Is equity home bias different from foreign bias?

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Abstract:

The literature on international equity holdings distinguishes between the home bias (overweighting of home stocks) and the foreign bias (relative underweighting of stocks from countries that are far from home geographically, economically, culturally, or informationally). In fact, the two biases may not be distinct at all. We characterize a measure of "pure" home bias as the amount by which home bias exceeds the level that would be predicted for a foreign country with zero "distance". We establish that there is no pure bias in 24 developed markets. In 4 countries there is negative pure bias explained by the fact that they are tax havens. There is positive and large pure bias in 13 younger markets. . We identify country characteristics that are correlated with the degree of pure home bias. These are mainly development and governance measures.

JEL Classification: G15, G18, G30, G38, F3

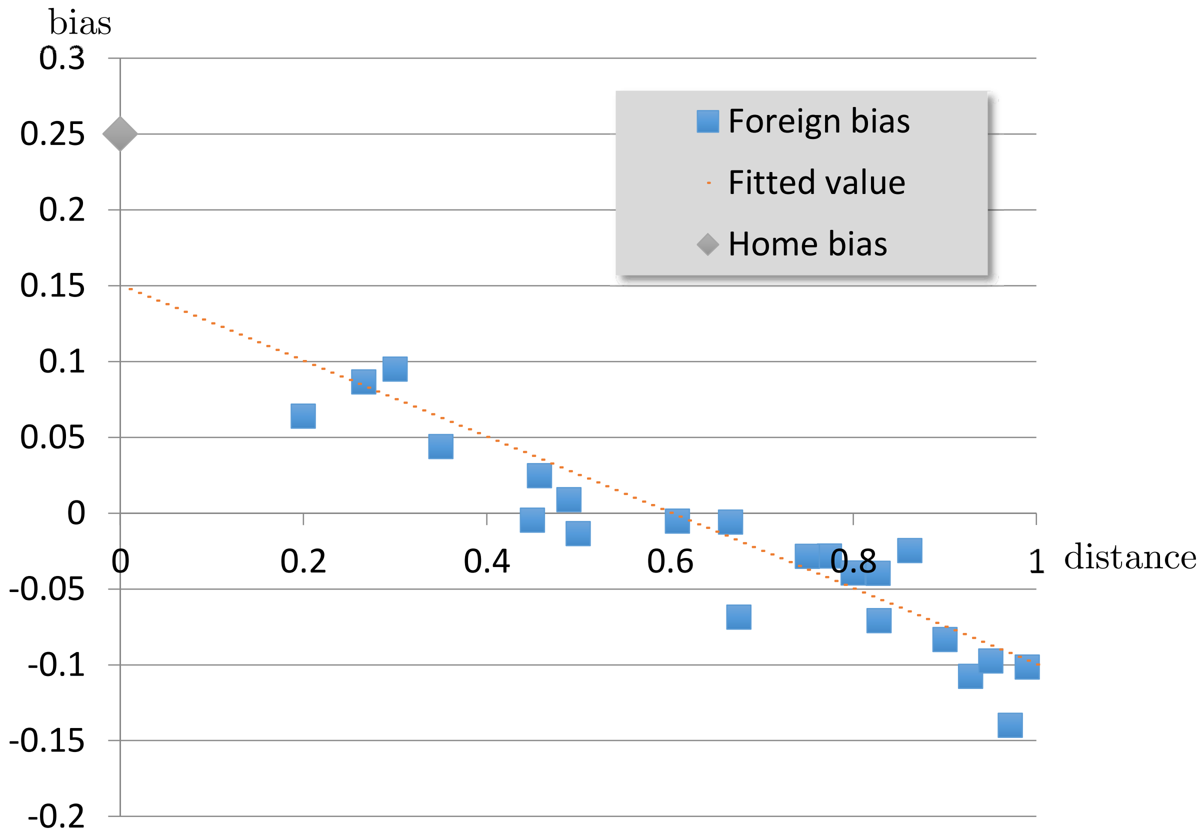
Introduction

The literature on international equity holdings distinguishes between the home bias and the foreign bias. Home bias refers to the observation that investors overweight their home-country stocks so much that the forgone marginal benefit to increased international diversification looks far greater than any observable costs of holding foreign equities, such as withholding taxes. Foreign bias, in contrast, refers to the observation that investors assign higher portfolio weights to foreign countries that are "closer"' to their home country, even when though these are the countries where the diversification benefits are smallest. Closeness here refers to a combination of geographic proximity, high information and trade flows, and other measures such as common culture.

These two phenomena are closely related. Both biases say that international equity investment choices depend on a measure of "distance" between the investing country and the country of investment. In the limit, the two biases could represent the same thing, since the home country is the closest country and also exhibits the most bias. In this paper we answer the following question: to what extent is the home country different from a hypothetical foreign country that has a "distance" of zero? The logic of asking this question is that the foreign bias predicts that "close" countries receive higher portfolio weights. The home country has a distance of zero, so the foreign bias predicts it should receive a high portfolio weight even if there is no separate home bias. Thus the fact that foreign bias is distance-related might in itself already explain much of, and perhaps all of, the home bias.

Accordingly, we define "pure" home bias as the amount of home bias in excess of the level that would be predicted for a foreign country with zero distance. Figure 1 illustrates the idea for the case where bias is measured as the gap between a country's portfolio weights and world market portfolio weights. For a representative investor domiciled in country *i* there is a relationship between the distance of various foreign countries, *j*, and the investor's excess holdings of stocks in those countries. The points marked by squares in the graph represent different foreign countries, some of which here are overweight in the investor's portfolio and others underweight. In this example the portfolio weights depend only on a single scalar measure of distance, measured on the X-axis. The squares plot on a noisy line, which is downward sloping to indicate that more distant countries are have lower (e.g. more negative) excess weights. The line cuts the Y-axis at 0.15, which is the amount of bias predicted for a zero-distance foreign country based on the country's foreign bias pattern. But the home country itself tautologically has X-axis distance of zero. In the example, the total home bias overweight is 0.25, shown as the diamond on the Y axis. Of this 0.25 overweight, 0.15 is explained by the absence of distance. We conclude that in this example the domestic investments still exceed what can be traced back to distance, and we measure the pure home bias as the residual part, 0.25-0.15=0.10.[2]

Figure 1 Home bias explained by distance versus pure home bias



To implement our idea we estimate for each country the foreign bias relationship that can be inferred from its foreign portfolio positions. A key innovation is to measure all independent variables as differences from the home country, so that each is a measure of "distance" and the intercept of the foreign bias regression has the interpretation of the portfolio bias for a foreign country with a "distance" of zero. We then test, in the same regression, whether the home investments differ from the intercept (that is, whether pure home bias is different from zero) and we investigate what country factors are related to the pure home bias. We also investigate whether these factors are different from the factors that are related to the unadjusted home bias. Thus we clarify the extent to which the home bias and foreign bias are distinct phenomena and the degree to which they are affected by different factors.

[2] Note that the home country itself is not used in the regression.

We establish that most developed markets have no statistically significant pure home bias. For them the home bias is just the amount of bias that would be predicted for a foreign country with zero "distance". Hence there is only one bias to explain for these countries: the slope of the foreign bias regression. For a few countries the pure home bias is negative. These are tax havens, which gives a clear economic explanation for this result. For newer markets the home bias is significantly positive and large. The return expectations gap between foreign and domestic investors ranges from 2.1 to 10 percent, suggesting either a significant deadweight cost or a serious misperception associated with investing abroad versus at home. We identify further country characteristics that are associated with the degree of that pure home bias.

Examining home and foreign bias in this way also enables us to add to the debate on two related issues. The first is the debate on how to measure biases in international portfolio holdings. There are two broad types of measure. One type measures the deviations of portfolio weights from a benchmark such as the world market portfolio. The other type measures foregone diversification benefits based on covariances. When bias is measured as the gap between the actual weights in a country's portfolio and the world weights there is, of course, a mechanical link between home and foreign bias. By construction, when foreign countries are underrepresented the home country must be overrepresented. For example, Bekaert and Wang (2009) develop a portfolio holdings measure of foreign bias which includes an adjustment for the degree of home bias. But for measures of foregone diversification like the difference between two covariances (Cooper and Kaplanis (1986), French and Poterba (1991)) there is no such necessary direct link between the two biases. We estimate the foreign bias relationship and pure home bias using both types of measure and find that the covariance measure gives more economically and statistically convincing results.

The second related issue we examine is the way that distance between countries should be measured for the purpose of describing international investor portfolio choice. The debate here concerns whether distance reflects true costs, such as incremental tax burdens, or is simply behavioral with no underlying economic costs. We allow the estimation to select a distance index that best explains the foreign bias relationship. For the covariance measure of bias this index has loadings that mainly reflect true cost variables such as taxes. Furthermore, the slope of the foreign bias regression is very similar for most countries, suggesting a genuine empirical regularity in behavior. However, this slope is too large to represent a rational trade-off between the size of foregone diversification benefits and the incremental tax costs, suggesting a misperception of the size of one or the other (or both).

1. Literature review

There is an extensive literature on home bias and foreign bias, which is summarized in e.g. Cooper, Sercu, and Vanpée (2013). In this section we discuss only that part of the literature which relates directly to this study.

Our work is closely related to distance-based or gravity models of the foreign bias, in particular Portes and Rey (2005). Portes and Rey estimate a version of the foreign bias regression based on portfolio flows. They regress the foreign equity portfolio flows, in dollars, from country i to country j in period t on the size of country i's equity market, the size of country j's equity market, the geographical distance between the countries, measures of information transfer between the countries, measures of the efficiency of transaction technology, and cyclical variables. They find that these "gravity" variables explain a large proportion of the variation in portfolio flows, and that portfolio diversification measures are not significant.[3]

Our work is also related to Bekaert and Wang (2009), who investigate both home bias and foreign bias. To do this they construct a measure of foreign bias stripped of its interdependency with home bias. Specifically, they adjust the foreign bias measure for the amount of equity invested in foreign markets, which reflects the degree of home bias. In this study we do almost the opposite. We strip the amount predicted by the foreign bias relationship from the home bias measure. Thus our focus is on the pure home bias rather than on improved measurement of the foreign bias, which is the focus of Bekaert and Wang.

Chan, Covrig and Ng (2005) and Lau, Ng and Zhang (2010) also distinguish between a domestic bias and a foreign bias and they identify the determinants of theses biases. Based on a sample of equity holdings of mutual fund portfolios of 26 countries they show that stock market development and familiarity variables explain the investment bias, but the impact on domestic and foreign bias is different. If a destination country is more remote from the rest of world, domestic investors hold more of this country's stocks, while foreign investors will

[3] Although the work of Portes and Rey provides the primary motivation for our distance-based analysis of the foreign bias, there is one aspect of their study that should be interpreted with caution when compared with our results. They report very high R^2s, but those cannot be compared with the R^2s we report in this study. Their regressions have unadjusted and unscaled dollar flows as dependent variables and use the size of home and foreign markets as dependent variables. The portfolio bias measures we use in the foreign bias regression are scaled by the size of the home market (because they are portfolio weights or transformations thereof) and benchmarked on the basis of the size of the foreign market (because they are relative to a portfolio benchmark) but these appear as explanatory variables in the Portes and Rey regression.. Therefore, we expect much lower R^2s, simply because the effects of the dollar scale of the home and foreign markets are removed from our measures.

invest less in this country. When a destination country has a more developed financial market, foreign investors will invest more in that country's stocks, while domestic investors invest less. Chan et al. define the domestic and foreign bias as the logratio of the actual weight of a country's stocks in the mutual fund portfolio and the weight of this country's stock in the world market portfolio. We see three issues with this approach if applied to our dataset. First, suppose that a German investor holds no stocks from, let's say Venezuela because transaction costs on trading Venezuelan stocks are too high. This is useful information, but the since the actual portfolio weight is zero, the logratio as defined in Chan et al. cannot be computed. Second, the logratio measure can lead to counterintuitive conclusions. If Sweden invests only 3% at home when its own weight is just 1%, this would be rated as a higher bias than the Unites States being fully biased when their market weight is 40%: Sweden's logratio is $log(0.03/0.01) = 0.48$ which exceeds the U.S.'s $log(1.00/0.40) = 0.40$. Third, the logratio measure results in an investment bias that is hard to interpret. It is not straightforward to assess the economic meaning of a log of the ratio of two weights.

The covariance-based measure of home bias we use is closely related to the analysis of the trade-off between the diversification benefits of foreign equity investments and various costs (Cooper and Kaplanis (1986), French and Poterba (1991), Cooper and Kaplanis (1994)). In this literature, differences between covariances of a given asset k's return with the return of two different portfolios, one held by investor i and the other by *j*, are interpreted as proportional to the differences between the net returns expected by investors i versus *j*. With homogenous expectations, that difference is a matter of difference of deadweight percentage costs associated with investing on foreign stocks. In the early implied-return studies, that difference was compared to *e.g.* transaction costs and taxes. In this paper, in contrast, we allow those costs to reflect any type of distance-related factors, whether real or perceived, that appear to affect the foreign equity portfolio behavior of investors.

In section 3, below, we discuss the literature related to the explanatory variables we use.

2. The empirical model and estimation

In this section we describe our empirical procedure. Consider a distance-based empirical model of the foreign bias for country i. There are N countries. Suppose that K distance variables may affect the foreign holdings held by investors located in country i. Let X_{ijk} be the k-th measure of the distance between country i and foreign country j. A weighted average across all K of these distance measures is used as a scalar index that measures the distance between country i and foreign country j. Let the weights in the index (assumed to be equal across countries) be w_k and the scalar index level be X_{ij}. So we have:

$$\bar{X}_{ij} \coloneqq \sum_{k=1}^{K} w_k X_{ijk}, \quad \{j = 1, \ldots, N; j \neq i\}. \tag{1}$$

Let the measure of portfolio bias for the holding in country j be Y_{ij}. The most common measure is based directly on portfolio holdings, and is defined as the difference between the actual portfolio holding of country j held by the investor located in country i (eq_{ij}) and the weight of country j in the world market portfolio (m_j):

$$Y_{ij}^{(1)} \coloneqq eq_{ij} - m_j. \tag{2}$$

The other measure we consider is a covariance-based measure proposed by Sercu and Vanpée (2008), which takes into account the relative diversification benefits of different foreign countries as well as portfolio holdings. This measure is the difference between the covariances of country j's equity return with the returns on two portfolios, one being the portfolio held by investor j (the stock's home investor) and the other the one held by the outside investor i:

$$Y_{ij}^{(2)} \coloneqq cov\left(r_j, r_{p_j}\right) - cov\left(r_j, r_{p_i}\right) \tag{3}$$

The Appendix reviews the logic for this measure of foreign bias as proportional to the gap between the return perceptions of a local and an outsider; that gap, in turn, can be interpreted as a deadweight cost faced by the outsider.

Assume a linear model for the foreign bias of country i:

$$Y_{ij} = a_i + b_i \bar{X}_{ij} + e_{ij}. \tag{4}$$

where a_i is a constant that is specific to country i. This will be estimated as a panel, with up to twelve years of data on N home countries each having $N - 1$ foreign investment destinations. Ideally, all variables shown should therefore also feature a time subscript, but we omit this for simplicity.

The parameter b_i describes the "distance aversion" or slope of the foreign bias of country i. In other words, the foreign bias of the holding in country j held by the investor in country i, as measured by the variable Y_{ij}, is a linear function of the scalar distance index $\bar{X}_{ij}$ up to an error term e_{ij}. In the above, b_i is written as country-specific, but when we test whether it might be the same for all countries we find that we cannot reject this simplification. With the assumption of equal slope coefficients, (4) becomes:

$$Y_{ij} = a_i + b\bar{X}_{ij} + e_{ij}, \tag{5}$$

with the convenient implication that differences between countries can be summed up by a single summer, the difference of their intercepts.

Not only the slope is common to all countries; so are, of course, the weights w_k that we assign to the K bilateral submeasures of distance, X_{ijk} for $k = 1, \ldots, K$, when synthesizing them into a single summary measure of bilateral distance X_{ij}. The weights are estimated simultaneously with a_i and b_i or b, as follows. We want this summary measure to have the same weights for all countries to ensure comparability; and subject to that constraint we want to find the weighting scheme that best explains the observed bias. So our procedure is to jointly solve for all home countries i the following least-squares problem, non-linear in the estimands:

$$\min_{a_i, b_i \forall\, w_k} \sum_j \left[Y_{ij} - \left(a_i + b_i \cdot \textstyle\sum_k w_k X_{ijk}\right)\right]^2 \text{ subject to } \textstyle\sum_k w_k = 1. \tag{6}$$

The above equation is written for a single cross-section, and becomes a panel when more years are added. In the above, each country's sensitivity to the overall index is also allowed to be different, but we can easily impose a common value of b_i too, if desired and statistically acceptable.[4]

The intercept remains specific to the investing country, i, for the obvious reason that this determines the country's pure home bias. Indeed, the predicted level of bias for a zero-distance country equals a_i, the level inferred by setting the X_{ij} to zero in the foreign bias regression. In general, the pure home bias could then be measured as the difference between the actual home bias and this intercept. But for the covariance measure, which is the measure adopted in the main body of the paper, the actual home bias for the home country is always identically zero, by construction (see equation (3)). It follows that the intercept in regression (5) is our estimate of the pure home bias.

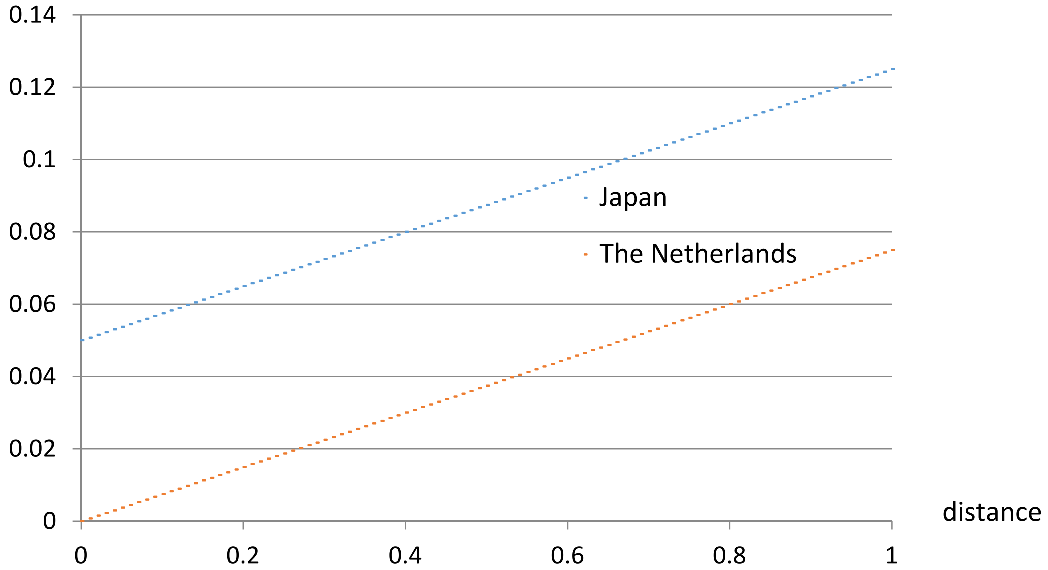
[4] We do *not* test whether the constraint of common weights is statistically acceptable. (An equation without the constraint of common w_k would be indistinguishable from a simple linear regression, one per home country i, of Y_{ii} on all X_{ijk}; the slopes would estimate the weights times the sensitivity b_i.) A model where weights differ across countries simply is economically not interpretable.

Before turning to tests about whether net home bias is zero, let us pause a moment to interpret the number: the story when bias is measured by a covariance gap is less obvious than when bias is a gap between actual and theoretical weights. Consider Figure 2, which shows lines estimated for two countries, labeled here Japan (the upper line) and the Netherlands (the lower one). Like in our actual estimates for the total period, Japan here has an estimated bias of 5% in terms of expected return gaps, while the Netherlands seem to exhibit no bias. The expected return gap is calculated as three times the estimated covariance gap, three being our plug-in value for relative risk aversion, the number that translates a covariance into a shadow net expected return. A shadow expected return is the expected return that would explain portfolio holdings after deducting explicit costs, information costs, shadow costs of capital restrictions if any, *etc*. Let France be 0.4 units away from the Netherlands. From the lower schedule we read off an expectations gap of 3% for France *v.* the Netherlands: to explain both country's choices, Dutchmen would have to be 3% more pessimistic about France than Frenchmen, reflecting for instance some form of deadweight costs faced by those outsiders. Likewise, they would have to be 7.5% more pessimistic about a country with Distance equal to 1, compared the a resident of that third country. Each such gap is an estimate of the costs and shadow costs perceived by Dutchmen over and above what locals perceive. In the Graph, the intercept is zero, which means that taking into account the cost of distance, Dutchmen do not overinvest in their own shares.

For Japan, the schedule is about 5% higher. This means that Japanese seem to be 5% more pessimistic than Dutch investors, holding constant the distance. In other words, their perception of distance-related costs is 5% higher than the Dutch's. More generally, the intercept for country i is an estimate of the extra costs perceived by i's investors relative to a putative investor who is not home biased in the above ("pure") sense.

Figure 2 Interpretation of Pure Home Bias in Expectations-gap Terms

For a given distance X_{ij}, $Y_i\ (X_{ij})$ plots the estimated extra cost perceived by investor i over investor j when buying j's stocks. For the Netherlands, the cost of distance is such that Dutch home investments are not really overweighted. For Japan, the perceived cost for comparable distance is 5% higher: to explain Japan's investments, their would have to face taxes etc that are 5% higher than what a no-net-bias investor is facing.



Our focus on differences between intercepts also largely eliminates a potential nuisance factor in the Sercu-Vanpée covariance gap. Expectations about net returns perceived by locals may be higher than those help by outsiders not only because the latter face extra costs, but also because the former are overly optimistic about their stocks (familiarity bias). However, any such familiarity bias would be largely filtered out when we look at the difference between two return gaps – say, the difference between the Dutch and the Japanese expectations gaps about France, both relative to French investors' expectations.

To test whether pure home bias is zero (that is, all home bias is explained by the absence of distance), we could test whether each intercept as estimated above is statistically close to zero. In addition, we can test whether there are any home-related variables Z_i that can explain the observed pure home bias. In short, our test would start from the working hypothesis:

$$a_i = A + dZ_i + u_i, \tag{7}$$

and the Null of no pure home bias would predict $A = 0 = d$.[5]

The above tests can be run as a two-step procedure, where we first estimate N intercepts and then use them as regressees in a second regression, (7). Not that the step-two regressee therefore includes the measurement error in the first-stage estimation. The econometrically superior alternative is to merge the two equations into one by substituting (7) into (5):

[5] Ideally, we should allow the new intercept A to be country-specific; but some of the country characteristics Z_i are constant over time, so we cannot estimate a coefficient for a second country-specific constant.

$$Y_{ij} = A + dZ_i + b\bar{X}_{ij} + v_{ij}, \quad (8)$$

so that the uncertainties about the estimate of b are taken into account in the standard errors for d. The estimation of the equation (8) is different when using the covariance measure and the traditional bias measure. For the covariance measure, which is defined as a difference already, we have no observation for home equals host ($i = j$) and the model can be estimated as specified in equation (8). For the traditional measure, that is defined as the actual portfolio weight of investor i in country j's shares minus a benchmark weight, a $i = j$ observation is equal to the home bias, while the other observations ($i \neq j$) represent a foreign bias. Thus, for the traditional bias measure, the pure home bias for country i is equal to:

$$Y_{ii} - a_i = A + dZ_i + u_i, \quad (9)$$

This home bias specification can be built in the foreign bias regression, such that we can work with $Y_{ij} - Y_{ii}$. Since $Y_{ii} - a_i = A + dZ_i$ implies that $a_i = Y_{ii} - A - dZ_i$, the a_i disappears totally from the specification $Y_{ij} - Y_{ii}$ and the traditional bias can be modeled in a similar way as the covariance-gap measure:

$$Y_{ij} - Y_{ii} = -A - dZ_i + b\bar{X}_{ij} + v_{ij}, \quad (10)$$

3. Variables and data

The foreign bias variables described in Equations (2) and (3) require data on both international portfolio holdings and country index returns. Actual portfolio weights are based on the international portfolio holdings data from the Coordinated Portfolio Investment Survey (CPIS) organised by the IMF. Because the CPIS has been conducted on an annual basis since 2001, we have annual portfolio weights for the period 2001-2012. Out of the 75 countries participating to the CPIS in 2012, only 42 could be retained in our sample due to data missing in Datastream or shortcomings of the CPIS dataset. We (partially) correct for third-party holdings or round tripping by reallocating the reported investments in financial offshore centers over the sample countries in proportion to the foreign investments of these centers, following Sercu and Vanpée (2008). Monthly equity returns for our 42 sample countries from January 1993 until December 2012 refer to the Morgan Stanley International Country Indices, also retrieved from Datastream. The risk-free rate is the 3-month U.S. Treasury Bill rate. Based on the monthly country returns and the actual aggregate portfolio weights, we estimate monthly portfolio returns for the representative investor of each country. We estimate a covariance matrix for each year from 2001 to 2012 using the portfolio weights of the respective year and considering a history of 10 years monthly returns.

We consider eleven distance variables, X_{ijk}. The distance variables can be classified as explicit costs and barriers to capital flows, familiarity indicators, and proxies for governance and financial market sophistication. The variables are measured in such a way that the home country has zero distance for each variable and an increasing value of the variable is expected to decrease investment in the equity market. Sections 3.1 to 3.4 discuss the distance variables that are used to explain the foreign bias, while sections 3.5 to 3.10 explain the home-country specific variables that have a potential to explain the pure home bias.

3.1 Explicit costs and barriers to capital inflows

Mishra and Ratti (2013) find that differentials in taxes on dividends and realized capital gains have an impact on cross border equity allocation, even after controlling for information asymmetries, behavioral issues and corporate governance. Like them we calculate the tax burden on capital gains (CTAX) and the tax burden on dividends (DTAX) as follows:

$$CTAX_t^{ij} = \begin{cases} \tau_{cg,t}^{j} \dfrac{M_t^j - M_{t-1}^j}{M_{t-1}^j} \left(1 + s_t^{ij}\right), & \text{if } M_t^j - M_{t-1}^j > 0 \\ 0, & \text{if } M_t^j - M_{t-1}^j \leq 0 \end{cases} \quad (11)$$

$$DTAX_t^{ij} = \tau_{d,t}^{ij} \frac{D_t^j}{M_{t-1}^j} \left(1 + s_t^{ij}\right), \quad (12)$$

where $\tau_{cg,t}^{j}$ and $\tau_{d,t}^{ij}$ are, respectively, the tax rate levied by country j on realized capital gains realized by foreign investors and the tax rate withheld on dividends paid to residents of country j. M_t^j is the level of the equity market index for country j (in local currency), D_t^j/M_{t-1}^j is the dividend yield for country j, and s_t^{ij} is the percentage change in the exchange rate of country's j currency relative to country's i currency between periods t and $t-1$. Tax rates on capital gains were kindly provided to us by Anil Mishra. Dividend withholding tax rates are obtained from PriceWaterhouseCoopers Worldwide Tax Summaries and equity indices, dividend yields and exchange rates are obtained from Datastream. For most countries, the tax rate withheld on dividends, $\tau_{d,t}^{ij}$, differs depending on the corresponding foreign country. For example, in Denmark, the general withholding tax rate on dividends paid to non-residents is 28% in 2010. However, Denmark has a tax treaty with all member countries of the

EU, for whom the tax rate is reduced to 15%, with an exception of Greek residents for which Denmark withholds 18% of the gross dividend. We measure the total tax burden (*Tax*) for investor i when investing in stocks of country j by the sum of the tax burden on dividends and the taxes paid on capital gains:

$$Tax_t^{ij} = CTAX_t^{ij} + DTAX_t^{ij} \quad (13)$$

The tax variable enters in our regression as a differential rate, notably the difference between the taxes paid in the foreign country and the taxes paid at home, i.e. $Tax_t^{ij} - Tax_t^{ii}$.

Binding restrictions on capital flows, a next variable in this category of explicit barriers, have waxed and waned over the period studied here.[6] An underinvestment bias towards a particular foreign country may be caused by specific restrictions on capital inflows to that country. Based on the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (*AREAER*), Schindler (2009) developed detailed indices for capital controls that allow for a distinction between inflows vs. outflows. Data on 91 countries from 1995 to 2005 from his 2009 flagship paper are publicly available, and were recently updated to 2012 by Fernandez, Rebucci and Uribe (2014). We use their subindex for capital inflow restrictions (*Capin*) to measure the impact of controls on incoming capital on the bias towards country j.

Based on the index of capital controls, some countries have to be excluded from our sample as either host or home markets for specific years. We want to model the relationship between a foreign investment bias and the distance between two countries. However, if a country forbids its citizens to invest abroad with a binding restriction, the logical consequence is that this country has a maximal home bias, which is completely unrelated to distance. Hence, we exclude countries that had a maximum value for the index of capital outflow controls as being

[6] In the developed countries, restrictions on the inflow of foreign capital have been abolished since the 1980s. A decade later, most emerging countries also opened their financial markets to foreign investors in accordance with the predominant view that capital controls distort the international allocation of capital and hinder long-run growth. More recently, the attitude towards international capital controls has become less hostile, though. In the run-up of the financial crisis of 2007-2009, many emerging economies suffered under massive inflows of foreign capital, which created real exchange rate overvaluation and over-borrowing (Fernandez, Rebucci and Uribe, 2014). But also after the crisis, foreign capital flows in and out of developing countries have proven to be disruptive, especially for countries with relatively underdeveloped financial markets. In most developed markets, interest rates are held exceptionally low in accordance to an expansive monetary policy. This results in an increasing number of carry trades with developing countries, where interest rates are much higher. Brazil, for example, saw massive foreign inflows in 2009, resulting in an appreciation of the Real of 30 percent relative to the dollar (Coelho and Gallagher, 2010). As a response, Brazil temporarily imposed a financial transaction tax of 2% on foreign purchases of stocks and bonds. Brazil was not alone in reinstalling some form of capital controls. Between 2008 and 2012, Iceland, South Korea, Colombia, Indonesia, Thailand and India introduced controls to discourage inflows of foreign capital or to slow down an exodus of foreign money.

a home country. Only one country, the Philippines, had extreme capital outflow controls over our full sample period. Other emerging markets like Russia and India are excluded for specific years only. Following a similar reasoning, if a country has extreme controls on capital inflows, foreigners will not buy this country's shares, even if the country is "close" to the home market. Therefore, we exclude countries as destinations if they have a maximum value for the index of capital inflows. Very few countries forbid capital inflows though. Only Russia and Venezuela do, and even only for a few years. Table 1 in the Appendix shows for each year all the home and destination countries that are excluded from our sample.

3.2 Familiarity indicators

We employ six indicators that proxy for familiarity between two countries: the physical distance, a trade-based distance, a common language indicator, a common currency indicator, a cross-listing ratio and the relative size of the country. Each of these variables are discussed in turn. The first familiarity measure is the geographical distance ($Dist$) between the home and destination country, calculated following the great circle formula using latitudes and longitudes of the most important city (in terms of population) or of a country's capital.

The second variable captures the separateness between countries through trade (D_{trade}). The trade-separateness variable is constructed as follows. Denote the export from country i to country j as X_{ij}. We want to scale actual bilateral trade, $X_{ij} + X_{ji}$, by a maximum level that is achievable given the countries' sizes. Think of the two countries as two neighbourhoods in a town. If the two are well integrated and distance does not matter, people from i would do their shopping randomly from all suppliers regardless of their neighbourhood. For instance, if i's spending is twice j's, it should absorb two thirds of both its own local supplies (production P_i) and j's supply, P_j. That means it exports one third of its own output, and imports two thirds of the foreign output. To generalise, denote i's share in total absorption[7] by ζ_i, and denote these theoretical trade amounts by hatted Xs. Then $\hat{X}_{ij} = (1 - \zeta_i)P_i$ while $\hat{X}_{ji} = \zeta_i P_j$. Total trade would therefore equal

$$\hat{X}_{ij} + \hat{X}_{ji} = (1 - \zeta_i)P_i + \zeta_i P_j \qquad (14)$$

We can scale actual trade by this utopian maximum. That is what we do below; in addition we take the squareroot because that provides more variation; and we look at unity minus that

[7] Absorption equals the sum of consumption and investment, whether private of government. This must also equal total output minus the current account surplus.

squareroot so that this distance measure becomes zero in the case of trade between i and itself. Thus, we define the trade-based distance between country i and country j as:

$$D_{trade} = 1 - \sqrt{\frac{X_{ij} + X_{ji}}{(1 - \zeta_i)P_i + \zeta_i P_j}} \quad (15)$$

Data on exports and imports are from the IMF Direction of Trade Statistics (retrieved via Datastream). Total production is measured by a country's GDP and aggregate expenditures are calculated by subtracting the current account balance from the GDP. The IMF Financial Statistics report data on the current account balance up to 2008. Current account balances as of 2009 and GDP data are obtained from the World Bank.

Apart from the physical or economic distance, familiarity can also arise between countries that share the same language. Therefore, we introduce a dummy variable that takes the value of unity if two countries have a different language and is equal to zero if the home and host country have a common language (*Language*).

Several researches have shown that the equity home bias within the Eurozone has fallen since the introduction of the euro (amongst others Coeurdacier and Guibaud, 2011, Baele, Pungulescu and ter Horst, 2007), mainly because Eurozone members benefit from a decrease in implied transaction costs. In general, we expect that countries sharing a currency have lower implicit costs for cross-border transactions. We capture this effect by introducing a dummy variable (*Currency*) that takes the value of zero when the home and host country have a common currency and unity otherwise.

Firms that cross-list their shares on a foreign stock market are typically better known in this host market. Therefore, we construct a foreign-listing measure (*Flist*) based on the ratio of the number of cross-listed shares from host country *j* on the stock market of country i ($Nshare_{ji}$) and the number of shares listed on the domestic stock market ($Nshare_{ii}$):

$$Flist_{ij} = 1 - \sqrt{\frac{Nshare_{ji}}{Nshare_{ii}}} \quad (16)$$

Data on the number of cross-listed shares for each home and host country are obtained from Sarkissian and Schill (2014) who conducted a survey on the foreign listings on stock exchanges from 73 home countries at the end of 1998, 2003 and 2006. These survey results update earlier work (Sarkissian and Schill 2004, 2009). The number of domestic stock listings is obtained from the World Federation of Exchanges and the websites of the stock markets of each country.

Size breeds familiarity too. For instance, within a given foreign market Kang and Stulz (1997) show that foreign investors have a strong preference for large firms. This can be due to the fact that large firms are more visible which implies that information gathering costs and information asymmetries are lower for bigger firms.[8] We hypothesise that, across countries, the same holds: investors hear more about large countries and are more inclined to invest there. We measure the relative size (*Size*) of the foreign country as the log of its GDP:

$$Size_t^{ij} := log\frac{GDP_i}{GDP_j} \tag{17}$$

GDP is measured in USD and the data is obtained from the World Bank. So in line with the other measures for distance, where less familiar markets get higher values, our size measure is equal to zero when the home country is equal to the host country, positive when the host country j is smaller than the home country i and negative when the host country's GDP is larger than the home market.

3.3 Financial market sophistication and governance

Well developed and transparent financial markets should attract more foreign capital than less sophisticated capital markets. Portes and Rey (2005) show that financial market sophistication is positively correlated with cross-border equity holdings. Portes and Rey distinguish between financial market development (measured by private credit over GDP) and financial market sophistication as measured by the World Economic Forum, and show that the latter is better able to explain foreign equity holdings than financial market development. We accordingly use the financial market sophistication index (*Soph*) retrieved from the Financial Development Reports published by the World Economic Forum. Note that the financial market sophistication index is based on expert judgment and is actually the perceived level of sophistication of the financial markets. Interestingly, the index value drops for most developed markets just after the global financial crisis, while it keeps on increasing gradually for the emerging countries. For the U.S. the index reached the highest level in 2007, with a

[8] Also, large firms are in general more liquid than small firms, which reduces transaction costs.

score of 6.33 (7 being the maximum) and drops to 5.96 in 2012. Over the same period, the index for Colombia increased from 4.22 to 4.55.

There is compelling evidence that proper governance, transparent policy making and a low level of political risk are important factors to attract international capital flows. Gelos and Wei (2005) show that good governance on the country-level and on the company-level both positively influence international portfolio holdings, but the effect of government transparency is more pronounced. To capture the effect of governance on international equity holdings (*Gov*), we use the Government effectiveness indicator from the World Bank Governance Indicators. To reflect the intuition that poorer governance and a lower level of financial market sophistication create a bigger distance to attract foreign investments, the two variables are defined as:

$$Soph_{ij} = -\left(Soph_j - Soph_i\right) \tag{18}$$

$$Gov_{ij} = -\left(Gov_j - Gov_i\right) \tag{19}$$

3.4 Lagged returns

Previous studies have shown that foreign investors exhibit return-chasing behavior buying stocks following high returns and selling stocks when the market has fallen (Froot, Scharfstein and Stein, 1992; Bohn and Tesar, 1996). Griffin, Nardari and Stulz (2004) use daily equity flows to show that foreign investors invest more in a particular market following high returns. The daily frequency of their data allows them to test for immediate responses and they find that investors react quite quickly to market returns, often within a few calendar days. We have daily data, so we work with the local equity return of the year preceding the year of our holdings data. We correct each local market return for the appreciation/depreciation of the foreign currency relative to the currency of the home market. Denote the local market return of destination country *j* by r_t^j and the percentage change in the exchange rate by s_t^{ij}. Our variable measures the difference of the lagged return of the host market *j* and the lagged return of home market *i*:

$$Lag\Delta return_{ij} = -\left(\left(r_{t-1}^j + s_{t-1}^{ij} + r_{t-1}^j * s_{t-1}^{ij}\right) - r_{t-1}^i \right) \tag{20}$$

This finishes our menu of distance measures that might affect foreign bias. We now turn to country characteristics that might affect the foreign bias intercept and the pure home bias. We use explicit costs and border controls in the home country, economic development indicators, the average remoteness of the home country and the patriotic nature of its citizens.

3.5 Explicit costs and capital outflow controls

Corresponding to the tax burden from the foreign country, we calculate the domestic tax burden (Dom_{tax}) as the sum of the tax burden on dividend income and on capital gains:

$$Dom_{tax} \coloneqq CTAX_t^i + DTAX_t^i \quad (21)$$

We expect that investors residing in low-tax countries hold more domestic stocks in their portfolios.

Another potential reason for a high level of home bias, that is purely driven by the home market, is that investors are not able to invest abroad due to restrictions on capital outflows. We include the Schindler and Fernandez et al. index measuring the intensity of capital outflow controls (*Capout*) (Schindler, 2009, Fernandez, Rebucci and Uribe, 2014).

3.6 Size of the home country

We take the log of the home country's GDP to control for its size. Because larger countries have better diversification opportunities at home, we expect the pure home bias to be positively related to size.

3.7 Economic and institutional development

Several studies have shown a link with development indicators like governance and political risk, financial market development and equity home bias. Kho, Stulz and Warnock (2009) show that countries with a poor quality of institutions and poor investor protection exhibit a high equity home bias. The reason, they argue, is that a high level of insider ownership is an optimal response to poor corporate and country level governance.

We include three measures to capture the degree of economic and institutional development: the score of a country on the Human Development Index (*HDI*), the home country's GDP per capita (GDP_{cap}) and the sophistication of the financial markets (*Soph*), all defined before. We expect each of these development indicators to correlate negatively with the pure home bias.

3.8 Remoteness of the home country

If a country is more remote, on average, from the rest of the world, it will in general be more difficult for its citizens to obtain information of foreign countries. We construct a variable that measures the average distance between the home country and all hosts included in the sample (*Remote*). We expect this variable to correlate positively with the pure home bias.µ

3.9 Patriotism

Next to rational reasons, overweighting the domestic market may also be driven by a behavioral bias. Behavioral drivers for the equity home bias may include over-optimism (Kilka and Weber, 2000), the feeling of familiarity towards domestic firms (Ke et al., 2010), overconfidence (Karlsson and Nordèn, 2007) or patriotism (Morse and Shive, 2011).

A general problem with behavioral-based constructs is that they are difficult to measure, and especially on an aggregate level, data are scarce. One exception is patriotism. The World Values Survey (WVS) contains the answers to a global questionnaire, conducted in almost 100 countries with almost 400,000 respondents. For each country, the WVS aims to obtain responses of at least 1,000 people. We utilize the survey waves for the periods 1999-2004, 2005-2009 and 2010-2014. In line with Morse and Shive (2011) our measure for patriotism (*Patriot*) is based on the responses to the question ``How proud are you to be [Nationality]?''. The survey responses are coded from 1 to 4, and we use the country's score average across respondents.

3.10 Lagged return

Following a similar reason as for the foreign investment bias, the "pure" home bias can be caused by the fact that domestic investors, being in general more optimistic about their home market's stocks, hold on to these assets when they performed well. Therefore, we include the lagged return of the home market (*Lagreturn*) as a potential driver for home bias.

3.11 Summary statistics

Some of proposed cost variables are highly correlated (as shown in Table 2, Panel A), which implies we can only include a subset in the regressions. We select the variables that consistently produce the highest adjusted R^2s, without causing mulitcollinearity issues. This subset of variables include taxes (*Tax*), capital inflow controls (*Capin*), trade-based distance (D_{trade}), log GDP (*Size*), common currency (*Currency*), common language (*Language*), governance (*Gov*) and the lagged return differential ($Lag\Delta return$).

Table 2 Correlation matrix explanatory variables

PANEL A: Correlation matrix distance variables

	Tax	Capin	Dist	D_trade	Lang	Ccy	Flist	Size	Soph	Gov	LagΔret
Tax	1.00										
Capin	0.15	1.00									
Dist	-0.04	0.25	1.00								
D_trade	-0.05	0.14	**0.74**	1.00							
Lang	0.00	-0.03	0.04	0.23	1.00						
Cccy	-0.02	0.15	0.36	0.28	0.01	1.00					
Flist	-0.03	0.09	**0.66**	**0.81**	0.20	0.17	1.00				
Size	0.00	0.07	0.00	-0.16	0.00	0.00	-0.25	1.00			
Soph	0.25	0.30	0.00	-0.05	0.00	0.00	-0.11	0.25	1.00		
Gov	0.33	0.46	0.00	-0.04	0.00	0.00	-0.08	0.15	**0.84**	1.00	
LagΔret	-0.65	-0.12	0.00	-0.02	0.00	0.00	-0.09	0.09	0.06	-0.06	1.00

PANEL B: Correlation matrix determinants pure home bias

	Dom_tax	Cap_outflows	Size_home	HDI	GDP_capita	Soph_home	Remote	Patriotism	Lagged return
Dom_tax	1.00								
Cap_outflows	0.04	1.00							
Size_home	-0.06	-0.12	1.00						
HDI	-0.20	**-0.72**	0.26	1.00					
GDP_capita	0.12	**-0.72**	0.31	**0.96**	1.00				
Soph_home	-0.31	-0.35	0.22	**0.52**	**0.63**	1.00			
Remote	0.05	0.44	-0.07	-0.39	-0.42	-0.12	1.00		
Patriotism	0.33	0.45	-0.31	-0.49	-0.48	-0.28	0.39	1.00	
Lagged return	0.56	0.20	0.06	-0.14	-0.09	-0.04	0.32	0.29	1.00

For the variables that are considered to explain the pure home bias, the correlations are shown in Panel B of Table 2. Due to the high correlation between the variables measuring economic and financial development and the index of capital outflow controls, we will define four separate regression specifications, each time including the Human Development Index (specification 1), GDP per capita (specification 2), financial sophistication in the home country (specification 3) and capital outflow controls (specification 4).

4. Results

We initially estimate the model as a three-dimensional panel with two cross-section specifications (the home and the destination country) and a time dimension (annual data from 2001 to 2012) for the covariance measure. We test for the presence of a pure home bias and explain the phenomenon simultaneously in one single regression as specified in equation (8). We include time dummies for the different sample years and use country pair clustered standard errors in the estimation. We find that, for the covariance-gap regressee, the slope terms using the covariance measure are very similar across countries, implying a parsimonious model. The weights allow us to construct a single index of distance, comparable across countries. The regression then gives us a sensitivity to (or aversion to) distance, b_i, which we initially allow to be country-dependent (not shown). The estimation results for the three-dimensional model with estimated with a common slope coefficient and with country-specific slopes are shown respectively in Table 3 and Table 4 in the Appendix.

A problem with the three-dimensional data is that both the covariance measure and the traditional investment bias measure are very persistent over time, causing a strong autocorrelation in the observations over the several years. The correlations between different years range from 82 to 99 percent for the covariance-measure and from 85 to 95 percent for the traditional bias measure. This, in combination with the huge amount of observations results in very high t-statistics for some variables. A strong persistency in home and foreign bias has been documented in the literature as well (for example in Bekaert and Wang, 2009, Cooper, Sercu and Vanpée, 2013 and Levy and Levy, 2014). Additionally, we are not considering the raw investment bias, but we are looking at the difference of the foreign and home bias, which are two mildly but similarly trending variables. This means that there the difference between the two variables should not show a time variation. Therefore, we decide to average our data over the sample period, that is we calculate average investment bias measures from 2001 to 2012 and use averaged explanatory variables accordingly.[9] We do not include the lagged return variables in our averaged-data, because an average lagged return has no sensible meaning. This does not reduce the power of our model, because the estimation results of the three-dimensional panel indicate that lagged returns have no explanatory power for the foreign or home bias parts. Tables 5 and 6 report respectively the estimation results for equation (8) using the covariance measure and for equation (10) using the traditional bias measure.

We start the discussion with the return expectations gap as the left-hand side variable and then proceed to the traditional measure.

[9] The adjusted R^2 for the model with averaged data is consistently higher than for the model with time-varying data, which also indicates that adding different observations over time only introduces additional noice to the model.

4.1 Results for the covariance-gap measure of bias

Table 5 presents the estimation results for the covariance measure, averaged over our sample period 2001-2012. The estimated slope coefficient ranges from 0.26 to 0.32 and is always statistically significant. A positive slope was expected here, because the return expectations gap should be positive and widen with distance (cfr. Figure 2). Overall, the results in panel B suggest that a large part of the foreign bias can be explained by a model with the following set-up:

- The measure of portfolio bias is the difference between the covariance of the host country's equity return and its portfolio return and the covariance of the host country's equity return and investor *i*'s portfolio return. This measures the difference in the marginal contributions to risk of incremental investments in the home and foreign markets. When multiplied by a plug-in RRAV value of 3, it measures a perceived extra cost (including shadow costs of information and perhaps restrictions) of *i*'s investors versus *j*'s investors when considering stocks from *j*.
- The distance of a foreign market is measured by an index of variables with the main weight being given to tax and governance differences. These are closely related to the difference in expected returns from investing in the home and foreign markets.
- The slope of the foreign bias regression is the same for all countries, so that the intercept
  measures a representative extra cost faced by investor i for any foreign country *j*, relative to the extra costs faced by a putative no-net-bias investor.

The above results agree with earlier conclusions by e.g. Cooper and Kaplanis (1986) that the foreign bias is not just a matter of actual expenses. Consider, for instance, taxes. This variable measures the difference between the taxes on a return on asset *j* as paid by foreign investor *i* versus those paid by a local, *j*. So the effect on expected return should be easy to predict: it should equal to $E(r_j - r_0) \cdot Taxes_{ij}$. Yet the estimated impact is totally out of line. *Taxes* has a weight *w* inside the total cost index of 0.5, and the coefficient *b* for that cost index is about 0.26-0.32, so the estimated impact on the covariance gap is about 0.13-0.16. Multiplied by a RRA of at least 2, this implies an expectations gap of at least 0.30 times *Taxes*, which does not at all fit with the predicted impact, $E(r_j - r_0) \cdot Taxes_{ij}$: expected returns are nowhere near 30 *p.a.*. Thus, we conclude that the bias is still not well explained: either investors irrationally magnify the impact of taxes, or the variable must be proxying for omitted variables.

Table 5 Estimation results covariance measure

This table shows the NLS estimation results of the equation: $Y_{ij} = A + dZ_i + b\bar{X}_{ij} + v_{ij}$. There are four regression specifications to avoid multicollinearity problems. The left-hand side variable is the covariance-based home bias measure as specified in equation (3). Panel A shows the factors explaining the pure home bias. Panel B shows the common slope coefficient and the weights for the distance variables based on the covariance-measure for foreign bias. Significance at the 90%, 95% and 99% confidence level are indicated with *, ** and *** respectively.

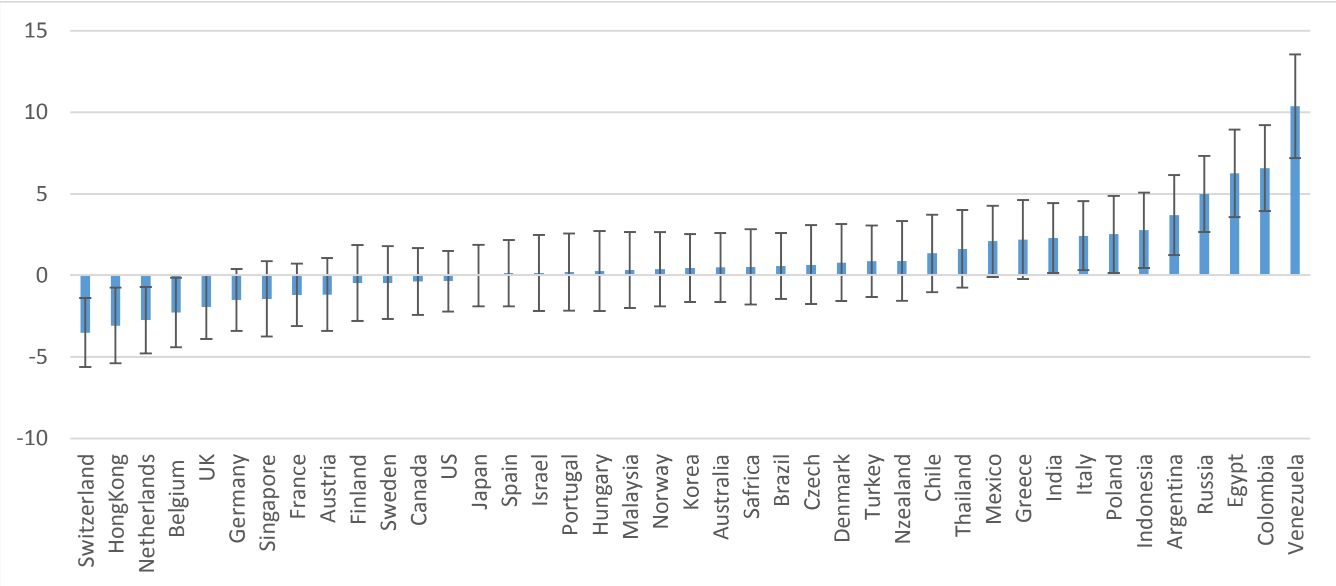
	Specification 1		Specification 2		Specification 3		Specification 4	
	Estimate	t-Value	Estimate	t-Value	Estimate	t-Value	Estimate	t-Value
Pure home bias factors								
Intercept	0.136**	2.46	0.145***	2.64	-0.044	-0.77	-0.037	-0.66
Patriotism	0.004	0.73	0.004	0.76	0.016***	3.05	0.009*	1.73
Dom_tax	0.358***	8.53	0.368***	8.72	0.308***	7.34	0.388***	9.26
Dom_size	-0.001	-0.32	0.003	0.71	-0.001	-0.19	-0.005	-1.47
Remote	0.007	1.07	0.002	0.24	0.024***	3.66	0.010	1.45
HDI	-0.206***	-8.87						
GDP_capita			-0.048***	-9.79				
Fin_sophistication					-0.017***	-9.10		
Cap_outflow							0.026***	5.14
Foreign bias factors								
Slope	0.275***	7.95	0.263***	8.44	0.271***	7.29	0.317***	8.37
Taxes	0.489***	7.52	0.482***	7.07	0.501***	5.69	0.488***	7.27
Cap_inflow	0.193***	6.33	0.184***	7.57	0.194***	7.45	0.206***	7.67
D_trade	0.007	0.14	0.020	0.42	-0.005	-0.10	0.054	1.28
Language	0.098***	6.01	0.094***	6.74	0.082***	6.39	0.089***	6.67
Currency	0.056***	3.36	0.048***	2.91	0.069***	3.82	0.045***	3.51
Size	0.032***	3.79	0.032***	3.87	0.033***	4.25	0.030***	4.11
Governance	0.125***	7.63	0.140***	7.10	0.126***	5.92	0.088***	7.33
Adj. R^2	**0.480**		**0.488**		**0.471**		**0.454**	

We now turn from the explanations of foreign bias to the implications for pure home bias (Panel A). The country-specific intercept a_i, that represents the pure home bias, cannot be immediately observed from Table 2, because it is substituted by $A + dZ_i$, which enables us to immediately explain the pure home bias in the same estimation round. Panel A of Table 2 shows that the pure home bias is mainly driven by measures for economic development: the Human Development Index, GDP per capita and financial market sophistication at home all correlate significantly negative with the pure home bias. In a similar sense, capital outflow controls seem to increase the pure home bias. We also find, counterintuitively, that a high tax burden in the domestic country increases the pure home bias. However, there might be an interaction with development here as well. Rich countries with a high stock market volume, levy in general higher taxes on dividends and capital gains than poorer countries (for example taxes withheld on dividends range between 15 and 25 percent in the Euro-zone, while no withholding tax on dividends exist in Malaysia and Egypt or India).

Lastly, consider the size of net home bias rather than its drivers. The pure home bias $A + dZ_i$ for each home country i is shown in Figure 3, where the sample countries are ranked on the basis of estimated pure home bias. which present a ranking of the sample countries based on the estimated pure home bias. Table 6 in the Appendix shows the countries alphabetically. (The numbers are covariance gaps, not yet translated into shadow extra costs.)

Figure 3 Pure home bias measure - covariance difference based

This figure shows the ranking of the estimated pure home bias based on the covariance measure. The error bars indicate +/- 2 times the standard deviation.



We see that, after correction for distance, home bias is not at all universally positive. For five countries, Switzerland, Hong Kong, the Netherlands, Belgium and the U.K., the estimate is actually negative. For twenty-five countries, which are all relatively developed markets, the estimate is statistically indistinguishable from zero. This implies that for most developed markets, the relative distance between countries explains the respective portfolio allocations and there is no pure home bias. A smaller group (11 countries) have positive estimates, ranging from 2.1 percent for Mexico over 5 percent for Russia to even 10 percent for

Venezuela. All countries in this group have tiny and/or young markets, and a few have explicit restrictions too. This suggests a coherent economic picture.

4.2 Results for the traditional measure of bias

Table 7 shows the estimation results for equation (10) using the traditional bias measure. The estimation results for the traditional investment bias measure are mixed. What looks good is the total R^2, which is about 0.6 rather than 0.5 for the covariance gap. Also, the estimated slope coefficient is consistently negative, as expected (see Figure 1). Moreover, the slope coefficient is of the same magnitude as what is estimated for the covariance measure, i.e. about 0.30. However, we get some bizarre results for the distance-weights explaining the foreign bias. Two variables, Size and Governance have significantly negative weights, which is counter intuitive. For Size (i.e. the relative difference in home and host country GDP), we expect that bigger countries are more attractive, because they are better known.[10] As far as governance is concerned, one would expect countries with strong institutions at home to invest relatively less in markets with poor governance and vice versa. However, we observe that exactly the opposite happens. Egypt, for example, scores relatively poorly on the governance effectiveness index? Still, the country invests less abroad than countries like Finland, which scores much higher on the government effectiveness indicator. In general, the determinants of the foreign bias from the traditional measure are not in line with the determinants of the covariance measure. The traditional foreign bias is mainly explained by cross-country trade relations, while the covariance-based foreign bias is explained by a mixed of explicit barriers like taxes and capital controls and familiarity variables.

[10] Since the traditional measure is defined as an actual weight minus the benchmark weight of the host country, the absolute foreign bias towards big countries is larger than towards small countries. If, for example, a German investors invests 10% of its assets in the U.S., this is a relatively substantial foreign investment; but because the U.S. has a market weight of, say. 30%, the foreign bias is still -0.20. If Germans invest only 0.5% of their wealth in Austria, this will result in a foreign bias of 0.25, because Austria represents only 0.25% of the world's stock market. A potential solution for this problem would be to scale the traditional bias measure by the size of the host market, like for example Bekaert and Wang (2009) do for some variables.

Table 7 Estimation results traditional bias measure

This table shows the NLS estimation results of the equation: $Y_{ij} - Y_{ii} = -A - dZ_i + b\bar{X}_{ij} + v_{ij}$. There are four regression specifications to avoid multicollinearity problems. The left-hand side variable is the traditional investment bias measure as specified in equation (2). Panel A shows the factors explaining the pure home bias. Panel B shows the common slope coefficient and the weights for the distance variables based on the covariance-measure for foreign bias. Significance at the 90%, 95% and 99% confidence level are indicated with *, ** and *** respectively.

	Specification 1		Specification 2		Specification 3		Specification 4	
	Estimate	t-Value	Estimate	t-Value	Estimate	t-Value	Estimate	t-Value
Panel A: Pure home bias factors								
Intercept	0.176	0.93	0.443**	2.52	-0.760***	-4.09	-0.631***	-3.19
Patriotism	-0.045***	-3.13	-0.057***	-4.36	0.017	1.25	-0.033**	-2.09
Dom_tax	-0.020	-0.18	0.038	0.39	-0.281**	-2.40	0.176	1.46
Dom_size	0.048***	3.69	0.075***	6.02	0.050***	3.53	0.026*	1.83
Remote	0.205***	11.12	0.160***	9.48	0.292***	15.62	0.205***	10.78
HDI	-1.077***	-20.86						
GDP_capita			-0.294***	-27.25				
Fin_sophistication					-0.089***	-18.03		
Cap_outflow							0.179***	14.66
Panel B: Foreign bias factors								
Slope	-0.297***	-2.89	-0.177*	-1.90	-0.278**	-2.57	-0.496***	-4.46
Taxes	0.103	0.37	-0.235	-0.41	0.137	0.45	0.243	1.54
Cap_inflow	0.259**	2.52	0.184	1.48	0.270**	2.29	0.264***	3.89
D_trade	0.690***	2.92	1.221**	2.10	0.681***	2.62	0.588***	4.21
Language	0.068	1.40	0.026	0.39	-0.016	-0.34	0.050*	1.72
Currency	0.308**	2.55	0.411*	1.75	0.389**	2.38	0.165***	3.09
Size	-0.244**	-2.58	-0.430*	-1.80	-0.258**	-2.35	-0.142***	-3.60
Governance	-0.185***	-2.93	-0.177*	-1.92	-0.202***	-2.63	-0.169***	-4.49
Adj. R^2	**0.615**		**0.677**		**0.591**		**0.568**	

In any case, the traditional investment bias, which is a difference of weights results in hard-tp-interpret results that have no counterpart when bias is measured by the covariance gap. In our opinion, this reinforces the a priori arguments in favour of using an expectations gap rather than a portfolio-weight gap. The superior results based on the covariance measure are in line with Cooper *et al* (2013)'s argument that an expectations gap is easy to interpret, without raising thorny issues as to how to scale the numbers. For a weight-based measure of bias, in contrast, scaling seems a hard-to-solve issue, and many papers come up with rather different solutions. Also risk and diversification are built-in in line with portfolio theory---aspects that are ignored in the traditional measure.[11] Stated differently, the good results suggest that

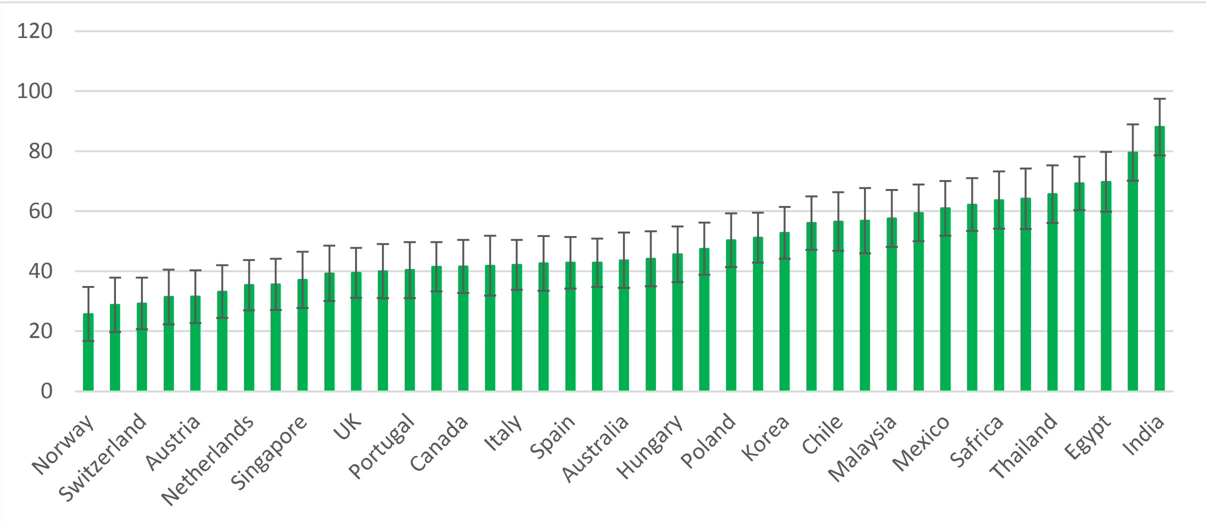
[11] Sometimes an average correlation is added as a regressor, which is still much more ad hoc than what is done in the covariance-gap approach.

investors do consider portfolio risk measures when they select foreign equities. A measure of home bias that incorporates diversification potential appears to be easier to explain and understand than one that does not: diversification benefits are traded off against implicit or explicit costs related to distance that offset the diversification gains.

When we turn to pure home bias (Panel A) we find equally incoherent results. The coefficient measuring patriotism of the home country is significantly negative, where we would expect a positive sign. Again, the pure home bias based on the traditional measure is explained by different variables than the net bias resulting from the covariance measure. The traditional pure home bias is explained by the size of the home country (large countries have a higher home bias) and the average remoteness of the country (more remote countries are more biased towards the home market). There is one important consensus, though. The variables with the strongest explanatory power for the pure home bias are again the economic development indicators. The Human Development Index, GDP per capita, financial market sophistication and capital outflow controls are all significant and have the predicted sign. The net bias estimated from the traditional measure, $Y_{ii} - a_i$, is plotted in Figure 4. In contrast to the covariance-based measure, the pure home bias is significantly positive for all sample countries. There is a sensible relation between the estimated pure home bias and the level of development of the sample countries.

Figure 4 Pure home bias measure - based on traditional bias

This figure shows the ranking of the estimated pure home bias based on the traditional bias. The error bars indicate +/- 2 times the standard deviation.



4.3 Additional results – robustness checks

There are several alternatives to measure the equity home bias. An overview of the different measures can be found in Cooper et al (2013). The most related paper to our work, is Chan et al. (2005), who also make a distinction between home bias and foreign bias, although both biases are considered separately. Chan *et al.* define the investment bias as the logratio of the actual weight of country *j* in investor's *i*'s portfolio and the benchmark weight of country *j*:

$$Y_{ij}^{(2)} = \log\left(\frac{eq_{ij}}{m_j}\right) \tag{22}$$

We compute Chan *et al.*'s bias measure and estimate the model according to equation (10). If a home country does not invest in a specific destination country $(eq_{ij} = 0)$, the logratio bias cannot be computed, so we omit the observations for which this is the case. Table 8 contains the estimation results.

The estimation results for the logratio bias measure are perfectly in line with earlier reported results. For the foreign bias factors (Panel B), we find a negative slope, indicating that more distant countries lead to a higher investment bias. The logratio measure is less dependent on the size of the investing country, which explains why size is not significant here. Similar to the results for the traditional bias measure, the governance variable has a negative sign. All other variables behave as expected.

The pure home bias (Panel A) is predominantly determined by economic development indicators. We also find that more patriotic countries are more home biased, higher taxes at home lead to a higher home bias, large countries have a lower net bias and more remote countries invest more at home.

Table 8 Estimation results - logratio investment bias

This table shows the NLS estimation results of the equation: $Y_{ij} - Y_{ii} = -A - dZ_i + b\bar{X}_{ij} + v_{ij}$. There are four regression specifications to avoid multicollinearity problems. The left-hand side variable is the logratio investment bias measure as specified in equation (22). Panel A shows the factors explaining the pure home bias. Panel B shows the common slope coefficient and the weights for the distance variables based on the covariance-measure for foreign bias. Significance at the 90%, 95% and 99% confidence level are indicated with *, ** and *** respectively.

	Specification 1		Specification 2		Specification 3		Specification 4	
	Estimate	t-Value	Estimate	t-Value	Estimate	t-Value	Estimate	t-Value
Panel A: Pure home bias factors								
Intercept	12.140***	10.65	13.900***	13.51	3.573**	2.24	3.838***	2.7
Patriotism	0.330***	4.07	0.274***	3.89	0.830***	8.82	0.556***	6.34
Dom_tax	5.525***	5.29	6.046***	5.71	3.570***	3.84	6.886***	6.64
Dom_size	-0.636***	-6.54	-0.396***	-4.13	-0.678***	-6.22	-0.860***	-8.02
Remote	0.445***	3.09	0.068	0.48	1.249***	10.53	0.654***	4.38
HDI	-1.006***	-11.5						
GDP_capita			-2.620***	-17.78				
Fin_sophistication					-0.698***	-17.45		
Cap_outflow							1.148***	7.87
Panel B: Foreign bias factors								
Slope	-6.211***	-8.19	-5.292***	-7.60	-6.322***	-8.87	-8.217***	-10.50
Taxes	0.171*	1.79	0.093	0.84	0.203**	2.44	0.250***	3.65
Cap_inflow	0.116***	5.04	0.069***	3.08	0.129***	5.97	0.161***	7.73
D_trade	0.618***	7.72	0.753***	7.52	0.590***	8.33	0.550***	9.33
Language	0.031**	1.82	0.009	0.52	0.010	0.62	0.036***	2.61
Currency	0.090***	5.50	0.075***	4.73	0.108***	5.88	0.062***	5.12
Size	0.012	1.31	0.009	0.94	0.008	0.80	0.009	1.19
Governance	-0.038***	-5.69	-0.010	-1.38	-0.048***	-7.11	-0.067***	-10.15
Adj. R^2	**0.673**		**0.729**		**0.633**		**0.598**	

Figure 5 Pure home bias - logratio measure

This figure shows the ranking of the estimated pure home bias based on the logratio investment bias. The error bars indicate +/- 2 times the standard deviation.

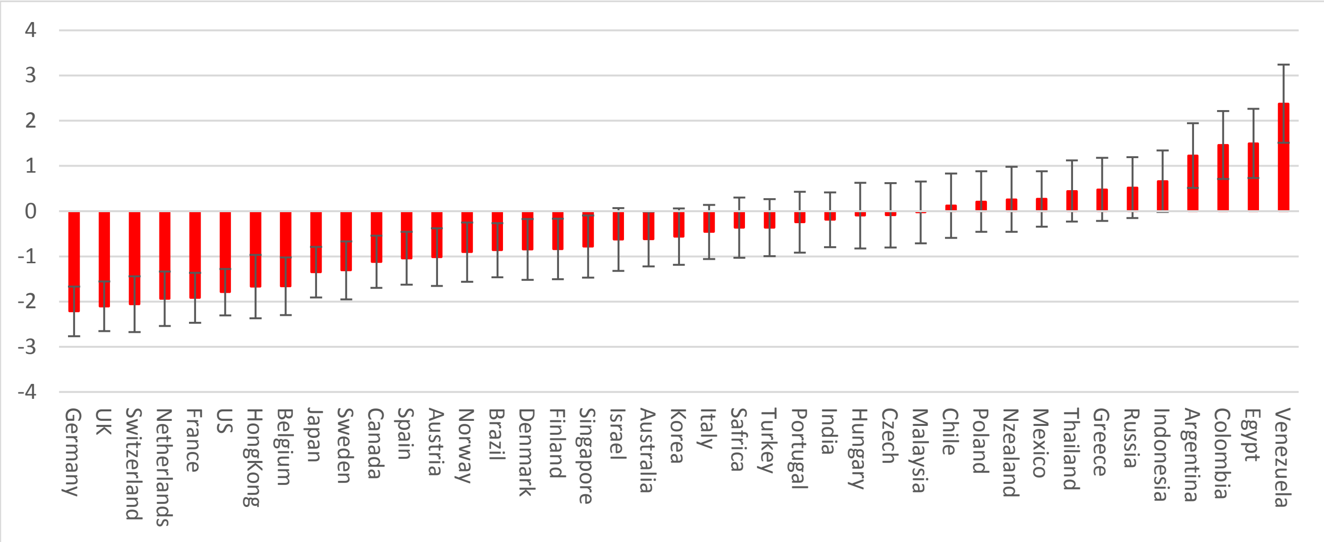


Figure 5 shows the estimated pure home bias. However, the figure serves only as a ranking method, since the interpretation of the logarithm of two portfolio weights is not straightforward. We find a significantly negative pure home bias for 18 (developed) countries. Another 18 countries have a pure home bias that is indistinguishable from zero and only five countries have a significantly positive bias.

5. Conclusions

We have developed a way of measuring the pure home bias that is distinct from the foreign bias. We have established that for 25 (out of 41) countries the pure home bias is effectively zero. All of these are well developed markets. For these countries, the home bias and foreign bias collapse into a single puzzle: why do they allocate to more distant countries lower portfolio weights than is attributable to the trade-off between diversification benefits and costs? The home bias arises simply because the home country is the least "distant" country, but in other respects it appears to be treated like a foreign country.

For a smaller part of the sample, all younger or smaller markets, the pure home bias ranges from 2.1 to 10 percent, implying a significant deadweights cost to invest abroad. We identify further country characteristics that are associated with the degree of that pure home bias. These are mainly related to development measures like the Human Development Index, GDP per capita and government effectiveness. For a few tax haven countries the pure home bias is negative, presumably because foreign demand for shares in these countries displaces domestic demand.

We also establish that the most parsimonious model for the foreign bias is one where investors trade-off diversification benefits against distance. The measure of portfolio over-weighting and under-weighting is not just based on holdings but takes account of covariances. The measure of distance is an index of variables, such as tax, that should affect portfolio holdings in a rational model, but investors seem to treat these costs as though they are greater than they actually are, or equivalently to underestimate diversification benefits. Importantly, however, the extent of this trade-off bias is the same in all countries, since the coefficient of the foreign bias regression is insignificantly different between countries.

Appendices

A.1 The covariance measure of foreign bias

Consider a mean-variance investor, i, who faces costs of foreign investment which depend on the location of the investment, in country j. The cost function is $\theta_{0i} + \theta_{1i} d_{ij}$, where θ_{0i} and θ_{1i} are constants and d_{ij} is a measure of distance between country i and country j (in a more general specification this will have multiple dimensions). The cost of investing in the home country, i, is zero. If the home country were treated as foreign it would have $d_{ij} = 0$ and its cost would be θ_{0j}. In fact it has cost equal to zero, so θ_{0j} is a measure of the amount of pure home bias caused by the fact that the home country is not foreign.

Let r_{p_i} denote the return on i's portfolio and η the (assumedly common) RRA measure. The efficiency conditions for investor i holding asset j are:

$$\begin{aligned} &E\big(\tilde{r}_j - r_f - [\theta_0 + \theta_1 d_{ij}]\big) = \eta \; cov\big(\tilde{r}_j, \tilde{r}_{p_i}\big), \qquad && j \neq i, \\ &E\big(\tilde{r}_j - r_f\big) = \eta \; cov\left(\tilde{r}_j, \tilde{r}_{p_j}\right), && j = i, \end{aligned} \tag{A.1}$$

$$\Rightarrow \alpha\big[\theta_0 + \theta_1 d_{ij}\big] = cov\left(\tilde{r}_j, \tilde{r}_{p_j}\right) - \; cov\big(\tilde{r}_j, \tilde{r}_{p_i}\big), \tag{A.2}$$

where $\alpha := \frac{1}{\eta}$, relative risk tolerance and r_f is the risk free rate. The right hand side of equation A.2 is in fact similar to the home bias measure proposed in Sercu and Vanpée (2008). Our approach of this measure is rather different though. Sercu and Vanpée (2008) use the difference in covariances to estimate the deadweight costs of foreign investments. Stated differently, they focus mainly on the drivers of the foreign bias while ignoring the fact that the intercept has a meaningful interpretation too. This paper aims to understand this intercept, which is basically the pure home bias, stripped of the foreign country effects.

The equation $Y_{ij} = a_i + b\bar{X}_{ij} + e_{ij}$ (eq 5) can be estimated by solving the following system of N equations (where N is the number of countries under consideration):

$$cov\left(\tilde{r}_j, \tilde{r}_{p_j}\right) - \; cov\big(\tilde{r}_j, \tilde{r}_{p_i}\big) = a_i + b_i \left[\sum_{k=1}^{Z} w_k X_{kij}\right] \tag{A.3}$$

The intercept a_i is a measure of the pure home bias of country i, $w_k$is the weight of a variable X_{kij} that captures some form of separateness between country i and country j, and the foreign bias of country i is composed of the relative weights of different factors X_{kij} and the steepness of the foreign bias effect. We need to normalize one of the coefficients in equation (A.3) otherwise the products leave the individual coefficient undetermined. However, randomly setting one country's b equal to unity seems arbitrary. Therefore, we constrain the sum of the weights to unity (thus $\sum_{k=1}^{Z} w_k = 1$). Note that the covariance-difference measure represents a the deadweight costs for investor i to invest in shares of country j. Intuitively, costs should increase with distance, so we expect the slope, b_i, to have a positive sign.

A.2 Countries with binding capital inflow and capital outflow restrictions

Table 1 Countries excluded from the sample due to binding restrictions on capital flows

		Argentina	Brazil	India	Malaysia	Philippines	Poland	Russia	Thailand	Venezuela
2001	Inflow									
	Outflow				X	X		X		
2002	Inflow							X		
	Outflow				X	X		X		
2003	Inflow							X		
	Outflow	X				X		X		
2004	Inflow									
	Outflow	X		X	X	X		X	X	
2005	Inflow							X		
	Outflow	X		X	X	X	X	X	X	
2006	Inflow							X		
	Outflow			X	X	X	X	X	X	
2007	Inflow							X		
	Outflow			X	X	X	X	X	X	
2008	Inflow									X
	Outflow	X		X	X	X	X		X	
2009	Inflow		X							X
	Outflow			X	X	X	X		X	
2010	Inflow									X
	Outflow		X	X	X	X	X			
2011	Inflow			X						X
	Outflow		X	X		X	X			
2012	Inflow									X
	Outflow		X	X		X	X			

A.3 Estimation results for the three-dimensional panel

Tables 3 and 4 show respectively the estimation result for equation (8) using the covariance measure as dependent variable. We estimate a three-dimensional unbalanced panel using data for 41 home countries, 42 destination countries and 11 years. Reports the estimation results of a model with a common slope coefficient, b, while Table 4 reports the results of a model with a country-specific slope b_i.

Table 3 Estimation results covariance measure - three-dimensional panel

This table shows the NLS estimation results for the equation: $Y_{ijt} = A + dZ_{it} + b\bar{X}_{ijt} + \upsilon_{ijt}$. There are four regression specifications to avoid multicollinearity problems. The left-hand side variable is the covariance-based home bias measure as specified in equation (3). Panel A shows the factors explaining the pure home bias. Panel B shows the common slope coefficient and the weights for the distance variables based on the covariance-measure for foreign bias. Significance at the 90%, 95% and 99% confidence level are indicated with *, ** and *** respectively. Time dummies are including and the model is estimated using cross-section clustered standard errors.

	Specification 1		Specification 2		Specification 3		Specification 4	
	Estimate	t-Value	Estimate	t-Value	Estimate	t-Value	Estimate	t-Value
Panel A: Pure home bias factors								
Intercept	0.140***	7.49	0.151***	7.99	0.043***	2.40	0.001	0.04
Patriotism	0.010***	6.43	0.012***	7.45	0.015***	9.17	0.015***	8.98
Dom_tax	0.127***	7.57	0.127***	7.61	0.107***	6.37	0.132***	7.77
Dom_size	-0.007***	-5.81	-0.003***	-2.70	-0.007***	-6.11	-0.012***	-9.92
Remote	0.006***	2.77	0.000	-0.12	0.020***	9.23	0.009***	4.00
Lagged return	0.003	0.84	-0.001	-0.49	0.006**	2.28	0.009***	2.94
HDI	-0.182***	-24.88						
GDP_capita			-0.043***	-26.75				
Fin_sophistication					-0.020***	-32.27		
Cap_outflow							0.019***	10.54
Panel B: Foreign bias factors								
Slope	0.194***	11.49	0.191***	11.35	0.177***	10.46	0.218***	12.61
Taxes	0.263***	4.29	0.258***	4.12	0.260***	3.86	0.270***	4.90
Cap_inflow	0.208***	12.70	0.198***	12.43	0.201***	11.56	0.230***	14.42
D_trade	0.063***	2.77	0.080***	3.39	0.023	0.93	0.108***	4.94
Language	0.129***	11.22	0.122***	10.99	0.109***	10.00	0.128***	12.31
Currency	0.082***	8.58	0.076***	8.15	0.107***	8.54	0.073***	9.15
Size	0.075***	10.66	0.075***	10.54	0.082***	9.88	0.069***	11.72
Governance	0.167***	11.39	0.178***	11.26	0.199***	10.40	0.121***	12.49
Lag_return_dif	0.012	1.16	0.015	1.41	0.019*	1.73	0.000	0.02
Adj. R^2	**0.419**		**0.423**		**0.431**		**0.399**	

Table 4 Estimation results covariance measure - country specific slope

This table shows the NLS estimation results for the equation: $Y_{ijt} = A + dZ_{it} + b_i\bar{X}_{ijt} + \upsilon_{ijt}$. There are four regression specifications to avoid multicollinearity problems. The left-hand side variable is the covariance-based home bias measure as specified in equation (3). Panel A shows the factors explaining the pure home bias. Panel B shows the country-specific slope coefficient and the weights for the distance variables based on the covariance-measure for foreign bias. Significance at the 90%, 95% and 99% confidence level are indicated with *, ** and *** respectively. Time dummies are including and the model is estimated using cross-section clustered standard errors.

	Specification 1		Specification 2		Specification 3		Specification 4	
	Estimate	t-Value	Estimate	t-Value	Estimate	t-Value	Estimate	t-Value
Pure home bias factors								
Intercept	0.598***	26.82	0.549***	29.95	0.326***	17.39	0.205***	6.37
Patriotism	0.011***	4.21	0.008***	4.45	-0.002	-0.68	-0.032***	-8.09
Dom_tax	0.047***	4.73	0.038***	4.34	0.039***	3.35	0.019	1.17
Dom_size	-0.023***	-15.83	-0.013***	-10.60	-0.036***	-27.61	-0.050***	-26.53
Remote	-0.004	-1.09	-0.014***	-5.31	0.056***	20.65	0.122***	20.05
Lagged return	0.005***	3.63	0.003**	1.93	0.002	1.55	0.005***	3.39
HDI	-0.320***	-23.31						
GDP_capita			-0.071***	-32.35				
Fin_sophistication					-0.021***	-35.19		
Capital_out							-0.023***	-5.90
Foreign bias factors								
Country-specific slopes								
Argentina	0.038***	4.98	0.040***	4.32	0.075***	3.19	0.086***	5.34
Australia	0.078***	5.52	0.105***	6.53	0.103***	7.80	0.079***	8.73
Austria	0.098***	5.44	0.111***	6.69	0.146***	8.89	0.165***	13.42
Belgium	0.083***	5.56	0.102***	6.24	0.143***	8.27	0.142***	11.69
Brazil	0.070***	5.79	0.086***	6.70	0.145***	6.64	0.097***	7.33
Canada	0.093***	5.54	0.107***	6.72	0.145***	8.86	0.137***	12.75
Chile	0.091***	5.37	0.121***	7.36	0.102***	7.77	0.062***	7.87
Colombia	0.050***	5.54	0.050***	4.79	0.080***	4.11	0.121***	7.74
Czech	0.070***	5.81	0.104***	7.21	0.135***	8.20	0.172***	13.23
Denmark	0.111***	5.87	0.110***	6.49	0.128***	8.66	0.142***	13.99
Egypt	0.075***	5.45	0.102***	7.61	0.155***	7.62	0.250***	12.84
Finland	0.114***	5.81	0.102***	6.65	0.118***	8.75	0.123***	13.04
France	0.099***	5.27	0.115***	6.75	0.187***	9.10	0.203***	13.99
Germany	0.097***	5.33	0.105***	6.53	0.192***	9.12	0.209***	14.00
Greece	0.061***	5.57	0.073***	7.17	0.141***	7.83	0.191***	13.47
HongKong	0.091***	5.81	0.109***	6.91	0.137***	8.70	0.065***	7.74
Hungary	0.090***	5.85	0.122***	7.28	0.121***	7.85	0.144***	12.31
India	0.086***	5.81	0.106***	6.22	0.213***	4.74	0.259***	8.58
Indonesia	0.086***	5.68	0.118***	7.27	0.089***	6.34	0.107***	9.32
Israel	0.063***	5.82	0.091***	7.21	0.164***	8.84	0.143***	13.47
Italy	0.049***	5.44	0.061***	6.37	0.197***	8.63	0.264***	13.98
Japan	0.091***	5.47	0.131***	6.88	0.157***	8.77	0.161***	13.19
Korea	0.031***	4.13	0.044***	3.81	0.085***	4.76	0.106***	6.70

Malaysia	0.077***	5.24	0.075***	4.85	0.033*	1.80	0.041***	2.92
Mexico	0.071***	5.70	0.075****	6.50	0.123***	6.81	0.149***	10.24
Netherlands	0.104***	5.43	0.114***	6.76	0.174***	9.15	0.174***	13.88
Nzealand	0.078***	5.61	0.109***	6.95	0.087***	7.55	0.052***	6.49
Norway	0.100***	5.94	0.129***	6.77	0.132***	8.81	0.141***	13.94
Poland	0.064***	5.30	0.110***	6.52	0.142***	5.14	0.197***	9.52
Portugal	0.077***	5.85	0.086***	6.82	0.159***	8.40	0.163***	12.23
Russia	0.059***	5.94	0.064***	6.78	0.056***	4.74	0.184***	12.18
Singapore	0.089***	5.67	0.074***	6.22	0.077***	7.44	0.054***	7.76
Safrica	0.091***	5.39	0.079***	5.84	0.114***	5.55	0.068***	5.05
Spain	0.086***	5.37	0.111***	6.63	0.183***	9.00	0.203***	13.98
Sweden	0.111***	5.74	0.105***	6.41	0.137***	8.86	0.136***	13.96
Switzerland	0.098***	5.40	0.124***	6.86	0.174***	9.39	0.157***	13.68
Thailand	0.083***	5.46	0.103***	6.17	0.052**	2.35	0.081***	4.94
Turkey	0.103***	5.65	0.117***	7.29	0.101***	6.66	0.146***	11.61
UK	0.105***	5.28	0.119***	6.78	0.210***	9.13	0.220***	13.90
US	0.082***	5.21	0.098***	6.56	0.166***	8.55	0.193***	12.32
Venezuela	0.039***	5.27	0.032***	5.47	0.082***	5.96	0.278***	10.28
Distance weights								
Taxes	0.603***	9.14	0.435***	6.14	0.029	0.31	-0.047	-0.75
Cap_inflow	0.264***	6.20	0.203***	7.80	0.177***	10.00	0.169***	12.43
D_trade	-1.117***	-5.50	-0.641***	-7.21	0.128***	5.70	0.343***	12.48
Language	0.240***	5.94	0.189***	7.43	0.127***	8.99	0.145***	13.79
Currency	0.221***	5.14	0.181***	6.58	0.117***	7.91	0.101***	10.14
Size	0.260***	5.90	0.184***	7.55	0.123***	9.49	0.077***	12.68
Governance	0.464***	6.12	0.398***	7.60	0.251***	9.51	0.194***	14.73
Lag_return_dif	0.065***	2.86	0.052***	2.92	0.048***	3.77	0.018**	2.08
Adj. R^2	**0.410**		**0.421**		**0.405**		**0.381**	

A.4 Estimated pure home bias – covariance measure

Table 6 shows the fitted pure home bias $A + dZ_i$ estimated from the covariance measure.

Table 6 The pure home bias - covariance measure

	Pure Home Bias	Std err	t-stat
Argentina	0.037***	0.012	3.010
Australia	0.005	0.011	0.460
Austria	-0.012	0.011	-1.050
Belgium	-0.023**	0.011	-2.130
Brazil	0.006	0.010	0.570
Canada	-0.004	0.010	-0.370
Chile	0.013	0.012	1.130
Colombia	0.066***	0.013	4.980
Czech	0.006	0.012	0.540
Denmark	0.008	0.012	0.670
Egypt	0.062***	0.013	4.670
Finland	-0.005	0.012	-0.400
France	-0.012	0.010	-1.250
Germany	-0.015	0.009	-1.580
Greece	0.022*	0.012	1.820
HongKong	-0.031***	0.012	-2.660
Hungary	0.003	0.012	0.220
India	0.023**	0.011	2.140
Indonesia	0.028**	0.012	2.390
Israel	0.002	0.012	0.130
Italy	0.024**	0.011	2.300
Japan	0.000	0.009	-0.020
Korea	0.004	0.010	0.430
Malaysia	0.003	0.012	0.280
Mexico	0.021*	0.011	1.910
Netherlands	-0.027***	0.010	-2.690
Nzealand	0.009	0.012	0.730
Norway	0.004	0.011	0.320
Poland	0.025**	0.012	2.130
Portugal	0.002	0.012	0.170
Russia	0.050***	0.012	4.250
Singapore	-0.014	0.012	-1.260
Safrica	0.005	0.012	0.450
Spain	0.001	0.010	0.130
Sweden	-0.004	0.011	-0.400
Switzerland	-0.035***	0.011	-3.320
Thailand	0.016	0.012	1.370
Turkey	0.009	0.011	0.780
UK	-0.019**	0.010	-1.980
US	-0.004	0.009	-0.390
Venezuela	0.104***	0.016	6.530

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