsored Level I ADR programs is incomplete for two reasons. The list of Level I programs provided by BONY includes only 505 of the roughly 600 programs that existed at the end of 1997, and of these only 353 appear in Worldscope.

16. That diversification gains are greater in countries whose returns are less correlated with U.S. returns suggests including a correlation variable. However, U.S. investors actually underweight such countries *more*; in multivariate regressions a correlation variable is insignificant.

17. The Kang and Stulz (1997) finding that foreigners prefer large firms suggests that our small country finding might be driven by small markets dominated by a few large firms. However, a concentration measure is not significant in bivariate or multivariate regressions.

18. Obstfeld and Rogoff (2001) construct a two-country model in which trade costs in goods markets give rise to home bias in both portfolio and consumption decisions. In their model, equilibrium portfolio shares are proportional to consumption shares, and home bias arises because households face "iceberg" costs of trade on goods shipped abroad. Extending this intuition into a multi-country framework, we suspect that any explanation of home bias based on trading costs in goods markets would likely imply a positive correlation between U.S. purchases of foreign equities and goods across countries, an implication seemingly at odds with our finding that trade links are unrelated to home bias.

19. That RESTRICT is insignificant for the EM regression may suggest that it is acting as a EM/industrial country dummy. However, such a dummy has no explanatory power if included in our full sample regressions.