A pure measure of home bias*

Ian A Cooper[†] Piet Sercu[‡] Rosanne Vanpée[§]

December 7, 2015

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, etc). 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.

Methodologically, the choice of the home-bias measure matters: two of our candidate proxies are discarded as invalid, and another one, the subject of serious *a priori* misgivings, produces equally dubious results. Our proposed version, in the end, is the Cooper-Kaplanis covariance-based measure.

We find no pure home bias in three out of four countries in our 41-country data base. Consistent with the literature, the main determinant of foreign bias seems to be distance, but a new result is that distance aversion varies by country. We identify country characteristics that are correlated with distance aversion and with the degree of pure home bias. More developed countries are less distance-averse. Countries with high tax rate and low credit standing have more pure home bias.

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

Keywords: Home bias, deadweight costs, Corporate governance, government effectiveness, institutional quality

*This is a revised version of a paper previously called: Is equity home bias different from foreign bias. The authors thank Prof. Anil Mishra (University of Western Sydney) and Andrés Fernndez Martin (Inter-American Development Bank) for kindly sharing their data. We are also grateful to Paolo Maio, Chandra Thapa, Kris Boudt, Martina Vandebroek, Tom Vinaimont and Hans Degryse, as well as participants at the University of Strathclyde seminar, the 2015 Multinational Finance Society in Cyprus and the Brussels 3L workshop for useful comments and discussions. We accept full responsibility for any remaining errors.

[†]London Business School, London NW1 4SA, England, UK; +44-207-000-7000; icooper@london.edu.

[‡]KU Leuven, Faculty of Economics and Business, Naamsestraat 69, 3000 Leuven, Belgium; +32-16-326756; piet.sercu@kuleuven.be.

[§]KU Leuven, Faculty of Economics and Business, Warmoesberg 26, 1000 Brussels, Belgium; +32-02-6081432; Rosanne.vanpee@kuleuven.be .

Introduction

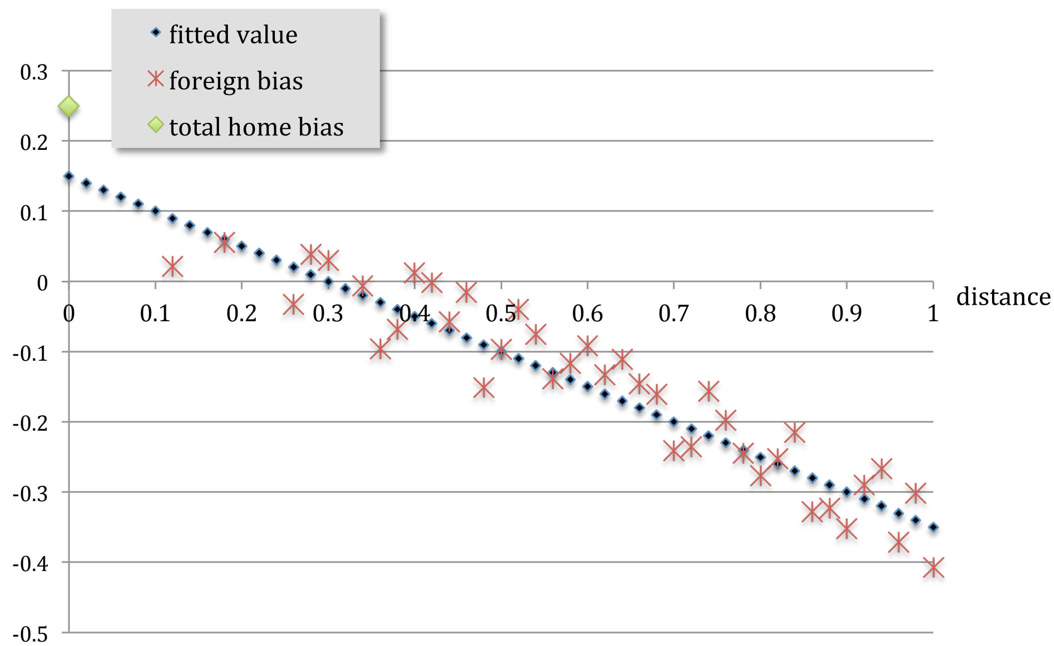
The literature on international equity holdings distinguishes between the home bias and the foreign bias. Home bias refers to the observation that investors overweight their home-country stocks so much that the forgone marginal benefit to increased international diversification looks far greater than 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 though these are the countries where the diversification benefits tend to be smaller. Closeness here refers to a combination of geographic proximity, high information and trade flows, and other measures such as common culture.

The phenomena of home and foreign bias 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. Thus the fact that foreign bias is distance-related might in itself already explain much of, and perhaps all of, the home bias, since the home country is the closest country and also exhibits the most bias. The two phenomena could represent one single factor, in short. In this paper we accordingly answer the following question: to what extent is the home country different from a hypothetical foreign country that has a "distance" of zero? Is home more than just an extremely close country?

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 asterisks in the graph refer to various foreign countries, a few of which here are overweight in the investor's portfolio while most are underweight. In this example the portfolio weights depend only on a single scalar measure of distance, measured on the X-axis. The asterisks plot on a noisy line, which is downward sloping to indicate that more distant countries have lower (and usually 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 gross home bias overweight is 0.25, shown as the diamond on the Y axis. Of this 0.25

Figure 1: Home bias explained by distance versus pure home bias



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.[1]

To implement our idea we estimate for each country the foreign bias relationship that can be inferred from its foreign portfolio positions. We 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 whether the home investments differ from the intercept (that is, whether pure home bias is different from zero) and we investigate what country characteristics 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.

From our work, the best measure of portfolio bias appears to be an expectations gap implied

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

by covariances, first proposed by Cooper and Kaplanis (1986). We conclude that for about three out of four markets there is no statistically significant pure home bias: their domestic investments seem to get just the weight that would be predicted for a foreign country with zero "distance". For that group, in short, there is only one bias to explain for these countries: the slope of the foreign bias regression. For the others, the return expectations gap may amount to up to 12 percent *p.a.*, suggesting at least one of three possibilities: (1) local investors face a significant deadweight cost to all foreign investment, (2) local investors have a serious misperception associated with investing abroad versus at home, or (3) foreign investors are otherwise particularly averse to investing in these countries. We identify country characteristics that are associated with the degree of that pure home bias. High pure home bias is associated with high capital gains taxes and low credit standing, suggesting that the pure home bias reflects mainly the attitude of foreign investors.

The main determinant of foreign bias (i.e. the main measure of distance on the x-axis of Figure 1) is the negative of the scaled amount of trade between the countries (trade-distance). We also find that the slope of the foreign bias regression (i.e. the slope of the line in Figure 1) differs across countries, indicating different degrees of distance aversion. We find that the more distance-averse countries are those with less development.

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 based on covariances, there is no such necessary direct link between the two biases.

We consider four measures of the format $y_{ij} - b_j$ where y_{ij} is a characteristic of i's investments into assets from j, and b_j a benchmark independent of i. Two of the four proposed measures (one covariance-based, and one weight-based) turn out to so dominated by the benchmark that these vectors are almost identically the same across home countries i, giving us no valid information about i's choices. A third measure triggers serious *a priori* misgivings, and the corresponding results are in line with that. We find that the surviving covariance measure gives the more economically and statistically convincing results. This is consistent with investors taking into account the diversification impact of foreign markets when they make their choices.

The second related issue we examine is the way in which 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 loads heavily on trade distance and on another familiarity indicator: having a common language. This is not consistent with a portfolio-theoretic trade-off between diversification and foregone return unless there is some substantial cost to investment which is highly correlated with these distance measures but has so far not been observed by researchers.

1 Literature review

The extensive literature on home bias and foreign bias is summarized in e.g. Cooper, Sercu, and Vanpée (2013) and many other papers cited therein. In this section we accordingly 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.[2]

[2]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, in contrast, are already 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)—numbers that appear as explanatory variables in the Portes and Rey regression. Therefore, we

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 that country's stocks, while foreign investors invest less in that country. When a destination country has a more developed financial market, foreign investors 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.

Both Bekaert and Wang and Chan *et al.* run separate home bias and foreign bias regressions. Their results show important differences. For example, a tax variable is highly significant in Bekaert and Wang, but not in Chan *et al.* Their results also show that different variables appear to be important in the foreign bias and the home bias. For instance, measures of return are significant in the foreign bias but not in the home bias regressions. Importantly, measures of correlation are highly significant in the foreign bias regressions but not in the home bias ones. This suggests that diversification considerations play a part in the foreign bias. However, the way diversification is included is largely *ad hoc*. Overall, the differences in the results show that, using this approach, the empirical determinants of the home and foreign biases depend on the portfolio bias measure used and possibly also the data period.

The covariance-based measures of home bias we use are closely related to the analysis of the trade-off between the diversification benefits of foreign equity investments and various costs. One measure is the difference between the risk of a foreign share incremental to the investor's

---

expect lower R^2s, simply because the effects of the dollar scale of the home and foreign markets are removed from our measures.

portfolio minus the risk incremental to the world market portfolio. This is the difference between the covariances of a given asset j's return with the return of two portfolios, one held by investor i and the other the world market portfolio. It can be interpreted as proportional to the difference between the net returns expected by investors i versus the global CAPM's prediction or even versus the beliefs of a world average investor.

The other covariance measure is also the difference between covariances of a given asset j's return with the return of two different portfolios. In this case it is the difference between its covariance with the portfolio held by i and that held by investor j, the resident of the asset's home base. This is interpreted as proportional to the differences between the net returns expected by investors i versus j.

With homogenous expectations for before-cost returns, if the factor causing portfolio bias is deadweight costs, these differences in covariances estimate the difference of deadweight percentage costs associated with investing in 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.

This analysis is related to the literature which finds that distance appears to dominate diversification benefits in forming international equity portfolios (Tesar and Werner (1995)). Bekaert and Wang similarly find that the diversification effect goes the wrong way in the foreign bias regressions: countries with higher correlations have lower foreign bias. Our results suggest that including covariances is useful in understanding the structure of international equity holdings. This could be because investors do take covariances into account, or alternatively it may be because the measures based on portfolio holdings suffer from a potential scaling problem, which we discuss below. However, because countries with low correlations are also more "distant" countries one has to be careful in disentangling the effects of correlation from those of distance.

A final strand of the literature which is related to our work is the attempt to identify the benefits investors gain by holding local stocks. If underdiversification is rational, the foregone diversification from not holding "distant" stocks should be offset by a gain from holding local stocks. It could be, for example, that investors have more information about local stocks and this results in a higher expected return. However, attempts to measure the gain resulting from such information have found little systematic evidence for such outperformance by local investors (e.g. Seasholes and Zhu (2010)). Although our work does not attempt to measure the gain from information, we show how our results can be used to discuss the rationality of this trade-off.

The literature related to the specific explanatory variables we use is discussed in Section 3. But first we outline the model and the measures of portfolio bias.

2 The empirical model and estimation

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 sums up the distance between country i and foreign country j. Let w_k denote the weights in the index (constrained to be equal across countries), and $\overline{X}_{ij}$ the scalar index level:

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

Let the measure of portfolio bias in i's investments into country j be Y_{ij}. Each of the four measures below is set up such that, when we study home bias (*i.e.* when $i = j$), the resulting number is positive; for foreign bias, then, the outcome usually is a negative number.

The most common measure is based directly on portfolio holdings themselves, 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):

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

Second, we consider the logratio investment bias as proposed by Chan, Covrig and Ng (2005) and also applied in amongst others Lau *et al.* (2010). This measure is calculated as the natural logarithm of the actual portfolio weight of country j in investor i's portfolio scaled by the benchmark weight of country j:

$$Y_{ij}^{(2)} := \ln \frac{eq_{ij}}{m_j}. \tag{3}$$

The third 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 the reference investor i, and the other the portfolio held by investor j (the stock's home investor):

$$\begin{aligned} Y_{ij}^{(3)} &:= \operatorname{cov}(r_j, r_{p_i}) - \operatorname{cov}(r_j, r_{p_j}), \\ &\overset{\text{eff}}{=} \lambda^{-1}[\mathrm{E}(r_j - r_0 - c_{ij}) - \mathrm{E}(r_j - r_0 - c_{jj})], \end{aligned} \tag{4}$$

where r_0 denotes the risk-free rate. As indicated in the second line, the logic behind this this is the mean-variance efficiency condition: in a well-chosen portfolio, an asset's covariance with the portfolio return is proportional to its expected net excess return, with relative risk tolerance λ^{-1}as the common proportionality factor. The net return is the standard return minus any deadweight costs c_{ij} that may arise when i holds asset j. That cost is defined broadly: it includes not only taxes and brokerage fees, but also shadow costs of binding capital restrictions and bias in the perception of the expectation. Xenophobia, for instance, adds to c_{ij} while overconfidence and familiarity bias reduce c_{kk}, possibly yielding a negative final cost. For this measure, the home bias case yields $Y_{ii} = 0$ instead of a positive number, but for foreign bias the number is negative: with strong home bias in country j, the second covariance would be close to j's own variance, thus producing a high numerical value relative to the first covariance. Economically, the story is that asset j's home investors face lower costs and may be biased in favor of their home asset while the home investor i, being an outsider, faces higher costs and may also be negatively biased.

Finally, we use the Cooper-Kaplanis covariance measure which chooses as its benchmark the world market portfolio rather than the portfolio of the foreign investor:

$$\begin{aligned} Y_{ij}^{(4)} &:= \operatorname{cov}(r_j, r_{p_i}) - \operatorname{cov}(r_j, r_w). \\ &\overset{\text{eff}}{=} \begin{cases} \lambda^{-1}[\mathrm{E}(r_j - r_0 - c_{ij}) - \mathrm{E}(r_j - r_0)], & \text{under the world CAPM,} \\ \lambda^{-1}[\mathrm{E}(r_j - r_0 - c_{ij}) - \mathrm{E}(r_j - r_0 - \sum_{l=1}^{N} v_l c_{lj})], & \text{with costs } c_{lj} > 0. \end{cases} \end{aligned} \tag{5}$$

In this expression the second covariance, the covariance with the world market portfolio return, is proportional to the benchmark return under the global CAPM and, under more general assumptions, reflects an average of the various expected net returns, after deadweight costs, across countries.[3]

[3]The alternative interpretation stems from the fact that the world market return always equals a weighted average of the return on the country-by-country portfolios. It follows that an asset's world covariance is a

All four measures have the same structure: a measure of the portfolio holding of investor i investing in country j minus a benchmark for country j. This structure leads to a significant econometric problem for the conventional measure and the Sercu-Vanpée covariance measure, which is discussed below.

For any of these measures we can assume a linear model for the foreign bias of country:

$$Y_{ij} = a_i + b_i \overline{X}_{ij} + e_{ij}. \tag{6}$$

where a_i is a constant that is specific to country i. 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 $\overline{X}_{ij}$ up to an error term e_{ij}.

In the above, b_i is written as country-specific. We examine whether the slopes are the same across countries, but they are not. In all regressions we impose common values on the weights w_k that we assign to the bilateral sub-measures of distance, X_{ijk} for $k = 1, \cdots, K$, when synthesising them into a single summary measure of bilateral distance X_{ij}.[4] The weights are estimated simultaneously as follows. We want this index of distance 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:

$$\text{minimise}_{a_i,\, b_i,\, \forall w_k} \sum_j \left[Y_{ij} - a_i - b_i \cdot \sum_k w_k X_{ijk} \right]^2 \text{ subject to } \sum_k w_k = 1. \tag{7}$$

To test whether pure home bias is zero (that is, all home bias is explained by the absence of distance), we test whether each intercept as estimated above is statistically different from the raw home bias $Y_{ii}^{(.)}$. In addition, we test whether there are any home-related variables Z_i that can explain the observed pure home bias. In short, our test starts from the working hypothesis

$$PHB_i := Y_{ii}^{(.)} - \hat{a}_i = A + d\, Z_i + u_i, \tag{8}$$

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

weighted average of the asset's covariances with each of the national portfolios. As such, it reflects a weighted average of the expectations in the various countries even if the global CAPM would fail—e.g. because of heterogenous expectations internationally.

[4] We do *not* test whether the constraint of common weights is statistically acceptable. A model where weights differ across countries simply is economically not interpretable.

A potential problem with the two-step regression procedure is that the second stage regressee, $\hat{a}_i$, includes a measurement error from the first-stage estimation, whose dispersion is not explicitly taken into account when setting the standard errors for the step-two estimates. But one should bear in mind that the two-step procedure still delivers 41 intercepts from as many regressions, not one set of parameters all generated by a single regression. These 41 intercepts should, therefore, still contain a decent sample of estimation errors which are taken into consideration in stage two. In addition, the two-step approach offers a clean separation between the estimation of pure home bias and its explanation. Lastly, one-step regressions are possible only if the home-bias equation is subtracted from the foreign-bias equation; but this leads to other econometric problems (Section 4.2). For these reasons we use just the two-step approach.

3 Variables and data

The investment bias measures described in Equations (2) to (5) 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) provided 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 1994 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 and the world market return is proxied by the return of the MSCI World Index.

We consider ten distance variables, X_{ijk}. The distance variables can be classified as explicit costs and barriers to capital inflows, familiarity indicators, and proxies for governance and financial market sophistication. Many such variables have been used in studies of home and foreign bias. For example, Bekaert and Wang and Chan *et al.* use a total of 34 variables between them. These fall into six major groups: development, information/distance, controls/openness, tax, investor protection/governance, and diversification. Within each group many of the variables are highly correlated, limiting the usefulness of employing multiple proxies for the same basic characteristic. The most important measures, in these studies, turn out to be development, distance, common language, capital controls, tax, and governance. The variables we use, listed below, cover these categories. Diversification is also found to be important, and our covariance measure of portfolio bias captures that directly. 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 3.3 discuss the distance variables that are used to explain the foreign bias, while sections 3.4 to 3.8 describe the home-country specific variables that have a potential to explain the pure home bias.

3.1 Explicit costs and barriers to capital inflows

The tax variable enters in our regression as a differential rate, notably the difference between the taxes on returns from asset j paid by investor i and those paid by a local (j), i.e. $Tax_t^{ij} - Tax_t^{jj}$. We have separate regressors for dividend (tax_{div}) and capital-gains taxes ($tax_{capgain}$).[5]

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.[6]

Binding restrictions on capital flows, a next variable in this category of explicit barriers, have waxed and waned over the period studied here.[7] An underinvestment bias towards a

[5]So unlike Mishra and Ratti (2013), for instance, we do not pre-multiply the tax rate by the taxable return. One reason is that then it is no longer clear whether the variable stands for return or for taxes. An additional source of worry with including returns is that the taxable basis for capital gains is unclear. Some countries have no capital gains taxes at all, others have a reduced tax rate, and still others use the full rate; in addition, losses can be deducted in some countries but not in all, and loss carry-forward rules are equally different. Finally, if the taxable basis is included it should be as an expected capital gain, not a realized one. So we let the regression coefficient pick its own implied average taxable basis.

[6]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.

[7]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

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 *v.* outflows. Data on 91 countries from 1995 to 2005 from his 2009 flagship paper are publicly available, and were recently updated to 2012 by Fernandéz, Rebucci and Uribe (2014). We use Schindler's 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, it can be argued that 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 a home country. Only one country, the Philippines, had extreme capital outflow controls over our full sample period, thus reducing our initial sample of 42 countries to 41. 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 6 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

---

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.

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. Bilateral distances are obtained from httpp://www.cepii.fr/. The second variable captures the separateness between countries through trade (D_{trade}). The trade-separateness variable is constructed as follows. Denote the value of exports 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[8] 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 tradewould therefore equal

$$\hat{X}_{ij} + \hat{X}_{ji} = (1 - \zeta_i)\, P_i + \zeta_i\, P_j \tag{9}$$

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

$$D_{trade} = 1 - \sqrt{\frac{X_{ij} + X_{ji}}{(1 - \zeta_i)\, P_i + \zeta_i\, P_j}}\,. \tag{10}$$

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.

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

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 ($Nshare_{ii}$):

$$Flist_{ij} := 1 - \sqrt{\frac{Nshare_{ji}}{Nshare_{ii}}}. \tag{11}$$

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.[9]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:

$$Size_t^{ij} := \log \frac{GDP_i}{GDP_j}. \tag{12}$$

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

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

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.

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:

$$Soph_{ij} := -(Soph_j - Soph_i), \tag{13}$$

$$Gov_{ij} := -(Gov_j - Gov_i). \tag{14}$$

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, and variables related to reputation and creditworthiness.

3.4 Explicit costs and capital outflow controls

Corresponding to the tax rate in the foreign country, we use two domestic tax variables: the domestic withholding tax on dividends (Tax_{div}) and the tax rate on capital gains ($Tax_{capgain}$). 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 index measuring the intensity of capital outflow controls ($Capout$) (Schindler, 2009, Ferandez, Rebucci and Uribe, 2014).

3.5 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.

3.6 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 Government Effectiveness indicator (Gov), all defined before. We expect each of these development indicators to correlate negatively with the pure home bias.

3.7 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.

3.8 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 Nordén, 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 utilise 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.

3.9 Reputation and other "pull" factors.

One usually looks for home-country variables that make the local investors more or less reluctant to invest abroad ("push" factors, if you want), but there could also "pull" factors, where foreigners are keen on the country's assets, thus leaving fewer of the locals that one would otherwise have predicted. One such feature is a high value weight of large, essentially international companies in the country's stock market. Examples that come to mind are the Netherlands (with Royal Dutch Shell, ING, Philips, Akzo, Unilever etc) or Switzerland (Nestlé, ABB, banks and pharma companies). Our proxy is the weight of a country's members in the Forbes Global 2000 List, scaled by the country's weight in the global stock market capitalization (*Forbes*).[10] This way, a score smaller than unity means that in general, companies are relatively small and local, while a value higher than unity indicates the presence of more large firms in the country's total stock market capitalization.

We add three more reputation variables: (i) the sovereign interest rate spread in the home country over the 10-year U.S. treasury rate. ii) country rating: these are Moody's country rat-

[10]The Forbes Global 2000 is an annual ranking of the 2000 largest public companies in the world. The list is published by Forbes magazine and available from http://www.forbes.com/global2000/.

ings, converted to a numerical scale (Aaa=24 to C=4) and then squared to reflect the non-linear impact of a rating; and (iii) the level of financial literacy of the citizens as assessed by IMD—a variable that could equally well have been grouped with the development regressors. Sovereign spread for the emerging countries are downloaded from World Bank staff calculations available on Datastream, where available. For other countries, we copied CDS spreads. Moody's ratings are from obtained from www.moodys.com. For the Financial Literacy indicator, our source is IMD World International World Competitiveness Yearbook.

Finally, we note that tax could also be a pull variable, at least for dividends which are generally taxed in the source coutry. A low tax rate could serve to attract foreign investors or a high tax rate to deter them. So although we have listed tax as a push variable above it could also represent pull. The interpretation will depend on the coefficient and the type of taxation. If a high tax rate on dividends results in a high pure home bias then it will represent pull in the sense that it is deterring foreigners. If a high dividend tax rate results in a low pure home bias then it will represent push in the sense that it is causing home investors to invest abroad.

3.10 Summary Statistics

For the foreign-bias regressions (Panel A in Table 1), three of proposed cost variables are highly correlated (especially among trade distance, geographical distance and foreign listings; and among Governance and sophistication), so we have to prune within those two groups. On the basis of adjusted R^2s we keep trade distance (D_{trade}) and governance (Gov).

For the variables that are considered to explain the pure home bias (Panel B of Table 1), problems proliferate, with unsurprisingly high correlation among all variables measuring economic and financial development and with the index of the county's score on capital outflow openness. Accordingly, we will define six separate regression specifications, including in turn each of the highly similar regressors.

4 Selecting a measure of home bias

Recall that for our empirical work we initially consider four candidate measures of home bias. The first one is the traditional yardstick, the unscaled gap between the weight assigned by investing country i to the assets of country j, eq_{ij}, compared to the latter's weight in the world market portfolio, m_j. The second is the log of the ratio of the weights, $\ln[eq_{ij}/m_j]$. The third

Table 1: Correlation matrix explanatory variables foreign bias

PANEL A: Correlation matrix distance variables

	tax_cap	tax_div	capin	dist	d_trade	lang	ccy	flist	size	soph	gov
tax_capgain	1.00										
tax_div	-0.19	1.00									
capin	-0.06	0.19	1.00								
dist	0.01	0.10	0.26	1.00							
d_trade	0.04	0.06	0.14	**0.54**	1.00						
lang	-0.01	-0.01	-0.03	0.04	0.23	1.00					
ccy	-0.01	0.07	0.15	0.36	0.28	0.01	1.00				
flist	0.05	0.05	0.09	0.26	**0.52**	0.21	0.16	1.00			
size	-0.31	0.04	0.07	0.01	-0.16	-0.01	0.00	-0.25	1.00		
soph	-0.05	-0.07	0.30	0.01	-0.04	-0.02	0.00	-0.11	0.24	1.00	
gov	-0.06	0.02	0.46	0.01	-0.03	-0.02	0.00	-0.08	0.14	**0.84**	1.00

PANEL B: Correlation matrix determinants pure home bias

	Tax cap	Tax div	Cap out flow	Size home	remote ness	HDI	GDP/ capita	Soph home	fin_lit eracy	Patrio tism	forbes	spread	rating2
tax_capgain	1.00												
tax_div	0.16	1.00											
cap_outflow	0.11	-0.12	1.00										
size_home	0.13	-0.04	-0.07	1.00									
remoteness	-0.16	-0.13	0.41	-0.05	1.00								
HDI	-0.06	0.19	**-0.68**	0.22	-0.37	1.00							
GDP_capita	-0.03	0.20	**-0.68**	0.27	-0.40	**0.96**	1.00						
soph_home	-0.25	-0.14	-0.36	0.22	-0.12	**0.52**	**0.63**	1.00					
fin_literacy	-0.06	-0.10	-0.33	-0.13	-0.20	**0.50**	**0.52**	**0.67**	1.00				
patriotism	0.06	0.10	0.40	-0.28	0.37	-0.45	-0.44	-0.28	-0.21	1.00			
forbes	0.19	0.20	-0.44	0.34	**-0.52**	**0.52**	**0.63**	0.40	0.34	-0.36	1.00		
spread	-0.04	0.17	0.02	-0.18	0.03	-0.10	-0.11	-0.46	-0.22	0.11	0.10	1.00	
rating2	-0.11	0.10	**-0.61**	0.31	-0.40	**0.83**	**0.87**	**0.76**	**0.59**	-0.35	**0.54**	-0.36	1.00

is Sercu and Vanpée (2008)'s difference of covariance risks of asset j in the portfolios chosen by investors j and i, respectively, *i.e.* $\text{cov}(r_j, r_{p_j} - r_{p_i})$—henceforth "SV Covariance measure". Lastly we adopt the Cooper-Kaplanis (1986) covariance measure ("CK Covariance measure"), $\text{cov}(r_j, r_{p_j} - r_w)$; that is, we use the world-average investor as the benchmark, not the asset's home investor.

Choosing between models with different left-hand side variables is fraught with problems. The usual measure, R^2, is easily interpreted only when there is a common dependent variable and competing sets of regressors. A correction for different regressees is available only if the competing Ys are one-to-one functions of each other, which does not apply here. A complicating factor is that the SV covariance measure is already a difference between a foreign item and a home one, so that the measure has value zero for home—unlike the other ones. Similarly converting the other measures into differences would have destroyed the comparability with the prior literature, so we abstained. Still, any such transformation might have made the R^2 look very different. In light of this we do not overly stress explanatory power; instead, we attach a lot of weight to prior considerations and to statistical indications about the quality of the measure.

4.1 Theoretical considerations

The advantage of the traditional measure is its simplicity. The thorny issue is whether this number can be interpreted properly without scaling, and if not, how to scale it. For example, assume Sweden invests $eq_{j,j} = 30\%$ at home whereas the world average investor puts just $m_j = 1\%$ into those assets. What, then, is the 'comparable' number for the US with, say, a world weight of 35%? Is the US investor really equally biased if she invests 64% (so that the weights gap is again 29%)?

While many authors think that is correct, others argue that a 29% gap is huge for Sweden compared to the US, as $29\%/1\% = 29$ while $29\%/35\% = 0.82$; so their preferred measure would be $(eq_{ij} - m_j)/m_j$ or eq_{ij}/m_j. Others criticise this. Since the maximum ratio for the U.S., in the example, is $100/35 = 2.8$, by the eq/m measure Swedes would be considered even more home biased than a hypothetically 100% biased America even if they invested as little than 3% at home. Clearly, something is wrong here.

Accordingly, some scale the gap by $(1 - m_j)$. In that view, one lets the Swedes start from their 1% world weight, and one sees how much of the remaining 99% they assign to home assets, and similarly for the US. For Sweden, the answer is $29/99 = 29\%$—a relative low number compared to the US, which uses up $29/65 = 44\%$ of the remaining room. Cooper *et al* (2013) weigh pros and cons, and ultimately propose weighing by the geometric average of the two scalers, $\sqrt{m_j(1 - m_j)}$, on the basis of both *a priori* desirable characteristics and a statistical argument for under-diversified portfolios under the Null of no bias. Empirically, in their work the last measure beats scaling by either m_j or by $(1 - m_j)$, but there is no clear gain vis-à-vis the raw, unscaled number.

Getting the scaling right is crucial for our purpose. Suppose the true model is $Y/Z = a + bX$ + e; then the regression $Y = c + dX + u$ is a mis-specification for $Y = cZ + dXZ + eZ$, and both the slopes and the intercepts will be badly affected when countries have different scales Z. Allowing for country-specific slopes and intercepts could pick up some of the scaling, but the consequence still is that the intercepts would mix pure home bias with scaling effects.

Regardless of the scaling, an additional issue is whether one can judge a measure of under-diversification without reference to risk. 90 percent home investments has a rather different impact when the home country has a large, diversified stock market instead of just a few mining stocks. The usual way of controlling for risk, by adding a world-market correlation as a regressor, would fail to pick this up if, as usual, home bias is pronounced.[11]

The log ratio measure $\ln eq_{ij}/m_j$, the next measure we consider, obviously goes for scaling by m_j, which is not necessarily the best choice, as we argued: Swedes investing 3% at home are deemed to be more biased than Americans holding a fully local portfolio. The log transform adds issues of its own. For home bias, the ratios are often substantially above unity and therefore sensitive to the basis; taking logs does attenuate this. But for foreign bias, which is core in our analysis, virtually all the ratios are well below unity, so that taking logs sends these numbers to very negative realms. The resulting outlier problem spirals out of control for the many zero entries (*e.g.* zero reported Ghanaian investments into Russia etc), so that one either loses those observations, or has to winsorize them to some arbitrary (but still hugely negative and influential) level.

A difference of the two covariances, lastly, when multiplied by relative risk aversion, gives us a gap between two mean-variance shadow expected returns. Being proportional to an expected-return spread, a covariance measure needs no further standardisation to make it comparable across countries. It also takes into account covariance risks with other assets, in a way that is consistent with portfolio theory. A 70% unscaled home bias is deemed to be much worse, for instance, if the home asset is very volatile, or otherwise more risky, than in the case the home asset is safe. A downside is that, being an estimate, a covariance-gap measure is a constructed variable, calculated from a sample using a model rather than directly observed.

On balance, all these arguments would broadly favor the covariance measures over the unscaled gap, and would rank the log ratio last.

4.2 Econometric issues

We must be careful how we interpret the results for some of these measures of portfolio bias because they suffer from a potential econometric problem. This can be illustrated using the SV covariance measure, but also affects the traditional portfolio measure.

Consider the foreign bias regression using the portfolio holdings of investor i. The covari-

[11] The riskiness if an asset j in a portfolio p is measured by its covariance with that specific portfolio; so one should not use the world portfolio here, and not scale the covariance into a correlation.

ance measure of bias for country j is $cov(r_j, r_{p_i}) - \text{cov}(r_j, r_{p_j})$. Using actual portfolio holdings and actual covariances, for investor i the cross-sectional variation across different foreign countries j of $\text{cov}(r_j, r_{p_i})$ is much lower than the cross-sectional variation of $\text{cov}(r_j, r_{p_j})$ across those countries. The reason is that markets with high variances, such as emerging markets, tend to have low correlations with other markets; so even these countries have low values of $\text{cov}(r_j, r_{p_i})$ for $i \neq j$. Strong home bias in the host country j, on the other hand, makes the second covariance approach j's variance. This varies a lot across countries, being much higher for emerging markets. Thus most of the variation in the SV covariance measure comes from variation in the benchmark return used for each foreign country, the second term in $\text{cov}(r_j, r_{p_i}) - \text{cov}(r_j, r_{p_j})$. This benchmark return is independent of the location of the investor i. As a result, the vectors of dependent variables, one per home i, are highly correlated across different homes (i.e. across equations in the panel).

This issue arises in a similar way with the traditional portfolio holdings measures. For investor i they are also the difference between the portfolio weights eq_{ij} held by investor i and benchmark weights m_j. These benchmark weights are much larger, and have much greater variation than the portfolio holdings; and they are the same for every investor investing in a specific foreign country. As with the covariance measure, most of the variation in the portfolio bias measures is, therefore, independent of the investor i; it tells a lot about world-market weights m_j, but almost nothing about i's choices.

Because of this, for both these measures the dependent variables are very highly correlated for different investors i. The regressions are structured as a 2-dimensional panel, but the correlated dependent variables mean that much of the results are driven by the relationship between the benchmark variable common to all equations on the left-hand side, and country characteristics on the right. The variable supposedly under study, the bilateral portfolio weights, hardly enters the picture. The size of the commonality is enormous: the average correlation between $Y_{i.}$ and $Y_{k.}$ amounts to 0.977 for the traditional measure and to 0.975 for the SV covariance gap. These are not 42 series with measures of foreign bias, in short, but 42 repetitions of the same benchmark, up to minute variation. This invalidates them for current purposes: they are about market weights m_j or variance $\text{var}(r_j)$, not foreign bias.

In the remaining of the paper we proceed with the remaining ones, CK and the logratio. The latter comes up with a decent average correlation (0.468, albeit after deleting all observations with zero holdings), while the Cooper-Kaplanis covariance gap does best at avoiding doublecounting, with an average correlation of 0.302.

4.3 First-stage regressions selecting the foreign bias measures

We now turn to the empirical results for the competing measures. The horse-race regressions were run as follows. The data structure corresponds to a three-dimensional panel with twelve years of observations for $N = 41$ home countries and $N - 1 = 40$ destination markets. In practice, home bias is hardly moving over time, an observation that is confirmed by the literature (for example in Bekaert and Wang, 2009, Cooper, Sercu and Vanpée, 2013 and Levy and Levy, 2014). As a result, we lose very little information if we simplify the estimation to a two-dimensional problem by just using (41×40) time series averages. For the log-ratio measure and the traditional measure, we can immediately calculate the average foreign bias for each home and destination pair over our sample period of 12 years. For the covariance measure, we use a constant matrix, based on 1994-2012 data.[12]

Given these data, we estimate equation (5),

$$\begin{aligned} Y_{ij} &= a_i + b_i \overline{X}_{ij} + e_{ij}, \\ &\quad \text{where } \overline{X}_{ij} := \sum_{k=1}^{K} w_k X_{ijk} \quad \text{for } j = 1, \cdots, N;\ j \neq i, \\ &\quad \text{subject to } \sum_{k=1}^{K} w_k = 1. \end{aligned} \tag{15}$$

We correct the standard errors for clustering across country-pairs in the panel we estimate. Table 2 shows the estimated average slope coefficients and estimated weights for the distance vector for the four measures under consideration, while Figure 3 contains plots of the 41 slope coefficients per bias measure.

To gauge the adequacy of the models on empirical grounds we first consider purely statistical features, namely the R^2 (subject to the caveats voiced above) and the variability of the country-specific slopes. By the R^2 criterion, the covariance measures seem to stand out with an explained variance of 75% for CK and 53% for SV, followed by the logratio measure (47%) and the traditional measure (45%).

---

[12]To be in line with the averaging se should have averaged twelve matrices, one based on 1994-2001, the next on 1995-2002, etc. But the result would have given a lot of weight to 2001 data, and linearly less weight to data further away from 2001. The final result is not meaningfully affected, but we prefer the equal-weight version.

Table 2: **First-stage regression for the competing investment bias measures**

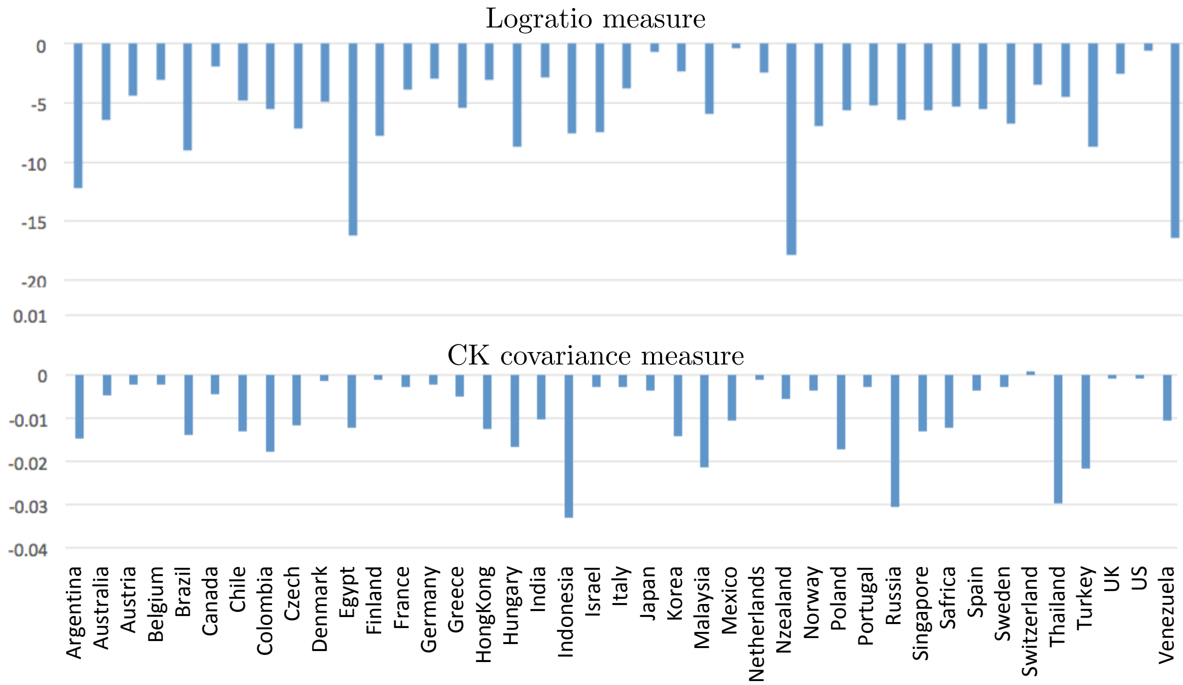
	log-ratio		traditional		covar - CK		covar - SV	
	Panel A: weights w_k inside the synthetic distance index							
	coeff	Tstat	coeff	Tstat	coeff	Tstat	coeff	Tstat
Tax capgain	0.013	1.15	0.266***	8.55	0.100***	3.18	0.013	0.21
Tax dividend	0.031***	2.72	0.307***	9.03	-0.173***	-3.60	0.255***	4.35
Cap inflow	0.020***	2.72	0.036	1.63	-0.139***	-4.39	0.228***	3.23
D trade	0.838***	19.27	0.217***	3.49	0.949***	5.83	-0.219	-1.66
Language	0.009	1.56	0.039**	2.21	-0.031	-1.51	0.193***	7.92
Currency	0.072***	4.56	-0.212***	-6.67	0.469***	4.97	0.137***	3.34
Size	0.005	1.29	0.331***	11.04	-0.100***	-5.11	0.050***	3.05
Governance	0.012***	4.98	0.016**	2.25	-0.071***	-5.26	0.342***	15.12
Sum	1.000	.	1.000	.	1.000	.	1.000	.
	Panel B: other regression statistics							
avg b_j	-5.920	.	0.222	.	-0.010	.	-0.136	.
std b_j	3.932	.	0.051	.	0.009	.	0.017	.
std/|avg| b_j	0.664	.	0.230	.	0.895	.	0.127	.
R^2 corrected	0.47	.	0.45	.	0.75	.	0.53	.

Key This table shows the NLS estimation results for the equation: $Y_{ij} = a_i + b_i[\sum w_k X_{ijk}] + \nu_{ij}$. The left-hand side variables are respectively the log-ratio measure, the traditional foreign bias, the CK covariance measure, and the SV covariance measure. The top panel of the table summarizes the estimation results for the country-specific slope coefficients, and shows the estimated weights for the distance variables. "Average" and "stdev" refer to the cross-section across 41 country-specific estimates. Significance at the 90%, 95% and 99% confidence level are indicated with *, ** and *** respectively. The model is estimated using cross-section clustered standard errors.

As argued, explanatory power means less here than in most empirical contexts, so we also consider other aspects, like the cross-sectional variation in the slopes b_i: more consensus might seem encouraging. The coefficient of variation is lowest for the SV covariance measure and the traditional measure. However, this is simply due to the statistical artefact discussed in the preceding section: the foreign bias regressions for these variables are effectively the same for each country so a similar slope is not surprising and indicates nothing positive about the model. For the traditional measure, in addition, the average slope is positive, indicating a severe mis-specification or outlier issue with that measure.

The two measures which are less dominated by their benchmark, the logratio and CK-covariance, show high variability of slopes between countries. It is not possible to accept a model which uses the same distance aversion for all countries and in the remainder of the analysis we maintain the assumption of different slopes. The average slopes for these two measures are negative, and so are all individual estimates, as we expect. Yet the correlation between the two sets of estimates, 0.23, is low, suggesting that the estimates are measuring different phenomena and/or are subject to serious estimation noise.

Figure 2: **Country-specific slope estimates in the step-1 regression (CK and log ratio)**



Key The figures shows for sets of country-specific slopes b_i in the regression $Y_{ij} - A_i + b_i\overline{X}_{ij} + e_{ij}$ — logratio-based on top, CK-based below.

The weightings in the distance index are similar for the logratio and CK-covariance measures in one important sense. Both give trade distance a very high weighting, consistent with the literature which identifies this type of indicator as a variable that is highly correlated with foreign bias. For the CK covariance measure, common currency is also important, which again echoes similar results found by others.

5 Pure home bias: significance and determinants

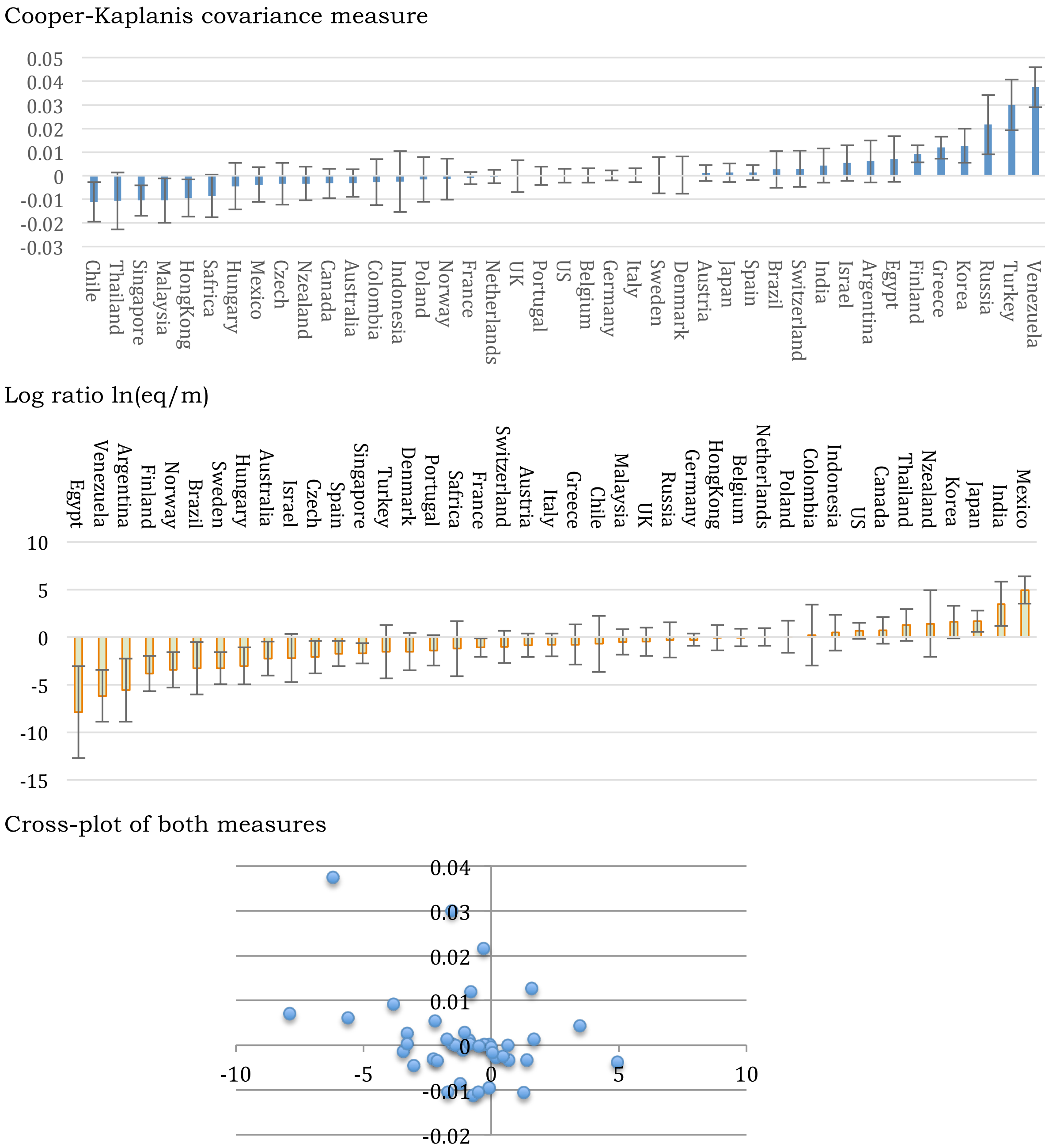
5.1 How large is Pure Home Bias?

Define

$$PHB_i := Y_{ii} - \hat{a}_i. \tag{16}$$

Having discussed the foreign bias and its determinants, we now turn to the resulting pure home bias estimates, shown in Figure 3. The Figure shows estimates obtained from regressions with country-specific slopes for the CK covariance and the logratio measures, each time with a

Figure 3: **Pure home bias resulting from CK covariance and logratio measures**



Key The Figure shows the pure home bias extracted from two possibly valid measures of home bias, the CK covariance spread (top) and the logratio measure (bottom). We add a cross-plot of the two sets of numbers, which reveals a rather weak (and negative) correlation (-0.32).

± two-sigma error zone added. Of the 41 countries, for the CK covariance measure most of the pure home bias estimates are insignificantly different from zero. Some less developed markets have significant positive pure home bias, and a small number of countries, such as Singapore,

Table 3: **Summary statistics for PHB as the CK expectations gap**

	CK cov, ×3 (% *p.a.*)	logratio .
average	0.469	-1.046
quartile 0 (min)	-3.353	-7.881
quartile 1	-0.983	-2.113
quartile 2 (med)	-0.004	-2.485
quartile 3	0.582	0.049
quartile 4 (max)	11.258	4.943
corr(hb, phb)	0.619	-0.378
var(phb)/var(hb)	0.304	12.494

Key We estimate pure home bias from the CK covariance. Multiplied by 3 (for relative risk aversion), this gives us the gap between the return expected by investor i from asset i and the world average investor's expectation about asset i's return. The pure home bias purges the CK covariance from any aversion to distance already present in foreign bias. We do likewise for the logratio measure of bias, but without any transformation.

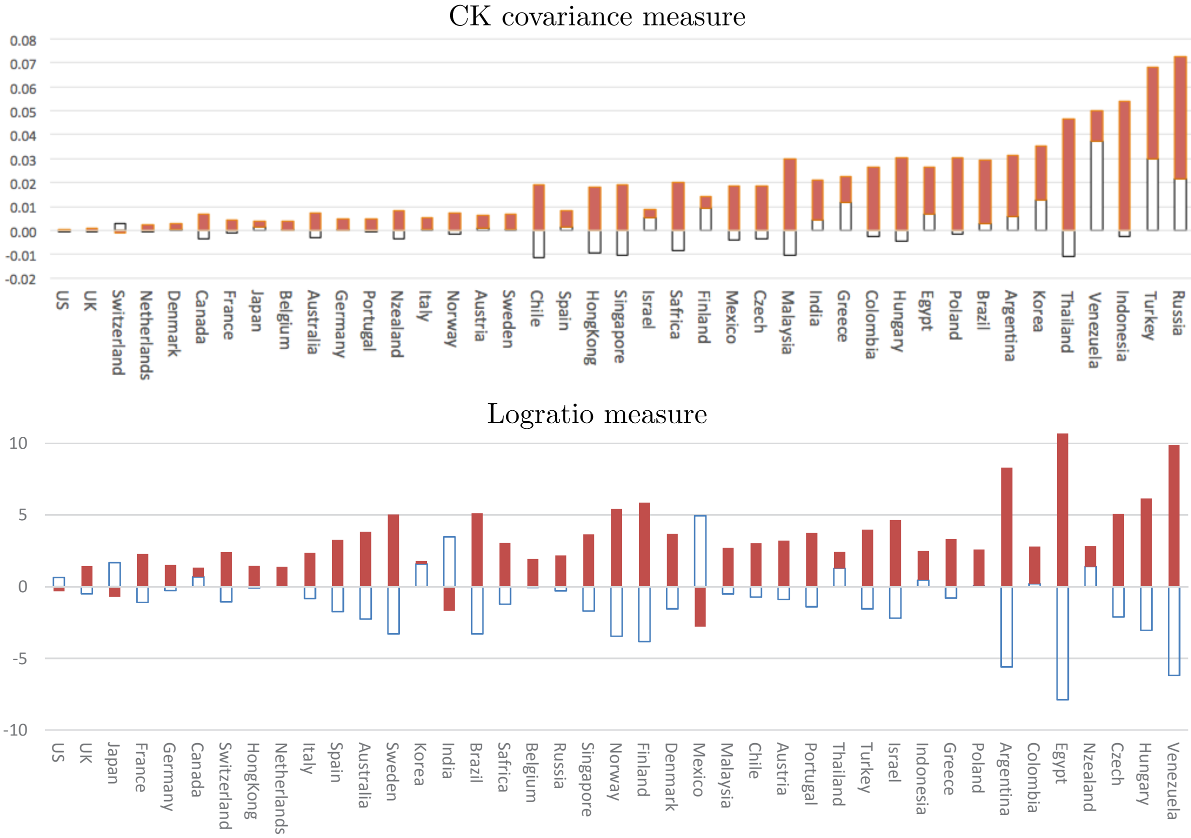
Malaysia, Hong Kong, and most anomalously in our data, Chile, have negative pure home bias. For the logratio measure, in contrast, many of the estimated pure home biases are negative and there is no clear pattern. The scatter chart in Figure 3 shows that the two measures of pure home bias have very little relationship, so that the choice of whether to use a covariance-based measure or a portfolio holdings measure is material to the results.

Table 3 displays for each yardstick the average level of the pure home bias, and some distributional measures. To give more economic intuition, for the CK covariance measure the pure home bias has been scaled by a risk aversion coefficient of 3 to convert it into an equivalent expectations gap. The average across all countries is equivalent to an expected-return gap of 0.469% per annum from the pure home bias. The median is even closer to zero, and the 50 percent smallest-bias countries disagree by less than 1.5%, as the interquartile range Q3–Q1 shows. For the logratio measure the numbers are much harder to interpret economically.

The table also shows the correlation of the pure home bias (phb) with the raw home bias (hb) and the proportion of the variance of hb which comes from phb. For the CK covariance measure, hb and phb are positively correlated; distance aversion accounts for about 70% of the variance of raw home bias, leaving a residual phb that represents just 30.4% of the variation of hb. For the logratio measure, in contrast, the correlation is negative and phb is more volatile than hb, which makes little sense.

Figure 4 shows the decomposition of the hb into the part explained by foreign bias and the remaining part, phb. The sum of the bars show hb. The shaded part is the intercept of the

Figure 4: **Total home bias: distance-related component and residual pure home bias**



Key Each stacked bar, from its highest to its lowest point, shows the raw home bias as defined by the measure. The shaded (or red) part corresponds to the step-1 regression intercept, that is, the part explained by distance. The remainder, shown as the white part, is pure home bias.

foreign bias regression, the reflection of distance aversion. The unshaded part is phb. For most cases, in CK the positive bias interacts with a positive intercept to produce a pure home bias that is much smaller and, in 16 instances, even negative. For the log-ratio measure, positive bias tends to come with a very high intercept, leading to a pure home bias that exhibits more variability than the original, as we already say from the variances in Table 3.

5.2 What country characteristics go with strong pure bias

The next question is what makes some countries relatively neutral to home and others not. The second step in our two-step analysis is to explain the pure home bias as calculated from the first-stage regressions. More specifically, we run the following second-stage regression:

$$PHB_i := Y_{ii} - \hat{a}_i = A + DZ_i + u_i. \tag{17}$$

with $\hat{a}_i$ the intercept retrieved from Step 1, and Z_i a selection of home country specific variables. Besides home-country variables that may make the local investors more or less reluctant to invest abroad we also add "pull" factors, reasons why foreigners may be keen on the country's assets and thus leave fewer of the locals that one would otherwise have predicted. These are (i) the sovereign interest rate spread in the home country over the 10-year U.S. treasury rate, (ii) Moody's country ratings, converted to a numerical scale (Aaa=24 to C=4) and then squared, and (iii) the IMD score of financial literacy of the citizens.

Because the variables measuring the level of economic and financial development are all highly correlated, we run six alternative regression specifications for which the estimation results are summarized in Table 4.

From Table 4 the factors causing pure home bias using the CK covariance measure are capital gains taxes and risk spreads on their government debt. High levels of both are positively related to pure home bias, or conversely low tax rates and low debt spreads reduce pure home bias. Low tax rates and low debt spreads are both features that would make a country more attractive to foreigners. Therefore, we view this evidence as being consistent with the pull explanation of pure home bias. The results using the logratio measure are mixed. The only variable that is reliably related to the level of pure home bias is the size of the home market, which is positively related. This makes little sense.

5.3 What country characteristics go with high distance aversion?

The results so far suggest that home bias and foreign bias are not separate phenomena for most countries. A single parameter, the slope of the foreign bias regression, plays a large part in explaining both as long as the measure of portfolio bias is the CK covariance measure. This leaves the central conundrum of the foreign bias literature: when investors trade off diversification gains against distance, is distance a proxy for a real cost or simply a behavioral variable which brings no tangible sacrifice. Although we cannot answer this question, our analysis can shed light on one aspect of the behavior. Our slope variable measures the distance aversion of different countries measured as the sacrifice in diversification relative to a standard distance index. This measure of distance aversion varies across countries. We examine what variables are related to the different degrees of distance aversion of different countries.

Table 5 shows a regression of the slope coefficient of the foreign bias regression on country

Table 4: **Second-stage regression — Explaining Pure Home Bias**

Panel A: CK-based pure home bias

		specification 1		specification 2		specification 3		specification 4		specification 5		specification 6	
		coeff	Tstat	coeff	Tstat	coeff	Tstat	coeff	Tstat	coeff	Tstat	coeff	Tstat
Intercept		0.000	0.000	-0.001	-0.020	-0.003	-0.060	-0.023	-0.540	0.001	0.030	-0.001	-0.04
Tax capgain	-	0.153***	4.41	0.153***	4.380	0.135***	3.630	0.166***	4.820	0.155***	4.540	0.129***	3.81
Tax div	-	0.004	0.32	0.003	0.300	0.000	0.010	0.001	0.060	0.001	0.080	0.006	0.55
Size home	+	0.002	0.79	0.002	0.800	0.002	0.730	0.003	0.900	0.001	0.470	0.003	1.11
Remoteness	+	-0.006	-0.77	-0.006	-0.760	-0.003	-0.470	-0.004	-0.530	-0.005	-0.670	-0.008	-1.17
Patriotism	+	0.000	0.01	0.000	0.040	0.001	0.130	0.002	0.460	0.001	0.120	0.000	0.06
Forbes	-	-0.002	-0.47	-0.002	-0.350	0.001	0.180	-0.004	-1.020	-0.002	-0.350	0.002	0.49
Spread	+	0.000**	2.59	0.000**	2.530	0.000	1.400	0.001***	2.840	0.000***	2.340	0.000	1.35
HDI	-	-0.011	-0.60										
GDP capita	-	.	.	-0.002	-0.570	.							
Soph home	-	.	.	.	.	-0.003	1.370	.					
Captl outflow	+	.	.	.	.	.	.	-0.005	-1.120				
Fin'ial literacy	-	.	.	.	.	.	.	.	.	-0.001	-0.670		
Rating^2	-	.	.	.	.	.	.	.	.	.	.	-0.000**	-2.410
Adj R^2		.	0.377	.	0.377	.	0.405	.	0.394	.	0.379	.	0.467

Panel B: Logratio-based pure home bias

		specification 1		specification 2		specification 3		specification 4		specification 5		specification 6	
		coeff	Tstat	coeff	Tstat	coeff	Tstat	coeff	Tstat	coeff	Tstat	coeff	Tstat
Intercept		-23.165	-1.750	-23.160	-1.770	-29.441**	-2.380	-24.847**	-2.080	-29.320**	-2.170	-30.182**	-2.45
Tax capgain	-	-18.353*	-1.85	-18.712*	-1.880	-17.712	-1.590	-19.775**	-2.040	-15.978	-1.600	-15.842	-1.49
Tax div	-	2.191	0.69	2.198	0.690	1.126	0.350	1.899	0.630	1.212	0.380	1.290	0.40
Size home	+	1.771**	2.13	1.784**	2.150	1.736**	2.040	1.606*	1.980	1.700*	1.840	1.754**	2.05
Remoteness	+	2.347	1.12	2.407	1.160	2.689	1.240	1.845	0.900	2.558	1.190	2.527	1.17
Patriotism	+	-0.796	-0.53	-0.735	-0.500	-0.274	-0.190	-0.887	-0.620	-0.269	-0.180	-0.246	-0.17
Forbes	-	1.145	0.93	1.475	1.110	0.921	0.640	1.209	1.040	0.694	0.520	0.606	0.45
Spread	+	-0.050	-0.93	-0.054	-1.010	-0.054	-0.800	-0.045	-0.870	-0.042	-0.720	-0.039	-0.62
HDI	-	-6.286	-1.25										
GDP capita	-	.	.	-1.423	-1.320								
Soph home	-	.	.	.	.	-0.223	-0.380						
Captl outflow	+	.	.	.	.	.	.	2.285*	1.890				
Fin'ial literacy	-	.	.	.	.	.	.	.	.	-0.055	-0.150		
Rating^2	-	.	.	.	.	.	.	.	.	.	.	0.000	-0.010
Adj R^2		0.111	.	0.116	.	0.072	.	0.162	.	0.068	.	0.068	.

Key The CK- (Panel A) and Logratio-based (Panel B) pure home bias measures are correlated with a set of country characteristics. The last six of these are so mutually correlated that they are entered one by one rather than in combinantion. .

Table 5: **Second-stage regression — Explaining distance aversion**

Panel A: CK-based pure home bias

		specification 1		specification 2		specification 3		specification 4		specification 5		specification 6	
		coeff	Tstat	coeff	Tstat	coeff	Tstat	coeff	Tstat	coeff	Tstat	coeff	Tstat
Intercept		-0.095	-2.67	-0.102***	-3.11	-0.062*	-1.90	-0.072**	-2.22	-0.078**	-2.000	-0.058*	-1.89
Tax capgain	+	-0.053*	-1.97	-0.047*	-1.90	-0.027	-0.93	-0.050*	-1.92	-0.065**	-2.250	-0.033	-1.24
Tax div	+	0.006	0.72	0.005	0.67	0.016*	1.95	0.010	1.16	0.016	1.680	0.008	1.00
Size home	-	0.003	1.27	0.003	1.31	0.003	1.50	0.004	1.69	0.005*	1.890	0.002	0.94
Remoteness	-	-0.004	-0.69	-0.004	-0.81	-0.009	-1.55	-0.002	-0.30	-0.006	-1.020	-0.002	-0.32
Patriotism	-	0.007*	1.76	0.007*	1.93	0.004	0.98	0.006	1.66	0.004	0.950	0.004	1.10
Forbes	+	0.008**	2.33	0.005	1.37	0.004	1.13	0.009**	2.68	0.008**	2.130	0.005	1.49
Spread	-	0.000	-0.39	0.000	-0.06	0.000	1.25	0.000	-0.76	0.000	-0.140	0.000	1.12
HDI	+	0.045**	3.33										
GDP capita	+	.	.	0.012***	4.28								
Soph home	+	.	.	.	.	0.005***	3.35						
Captl outflw	-	.	.	.	.	.	.	-0.012***	-3.58				
Finial literacy	+	.	.	.	.	.	.	.	.	0.002**	2.020		
Rating^2	+	.	.	.	.	.	.	.	.	.	.	0.000***	4.010
Adj R^2		0.521	.	0.589	.	0.522	.	0.539	.	0.427	.	0.570	.

Panel B: Logratio-based pure home bias

		specification 1		specification 2		specification 3		specification 4		specification 5		specification 6	
		coeff	Tstat	coeff	Tstat	coeff	Tstat	coeff	Tstat	coeff	Tstat	coeff	Tstat
Intercept		-37.016**	-2.15	-38.779**	-2.26	-45.007***	-2.80	-35.770***	-2.43	-45.839**	-2.62	-44.636***	-2.80
Tax capgain	+	-34.133**	-2.64	-33.824**	-2.59	-31.692**	-2.20	-38.166***	-3.20	-31.064**	-2.39	-32.804**	-2.38
Tax div	+	-3.829	-0.92	-4.050	-0.97	-4.927	-1.19	-3.803	-1.02	-4.829	-1.16	-4.683	-1.13
Size home	-	3.551***	3.28	3.559***	3.27	3.526***	3.19	3.270***	3.27	3.570***	2.99	3.572***	3.22
Remoteness	-	-0.583	-0.21	-0.481	-0.18	-0.327	-0.12	-1.579	-0.62	-0.391	-0.14	-0.519	-0.19
Patriotism	-	-1.268	-0.65	-1.074	-0.56	-0.634	-0.33	-1.760	-1.00	-0.609	-0.32	-0.664	-0.35
Forbes	+	4.568***	2.84	4.734**	2.71	4.022**	2.14	5.007***	3.48	3.868**	2.25	4.218**	2.40
Spread	-	-0.078	-1.12	-0.079	-1.11	-0.069	-0.78	-0.076	-1.20	-0.062	-0.83	-0.078	-0.96
HDI	+	-7.333	-1.12										
GDP capita	+	.	.	-1.302	-0.92								
Soph home	+	.	.	.	.	-0.060	-0.08						
Captl outflw	-	.	.	.	.	.	.	4.037**	2.71				
Finial literacy	+	.	.	.	.	.	.	.	.	0.040	0.09	.	
Rating^2	+	.	.	.	.	.	.	.	.	.	.	-0.001	-0.33
Adj R^2		0.465	.	0.459	.	0.444	.	0.548	.	0.445	.	0.446	.

Key The CK- (Panel A) and Logratio-based (Panel B) distance aversion estimates are correlated with a set of country characteristics. The last six of these are so mutually correlated that they are entered one by one rather than in combinantion. .

endsmall

characteristics. It has the same structure as the regressions of pure home bias in Table 4. For the CK covariance measure the only variable which is reliably related to the slope is the measure of development, the last variable in the regression. In all specifications this shows up as significant. Higher development increases the slope and so reduces the level of distance aversion (recall that the slope is negative). This is consistent with investors from more developed markets suffering less from a pure behavioral bias, if the explanation for distance aversion is a behavioral one. The results using the logratio measure are strong, with several variables being highly significant. In particular, country size is highly significant. However, the econometric bias that we discussed above is likely to cause variables like the logratio measure which are scaled by size to have an automatic correlation with size. So we do not attach great importance to the results of the logratio regression.

6 Implications

The fact that when we use the CK covariance measure the empirical model is formulated in terms of covariances means that we can relate our results directly to the important issue of the economic cost of the bias in international portfolio holdings (Levy (2013)). For many markets the pure home bias is zero, so the covariance measure of foreign portfolio bias is directly proportional to the distance index:

$$Y_{ij} = b\,\overline{X}_{ij}. \tag{18}$$

If the coefficient of risk-aversion is λ, the lost diversification from the biased holding of country i is $\lambda\,Y_{ij}$. The distance index, $\overline{X}_{ij}$, is mainly a measure of trade distance. One interpretation of this is that it proxies an expected return loss from an information disadvantage. Suppose that the loss of expected return is proportional to the distance index, with a constant of proportionality θ. Then the bias in the portfolio holding of country j by investor i results in a gain from avoided information disadvantages of $\theta\,\overline{X}_{ij}$. Using (18) to combine this with the diversification loss, the net loss from bias in the holding of country j is $(\lambda\,b - \theta)\overline{X}_{ij}$. The term $(\lambda\,b - \theta)$ measures the net loss from portfolio bias, and this can be positive or negative depending on whether $b\,\lambda$ is greater or less than θ. The sign of b determines whether the distance measure or diversification considerations dominate in forming international equity portfolios: as diversification considerations have been built into the left-hand side variable already, orthodox portfolio theory would predict a zero slope. The estimated b, being negative, is consistent with there being an aversion towards investing in dissimilar countries, over and above diversification considerations, as found in other studies.

Our results imply that there could be a significant economic cost to the international portfolio bias even if the average correlation of foreign markets with the home market is large. Levy analyses a case where an investor has a home bias but optimizes her holdings of foreign stocks. For the parameter values he uses the economic cost of the home bias is small. The extra cost we identify comes from the foreign bias because investors do not appear to optimize their holdings of foreign stocks. If the stocks which are most underweight in the portfolio are those with the greatest diversification potential then the portfolio of foreign equities is not optimal, resulting in a net additional cost. For smaller and less developed markets, there is the further effect of the pure home bias.

7 Conclusions

We have developed a way of measuring the pure home bias, defined as that part of gross home bias that goes beyond what can be predicted from the pattern behind the foreign bias. For most of the 41 countries we study the pure home bias seems is insignificantly different from zero. 70% of the variation in raw home bias is explained by the foreign bias pattern.

We find that the most satisfactory model for the foreign bias is based on covariances rather than portfolio holdings that do not take into account the covariance structure of returns. Investors trade off diversification benefits against distance. The appropriate benchmark with which to compare their actual portfolios is the global market portfolio. Using this measure, the main variable explaining foreign bias is trade distance. Countries differ in the degree of distance aversion, with the least distance-averse being the most developed.

For countries with zero pure home bias, the home country is simply like a foreign country with zero distance. There is nothing extra which is special about it. Investors do not appear to exhibit a pure fear of foreign investment separate from the general dislike of distance. The home bias and foreign bias collapse into a single puzzle: why do investors allocate lower portfolio weights to more distant countries? Specifically, they give up diversification by avoiding distant markets but there is no systematic benefit to this behavior that has yet been identified (as far as we know).

For a smaller part of the sample, all riskier and newer markets, the pure home bias, measured as the expectations gap that corresponds to the observed covariance gap, ranges up to 11.3

percent per annum. We identify the country characteristics that are associated with the degree of that pure home bias. These are mainly tax and credit standing. Both affect pure home bias in a way that implies the cause of pure home bias is the unwillingness of foreigners to invest in the countries with high pure home bias.

Appendices

A.1 Countries with strict capital controls

Table 6 below lists, per year, the observations omitted from the calculations because of zero cross-border flows in or out.

Table 6: **Countries excluded from the sample due to strict 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			

References

Baele, L., C. Pungulescu and j. Ter Horst (2007). Model uncertainty, financial market integration and the home bias puzzle, Journal of International Money and Finance 26 (4), p. 606-630.

Bekaert, G., C.R. Harvey (1997). Emerging equity market volatility, Journal of Financial Economics 43 (1), p. 29-77.

Bekaert, G., C.B. Erb, C.R. Harvey, T.E. Viskanta (1997). What matters for emerging equity market investments, Emerging Markets Quarterly 1, p. 17-46.

Bekaert, G., C.B. Erb, C.R. Harvey and T.E. Viskanta (1998). Distributional characteristics of emerging market returns and asset allocation. Journal of Portfolio Management 24 (2), p. 102-116.

Bekaert, G., and Wang, X. (2009). Home bias revisited. papersssrncom. Retrieved from http://ssrn.com/abstract=1344880.

Bollerslev, T. (1990). Modelling the coherence in short-run nominal exchange rates: a multivariate generalized ARCH model, Review of Economics and Statistics 73 (2), p. 498-505.

Chan, K., V. Covrig and L. Ng (2005). What determines the domestic bias and the foreign bias? Evidence from mutual fund equity allocation worldwide, The Journal of Finance 60 (3), p. 1495-1534.

Chin, Menzie D., Hiro Ito (2006). What Matters for Financial Development? Capital Controls, Institutions, and Interactions, Journal of Development Economics 81 (1), p. 163-192.

Coelho, B. and K.P. Gallagher (2010). Capital Controls and 21st Century Financial Crises: Evidence from Colombia and Thailand, PERI Working Paper Series, WP 213, University of Massachusetts Amherst.

Coeurdacier, N. and S. Gibaud (2011). International portfolio diversification Is better than you think, Journal of International Money and Finance 30 (2), p. 289-308.

Cooper, I., and Kaplanis, E. (1986). Costs to crossborder investment and international equity market equilibrium, in Recent developments in corporate finance, edited by j. Edwards, j. Franks, C. Mayer and S. Schaefer, Cambridge University Press, 209-240.

Cooper, I., and Kaplanis, E. (1994). Home bias in equity portfolios, inflation hedging, and international capital market equilibrium. Review of Financial Studies, 7(1), 4560.

Cooper, Ian, Piet Sercu, and Rosanne Vanpee (2013). The equity home bias: Survey and synthesis. Foundations and Trends in Finance, 7.4, 289-416.

Fernández, A., A. Rebucci and M. Uribe (2014). Are capital control prudential? An empirical investigation, NBER Working Paper No 19671, available at https://sites.google.com/site/andresfernandezmartin8/research

French, K. R., and Poterba, j. M. (1991). Investor Diversification and International Equity Markets. American Economic Review, 81(2), 222226.

Gelos R.G. and S.-J. Wei (2005). Transparency and international portfolio holdings, Journal of Finance 60 (6), p. 2987-3020.

Kang, j.-K. and R. M. Stulz (1997). Why is there a home bias? An analysis of foreign portfolio equity ownership in Japan, Journal of Financial Economics 46 (1), p. 3-28.

Karlsson, A. and Nordén, L. (2007). Home sweet home: Home bias and international diversification among individual investors. Journal of Banking & Finance 31(2), 317-333.

Ke, D., Ng, L., and Wang, Q. (2010). Home bias in foreign investment decisions. Journal of International Business Studies 41(6), 960-979.

Kho B.-C., R. M. Stulz and F. E. Warnock (2009). Financial Globalization, Governance and the Evolution of the Home Bias, Journal of Accounting Research 47 (2), 597-635.

Kilka, M. and Weber, M. (2000). Home Bias in International Stock Return Expectations. Journal of Psychology and Financial Markets 1(3-4), 176-192.

Kohers, G., N. Kohers, and T. Kohers (2006). The risk and return characteristics of developed and emerging stock markets: the recent evidence. Applied Economic Letters 13, p. 737-743.

Lau, S.T., L. Ng and B. Zhang (2010). The world price of home bias, Journal of Financial Economics 97 (2), p. 191-217.

Levy H. and M. Levy (2014). The home bias is here to stay, Journal of Banking and Finance 47, p. 29-40.

Levy H. (2013). What is the economic cost of the investment home bias? Available at SSRN: http://ssrn.com/abstract=2345193

Longin, F, and B. Solnik (1995). Is the correlation in international equity returns constant: 1960-1990?, Journal of International Money and Finance 14 (1), p. 3-26.

Mishra, A. V. and R.A. Ratti (2013). Home bias and cross border taxation, Journal of International Money and Finance 32, p. 169-193.

Morse, A. and Shive, S. (2011). Patriotism in your portfolio. Journal of Financial Markets 14(2), 411-440.

Portes, R., and Rey, H. (2005). The determinants of cross-border equity flows. Journal of International Economics, 65(2), 269296.

Saborowski C., S. Sanya, H. Weisfeld and j. Yepez (2014). Effectiveness of Capital Outflow Restrictions, IMF Working Paper WP/14/8.

Sarkissian, S. and M.J. Schill (2004). The overseas listing decision: New evidence of proximity preference, Review of Financial Studies, 17 (3), p. 769-810.

Sarkissian, S. and M.J. Schill (2009). Are there permanent valuation gains to overseas listing?, Review of Financial Studies, 22 (1), p. 371-412.

Sarkissian, S. and M.J. Schill (2014). Cross-Listing Waves, Journal of Financial and Quantitative Analysis, forthcoming

Schindler, M. (2009). Measuring financial integration: A new data set, IMF Staff Papers 56 (1), p. 222-238.

Seasholes, M.S. and N. Zhu (2010). Individual investors and local bias, The Journal of Finance 65 (5), p. 1987-2010.

Sercu, P., and Vanpée, R. (2008). Estimating the Costs of International Equity Investments. Review of Finance, 12(4), p.587-634.

Tesar, L.L. and I.M. Werner (1995). Home bias and high turnover, Journal of International Money and Finance 14 (4), p. 467-492.