The Role of Uncertainty Avoidance in Foreign Investment Bias

Burcu Erdogan*
Universität Trier

November 2014

Abstract

In this paper, I explore the determinants of foreign bias in international portfolio investment focusing on a behavioral explanation. Specifically, I investigate whether investors having a stronger uncertainty aversion perceive a foreign country to be more unfamiliar than those with less such aversion. I exploit systematic differences in uncertainty avoidance across countries in my analysis using Hofstede's (1980, 2001) findings for this purpose. I show that less familiarity with the foreign markets discourages investors from investing abroad and that this effect is more pronounced the more uncertainty averse the investor, even after controlling for different sources of risk. I provide compelling evidence that uncertainty avoidance helps to explain foreign bias and that it has an amplifying effect on unfamiliarity and should be accounted for when modeling portfolio choices.

JEL Classification Codes: F30, G11, G15, Z13

Keywords: foreign bias, home bias, international portfolio investment, uncertainty avoidance

*E-mail: erdogan@uni-trier.de, Tel.: +49(0)651/201-2734.

I thank Marc Oliver Rieger for making Datastream available; John D. Burger and other participants of the INFINITI 2014 Conference, Christian Bauer, Matthias Neuenkirch and participants of the VWL Brown Bag Seminar at the Univesity of Trier for corrections and helpful comments.

1 Introduction

The fact that investors tend to hold proportionally more domestic assets in their portfolios than anticipated by their country's relative share in the world market portfolio is a well-documented phenomenon in the finance literature. Although standard portfolio theory[1] states that investors would gain significantly from international diversification in terms of portfolio efficiency, empirical evidence shows that investors irrationally forego these gains and continue to overweigh domestic assets, resulting in a lack of cross-border diversification, which in turn implies foreign investment bias.

In my study, I explore the determinants of foreign investment bias focusing on a behavioral perspective. I use holdings of portfolio investment securities data from the International Monetary Fund's (IMF) Coordinated Portfolio Investment Survey (CPIS) from 2001 to 2012. Following Chan et al. (2005), I believe that less familiarity with the foreign markets discourages investors from investing abroad. Essentially, the main contribution of my study is to test the hypothesis of whether high uncertainty averse investors invest disproportionately more in familiar countries and less in distant countries. In other words, I investigate whether distances between countries appear to be even greater for investors from countries that are characterized by higher uncertainty avoidance. I exploit systematic differences in uncertainty aversion across countries, and use the findings of Hofstede (1980, 2001), who provides uncertainty avoidance indices for around 50 countries based on a cross-country survey. Specifically, I investigate whether familiarity and uncertainty aversion affect foreign investment bias, and whether the degree of uncertainty aversion changes the perception of what is "unfamiliar" or "distant" in the eyes of the investors.

My results prove the amplifying effect of uncertainty aversion on investors' perception of unfamiliarity and have important implications for portfolio theory and asset pricing. The most striking result is that foreign bias increases with unfamiliarity with the peer country, an effect that is stronger for countries that are more uncertainty averse. The more uncertainty averse investors invest disproportionately less in the destination country compared to investors with less uncertainty aversion. My results also confirm previous findings in the literature that analyzes home bias and foreign investment. Briefly, economic development and freedom, legal, political, and administrative environment, quality of governance, capital controls, trade linkages, real bilateral exchange rate volatility, financial market characteristics, and cultural attitudes explain foreign investment bias.

The rest of the paper is organized as follows. Section 2 reviews the literature. Section 3 details the uncertainty avoidance index, CPIS data, and explains how foreign bias is

[1] See Levy and Sarnat (1970), and Solnik (1974).

measured. Section 4 discusses my regression framework including a brief overview of its theoretical background, and illustrates explanatory variables. Section 5 reports the main results; Section 6 concludes.

2 Literature Review

The seminal work of French and Poterba (1991) was the first to describe "home bias" in equities across borders. Interestingly, a very appealing paper is cited in French and Poterba's (1991) study -Heath and Tversky (1991)- to highlight the role of investor behavior and risk perception on imperfect diversification. More specifically, the authors say that in addition to considering historical standard deviation of returns to evaluate the riskiness of different investments, investors may also assign additional risk to foreign investments about which they know less. According to this view, (un)familiarity plays a role in investing abroad.

Cao et al. (2011) and Boyle et al. (2012) prove underdiversification in assets that are perceived to be less familiar by modeling preference for familiarity in a theoretical model framework. In addition, there are several empirical papers that investigate whether there is a behavioral bias toward familiar assets. Huberman (2001) states that familiarity is related to a general sense of comfort with the known and discomfort with the distant and proves the investors' geographic bias towards local assets. Coval and Moskowitz (1999) also report evidence of a geographic proximity preference by U.S. domestic mutual fund managers where distance reflects asymmetric information between local and nonlocal investors. In a similar vein, familiarity effects or informational asymmetries explain the frictions in international capital markets, according to Portes and Rey (2005), and Ke et al. (2010) state that familiarity reduces home bias. Grinblatt and Keloharju (2001) show that investors exhibit a preference for closer firms when they analyze the impact of distance, language, and culture on investment decisions of Finnish investors. Amadi (2004) finds that familiarity factors such as common language, trade, and possibly, immigrant links significantly influence equity home bias. Chan et al. (2005) examine the determinants of both home bias and foreign investment bias in equity markets, and document that familiarity variables contribute to the investment decisions of both domestic and foreign investors. A common finding in the literature is that distance, which proxies unfamiliarity, is negatively related to investment abroad. However, unfamiliarity might be perceived differently by investors depending on their degrees of uncertainty aversion. I assert that the same level of unfamiliarity might hamper trade in assets even more

for high uncertainty averse countries than for low uncertainty averse ones[2] and empirically test for the impact of uncertainty aversion on portfolio choice, which works through differences in the perception of unfamiliarity.

My study is also related to the branch of literature that discusses the impact of ambiguity aversion on portfolio investment decisions. In their survey on behavioral finance, Barberis and Thaler (2003) provide a review of ambiguity aversion and its applications . Uppal and Wang (2003) develop a model that allows for different ambiguity aversion levels of investors for the marginal distribution of returns for any subset of stocks and prove underdiversification in portfolios. Bauer (2012) introduces ambiguity as an element in addition to risk in a standard portfolio choice model and in an application shows that the optimal weight on foreign assets is lower in the ambiguous model, resulting in a higher home bias and a higher foreign bias, respectively. Dlugosch and Wang (2014) show that different attitudes toward ambiguous situations generate an overdiversification of domestic assets and an underdiversification of foreign assets.[3]

These findings suggest that taking the differences in investor attitude toward unstructured and ambiguous situations could explain foreign investment bias and home bias in portfolio holdings, controlling for other potential sources of risk. The uncertainty avoidance index (UAI) calculated by Hofstede (1980, 2001) for around 50 countries makes it possible to test this hypothesis empirically. Hofstede's index quantifies different levels of uncertainty aversion across countries. Beugelsdijk and Frijns (2010), using mutual fund holdings data obtained from Thomson Financial Services, document empirical evidence that a nation's foreign bias increases with an increase in the nation's uncertainty aversion. In a cross section of institutional portfolios, Anderson et al. (2011) show that uncertainty avoidance is positively related to the degree of home bias. On the other hand, utilizing portfolio holdings survey data from IMF, Aggarwal et al. (2012) find that uncertainty avoidance does not significantly explain cross-border holdings of either debt or equity. My approach is different from these studies in that I attempt to find out whether uncertainty avoidance inflates the impact of unfamiliarity on home bias. Thus, I not only analyze the direct impact of uncertainty avoidance on investors' foreign market investment decisions, but extend this branch of the literature by analyzing the boosting impact of ambiguity aversion on unfamiliarity.

The last two decades have witnessed several other explanations, aside from behavioral, for home bias and foreign investment bias. One recent excellent review of various explana-

[2]Huang (2007) analyzes a similar proposition for bilateral trade in goods.

[3]Dlugosch and Wang (2014) also prove home and foreign bias empirically using a proxy for ambiguity aversion that relies on results from the International Test of Risk Attitudes (INTRA) survey (Hens et al. 2014) and a broad set of controls.

tions of home bias phenomenon is provided by Coeurdacier and Rey (2013). Transaction costs (Portes and Rey, 2005), information asymmetries (Brennan and Cao, 1997; Coval and Moskowitz, 1999; Ahearne et al., 2004), real exchange rate risks (Fidora et al., 2007; Bekaert and Wang, 2009), hedging inflation risk (Cooper and Kaplanis, 1994), policies, and institutional barriers (Burger and Warnock, 2003; Bekaert and Wang, 2009; Aggarwal et al., 2005) are the most plausible explanations proposed to date. I use many other controls that are common in the literature to test the robustness of my results, including cultural distance between the two markets and other cultural dimensions as measured by Hofstede (1980, 2001)[4], as done by, for example, Beugelsdijk and Frijns (2010), Anderson et al. (2011), and Aggarwal et al. (2012).

3 UAI, CPIS, and Measuring Foreign Bias

I use an unbalanced panel data-set for my analysis. My sample covers annual observations from 49 countries over the period 2001 to 2012. Table 1 lists the countries in my sample. Since my focus is on the role of different attitudes toward uncertainty, I select countries for which the uncertainty avoidance index (UAI) is available in Hofstede's cross-cultural survey. The Appendix contains further information about this survey. The cultural values framework of Geert Hofstede is used in a range of empirical studies and has had far greater impact than any other cultural values approach (see Kirkman et al., 2006). Also, Hofstede has better country coverage. Therefore, I use Hofstede's cultural values framework, in particular UAI, for my analysis.[5] According to Hofstede, UAI is related to a society's tolerance for uncertainty and ambiguity. The index captures how members of a society react to unknown conditions in the future. In some countries, "unknown" is threatening and they have a higher UAI, whereas in others it is intriguing and they have a lower UAI. High UAI countries maintain rigid codes of behavior and are intolerant of situations that are different from usual. Weak UAI countries are more relaxed in attitude so that practice counts more than principle. Following these behavior codes, high UAI societies tend to construct strong mechanisms to deal with uncertainty, such as religion and strict laws, rules, and safety measures. Table 1 also lists UAIs for the countries in my sample. Greece is the most uncertainty averse country with a UAI of 112, whereas Singapore is the least uncertainty averse with a UAI of 8. In general, most of the high

[4]More details about Hofstede's cultural values framework can be found in the Appendix.

[5]A common criticism of using Hofstede's cultural dimensions in current research is that they are no longer up to date. However, Tang and Koveos (2008) provide a framework to update these dimensions and confirm that uncertainty avoidance reflects some rather stable institutional traditions and is not likely to change over time.

UAI countries are in continental Europe or Latin America and most of the low UAI countries are in northern Europe or Anglo-Saxon in origin. The table suggests that there are systematic differences across countries in terms of uncertainty aversion.

Data on holdings of equity and long-term debt instruments are from the IMF Coordinated Portfolio Investment Survey for the period 2001 to 2012. Under the supervision of the IMF, national compilers from around 70 countries collect data on aggregate equity and bond holdings in their respective countries from around 230 destination countries on an end-of-year basis.[6] This is the most comprehensive survey of international portfolio holdings (IMF, 2002). Moreover, the bilateral structure of the data permits me to investigate foreign investment bias between pairs of countries, and I can consider not only holder country characteristics but also destination country characteristics. Nevertheless, this dataset has been subject to some criticism. First, the CPIS data cannot address round-tripping issues; that is, if a resident in country A holds assets of country B through an institution in country C, it will look like country A is holding assets of country C (Lane and Milesi-Ferretti, 2008). This problem can be pronounced in the case of financial offshore centers, and I thus exclude Luxembourg and Ireland from my sample. Furthermore, this dataset does not have a currency breakdown of holdings and does not directly report domestic asset holdings. Therefore, domestic asset holdings are calculated indirectly by subtracting total liabilities of a specific country to other countries from the stock market capitalization of that country. The assumption here is that the country does not have any liabilities to non-reporting countries. Despite these criticism, however, CPIS is still the best data source for equity holdings across borders.

To calculate foreign investment bias scores, I follow the literature motivated by the international capital asset pricing model (CAPM) of Cooper and Kaplanis (1986). The idea is basically to compare optimal market weight with the actual holdings ratio to see whether there is under- or overinvestment in a specific country. To this end, I first calculate $w_{H,D,t}$ which is the actual share of country D's assets in country H's portfolio at time t. Next, I calculate $w^*_{D,t}$ which is the benchmark weight of country D's assets suggested by country D's relative market capitalization in the world at time t.[7] My dependent variable is the following foreign bias score[8]:

$$FIB_{H,D,t} = log(\frac{w_{H,D,t}}{w^*_{D,t}}) \tag{1}$$

[6] I label a country that holds securities as a "holder" (H) and a country to which funds flow as a "destination" (D).

[7] At this point I follow Bekaert and Wang (2009) and assume that world market size is the sum of total market sizes of all holder countries in my sample.

[8] See also Chan et al. (2005) and Beugelsdijk and Frijns (2010).

Table 1: The table reports the uncertainty avoidance index for each country in my sample, the average foreign investment bias (FIB) score as a holder, the average FIB score into a certain destination market, the average benchmark weight suggested by the relative market capitalization of each country with respect to world market capitalization, and the average actual allocation share into each market.

Country	UAI	Average FIB as Holder	Average FIB as Destination	Average Benchmark Market Weight	Average Actual Allocation
Argentina	86	-16.26	-10.90	0.20	0.12
Australia	51	-6.17	-5.87	2.39	0.66
Austria	70	-3.47	-5.48	0.23	0.29
Belgium	94	-3.53	-4.66	0.65	0.23
Brazil	76	-7.88	-5.99	1.94	0.54
Bulgaria	85	-12.53	-13.56	0.02	0.04
Canada	48	-4.16	-5.89	3.73	0.29
Chile	86	-11.78	-9.81	0.45	0.03
Colombia	80	-20.55	-12.83	0.25	0.03
Costa Rica	86	-9.13	-19.28	0.01	0.19
Czech Republic	74	-5.77	-7.09	0.10	0.11
Denmark	23	-2.75	-6.95	0.44	0.15
Estonia	60	-4.66	-10.41	0.01	0.01
Finland	59	-1.87	-4.78	0.48	0.39
France	86	-3.01	-3.98	4.52	1.62
Germany	65	-4.74	-3.87	3.39	1.39
Greece	112	-9.29	-6.84	0.28	0.05
Hong Kong	29	-9.10	-6.43	2.28	0.31
Hungary	82	-6.70	-6.19	0.06	0.14
Indonesia	48	-17.97	-7.99	0.43	0.07
Israel	81	-4.50	-8.06	0.35	0.04
Italy	75	-2.81	-4.78	1.64	0.38
Japan	92	-6.82	-6.11	9.40	1.04
Malaysia	36	-7.02	-8.95	0.67	0.13
Malta	96	-8.60	-13.28	0.01	0.01
Mexico	82	-13.24	-7.56	0.75	0.44
Netherlands	53	-3.07	-3.90	1.54	0.81
New Zealand	49	-2.10	-9.64	0.12	0.02
Norway	50	-1.88	-6.50	0.48	0.14
Pakistan	70	-7.57	-15.66	0.08	0.001
Panama	86	-13.93	-5.49	0.02	0.08
Philippines	44	-7.29	-8.90	0.23	0.02
Poland	93	-13.88	-6.87	0.28	0.15
Portugal	104	-13.25	-7.42	0.19	0.04
Romania	90	-9.23	-11.00	0.05	0.04
Russia	95	-21.12	-5.98	1.59	0.30
Singapore	8	-1.53	-6.53	0.70	0.13
Slovak Republic	51	-2.74	-16.05	0.01	0.02
South Africa	49	-6.01	-8.26	1.30	0.09
South Korea	85	-8.26	-7.11	1.79	0.30
Spain	86	-6.40	-5.20	2.61	1.32
Sweden	29	-2.55	-5.45	1.06	0.52
Switzerland	58	-2.75	-4.04	2.48	0.85
Thailand	64	-19.28	-7.92	0.41	0.08
Turkey	85	-15.38	-8.36	0.43	0.08
United Kingdom	35	-2.63	-3.60	7.40	2.67
United States	46	-2.63	-3.43	42.29	7.35
Uruguay	100	-9.10	-14.89	0.0003	0.003
Venezuela	76	-17.66	-12.91	0.02	0.08

The majority of the observations have a negative $FIB_{H,D,t}$ value since the actual share of holdings are lower than the optimal weight of assets suggested by CAPM, formally $w_{H,D,t} < w^*_{D,t}$. The lower the value of $FIB_{H,D,t}$, the less the foreign investment in a country, hence, the higher the foreign investment bias.

Table 1 provides an overview of average foreign bias for the countries in my sample both as holder of the assets and as destination of the funds. The second column of Table 1 reveals that the highest foreign investment bias is observed in Russia, which has a FIB score of -21.12, followed by Colombia with -20.55 and Thailand with -19.28. Venezuela, Argentina, and Turkey also have very low foreign investment bias scores; -17.66, -16.26, and -15,38 respectively, meaning that, on average, these countries invest less in foreign countries than what optimum portfolio theory would suggest. Singapore has the least foreign investment bias with an average FIB score of -1.53. Finland and Norway also have relatively low foreign bias, each with a FIB score of roughly -1.88.

The third column of Table 1 reports the average FIB scores of the destination countries. According to these figures, the least foreign bias is toward the United States, which has a FIB score of -3.43; the next least is than toward the United Kingdom with -3.60. There is still underinvestment in these markets but it is quite moderate compared to the severe underinvestment in countries such as Costa Rica (-19.28), the Slovak Republic (-16.05), and Pakistan (-15.66).

The last two columns of Table 1 present the optimal market weights and actual share of allocation into each country. In general, benchmark weights are higher than actual allocations, conforming the existence of foreign investment bias in most cases. The highest optimal market weight is attached to the United States; moreover, the most capital flow, on average, is into the U.S. market.

I use many control variables to explain foreign investment bias. Table 2 lists the variables I use in my analysis and the sources from which the data are drawn. I consider five different categories of explanatory variables other than the UAI and culture dimensions: familiarity variables, macroeconomic variables, capital controls, political/legal and economic freedom variables and financial market characteristics. I discuss the details of these variables in the following section.

4 Regression Framework

The theoretical backbone of my analysis is the international capital asset pricing model with barriers to cross-border investment developed by Cooper and Kaplanis (1986). In

Table 2: The table lists the variables used in my analysis and their data sources.

Variable	**Source**
Equity holdings	IMF, CPIS
Holdings of long-term debt instruments	IMF, CPIS
Culture Dimensions	
Uncertainty aversion index (UAI), individualism (IDV), power-distance (PDI), masculinity (MAS)	Hofstede (1980, 2001)
Familiarity Variables	
Distance, currency union, common border, common language, colonial relationship, regional trade agreement, common legal origin, local time difference	Rose (2005), CEPII
Macroeconomic Variables	
Inflation, GDP, Exchange Rates	Datastream, Oxford Economics
Bilateral Trade Flows (Imports to GDP)	IMF Direction of Trade Statistics (DOTS)
Capital Controls	
Capital market controls index	Economic Freedom Network
Political, Legal and Economic Freedom Var.	
Political Stability Indicator	Ifo World Economic Survey
Legal and Administrative Restrictions	Ifo World Economic Survey
Economic Freedom Index	Heritage Foundation
Government Effectiveness	World Bank, World Governance Indicators
Financial Market Characteristics	
Stock market capitalization and turnover	Datastream
Bond market capitalization	BIS Securities Statistics

this model, a representative investor chooses an optimal portfolio of assets from N countries by maximizing the expected returns for a given level of variance. Solving the investor's optimization problem and imposing the world capital market equilibrium, the authors define deviations of actual asset holdings from the optimal world market portfolio, i.e., foreign investment bias, as a function of investor and country-specific deadweight costs (see also Chan et al., 2005). The Cooper and Kaplanis (1986) model enables me to empirically test for determinants of foreign investment bias by accounting for potential investor-related and country-related sources of deadweight costs.

To analyze the determinants of foreign investment bias (Equation (1)), I take both holder and destination country characteristics into account, i.e., their economic development, financial market features, trade linkages, political stabilities, legal restrictions and standard familiarity variables previously used in the literature.[9] The unique feature of my model

[9]My regression model is also related to the gravity models used in the finance literature to examine the determinants of security holdings. Okawa and van Wincoop (2012) develop a theory for bilateral asset holdings that takes a gravity form. Even before their contribution, however, gravity-type models were

is that it allows for a disproportionate effect of the distance variable depending on the country's degree of uncertainty avoidance. My regression model is specified as follows:

$$FIB_{H,D,t} = c + Z_{H,D}\alpha + X_{H,D,t}\beta + X_{H,t}\delta^H + X_{D,t}\delta^D + UAI^H\gamma^H + UAI^D\gamma^D \\ + ln(dist)_{H,D}(\theta + UAI^H\theta^H + UAI^D\theta^D) + \zeta_H + \eta_D + t + \epsilon_{H,D,t}$$

where $Z_{H,D}$ are time-invariant country pair characteristics (i.e., common official language, common border, common legal origin, local time difference); $X_{H,D,t}$ are time-varying country pair characteristics (bilateral trade, bilateral real exchange rate volatility, stock return correlations, and GDP correlations); $X_{D,t}$ are time-varying variables for the destination country (macroeconomic variables, financial market characteristics, capital controls, political risk, economic freedom, and governance indicators); $X_{H,t}$ are time-varying variables for the holder country (similar to those for destination country). I account for holder, destination, and year dummies to eliminate all other unobserved country and time effects such as a global business cycle or financial crisis. $ln(dist)_{H,D}$ is the logarithmic distance in miles between the country pair and UAI is the uncertainty avoidance index. θ captures the effect of unfamiliarity proxied by distance. θ^H and θ^D capture the differential effects of unfamiliarity on home bias depending on the extent of uncertainty avoidance. As unfamiliarity is assumed to increase with distance, θ is expected to be negative, implying that the higher the unfamiliarity, the lower the foreign asset holdings. The less familiar countries are with each other, the more difficult and costly it becomes to gather investment-related information. Hence, less familiarity with a country leads to less investment in this country and to a higher foreign investment bias. This effect is expected to be stronger for high uncertainty averse investors; hence, θ^H should also have a negative sign.[10] Moreover, I expect γ^H to be negative because higher uncertainty averse agents decrease their allocations of foreign assets, which they evaluate to be riskier than domestic assets. It is difficult to make a prediction about the signs of γ^D and θ^D a priori, since portfolio allocation decisions are mostly related to the investor's (holder's) uncertainty aversion but not necessarily to the uncertainty aversion of the destination.

The dependent variable "foreign bias score" is the logarithm of the actual portfolio share of a country over the optimal portfolio share, which does not allow me to consider zero portfolio holdings in my sample. To avoid a potential sample selection bias, I replace zero holdings by 0.001, following Beugelsdijk and Frijns (2010), which enables me to estimate a pooled Tobit model where the originally zero holdings are censored on the left.

commonly utilized (see e.g. Portes and Rey, 2005; Aggarwal et al., 2012).

[10] Before interacting the variables, I demeaned them as suggested by Wooldridge (2002).

In the following subsections, I detail the six categories of explanatory variables.

Other Familiarity Variables

The other familiarity variables included in the analysis are the dummy variables indicating whether the two countries belong to the same currency union, share a common border, speak a common official language, have ever had a colonial relationship, have a regional trade agreement with each other, or share a common legal origin, as well as the local time difference between them. A destination country is familiar to investors if both countries belong to the same currency union, they are neighbors, the same official language is spoken in both countries, and they have had a colonial relationship, a common legal origin or a regional trade agreement; in this case, investors are expected to hold more of this country's assets. The local time difference between the two countries is negatively related to familiarity and, consequently to foreign investment.

Macroeconomic Variables

The second category of control variables is the macroeconomic factors that could influence country-level portfolio allocation decisions such as log GDP per capita and inflation in both holder and destination countries, bilateral real exchange rate volatility and imports from destination country to holder over GDP. I expect positive coefficients on log GDP per capita, which reflects the countries' economic size. If a country is well developed, it should attract more investment and also should have more resources that could potentially be invested in other countries. The sign on home inflation is expected be positive; an inflationary environment could signal high macroeconomic instability, with the consequence that agents might look elsewhere for investment opportunities. On the other hand, an inflationary environment in the destination country might deter investment, resulting in a negative sign on this variable.

I follow Fidora et al. (2007) to calculate the volatility of the bilateral exchange rate between the holder and destination countries. It is the log of the standard deviation of monthly bilateral exchange rate changes in a year and I am agnostic as to its expected sign. A more volatile bilateral exchange rate might discourage investors from investing in the peer country. On the other hand, more portfolio investment in a country means more capital movement across the border, which would increase the volatility of the bilateral exchange rate. In this context, there is a potential endogeneity problem between bilateral exchange rate volatility and foreign portfolio holdings. To cope with this problem, I use the lagged bilateral exchange rate volatility in my estimations alternatively, in addition to current volatility, which does not qualitatively change my results. In my estimations, I also control for the imports-to-GDP ratio in order to account for hedging motives. The

idea is that as a country imports more goods from the peer country, it will also buy more of that country's financial assets to hedge against risks related to the peer country and against terms of trade shocks (Obstfeld and Rogof, 2001). This would in turn increase cross-border asset holdings, thus decreasing foreign investment bias.

Capital Controls

The next category of control variables is the capital controls indicator at home as well as in the destination country. This variable reflects the percentage of capital controls not levied as a share of the 13 types of international capital controls reported by the IMF and ranges from 0 to 10 (Gwartney et al., 2013). The higher the indicator, the lower the restrictions; for example, a 10 would mean unrestricted capital flow. I expect a positive sign on the capital controls indicator because foreign investments increase as capital is allowed to flow freely across borders.

Political, Legal, and Economic Freedom Variables

The fourth set of variables are intended to control for political stability, legal environment, overall economic freedom, and governance in the country pair. The indicators for political stability and for legal/administrative restrictions in a country are taken from the Ifo World Economic Survey (WES). Economic experts in multinational firms and institutions in many industrial, emerging, and developing economies are surveyed semi-annually for their evaluations of the current economic situation and expectations for the future. The first indicator taken from WES measures a country's political stability and the second one measures the legal/administrative restrictions imposed on foreign firms when investing in the country. These indicators fall in an interval from 1 to 9, where a higher score reflects a more stable political environment and less legal/administrative restrictions on foreign investors. If the source country is more politically stable, investors might prefer to keep their funds at home. Hence, the sign on the political stability indicator for the holder country is expected to be negative. On the other hand, the sign on the political stability variable for the destination country is expected to be positive; that is, the more politically stable a destination country, the higher will be the investments in this country. Lower legal/administrative restrictions on foreign investors in the home country might also signal a better legal/administrative environment for domestic investors, which could encourage them to invest both at home and abroad. Therefore I have no clear expectations for the sign on the indicator for domestic legal/administrative restrictions. However, fewer legal/administrative restrictions in a foreign country should increase investments by foreign investors in this country; hence, the sign on this indicator is expected to be positive.

In addition, I include the index for overall economic freedom provided by the Heritage Foundation, which is comprised of 10 equally weighted categories that can be grouped into four broad categories defined by the Foundation: rule of law (property rights, freedom from corruption); limited government (fiscal freedom, government spending); regulatory efficiency (business freedom, labor freedom, monetary freedom); and open markets (trade freedom, investment freedom, financial freedom). I predict a positive sign on the coefficients on economic freedom indices at home and abroad because overall economic freedom on both sides of the border should promote foreign investments, thus decreasing foreign investment bias. I also add a governance indicator to my analysis; namely, government effectiveness, which stems from the World Bank Governance Indicators. Kaufmann et al. (2010) state that these data reflect the views on governance of survey respondents who are public, private, and NGO sector experts in more than 200 countries. Government effectiveness involves the quality of public services, the quality of the civil service and its degree of independence from political pressure, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. A higher score indicates better governance at home and across the border and is expected to increase foreign investment.

Financial Market Characteristics

To account for the financial market development of source and destination countries, I add log market capitalization and turnover to my estimations, following Bekaert and Wang (2009) and Chan et al. (2005). High market capitalization in a country signals a developed market structure, making investors more willing to invest in a domestic as well as in a foreign portfolio and also possibly attracting foreign capital; thus, at this point I have no firm expectations as to the sign of the coefficient on market capitalization (see also Chan et al., 2005). Turnover is the ratio of total traded volume in a year to market capitalization at the end of the year, which captures liquidity in the respective stock market. Investors are more likely to invest in liquid markets; hence, a more liquid domestic stock market could be attractive for domestic investors, which would increase foreign investment bias. A liquid market in the peer country, on the other hand, may invite foreign investments. As a result, I predict that the sign for turnover of the domestic market will be negative and that the sign for turnover of the destination market will be positive.

I also use the correlation between the monthly stock market returns of the two countries and quarterly GDP correlations in the two economies in the previous year to test for diversification gains. A higher correlation reduces the diversification potential between the countries; in consequence reducing foreign investments (Bekaert and Wang, 2009).

The coefficient for the diversification variable is therefore expected to be negative.

Cultural Distance and Culture Dimensions

Like Beugelsdijk and Frijns (2010), Anderson et al. (2011) and Aggrawal et al. (2012), I also investigate the effect of cultural distance between holder and destination countries on foreign investment bias. To measure cultural distance between two countries I follow Kogut and Singh (1988). Utilizing Hofstede's four cultural dimensions (power-distance, individualism, masculinity, and uncertainty avoidance), I calculate an index for cultural distance as follows:

$$CD_{H,D} = \sum_{n=1}^{N} \left(\frac{C_{n,H} - C_{n,D}}{V_n} \right) /N$$

where $CD_{H,D}$ is the cultural distance between country H and country D, $C_{n,H}$ is the index for the n^{th} cultural dimension of country H (and country D, respectively), V_n is the variance of the n^{th} index and there are N cultural dimensions. In addition to the direct impact of cultural distance on equity holdings, I also test whether the perception of cultural distance varies depending on the degree of uncertainty avoidance. One would expect a positive correlation between cultural similarity and foreign investment. Differences in the uncertainty aversion of investors, however, could affect their perceptions of cultural closeness. Home country investors may perceive cultural distance to be even greater if they are highly uncertainty averse. On the other hand, it is not clear what the effect would be if it is the destination country that is more uncertainty averse. The level of uncertainty aversion in the destination country does not necessarily influence the security holdings of holder country investors, nor does it necessarily change their perception of cultural distance.

Finally, I include Hofstede's other culture dimensions in my model: power-distance, individualism, and masculinity indices.[11] It is difficult to formulate an ex ante prediction about the impact of the power-distance in a society on foreign investments. Aggarwal et al. (2012) argue that this culture dimension is related to individual greed and ambition, which could lead to more rent-seeking activity by investors also across the border, thus increasing foreign investments. More individualistic societies are expected to be more overconfident and more risk-friendly; therefore, they should invest more in foreign countries. In a similar vein, a higher score on the masculinity index may also lead to overconfidence and an increase in foreign asset holdings.

[11] See the Appendix for a short explanation of Hofstede's culture dimensions.

5 Estimation Results

Table 3 shows my estimation results for various regression specifications in which the dependent variable is the foreign investment bias score calculated by Equation (1). I start from a very parsimonious model and test for different sets of control variables. In the last column of the table I report the results from the full specification. I include holder, destination, and year dummies in all specifications to overcome any omitted variable bias related to individual countries or time.[12] Moreover, I estimate pair clustered standard errors that are robust to heteroscedasticity.

The base model confirms that unfamiliarity, proxied by distance, discourages investors from holding stocks of the peer country and foreign investment bias score deteriorates. There is a significant amplifying effect of the degree of uncertainty avoidance on the perception of unfamiliarity, which is reflected in the significant negative coefficient on the interaction term for the holder country (ln(dist) * (H) UAI) as expected. This effect is robust to different model specifications. As I feed my model with other explanatory variables, the coefficients on the interaction term remain significant and the size of the coefficient does not change much. Hence, I provide evidence that more uncertainty averse investors perceive unfamiliarity more acutely than less uncertainty averse investors, and hold even fewer stocks of firms based in unfamiliar countries.[13] Moreover, uncertainty aversion has a significant direct impact on foreign investment bias; higher uncertainty aversion in a society reduces foreign investment, thus strengthening the foreign bias. This is robust over different model specifications, but in the full specification, it is no longer significant. I had not a priori expectation about the sign of the interaction term for the destination country and the sign of the degree of uncertainty aversion in the destination country; it turns out that they are both negative and significant in the base model.[14] When I control for all the other variables, destination's uncertainty aversion loses its significance and the significance level for the interaction term for the destination country falls.

Other Familiarity Variables

I add the gravity-type familiarity variables to my base model next and the results are

[12] As a robustness control, I also included region dummies (i.e. Latin America, continental Europe, northern Europe, Asia-Pacific, Anglo-Saxon in origin) to my specification. My results remain robust and are available upon request.

[13] In a different model setting, Dlugosch and Wang (2014) do not find a boosting effect of ambiguity aversion as they report that explanatory power completely shifts from the distance variable to the interaction of their proxy for ambiguity aversion with distance.

[14] A possible explanation is that highly uncertainty averse destination countries might be resistant to sharing information, which could lead to fewer cross-border equity holdings.

Table 3: The table reports the determinants of foreign investment bias in equity holdings. In each case, left-censored Tobit regressions with holder, destination and year dummies are estimated. Country pair clustered robust standard errors are used in each estimation. Zero equity holdings are replaced with 0.001 and left censoring is done accordingly. I start with a base model and add the following set of variables sequentially: familiarity variables (other than distance), macroeconomic variables, capital control variables, political stability and legal/administrative restrictions, financial market development variables, cultural distance variables, and other culture dimensions. Finally, I report the estimates from the full specification with all variables.

	Exp.	Base Model	Other Familiarity Var.	Macroeconomic Var.	Capital Cont.	Polit. and Legal Var.	Financial Market Dev.	Cultural Distance	Other Culture Var.	All Variables
ln(dist)	-	-1.5457*** (-23.82)	-1.1742*** (-10.40)	-0.9657*** (-11.70)	-1.5497*** (-23.76)	-1.5405*** (-23.38)	-1.5300*** (-24.17)	-1.4961*** (-23.65)	-1.5457*** (-23.82)	-0.8228*** (-6.89)
ln(dist)* (H) UAI	-	-0.0132*** (-7.13)	-0.0132*** (-6.87)	-0.0125*** (-7.22)	-0.0132*** (-7.14)	-0.0140*** (-7.44)	-0.0131*** (-7.17)	-0.0146*** (-7.79)	-0.0132*** (-7.13)	-0.0136*** (-7.11)
ln(dist)* (D) UAI	-/+	-0.0062** (-2.96)	-0.0053* (-2.57)	-0.0048* (-2.40)	-0.0065** (-3.14)	-0.0065** (-3.11)	-0.0060** (-2.93)	-0.0073*** (-3.61)	-0.0062** (-2.96)	-0.0048* (-2.39)
(H) UAI	-	-0.1464*** (-13.15)	-0.1435*** (-12.98)	-0.0964*** (-6.88)	-0.1543*** (-13.70)	-0.0794*** (-5.89)	-0.1722*** (-11.01)	-0.1443*** (-13.14)	-0.0914** (-2.96)	-0.0154 (-0.48)
(D) UAI	-/+	-0.0993*** (-9.17)	-0.0973*** (-9.09)	-0.0375** (-2.74)	-0.1013*** (-9.26)	-0.0934*** (-7.04)	-0.1080*** (-7.32)	-0.0962*** (-8.85)	-0.0380 (-1.68)	0.0049 (0.22)
Currency union	+		-0.5161** (-3.03)							-0.1609 (-0.90)
Common border	+		0.5165* (1.98)							0.3450 (1.49)
Common language	+		-0.0275 (-0.16)							0.0148 (0.09)
Colonial relation	+		0.7472* (2.31)							0.3839 (1.16)
Reg. trade agg.	+		0.0799 (0.55)							-0.0944 (-0.64)
Common legal origin	+		0.8775*** (8.00)							0.7594*** (6.99)
Time difference	-		-0.0617** (-2.94)							-0.0313 (-1.45)
(H) ln(GDP per capita)	+			1.1782*** (5.62)						1.1107*** (4.47)
(D) ln(GDP per capita)	+			0.0467 (0.28)						0.2628 (1.35)
(H) Inflation	+			0.0262* (2.11)						0.0231 (1.43)
(D) Inflation	-			-0.0129 (-1.49)						-0.0115 (-1.20)
ln(imports to gdp)	+			0.5070*** (10.43)						0.4243*** (8.56)
ln(real exch. rate vol.)	-/+			0.2072*** (4.33)						0.2152*** (4.29)
(H) Unrest. cap. cont.	+				0.1079*** (6.30)					0.1077*** (6.18)
(D) Unrest. cap. cont.	+				0.0585** (3.23)					0.0205 (1.32)
(H) Political stability	-					-0.0497* (-2.56)				-0.0726*** (-3.52)
(D) Political stability	+					-0.0130 (-0.70)				0.0083 (0.41)
(H) Legal/Adm. restr.	-/+					0.1206*** (4.10)				0.1207*** (4.24)
(D) Legal/Adm. restr.	+					0.0468 (1.89)				0.0352 (1.39)
(H) Economic freedom	+					0.0397*** (3.96)				0.0437*** (4.11)
(D) Economic freedom	+					0.0375*** (3.45)				0.0247* (2.41)
(H) Govern. effect.	+					1.2271*** (8.11)				1.0990*** (7.73)
(D) Govern. effect.	+					-0.2730 (-1.94)				-0.0797 (-0.58)
(H) ln(Eq. Mar. Cap.)	-/+						-0.0885 (-1.27)			-0.5350*** (-6.38)
(D) ln(Eq. Mar. Cap.)	-/+						-0.0541 (-0.87)			-0.1062 (-1.32)
(H) Market turnover	-						-0.0030*** (-5.90)			-0.0014** (-2.72)
(D) Market turnover	+						-0.0004 (-0.82)			-0.0003 (-0.63)
Cultural distance	-							-0.0814* (-2.39)		0.0372 (1.05)
Cultural dist * (H) UAI	-							0.0022* (2.05)		0.0019 (1.73)
Cultural dist * (D) UAI	-/+							0.0017 (1.46)		0.0014 (1.26)
(H) PDI	-/+								-0.0012 (-0.06)	0.1599*** (5.25)
(D) PDI	-/+								0.0711*** (3.73)	-0.0001 (-0.00)
(H) IDV	+								0.0450 (1.04)	0.2409*** (4.74)
(D) IDV	-/+								0.1028** (3.16)	0.0299 (0.75)
(H) MAS	+								-0.0191 (-0.66)	-0.0938** (-3.16)
(D) MAS	-/+								-0.0010 (-0.05)	0.0054 (0.25)
Constant		24.1844*** (22.52)	21.0518*** (16.51)	3.2499 (0.89)	23.6225*** (21.67)	1.9189*** (40.72)	1.9540*** (44.26)	23.5991*** (22.10)	3.8290 (0.75)	-20.2663*** (-3.50)
Observations		20070	20070	18568	18274	18116	19792	20070	20070	14942
Number of left cen. obs.		5712	5712	5207	5203	5046	5535	5712	5712	4010
Pseudo R^2		0.233	0.242	0.244	0.235	0.244	0.238	0.234	0.233	0.269

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

presented in the second column in Table 3. The dummy for common legal origin is positive as expected, significant, and robust to different specifications. If countries share similar legal roots, there will be more equity investment in the peer country. The impact of the local time difference is significant as well. When the local time difference increases between countries, bilateral equity holdings fall, which could be due to a mismatch in trading times in the respective stock markets. If the country pair once had a colonial relationship, there is less foreign investment bias. If the countries are neighbors, investors increase their cross-border equity holdings. However, local time difference, colonial relation, and common border dummies are not significant in the full specification.[15]

Macroeconomic Variables

I extend the next model with the macroeconomic determinants. The results in the third column of Table 3 indicate that size of the home economy matters. The more advanced a holder country is, the greater the foreign asset holdings. This finding is robust when I control for all other potential determinants of foreign bias. If there is a high inflation environment at home, investors increase their foreign asset holdings significantly, probably due to higher macroeconomic risk in the domestic market. Nonetheless, this inflation hedging motive fades out of significance in the full model. The imports-to-GDP ratio is positive, as expected, significant, and robust demonstrating a hedging effect against terms of trade shocks similar to that found by Fidora et al. (2007). As a country imports more from a partner country, it also increases its equity holdings in the firms from this country. The coefficient on the bilateral real exchange rate volatility is positive, significant, and robust. This result is at odds with the findings of Fidora et al. (2007), who report a significant negative impact of bilateral exchange rate volatility on bilateral portfolio holdings. My result is more in line with the argument that more cross-border capital flows cause a more volatile bilateral exchange rate. Hence, a more volatile exchange rate signals higher cross-border equity holdings.[16]

Capital Controls

The model shown in the fourth column of Table 3 includes the indicators for capital controls both in the holder country and in the destination country. As capital controls are removed, cross-border asset holdings increase, which in turn significantly decreases foreign investment bias. This finding is robust in the fully specified model for the holder

[15] I interact the UAIs of the holder and destination countries with other familiarity variables (i.e., common language, common legal origin, and regional trade agreement) as a robustness check. The interaction terms are insignificant; the results are available upon request.

[16] To address a potential endogeneity problem between equity holdings and exchange rate volatility, I alternatively use lagged bilateral real exchange rate volatility in my estimations. The results remain unchanged and are available upon request.

country, but not for the destination country. If the holder country has fewer capital controls (perhaps, e.g., fewer controls on outgoing capital) and more investment freedom, bilateral equity holdings increase. This result confirms the findings of Chan et al. (2005), who mention that countries with fewer restrictions on capital flow experience greater allocation abroad.

Political, Legal, and Economic Freedom Variables

I next control for a set of political, legal, and governance indicators. The impacts of all the significant variables remain robust to inclusion of other variables (compare the fifth and the last columns of Table 3). If the home country has a stable political environment, investors prefer to invest in the domestic market, which impairs foreign investment bias. On the other hand, more effective governance, and a less restrictive legal and administrative environment at home stimulate foreign investment and ameliorate foreign investment bias. This might be because higher quality policy formulation and implementation, and a reliable government that commits to such policies as well as a less restricted legal and administrative climate promote investing behavior in general and give investors the courage to also invest in foreign markets. The indicators for overall economic freedom are significantly positive and robust, both for the holder and for the destination. This finding is intuitive when considering that an improvement in the overall economic freedom encompasses superior property rights as well as more business, financial, and investment freedom. Investors in the holder country are more confident about investing abroad when economic freedom prevails at home and across the border.

Financial Market Characteristics

The model presented in the sixth column of Table 3 accounts for financial market development and stock markets turnover. The results suggest that liquidity of the domestic stock market attracts investment and makes investors prefer to invest at home, thus aggravating foreign investment bias. This finding is robust, as evidenced by the last column of Table 3. In addition, the size of the domestic stock market also becomes significant and has the effect of increasing foreign investment bias, probably because a larger domestic market provides ample investment opportunities without looking elsewhere.[17]

[17] I also enhance my base specification with stock return correlations and GDP correlations between the two markets to investigate diversification benefits.Neither of the variables is significant. Moreover, including them reduces the sample size. Therefore, I exclude them in the full specification. Results are available upon request. Okawa and van Wincoop (2012) show that there is no theoretical justification for controlling for stock return correlations and GDP correlations, and I thus believe that omitting these two variables does no harm to my model.

Cultural Distance and Culture Dimensions

Next, I add the cultural distance index and related interaction terms to my base model. The coefficient on cultural distance is negative, as expected, and significant. Greater cultural distance is a barrier to investing in the peer country's stocks. However, this effect diminishes as the model is extended with all the other variables. Beugelsdijk and Frijns (2010) also find that cultural distance between a country pair does not significantly affect foreign investment. Similarly, in their analysis of institutionally managed portfolios, Anderson et al. (2011) find that cultural distance is insignificant at the country level. The coefficient on the interaction term for the holder country is significant and, surprisingly, positive. However, in the extended model this impact disappears.

Lastly, I control for indices of other cultural dimensions: power-distance, individualism, and masculinity and obtain unexpected results. The only significant effects come from power-distance and individualism in the destination country. Higher power-distance and more individualism in the destination increase investment in this country, a finding with no theoretical or behavioral explanation. However, these puzzling results could be due to an omitted variable bias, a notion that is supported by the results from the fully specified model. When I feed the model with other variables, the results take on a completely different character. In the full model, the destination's culture does not influence the investment decision of domestic investors and yet the investor's the cultural characteristics play a significantly important role in his or her portfolio allocation decisions. Power-distance and individualism have significant and positive coefficients, consistent with my predictions and in accordance with the findings of Aggarwal et al. (2012) and Beugelsdijk and Frijns (2010). In societies where individual-based decision making dominates, investors may become overconfident, underrate the risk associated with foreign assets, and increase their foreign investments. The impact of power-distance has no theoretical base, but significant effects found in various studies invite an in-depth examination of the issue. Masculinity has a significant negative sign in my full model, although lower in absolute value compared to the coefficients on power-distance and individualism, which contravenes the findings of Anderson et al. (2011) and Aggarwal et al. (2012).

The last column in Table 3 sets out the results from the model that includes all of the explanatory variables. McFadden's pseudo R-square for the full model is 0.27, which is higher than that of the base model (0.23). Including other variables does not affect my results regarding economic development, financial market characteristics, capital controls, and political and legal environment controls. I have already discussed the impacts of variables that remain robust to the inclusion of the other variables. The size of the geographical distance variable falls in absolute value when I add the other controls, but

it is still negative and significant, as predicted. Investors prefer not to invest in distant and unfamiliar markets. In addition, markets that are at a certain geographical distance will appear more distant to highly uncertainty averse investors. The degree of uncertainty aversion affects perception of distance and unfamiliarity, which plays a role in portfolio allocation decisions, verifying my hypothesis. The direct significant effect of uncertainty aversion on foreign investment bias vanishes when the model is fully specified, which is not completely surprising given the lack of agreement in the literature as to the significance of the UAI in the first place. For example, Beugelsdijk and Frijns (2010) and Anderson et al. (2011) report a significant negative impact of the UAI on investments abroad, whereas Aggarwal et al. (2012) indicate that it is insignificant in explaining foreign portfolio holdings.

Robustness Analysis

As a robustness analysis, I split my sample by distinguishing between advanced and emerging markets as the destination of investment funds. According to Beugelsdijk and Frijns (2010), the criteria for investing in emerging markets may be different from the criteria for investing in advanced markets. Table 4 shows the results for the two samples. Geographic proximity and the interaction term for the holder country (ln(dist) * (H) UAI) continue to be highly statistically significant in both samples. Moreover, I find a more pronounced impact of unfamiliarity and perception of unfamiliarity in the emerging market sample; these coefficients are larger in absolute values in this sample. Emerging markets are more risky in general; thus, an investor will allocate less to an emerging market than to an equally distant advanced market, ceteris paribus. Investors also perceive a distant emerging marking to be farther away than in actually equally distant advanced market. The impacts of the other familiarity variables are a bit different across the two samples. Common legal origin significantly increases foreign investment in both samples, especially for the emerging markets sample. Common language (see also Beugesdijk and Frijns, 2010) and common border are significant determinants of foreign investment bias in the emerging market sample. The local time difference matters when investing in advanced markets. Hedging against terms of trade shocks is at work in both samples. The real bilateral exchange rate volatility effect in the full sample is driven by investment in advanced markets. The results for the political, legal, and administrative variables are comparable across samples. One interesting finding is that legal and administrative climate in the destination country is significantly positive in the emerging market case, meaning that fewer legal and administrative restrictions in an emerging market country increase foreign investment in it. As to cultural dimensions, the power-distance index is not significant in the emerging market sample. However, individualism is significantly

positive and masculinity is significantly negative in both samples, as they are in the full sample.

To clarify the impact of the interaction variable on the foreign investment bias score, I provide a simple example. For the full model, I calculate the elasticity of distance on home bias for two countries - Japan and the USA. Japan has an uncertainty avoidance index of 92 and for the USA, the index is 46. The USA is much less uncertainty averse then Japan. The elasticity of distance for Japan is -2.07 ($-0.8228 * ln(dist) - 0.0136 * (92 * ln(dist)) = -2.07ln(dist)$), whereas for the United States the elasticity is -1.45 ($-0.8228 * ln(dist) - 0.0136 * (46 * ln(dist)) = -1.45ln(dist)$). Japanese investors, who dislike uncertainty more than U.S. investors, decrease their equity holdings of the peer country even less than US investors. If the destination country is, for instance France, which lies almost at the same distance from the United States and Japan (c.a. $ln(dist) = 8.3$), the foreign investment bias score of Japan into France is lower than that of the United States by -5.46 solely due to differences in perceptions of the destination country's remoteness. All in all, my results show that distances are greater for the more uncertainty averse investors.[18]

6 Conclusions

This paper contributes to the literature on foreign investment bias by providing a behavioral perspective. I investigate the determinants of foreign investment bias in portfolio allocation decisions with a chief focus on attitudes toward uncertainty and ambiguity. I use IMF Coordinated Portfolio Investment Survey data on cross-border portfolio holdings from 49 countries. I posit that less familiarity with foreign markets discourages investors from investing abroad, which in turn increases foreign investment bias. I test whether high uncertainty averse countries invest disproportionately more in familiar countries and less in distant countries. In other words, I investigate whether distances between countries appear to be even greater for those countries characterized by higher uncertainty avoidance. I exploit systematic differences in uncertainty aversion across countries in my analysis, using Hofstede's (1980, 2001) findings for this purpose.

[18] I also investigate foreign investment bias in long-term debt securities (Burger and Warnock, 2003; Fidora et al., 2007; Aggarwal et al., 2012). Table 5 in the Appendix provides the estimation results, which are quite similar to the results for equity investments. I check the robustness of the estimation results by splitting my sample based on the destination of funds allocated to cross-border holdings of long-term debt securities, namely, into advanced and into emerging markets. Table 6 in the Appendix reports the results for the two samples, which are again comparable to results from the analysis of equity holdings. My hypothesis is also true for debt portfolios: the negative impact of unfamiliarity on foreign investment holds for investment in long-term debt securities and the perception of "unfamiliar" again depends on the extent of uncertainty aversion on the part of the holder of debt portfolios.

Table 4: The table reports results from a robustness analysis in which investment in equities in two alternative country samples is investigated: advanced markets and emerging markets. The dependent variable is the foreign investment bias score (Equation (1)) and the full specification is run. In each case, left-censored Tobit regressions with holder, destination, and year dummies are estimated. Country-pair-clustered robust standard errors are used in each estimation. Zero equity holdings are replaced with 0.001 and left censoring is done accordingly.

	Investment in Advanced Markets	Investment in Emerging Markets
ln(dist)	-0.5931*** (-4.20)	-1.5618*** (-8.09)
ln(dist)* (H) UAI	-0.0097*** (-4.99)	-0.0124*** (-4.23)
ln(dist)* (D) UAI	-0.0014 (-0.67)	0.0176*** (3.43)
(H) UAI	-0.0569 (-1.56)	0.0271 (0.54)
(D) UAI	-0.0291 (-0.44)	0.0660* (2.31)
Currency union	0.0615 (0.35)	-0.0574 (-0.15)
Common border	-0.2266 (-0.97)	1.1362** (2.88)
Common language	0.0241 (0.17)	0.7786** (3.01)
Colonial relation	0.3389 (1.02)	0.7581 (1.27)
Reg. trade agg.	-0.2395 (-1.27)	0.2162 (1.03)
Common legal origin	0.3791*** (3.79)	0.8582*** (5.24)
Time difference	-0.0624* (-2.28)	0.0494 (1.56)
(H) ln(GDP per capita)	0.9885*** (3.89)	1.1794* (2.51)
(D) ln(GDP per capita)	0.4094 (1.51)	0.5187 (1.86)
(H) Inflation	0.0077 (0.66)	0.0672 (1.63)
(D) Inflation	0.0520* (2.48)	-0.0097 (-0.88)
ln(imports to gdp)	0.3748*** (6.29)	0.3272*** (5.16)
ln(real exch. rate vol.)	0.1566** (2.85)	0.0222 (0.26)
(H) Unrest. cap. cont.	0.0897*** (5.14)	0.1294*** (3.92)
(D) Unrest. cap. cont.	-0.0161 (-0.88)	0.0425 (1.61)
(H) Political stability	-0.0296 (-1.40)	-0.1279** (-3.28)
(D) Political stability	0.0174 (0.75)	0.0029 (0.09)
(H) Legal/Adm. restr.	0.0955*** (3.68)	0.1604** (2.88)
(D) Legal/Adm. restr.	-0.0314 (-1.11)	0.0845* (2.17)
(H) Economic freedom	0.0270** (2.64)	0.0639** (2.92)
(D) Economic freedom	0.0216 (1.80)	0.0348* (2.36)
(H) Govern. effect.	1.0084*** (7.12)	1.2946*** (4.87)
(D) Govern. effect.	0.1416 (1.14)	-0.8274* (-2.41)
(H) ln(Market cap.)	-0.5981*** (-6.91)	-0.4424** (-2.87)
(D) ln(Market cap.)	-0.1508 (-1.53)	-0.0704 (-0.63)
(H) Market turnover	-0.0017** (-2.98)	-0.0004 (-0.53)
(D) Market turnover	0.0010* (2.22)	-0.0017 (-1.69)
Cultural distance	-0.0325 (-0.77)	0.1017 (0.99)
Cultural dist * (H) UAI	0.0001 (0.05)	0.0011 (0.58)
Cultural dist * (D) UAI	0.0019 (1.40)	-0.0030 (-1.18)
(H) PDI	0.2130*** (7.02)	0.0775 (1.53)
(D) PDI	0.0011 (0.04)	-0.0384* (-2.20)
(H) IDV	0.2555*** (4.48)	0.1909* (2.31)
(D) IDV	0.0110 (0.90)	0.0277 (0.83)
(H) MAS	-0.0693* (-2.04)	-0.1090* (-2.30)
(D) MAS	0.0523 (0.35)	0.0007 (0.03)
Constant	-20.0797** (-2.79)	-20.5166* (-2.41)
Observations	7592	7350
Number of left cen. obs.	1453	2557
Pseudo R^2	0.338	0.258

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

My results confirm standard findings in the foreign investment bias literature. In general, the economic, political, legal, and administrative environment, as well as culture, matter for foreign investment decisions. Moreover, I find compelling evidence that uncertainty aversion alters the perception of "unfamiliar" or "distant" and helps explain foreign investment bias puzzle. If the holder country is uncertainty averse, it invests even less in an unfamiliar country compared to a holder country that is less uncertainty averse. This affect has not to date been recognized in the literature but henceforth should be accounted for when modeling portfolio choices. Doing so could enhance our understanding of how the asset prices are set and offer new avenues of research, especially in regard to the role of human behavior in finance. For economic policy, this finding suggests that making the unfamiliar more familiar could enhance financial integration.

Appendix

Hofstede's Cultural Values Framework

Geert Hofstede conducted a large-scale survey inside IBM subsidiaries in 40 countries, asking many questions about values. The survey was first conducted circa 1968 and then again circa 1972, resulting in 116,000 questionnaires being filled out by employees ranging from researchers to blue-collar workers. Based on the data collected via this paper-and-pencil survey, each country was assigned a score on four cultural dimensions: uncertainty avoidance, individualism, masculinity, and power-distance. In the following years, both the number of countries and the number of cultural dimensions were increased. For example, the degree of long-term orientation of a society was added in 1991 and is available for 23 countries. In 2010, two more cultural dimensions were added by Minkov's World Values Survey for 93 countries, namely, pragmatism and indulgence.

Uncertainty avoidance indices are compiled primarily on the basis of answers to three questions related to rule orientation, employment stability, and stress at work. Stress reveals the psychological condition of a person when s/he faces an uncertain situation, and the first two questions are related to mechanisms for handling a stressful situation. Chapter 4 in Hofstede (1980, 2001) and the appendix in Huang (2007) provide more details on the measurement of national uncertainty aversion.

In brief, Hofstede defines individualism (IDV) as a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families. The higher the degree of individualism, the less individuals feel

themselves responsible for their relatives and the more they question loyalty to a particular in-group. The power-distance index (PDI) measures the degree to which the less powerful members of a society accept and expect that power is distributed unequally according to Hofstede. The higher the PDI, the more easily people accept a hierarchical order without further justification. Masculinity (MAS) expresses a society's preference for achievement, heroism, assertiveness, and material rewards for success, all of which leads to more competitiveness. Finally, long-term orientation (LTO) reflects how much importance a society attaches to the future and how willing its members are to accept short-term losses in favor of a better future.

Table 5: The table reports the determinants of foreign investment bias in long-term debt securities holdings. In each case, left-censored Tobit regressions with holder, destination, and year dummies are estimated. Country-pair-clustered robust standard errors are used in each estimation. Zero holdings are replaced with 0.001 and left censoring is done accordingly. I start with a base model and add the following set of variables sequentially: familiarity variables (other than distance), macroeconomic variables, capital control variables, political stability and legal/administrative restrictions, financial market development variables, cultural distance variables, and other culture dimensions. Finally, I report the estimates from the full specification with all variables.

	Exp.	Base Model	Other Familiarity Var.	Macroeconomic Var.	Capital Cont.	Polit. and Inst. Var.	Financial Market Dev.	Cultural Distance	Other Culture Var.	All Variables
ln(dist)	-	-1.5837*** (-26.51)	-1.2017*** (-10.19)	-0.8699*** (-10.44)	-1.5738*** (-26.38)	-1.5690*** (-26.11)	-1.5835*** (-26.55)	-1.5530*** (-26.10)	-1.5837*** (-26.51)	-0.7818*** (-6.33)
ln(dist)* (H) UAI	-	-0.0109*** (-5.16)	-0.0098*** (-4.54)	-0.0101*** (-5.16)	-0.0106*** (-4.98)	-0.0117*** (-5.44)	-0.0109*** (-5.19)	-0.0122*** (-5.80)	-0.0109*** (-5.16)	-0.0126*** (-6.60)
ln(dist)* (D) UAI	-/+	-0.0043* (-2.11)	-0.0032 (-1.55)	-0.0034 (-1.78)	-0.0046* (-2.27)	-0.0044* (-2.19)	-0.0043* (-2.12)	-0.0057** (-2.87)	-0.0043* (-2.11)	-0.0043* (-2.05)
(H) UAI	-	-0.1526*** (-18.02)	-0.1482*** (-17.64)	-0.0975*** (-9.43)	-0.1467*** (-16.76)	-0.1498*** (-14.58)	-0.2062*** (-20.17)	-0.1495*** (-17.44)	-0.1322*** (-14.57)	-0.0380** (-3.16)
(D) UAI	-/+	-0.0664*** (-10.45)	-0.0630*** (-9.25)	-0.0174 (-1.95)	-0.0631*** (-9.64)	-0.0564*** (-6.99)	-0.0994*** (-11.59)	-0.0636*** (-9.84)	0.0199* (2.26)	0.0280** (2.65)
Currency union	+		0.5011** (2.71)							-0.1399 (-0.78)
Common border	+		-0.3519 (-1.37)							0.3708 (1.53)
Common language	+		0.3103 (1.79)							0.0570 (0.34)
Colonial relation	+		0.4175 (1.58)							0.3731 (1.05)
Reg. trade agg.	+		0.2812 (1.91)							-0.0589 (-0.38)
Common legal origin	+		0.5648*** (4.82)							0.7448*** (6.71)
Time difference	-		-0.0667** (-3.00)							-0.0394 (-1.73)
(H) ln(GDP per capita)	+			1.3138*** (7.44)						0.6326** (2.69)
(D) ln(GDP per capita)	+			0.0696 (0.43)						0.1991 (1.09)
(H) Inflation	+			0.0015 (0.13)						-0.0078 (-0.58)
(D) Inflation	-			0.0113 (1.37)						-0.0170 (-1.78)
ln(imports to gdp)	+			0.5575*** (11.59)						0.4168*** (8.32)
ln(real exch. rate vol.)	-/+			0.0274 (0.49)						0.1996*** (4.01)
(H) Unrest. cap. cont.	+				0.0331* (2.13)					0.1121*** (6.42)
(D) Unrest. cap. cont.	+				0.0337 (1.84)					0.0180 (1.11)
(H) Political stability	-					-0.0211 (-0.98)				-0.0936*** (-4.66)
(D) Political stability	+					0.0616** (2.88)				-0.0180 (-0.91)
(H) Legal restr.	-/+					0.0451 (1.69)				0.1435*** (4.92)
(D) Legal restr.	+					-0.0326 (-1.19)				0.0505 (1.91)
(H) Economic freedom	+					-0.0507*** (-4.50)				0.0371*** (3.49)
(D) Economic freedom	+					-0.0027 (-0.27)				0.0245* (2.16)
(H) Govern. effect.	+					0.7544*** (5.42)				1.2144*** (8.16)
(D) Govern. effect.	+					0.3658* (2.42)				-0.1071 (-0.77)
(H) ln(Bond Mar. Cap)	-/+						-0.5875*** (-9.73)			0.1548 (1.95)
(D) ln(Bond Mar. Cap)	-/+						-0.3625*** (-5.57)			-0.1053 (-1.53)
Cultural distance	-							-0.0101 (-0.27)		0.0474 (1.34)
Cultural dist * (H) UAI	-							0.0025 (1.87)		0.0021 (1.83)
Cultural dist * (D) UAI	-/+							0.0036** (2.81)		0.0011 (0.98)
(H) PDI	-/+								0.0733*** (3.60)	-0.0148 (-0.53)
(D) PDI	-/+								0.1651*** (8.21)	-0.0094 (-0.40)
(H) IND	+								0.0923*** (4.19)	-0.0360 (-0.89)
(D) IND	-/+								0.2735*** (10.37)	0.0593 (1.60)
(H) MAS	+								-0.0740*** (-5.74)	0.0019 (0.12)
(D) MAS	-/+								-0.0999*** (-9.22)	-0.0103 (-0.77)
Constant		26.7586*** (28.26)	23.4832*** (18.89)	3.8625 (1.26)	25.7426*** (26.12)	28.0541*** (15.48)	56.8195*** (19.43)	26.1179*** (27.43)	-10.1870** (-2.66)	-10.2505* (-2.17)
Observations		18931	18931	17537	17190	17027	18931	18931	18931	14783
Number of left cen. obs.		3914	3914	3578	3511	3362	3914	3914	3914	4004
Pseudo R^2		0.209	0.214	0.225	0.210	0.215	0.211	0.210	0.209	0.267

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: The table reports results from a robustness analysis in which investment in long-term debt securities in two alternative country samples is investigated: advanced markets and emerging markets. The dependent variable is the foreign investment bias score (Equation (1)) and the full specification is run. In each case, left-censored Tobit regressions with holder, destination, and year dummies are estimated. Country-pair-clustered robust standard errors are used in each estimation. Zero equity holdings are replaced with 0.001 and left censoring is done accordingly.

	Investment in Advanced Markets	Investment in Emerging Markets
ln(dist)	-0.5763*** (-3.99)	-1.5268*** (-7.53)
ln(dist)* (H) UAI	-0.0091*** (-4.78)	-0.0109*** (-3.81)
ln(dist)* (D) UAI	-0.0011 (-0.51)	0.0190*** (3.49)
(H) UAI	-0.0340** (-2.69)	-0.0439* (-2.20)
(D) UAI	-0.0272 (-0.47)	0.0693*** (4.71)
Currency union	0.1011 (0.57)	-0.0798 (-0.20)
Common border	-0.1692 (-0.70)	1.2255** (2.91)
Common language	0.0205 (0.14)	0.8035** (3.05)
Colonial relation	0.3057 (0.92)	0.8910 (1.37)
Reg. trade agg.	-0.2184 (-1.13)	0.2377 (1.09)
Common legal origin	0.3875*** (3.76)	0.8606*** (4.99)
Time difference	-0.0730* (-2.53)	0.0420 (1.26)
(H) ln(GDP per capita)	0.4511 (1.94)	0.6957 (1.54)
(D) ln(GDP per capita)	0.3438 (1.22)	0.5174* (1.99)
(H) Inflation	-0.0053 (-0.39)	-0.0065 (-0.29)
(D) Inflation	0.0422* (2.00)	-0.0154 (-1.37)
ln(imports to gdp)	0.3382*** (5.73)	0.3299*** (5.16)
ln(real exch. rate vol.)	0.1393* (2.50)	0.0134 (0.16)
(H) Unrest. cap. cont.	0.0794*** (4.58)	0.1601*** (4.93)
(D) Unrest. cap. cont.	-0.0067 (-0.37)	0.0469 (1.72)
(H) Political stability	-0.0620** (-2.83)	-0.1343*** (-3.81)
(D) Political stability	0.0049 (0.21)	-0.0237 (-0.74)
(H) Legal restr.	0.1080*** (3.91)	0.1906*** (3.37)
(D) Legal restr.	-0.0262 (-0.91)	0.1083** (2.69)
(H) Economic freedom	0.0198 (1.93)	0.0651** (3.17)
(D) Economic freedom	0.0122 (1.01)	0.0437* (2.53)
(H) Govern. effect.	1.0326*** (6.92)	1.5921*** (5.78)
(D) Govern. effect.	0.0876 (0.64)	-0.9831** (-2.78)
(H) ln(Bond Mar. Cap)	0.0468 (0.59)	0.3200* (2.16)
(D) ln(Bond Mar. Cap)	-0.1724 (-1.69)	-0.0125 (-0.14)
Cultural distance	-0.0438 (-1.05)	0.1594 (1.56)
Cultural dist * (H) UAI	-0.0004 (-0.36)	0.0021 (1.04)
Cultural dist * (D) UAI	0.0015 (1.08)	-0.0038 (-1.41)
(H) PDI	0.0319 (1.14)	-0.0951* (-2.01)
(D) PDI	0.0124 (0.43)	-0.0429** (-2.71)
(H) IND	0.0509 (1.33)	-0.1723* (-2.49)
(D) IND	0.0259 (1.74)	0.0280 (1.42)
(H) MAS	-0.0156 (-0.96)	0.0350 (1.35)
(D) MAS	0.0146 (0.12)	-0.0016 (-0.14)
Constant	1.3252*** (32.71)	2.0889*** (29.04)
Observations	7561	7222
Number of left cen. obs.	1439	2565
Pseudo R^2	0.334	0.257

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

References

Aggarwal, Raj, Colm Kearney and Brian Lucey, 2012. "Gravity and culture in foreign portfolio investment," *Journal of Banking and Finance*, 36(2), 525-538.

Aggarwal, Reena, Leora Klapper and Peter D. Wysocki, 2005. "Portfolio preferences of foreign institutional investors," *Journal of Banking and Finance*, 29(12), 2919-2946.

Ahearne, Alan G., William L. Griever and Francis E. Warnock, 2004. "Information costs and home bias: An analysis of US holdings of foreign equities," *Journal of International Economics*, 62(2), 313-336.

Amadi, A., 2004. "Does familiarity breed investment? An empirical analysis of foreign equity holdings," Working paper, University of California, Davis.

Anderson, Christopher W., Mark Fedenia, Mark Hirschey and Hilla Skiba, 2011. "Cultural influences on home bias and international diversification by institutional investors," *Journal of Banking and Finance*, 35(4), 916-934.

Barberis, Nicholas and Richard Thaler, 2003. "A survey of behavioral finance," in: G.M. Constantinides, M. Harris and R. M. Stulz (eds.), *Handbook of the Economics of Finance,* ist ed., vol. 1, ch. 18, 1053-1128.

Bauer, Christian, 2012. "Products of non-additive measures: A Fubini-like theorem," *Theory and Decision*, 73(4), 621-647.

Bekaert, Geert and Xiaozheng Wang, 2009. "Home bias revisited," Columbia Business School.

Beugelsdijk, Sjoerd and Bart Frijns, 2010. "A cultural explanation of the foreign bias in international asset allocation," *Journal of Banking and Finance*, 34(9), 2121-2131.

Boyle, Phelim, Lorenzo Garlappi, Raman Uppal and Tan Wang, 2012. "Keynes meets Markowitz: The trade-off between familiarity and diversification," *Management Science*, 58(2), 253-272.

Brennan, Michael J. and H. Henry Cao, 1997. "International portfolio investment flows," *Journal of Finance*, 52(5), 1851-1880.

Burger, John D. and Francis E. Warnock, 2003. "Diversification, original sin, and international bond portfolios," *International Finance Discussion Papers* 755, Board of Governors of the Federal Reserve System (U.S.).

Cao, H. Henry, Bing Han, David Hirshleifer and Harold H. Zhang, 2011. "Fear of the

unknown: Familiarity and economic decisions," *Review of Finance*, 15(1), 173-206.

Chan, Kalok, Vicentiu Covrig and Lilian Ng, 2005. "What determines the domestic bias and foreign bias? Evidence from mutual fund equity allocations worldwide," *Journal of Finance*, 60(3), 1495-1534.

Coeurdacier, Nicolas and Hélène Rey, 2013. "Home bias in open economy financial macroeconomics," *Journal of Economic Literature*, 51(1), 63-115.

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

Cooper, Ian and Evi Kaplanis, 1994. "Home bias in equity portfolios, inflation hedging, and international capital market equilibrium," *Review of Financial Studies*, 7(1), 45-60.

Coval, Joshua D. and Tobias J. Moskowitz, 1999. "Home bias at home: Local equity preference in domestic portfolios," *Journal of Finance*, 54(6), 2045-2073.

Dlugosch, Dennis and Mei Wang, 2014. "Relation between equity home bias and ambiguity aversion: An international study," SSRN working paper.

Fidora, Michael, Marcel Fratzscher and Christian Thimann, 2007. "Home bias in global bond and equity markets: The role of real exchange rate volatility," *Journal of International Money and Finance*, 26(4), 631-655.

French, Kenneth R. and James M. Poterba, 1991. "Investor diversification and international equity markets," *American Economic Review*, 81(2), 222-226.

Grinblatt, Mark and Matti Keloharju, 2001. "How distance, language, and culture influence stock holdings and trades," *Journal of Finance*, 56(3), 1053-1073.

Gwartney, James, Robert Lawson and Joshua Hall, 2013. "Economic Freedom of the World: 2013 Annual Report", Fraser Institute.

Heath, Chip and Amos Tversky, 1991. "Preference and belief: Ambiguity and competence in choice under uncertainty," *Journal of Risk and Uncertainty*, 4(1), 5-28.

Hens, Thorsten, Marc Oliver Rieger and Mei Wang (2014): "Prospect theory around the world," *Management Science*, forthcoming.

Hofstede, Geert, 1980. *"Culture's Consequences: International Differences in Work Related Values"*, Sage, Beverly Hills, CA.

Hofstede, Geert, 2001. *"Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations"*, 2nd ed. Sage, Thousand Oaks, CA.

Huberman, Gur, 2001. "Familiarity breeds investment", *Review of Financial Studies*, 14(3), 659-680.

International Monetary Fund (IMF), 2002. *Coordinated Portfolio Investment Survey Guide*.

Kaufmann, Daniel, Aart Kraay and Massimo Mastruzzi, 2010. "The Worldwide Governance Indicators: Methodology and analytical issues". *World Bank Policy Research Working Paper*, No. 5430.

Ke, Dongmin, Lilian Ng and Qinghai Wang, 2010. "Home bias in foreign investment decisions," *Journal of International Business Studies*, 41, 960-979.

Kirkman, Bradley L., Kevin B. Lowe and Cristina B. Gibson, 2006. "A quarter century of Culture's Consequences: A review of empirical research incorporating Hofstede's cultural values framework," *Journal of International Business Studies*, 37, 285-320.

Kogut, Bruce and Harbir Singh, 1988. "The effect of national culture on the choice of entry mode," *Journal of International Business Studies*, 19(3), 411-432.

Lane, Philip R. and Gian Maria Milesi-Ferretti, 2008. "International investment patterns," *Review of Economics and Statistics*, 90(3), 538-549.

Levy, Haim and Marshall Sarnat, 1970. "International diversification of investment portfolios," *American Economic Review*, 60(4), 668-75.

Obstfeld, Maurice and Kenneth Rogoff, 2001. "The six major puzzles in international macroeconomics: Is there a common cause?," *NBER Chapters*, 15, 339-412.

Okawa, Yohei and Eric van Wincoop, 2012. "Gravity in international finance," *Journal of International Economics*, 87(2), 205-215.

Portes, Richard and Helene Rey, 2005 "The determinants of cross-border equity flows," *Journal of International Economics*, 65(2), 269-296.

Rose, Andrew, 2005. "Which international institutions promote international trade?," *Review of International Economics*, 13(4), 682-698.

Solnik, Bruno H., 1974. "An equilibrium model of the international capital market," *Journal of Economic Theory*, 8(4), 500-524.

Tang, Linghui and Peter E. Koveos, 2008. "A framework to update Hofstede's cultural value indices: Economic dynamics and institutional stability," *Journal of International Business Studies*, 39, 1045-1063.

Uppal, Raman and Tan Wang, 2003. "Model misspecification and underdiversification,"

Journal of Finance, 58(6) 2465-2486.

Wooldridge, Jeffrey M., 2002. "Introductory Econometrics: A Modern Approach", South-Western College Publishing.