DOI: 10.28934/ea.1999 First Online: April 16, 2025

ORIGINAL SCIENTIFIC PAPER

The Effects of Strict Social Norms on Home Bias

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ABSTRACT

Despite the documented advantages of international portfolio diversification, investors tend to over-allocate to domestic markets, leading to exposure to home bias. This paper explores the behavioral explanation of this phenomenon by investigating the relationship between cultural tightness-looseness and equity home bias. Based on foreign portfolio holdings data from 28 of the most developed markets and over the period 2001-2022, we find empirical support using the OLS methodology that investors from culturally tighter countries register higher levels of home bias, compared to investors from looser countries. In cultures where stricter social norms are imposed and little deviation is allowed, investors exhibit higher confidence in domestic returns and associate international investments as more costly. Due to higher levels of innovation and fewer behavioral constraints, investors from looser countries overcome the cost associated with the unfamiliarity of foreign stocks, managing to better diversify their portfolios internationally. Additionally, we identify that financial education and economic openness of the investor country alleviate the effect stricter norms have on home bias. The significance of the study is reinforced by the robustness tests performed, such as employing alternative measures of both our dependent and independent variables and testing the identified relationships through different estimation methods. This paper contributes to the extensive literature on home bias by identifying the strictness of social norms as a key cultural determinant in shaping international portfolio allocation and exploring channels to mitigate its effect on home bias.

Keywords: *home bias; cultural tightness-looseness; foreign equity portfolio allocations; financial education; economic openness*

JEL Classification: C23, G15, G41

INTRODUCTION

Following the recent significant acceleration of trade liberalization and financial integration, investors can benefit from the reduction of trade barriers and the deregulation of financial markets. However, the reduction in home bias occurs at a slower pace than globalization (Baele et al., 2007), a phenomenon that warrants further analysis on investors' tendency to tilt their investments toward the domestic market.

International portfolio allocation has been documented in the literature as influenced by a myriad of factors, both rational motives (Portes and Rey, 2005; Cooper et al., 2013) and behavioral ones (Aggarwal et al., 2012; Pradkhan, 2016). There is extensive literature endorsing the impact of investors' culture on shaping individual investors' preferences and behaviors, making it an important factor in financial decision-making. Studies like Anderson et al. (2011) and Beugelsdijk

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and Frijns (2010) confirm that culture, depicted through Hofstede cultural values, impacts equity home bias. These studies show that individualism (IDV) leads to lower levels of under-diversification, while uncertainty avoidance (UAI) serves as a costly obstacle to allocating capital to foreign markets. Cultural differences can be further interpreted as a lack of familiarity, as investors may feel disconnected from markets with different cultural practices, which can affect their willingness to invest internationally (Aggarwal et al., 2012).

In an attempt to move beyond cultural values as a sole indicator of cultural differences, and based on Pelto's (1968) introduction of the concept of social norms strength, Gelfand et al. (2006) find that cultural tightness looseness (CTL) - the degree to which societies enforce social norms and tolerate deviations - relates to variance within societies. Compared to cultural values which treat culture as homogeneous within national borders, CTL can capture the cultural diversity within a country as social norms are enforced differently across regions, social classes, and institutions. Following Gelfand et al. (2011), strong norms and sanctions are specific to tighter societies, while tolerance for deviating behavior and diversity corresponds to looser societies. CTL has been documented extensively in the literature as a predictor of economic behaviors (Gunia et al., 2011; Eun et al., 2015; Deckert and Schomaker, 2022).

Extensive literature has documented that financial literacy has taken up the form of human capital that investors leverage to increase the productivity of their financial capital (Lusardi et al., 2014). Various studies report that holding financial knowledge determines stock market participation (Lusardi et al., 2014; Chen et al., 2023). Guiso and Jappelli (2009) corroborated this idea by proving, using a representative sample of bank clients, that limited financial literacy leads to under-diversification. Furthermore, the study of Giofre (2017) empirically shows that education in finance diminishes the informational costs faced when investing in countries with weak investor protection standards. This implies that financially literate investors experience a reduced cost of potential informational asymmetries in such a framework, where the concept of diversification can shift the perspectives on risk aversion. This prompts us to explore whether country-level financial education provides knowledge that can transcend cultural norms by emphasizing rational financial behavior.

Despite the growth of financial globalization and broader access to global markets, certain countries continue to impose restrictions on foreign investment and limit the flow of international capital. Baele et al. (2007) empirically identified that trade openness reduces home bias, while Mondria et al. (2010) validate the explanatory power of two financial openness measures on equity home bias, showing that regulatory restrictions on capital account transactions, as well as the lack of international financial integration, can lead to overallocation on domestic markets. Cooper (2013) argues that while multiple factors are needed to explain equity home bias, economic openness and information asymmetries are among the most important. Given its significance in the equation that predicts home bias, we investigate whether the degree of a country's economic openness can moderate the effect that the strength of social norms can have on international portfolio diversification.

In this paper, we study the role of cultural tightness looseness, using Uz's (2015) measure of CTL to explain the phenomenon of home bias exhibited by 28 investor countries for the period of 2001-2022. Furthermore, given its documented significance in predicting home bias, we explore the moderating effects of investors' country-level financial education and economic openness on the relationship between home bias (HB) and cultural tightness-looseness (CTL). Our results show that investors from tighter countries are more exposed to home bias, and they can benefit from higher national-level financial education and greater economic openness to enhance their international portfolio diversification. These associations hold when controlling for previous determinants of home bias, such as economic development or certain Hofstede cultural dimensions, and are strengthened by a series of robustness tests, including alternative measures of principal variables and alternative estimation methods. To our knowledge, this study is among the first to empirically link CTL to investment biases, and the unique contribution lies in

examining how financial literacy can mitigate the impact of cultural constraints on portfolio diversification and how economic openness may facilitate a reduction in the barriers posed by cultural tightness.

The rest of the paper is structured as follows. Section 2 presents the hypotheses investigated in this study. Variables descriptions and statistics are described in Section 3, while Section 4 details the design of our study and relays the empirical results and the robustness checks. Section 5 concludes the papers.

THEORETICAL BACKGROUND

At the onset of home bias exploration, French and Poterba (1991) relate that the overweighting of domestic stocks stems from investors being unclearly optimistic about home markets. In tighter societies, a sense of conformity may foster overconfidence in domestic markets. In such societies, investors might feel compelled to prefer domestic investments, striving to conform to widely accepted local standards and behaviors, thus increasing their exposure to HB.

The portfolio of a risk-averse investor is biased towards its own country stock due to the perception of safety given by domestic assets (Guiso et al., 2009). Furthermore, individuals from tighter societies perceive foreign markets as having higher informational costs due to narrow socialization (Arnett, 1995), reinforcing their preference for safety and predictability over novelty and uncertainty. Conversely, investors from looser societies are more willing to engage in risk-taking and innovative behavior (Gelfand et al., 2006), which can reduce their perceived informational barriers, leading to a more diversified equity portfolio.

Finally, the freedom to express themselves and a strong emphasis on values make individuals from culturally loose countries more rational than emotional when making investment decisions. Lubart (2010) identified a linear relationship between cultural looseness and IDV, which is usually associated with creativity and innovation. This link is also confirmed by Deckert and Shomaker (2022), where cultural tightness-looseness is correlated with a driver of economic performance: innovation. Investors from loose societies would benefit more from openness to innovation and individualistic traits, given that these induce a perceived information advantage and boost investors' confidence in foreign assets. In the light of these arguments, we postulate the following hypothesis:

H1: *Investors from culturally tighter societies tend to overallocate funds on domestic equity capital markets due to higher aversion to non-familiarity*.

Hofstede (2001) believes that, at a national level, education can be considered one of the key channels that perpetuate culture. Taras et al. (2010) aim to clarify this relationship by testing and confirming the hypothesis that the predictive power of personal values would be significantly stronger for individuals from countries with higher levels of financial sophistication. We expect that in countries with greater levels of education, investors have increased autonomy and freedom, making it easier for them to overcome the constraints of conformity imposed by tighter societies, which in turn determine overallocation on domestic markets.

As pointed out by the study of Cupák (2022), confidence in one's own financial knowledge, implicitly driven by financial education, can foster risky financial asset ownership. Based on a study concerning household financial decision-making, Korkmaz (2021) finds that financial literacy can stimulate risk-taking behavior regardless of the risk-averse level of individuals. Thus, we speculate that the uncertainty costs associated with international diversification, specific to tighter cultures, can be scaled down using the confidence from holding financial literacy.

We expect investors from countries with higher financial education levels to be more informed about the financial decision-making process, have a greater capacity to understand and evaluate

risk (Molina, 2023), and recognize the distinct advantages of international diversification. This enables them to be less constrained by the threat of non-familiarity with foreign stocks, thus experiencing lower HB.

H2: *Financial skills alleviate the effect of tightness on equity home bias.*

According to Nozick (1974), freedom permits economic, social, spiritual, and cultural experimentation, leading to new and better ways to solve problems and live peacefully with one another. Gelfand et al. (2006) argue that individuals in looser societies usually have a greater promotion focus, a greater preference for the cognitive style of innovators, and a tendency towards experimentation, trial, and error. Deckert and Schomaker (2022) endorse this proposition in their study where they find that cultural looseness harbors national innovativeness. Extending on this theory, we contemplate whether investors from societies with stricter social norms can benefit from higher degrees of country economic openness, and consequently, a more transparent flow of information, to overcome the preference to overinvest at home.

Welzel (2013) provides a compelling framework for understanding how economic openness can mitigate the reluctance of investors from culturally tight societies to allocate capital on foreign markets. His theory of human empowerment suggests that as societies become more economically integrated, they experience institutional, informational, and cognitive shifts that weaken traditional constraints on behavior, such as the ones endorsed by societies with pervasive social norms and low tolerance towards deviant behavior. Additionally, trade openness has been documented as a factor that determines change. It encourages cultural integration based on the premise that culture and economic processes interact, shaping and reinforcing one another in a way that they cannot be reduced to purely separate influences (Jones, 2006). A study by Stulz and Williamson (2003) highlights that the impact of culture, proxied by religion, on investor protection rights is tempered by openness. This leads us to believe that unrestricted cross-country capital flows may outweigh the reluctance towards foreign equity investments driven by cultural tightness. Investors from tighter cultures are expected to benefit from their country's economic openness, making them less resistant to change and foreign exposure. Based on these arguments, we postulate the following hypothesis:

H3: *Economic openness suppresses the effect of cultural tightness on the home bias level.*

DATA AND STATISTICS

The main data source for the panel data of country-level portfolio allocation is the Coordinated Survey of Portfolio Investment (CPIS) by the International Monetary Fund (IMF). The CPIS database reports annual cross-country portfolio holdings of equity and debt securities in US dollars (millions). We constructed the domestic portfolio allocation shares by considering only the equity and investment fund shareholdings. The survey has been used extensively in prior studies centered around the topic of home bias (Cooper et al., 2013; Wei and Zhang, 2020).

The initial sample of countries comprised developed and emerging markets, following the MSCI ACWI index classification. Given the limited coverage of countries in the CPIS report and CTL scores and the necessity to exclude opaque holdings to offshore centers, the sample was narrowed down to 28 investor countries. As described below, we construct the measure of home equity biases using the annual cross-country portfolio holdings for the 2001–2022. Overall, we perform our empirical study on a total of 616 panel observations.

Home Bias Measure

We have employed the home bias measure suggested by Ahearne et al. (2004) that has been used in various studies (Baele et al., 2007; Fidora et al., 2007; Bekaert and Wang (2009). This measure not only evaluates the gap between the benchmark allocation and the actual domestic allocation but is also normalized to account for the size of the market. The measure, computed using the formula relayed in Eq. (1), reflects how much an investor originating from country *i* tends to overallocate on their domestic market, relative to the allocation they should have at home according to the world CAPM, divided by the maximum possible size of home bias. Because all countries in our sample exhibit home bias, the normalized measure ranges from 0 to 1, with 1 indicating total home bias – where the home country invests exclusively in its own stocks.

$$HB_{i_{norm}} = (a_{i,i} - w_i)/(1 - w_i), \quad (1)$$

The actual domestic allocation ($a_{i,i}$) is computed as the amount of domestic equity holdings relative to the amount of all equity holdings of investor *i*, following the formula from Eq. (2) and the benchmark domestic allocation (w_i) is computed using Eq. (3).

$$a_{i,i} = (MC_i - FL_i)/(MC_i - FL_i + FA_i) \quad (2)$$

$$w_i = MC_i/\sum_i^W MC_i \quad (3)$$

While the CPIS database provides information on cross-country bilateral portfolio investments, information on domestic holdings was derived using the market capitalization of country *i* (MC_i) and the amount of equity capital inflows from foreign investors (FL_i). To obtain the total amount of equity holdings, we added the domestic holdings to the total foreign holdings as reported by CPIS. Following the Capital Asset Pricing Model (CAPM), where investors are expected to hold diversified portfolios with risky assets weighted by their market value, w_i is the ratio between the stock market capitalization of the domestic country (MC_i) and that of all world markets. The data on country market capitalization was extracted from Refinitiv Datastream.

Independent Variables

Cultural Tightness Looseness

To investigate how cultural differences affect HB, we employed the CTL measure from Uz (2015) as our main independent variable. Based on data from the 4th wave of the World Values Survey (WVS), conducted in 2000, this measure reflects the heterogeneity in values, norms, and behaviors. Thus, it is computed using the standard deviation construct. For index construction, the author measured the domain-specific index, the domain-general index, and the combined one. In our study, we opted for the combined one, which is built on questions relating to work, family, and religion domains for a group of 65 countries. This index represents the prime measure of CTL, given that it overcomes the limitations imposed by the other two indices and blends the best of the two worlds. If a culture has pervasive norms and sanctions deviance from these norms, it has a tight distribution around the mean, which pertains to tighter societies. On the opposite side, tolerance towards deviation from the norms stems from heterogeneity in social norms, prevalent in looser societies. The CTL index ranges from 3.1 (Indonesia) and 99,6 (France), where higher values reflect higher variance in norms, values, and behavior, as evident in loose nations.

The measure employed is superior to other measures documented in the literature, like the measure of Gelfand et al. (2011), since the latter merely assesses the perception of variation of social norms. As opposed to this measure, Uz's measure relies on the dispersion of actual

responses related to norms and morals, thus capturing cultural heterogeneity systematically (Uz, 2015).

Financial Education

We follow the study of Giofré (2017) in selecting our financial education measure and consider the *"education in finance*" indicator reported by the IMD World Competitiveness Yearbook, which is available for over 50 countries worldwide. The level of financial education is evaluated based on a survey of senior business leaders that provides an evaluation on a 0-10 scale for the statement "*education in finance does meet the needs of the business economy*". An investor originating from a certain source country is assumed to be more financially educated if the respective country registers a higher score for this indicator. The reliability of the measure is backed up by the study of Jappelli and Padula (2011). The study finds that the country rankings derived from the survey are comparable to measures of cognitive abilities at the individual level.

A shortcoming of such a financial education measure selection might be the fact that it is derived from a survey that evaluates the perception individuals have on the level of financial education rather than quantifying the respective level of knowledge and skills. As an alternative measure we employ the Standards & Poor's Ratings Services Global Financial Literacy Survey indicator that evaluates the financial knowledge based on four concepts: risk diversification, inflation, numeracy, and interest compounding. The measure has been extensively used in the literature to explain financial outcomes (Lusardi et al., 2014; Cupák, 2022).

Economic Openness

To measure the degree of financial openness, we use the Economic Freedom Index, EFW, provided by The Economic Freedom Network. The EFW index reflects the degree to which individuals are allowed to make their own economic choices free of constraints imposed by external forces. The measure is available for all 28 countries in our sample and the period between 2001-2021. We backfill the data for the year 2022 considering the history of scores, allowing for the closest observations to weigh more than the farthest ones. The index scores range from 0 to 9, where higher values reflect a higher level of country economic openness. The index has been widely used in the literature (Chan et al., 2005; Wallmeier and Isel, 2022).

Literature on economic openness distinguishes between two types of ways to assess a country's integration into the global financial system (Wang, 2022). Formal legal frameworks and policies that regulate the cross-border movement of capital reflect the *de jure* economic openness, which is our selected measure. *De facto* indices measure the realized extent of cross-border financial activities, measured by the volume of international capital flows, regardless of a country's regulatory stance on international capital mobility. As an alternative measure, we also employ a *de facto* indicator, using the sum of foreign portfolio assets and liabilities from the External Wealth of Nations Database (Lane and Milesi-Ferretti, 2007), scaled by nominal gross domestic product (GDP).

Control Variables

Drawing upon previous literature on home bias determinants, we control for these factors grouped into categories like: capital flow frictions (Cooper and Kaplanis, 1986; Ferreira, 2011), familiarity (Chan et al., 2005; Lane and Milesi-Ferretti, 2008;), behavioral factors (Morse and Shive, 2011; Wei and Zhang, 2020; Kim, 2022) and culture (Anderson et al., 2011; Beugelsdijk and Frijns, 2010; Pradkhan, 2016). The description of the variables and their source is presented in Table 1.

Table 1. Control variables overview

Variable	Description and source
Capital flow frictions	
Exchange rate risk	The standard deviation of the 36-month moving average of the trade-weighted REER. Bank of International Settlements.
Outflow restrictions	Equity outflow restrictions for the source country. Fernández et al. (2016)
Economic development	Log of GDP per capita (current US$). World Development Indicators
Market correlation	Country market return correlation with world market, computed on the five-year history of monthly return data. Datastream.
Good governance	Sum of the percentile ranks of government effectiveness and control of corruption. World Governance Indicators.
Familiarity	
Geographical proximity	The log of the distance between the source country and the rest of the world is calculated using data from CEPII
Linguistic distance	Average weighted linguistic distance between the source country and the rest of the world. Spolaore and Wacziarg (2009)
Trade closeness	The ratio of total bilateral trade, given by the sum of imports and exports between the source country and the rest of the world relative to the source country's GDP. IMF (Direction of Trade Statistics).
Cultural distance	The Kogut and Singh (1998) composite index quantifies the cultural difference between the source culture and the rest of the world, based on Hofstede's and Schwartz's cultural dimensions. Author's calculations.
Behavioral factors	
Patriotism	Mean country score based on the question "How proud are you to be [substitute nationality]?". The author's calculations, based on WVS data.
Social trust	An indicator reflecting the country's level of social trust. Author's calculations on WVS data.
Culture	
IDV	Reflects a preference for a loosely knit social framework, the opposite of collectivism. Hofstede (2001)
UAI	Reflects an anxious attitude towards ambiguity and intolerance of unorthodox behavior and ideas. Hofstede (2001)

Descriptive Statistics

Table 2 provides a cross-country overview of the main variables in our study. HB and economic openness are presented as weighted averages across our sample period, while financial education reflects the time-invariant country level. On average, investors exhibit a home bias (HB) level of 67.47%. This reinforces the observation that investors are highly biased towards investing domestically and it can be observed that, on average, each country in the sample exhibits a home bias.

The highest levels of HB are recorded for India (99.88%) and Turkey (99.74%). At the same time, these are among the top 3 countries with the lowest economic openness level and are situated in the tightest quartile of the sample. On the other end, the Netherlands, with an average HB score of 29%, clearly leads as the least home-biased country, significantly outpacing the other investors in terms of global portfolio diversification. In terms of CTL, financial education and economic openness, the Netherlands also surpasses the median score.

Table 2. Summary statistics for HB, CTL, financial education, and economic openness

Investor Country	HB (%)	CTL	Financial Education	Economic openness
Argentina	75.51	75	4.77	*5.78*
Austria	41.55	75.8	6.53	7.91
Canada	63.29	84.6	6.99	8.20
Chile	70.62	86.8	6.69	8.04
Czech Republic	68.32	59.6	5.14	7.75
Denmark	42.88	65.5	7.82	8.17
Finland	49.58	74.5	*7.90*	8.08
France	63.61	99.6	5.99	7.70
Germany	46.83	82.9	5.55	8.03
Greece	82.56	58.3	5.28	7.06
Hungary	69.77	42.8	6.01	7.41
India	*99.88*	43.7	6.45	6.36
Indonesia	99.11	*3.1*	4.23	6.73
Italy	41.25	67.8	4.04	7.52
Japan	77.47	43.3	4.56	7.91
Mexico	93.20	74.7	*3.77*	6.97
Netherlands	*29.08*	74.2	7.16	7.93
Poland	92.43	42.8	4.22	7.06
Portugal	55.14	87.4	4.62	7.63
Russian Federation	99.10	57.2	4.75	5.99
Singapore	52.71	55.2	7.55	*8.76*
South Africa	85.72	67.6	4.01	6.82
South Korea	87.40	20.1	6.78	7.59
Spain	74.65	83.9	4.88	7.81
Sweden	48.11	87.9	7.24	7.90
Turkey	99.74	12.5	5.92	6.61
United Kingdom	46.34	89.3	5.00	8.27
United States	60.67	58.0	6.55	8.43
World average	***67.47***	***65.31***	***5.77***	***7.52***
Median	*68.32*	*67.8*	*5.92*	*7.70*
25th percentile	*48.11%*	*55.2*	*4.75*	*7.06*
75th percentile	*85.72%*	*83.9*	*6.78*	*8.03*

Source: Author's computations

METHODOLOGY

This research aims to investigate the impact of CTL on HB through Ordinary Least Squares, OLS regression estimates, while controlling for an extensive set of explanatory variables categorized into three groups. The first group comprises time-varying variables for each country, such as capital frictions and market correlation, which may explain investors' preferences for domestic versus foreign assets over time. Prior research, such as the study by Chan et al. (2005), suggests that market participants respond swiftly to macroeconomic changes, supporting the use of current-period values. The second group includes time-invariant variables for country *i* relative to the world, such as proximity measures, which can impact the perceived level of familiarity, thus affecting the overall investment behavior. The third group encompasses time-invariant variables specific to country *i*, such as cultural values that influence investor sentiment toward international diversification.

Following the work of tangent studies of Bekaert and Wang (2009), Anderson et al., (2011), Pradkhan (2016), the framework equation for testing the validity of H1 can be expressed as:

$$HB_{it} = B_0 + B_1 CTL_i + B_2 X_{it} + B_3 Y_{wi} + B_4 Z_i + e_{it} \quad (4)$$

HB_{it} represents the equity home bias of country i at time t, and CTL_i denotes the cultural tightness-looseness level for country i. The control variables X_{it} comprise the time-varying variables for country i, Y_{wi} consists of time-invariant variables relative to the world for country i, and Z_i includes cultural variables specific to country i. Finally, e_{it} is the error term capturing unobserved factors affecting HB. We extend the above-mentioned equation to test H2 and H3 by considering a fourth group of interaction terms that capture the interaction effects between CTL and time-invariant financial education (FE_i) and time-varying financial education (EE_{it}):

$$HB_{it} = B_0 + B_1 CTL_i + B_2 (CTL_i * FE_i) + B_3 X_{it} + B_4 Y_{wi} + B_5 Z_i + + e_{it} \quad (5)$$

$$HB_{it} = B_0 + B_1 CTL_i + B_2 (CTL_i * EE_{it}) + B_3 X_{it} + B_4 Y_{wi} + B_5 Z_i + + e_{it} \quad (6)$$

Specific to our panel data structure, there are concerns regarding the residuals being correlated across time for a given cross-sectional unit or across cross-sectional units for a given point of time. Following the same approach as Chan et al. (2005) and Bekaert and Wang (2009) we employ heteroskedasticity robust standard errors, without clustering. To control year-to-year changes, we include year effects in all specifications employed in this study, thus mitigating time-specific influences, including autocorrelation problems.

RESULTS AND DISCUSSIONS

Role of Tightness-Looseness

Table 3 contains the OLS estimates, where we delve into evaluating how heterogeneity in social norms impacts HB through multiple specifications. We begin by reporting in Column (1) the indirect relationship between CTL and HB, suggesting that country-level cultural looseness leads to a decrease in HB, as indicated by the statistically significant 1% level coefficient of CTL. This confirms our assumption regarding the direction of the link between the two variables, and we further enhance our specification to investigate whether this relationship holds when adding other explanatory variables.

Column (2) contains the regression results for the specification, including the main model control variables where we refrain from including variables shaped by cultural factors in the first instance. We can highlight that CTL retains its sign and statistical significance when adding previously documented explanatory variables for HB. The signs of the coefficients for the control variables are in line with our expectations reflected in Table 3, and all of them are statistically significant, at least at the 10% threshold, except the market correlation measure.

The way individuals exhibit trust relates closely to cultural context. Anderson et al. (2011) and Pradkhan (2016) find robust evidence that cultural dimensions like IDV and UAI variation shape investment behavior. We extend our main model specification in Column (3) by adding the measures of social trust, IDV, and UAI to explore whether these are interfering with the explanatory power of CTL towards HB. The depicted estimates reinforce our H1 on the importance of CTL in explaining equity home bias, even when the specification controls for other cross-country cultural differences.

Table 3. Home bias and cultural tightness-looseness

	Exp. Sign	Base model	Main model	Culture control	Actual weight	Stand. beta (%)
		(1)	(2)	(3)	(4)	(5)
CTL	-	-0.0053*** (0.0002)	-0.0030*** (0.0003)	-0.0031*** (0.0003)	-0.0030*** (0.0003)	-31.98
Exchange rate risk	+		0.4050* (0.218)	0.3547* (0.210)	0.2657 (0.202)	7.46
Outflow restrictions	+		0.0955*** (0.019)	0.0614*** (0.017)	0.0635*** (0.018)	10.83
Economic development	-		-0.0234** (0.010)	-0.0299*** (0.010)	-0.0077 (0.011)	-13.08
Market correlation	+		0.07416 (0.050)	0.1039** (0.048)	0.0968** (0.050)	9.01
Government index	-		-0.1274*** (0.024)	-0.0485** (0.024)	-0.0588** (0.025)	8.72
Average geographic distance	+		0.0844*** (0.016)	0.0555* (0.030)	0.0430 (0.031)	6.73
Linguistic distance to USA	+		0.0293*** (0.003)	0.0232*** (0.003)	0.0170*** (0.003)	14.07
Bilateral trade	-		-0.2677*** (0.050)	-0.1939*** (0.046)	-0.1831*** (0.046)	-11.21
Cultural distance	+		0.0421*** (0.006)	0.0144*** (0.006)	0.0145** (0.008)	5.55
Patriotism	+		0.0831*** (0.024)	0.0965*** (0.028)	0.0412 (0.030)	9.64
Social trust	-			-0.0019*** (0.0005)	-0.0016*** (0.0005)	-13.41
IDV	-			-0.0007 (0.0008)	-0.0019** (0.0009)	-6.96
UAI	+			0.0015*** (0.0003)	0.0020*** (0.0003)	16.50
Year effects		*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Number of obs.		*638*	*616*	*616*	*616*	*616*
R^2		*0.4378*	*0.7329*	*0.7733*	*0.7503*	*0.7733*

*The equations from Columns (1) – (5) are OLS regressions. The robust standard errors are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.*

One can observe that in the culture control specification, the IDV coefficient is not statistically significant at the 10% level, and this outcome is not surprising. First, based on the variance inflation factor analysis[1], IDV is highly correlated with the other predictors in the model, which might distort the results. Secondly, past literature has provided conflicting findings about the impact of IDV on HB. The study from Beugelsdijk and Frijns (2010) suggests that IDV should lead to higher international diversification, while Anderson et al. (2011) find that IDV might encourage HB, though not statistically significant in all specifications employed. Finally, in a study debating the objectiveness of Hofstede's cultural dimensions and their predictive power, Minkov and Kaasa (2022) suggest that different cultural dimensions often reflect the same underlying constructs. IDV and CTL may be capturing related cultural traits.

We repeat our culture control specification by replacing the home bias measure with the actual portfolio weight allocated to domestic equity, following the same approach as Pradkhan (2016). The results available in Column (4) support the influence of CTL on equity investment allocation

[1] Not reported in the article but can be provided on demand.

behavior. At this juncture, it is also compelling to explore the economic significance of the explanatory variables. In Column (5), we compute the standardized weight for each predictor of the model, and we attest that one standard deviation change in the CTL is associated with a 31,98% standard deviation increase in HB. CTL exhibits a greater marginal effect on HB than other strong predictors like UAI, linguistic distance, or social trust.

Moving forward, we employ our main model specification considering the multicollinearity concerns associated with the culture control model.

Moderators Role

Interaction between CTL and Financial Education

Extensive literature has reported on the importance of financial education in predicting stock market participation and specifically its diminishing effect on the investor's exposure to domestic equity bias (Bose, 2015). In this sub-chapter, we explore the moderating effect of financial education on the relationship between CTL and HB, thus testing the validity of our H2. Table 4, Columns (1) and (3) display the estimation results of including financial education measure as an additional explanatory variable and the interaction effect between CTL and financial education, respectively. We can highlight that CTL's coefficient is consistent throughout the specifications while maintaining its statistical significance at the 1% level. The results relayed in Column (1) confirm the decreasing effect financial education has on HB, which is in line with our sign expectations based on previous studies (Kimball and Shumway, 2010). Furthermore, in Column (3), we can see that the interaction effect is significant at a 1% level and has a negative sign, which confirms our H2. Financial education amplifies the effect CTL has on HB by decreasing investors' tendency to allocate funds disproportionately to domestic markets.

Table 4. Moderating Effects of Financial Education and Economic Openness on CTL–HB Relationship

	Financial Education	**Economic Openness**	**Interaction term Financial Education**	**Interaction term Economic Openness**
	(1)	**(2)**	**(3)**	**(4)**
CTL	-0.0031*** (0.0003)	-0.0032*** (0.0003)	-0.0036*** (0.0002)	-0.0037*** (0.0003)
Financial Education	-0.0124** (0.005)		-0.0155*** (0.005)	
Economic Openness		-0.0323*** (0.012)		-0.0200* (0.012)
Financial Education × CTL			-0.0009*** (0.0002)	
Economic Openness × CTL				-0.0018*** (0.0005)
Control variables	*Yes*	*Yes*	*Yes*	*Yes*
Year effects	*Yes*	*Yes*	*Yes*	*Yes*
Number of obs.	*616*	*616*	*616*	*616*
R^2	*0.7357*	*0.7231*	*0.7442*	*0.7299*

*The equations from Columns (1) – (4) are OLS regressions. The robust standard errors are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.*

In light of these results, we are interested in exploring the marginal effect of the interaction term at different levels of HB. On the left side, Figure 1 displays how financial education dynamically shapes the link between CTL and HB, where the color bands represent different levels of predicted HB. We can observe that investors from extremely tight societies become more home-

biased as financial education increases. This effect is applicable to the tighter countries from the sample like Indonesia and Turkey which are incidentally also the ones recording over 99% HB.

Going upwards to average values of looseness, one can notice that financial education does not yield any amplification effect on CTL to lower HB. Finally, the moderating effect is highly visible for looser countries where financial education manages to boost social norms variation and decrease the levels of HB. This effect is especially detectable for investors with lower-than-average financial education.

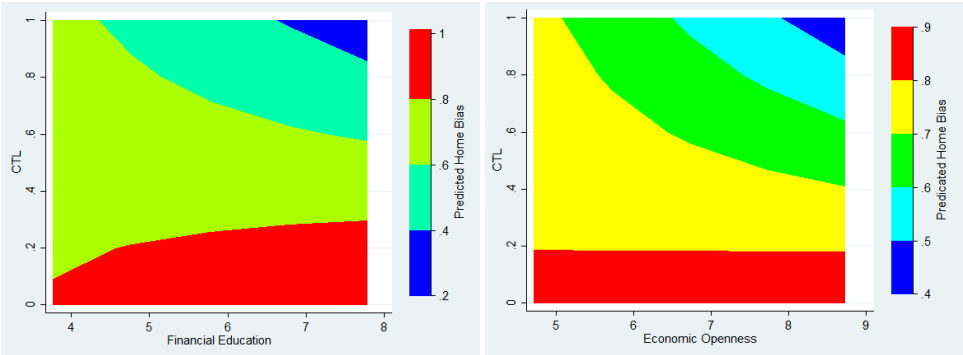

Figure 1. The average marginal effect of Financial Education and Economic Openness on HB for different levels of CTL[2]

Source: Author's computations

Interaction between CTL and Economic Openness

Financial openness has been nominated as a fundamental determinant of HB as empirically proven in the studies of Baele et al. (2007) and Mondria et al. (2010). Furthermore, a country's openness to international trade has been shown to act as a mitigator of cultural values on financial outcomes (Stulz and Williamson, 2001), which prompts us to explore whether economic openness mediates the relationship between CTL and HB. Table 3, Column (2) displays the estimates obtained when introducing the economic openness measure in our main model specification.

Corroborating previous studies, the coefficient of economic openness is negative and significant at the 1% level, relaying that country-level economic openness decreases the degree of HB. Column (5) reports the coefficient of the interaction term with CTL, which is negative and statistically significant. This evidence confirms H3 and suggests that the economic openness of the investor country can help individuals from tighter societies overcome the high perceived cost of investing in international markets. Furthermore, we can highlight that this effect is more consistent than the effect financial education exhibits on the CTL-HB link.

Complementary to the financial education effect discussion, we investigate the marginal effect of economic openness on HB for various levels of CTL. On the right, Figure 1 depicts the economic openness effect on HB, where we can spot a more defined linear relationship between the interaction terms and HB, except for the tightest countries. This relationship is highlighted at lower values of economic openness, as illustrated by the convex line between the yellow and the green contour, which implies that investors originating from countries with lower economic openness can benefit more from the diminishing effect of CTL on HB. The constant level of HB at low levels of CTL indicates that, in the absence of variation in social norms, economic openness loses its explanatory power and cannot improve international portfolio diversification.

[2] For an easier interpretation of the marginal effect results, the measure CTL has been rescaled to lie within the range between 0 and 1 throughout the study.

Endogeneity

Going further, we examine whether our results are flawed by endogeneity. More relevant than the possibility of reverse causality between CTL and HB is the omitted variables bias and the error induced by having survey-based variables. To dismiss such suspicions, we instrument our main independent variable, CTL, using the measure of kinship introduced by Enke (2017). It represents an index of kinship tightness, which measures the extent to which societies are embedded in closely linked extended family structures. Tight kinship societies concentrate their trust and cooperation towards in-groups, while societies with looser kinship systems place lower emphasis on communal moral values and in-group favoritism, which allows them to develop broader institutions.

Table 5 Panel A reports the IV (2SLS) first-stage regression results, where Column (1) estimates confirm the strong negative relationship between CTL and kinship, relayed by the statistically significant coefficient. Panel B from Table 5 reports the second-stage regression results in the same column, showing that CTL's coefficient remains significantly robust in explaining HB. Furthermore, the table also reports the Cragg-Donald Wald F statistic which records values (159.90) well above the critical values (16.38), which confirms the power of the instrument selected.

We also discuss the possibility of endogeneity between HB and the employed moderators - financial education and economic openness. In the case of economic openness, we find no threat of endogeneity bias due to its low correlation with HB. However, for the financial education measure, we consider opting for an instrumental variable, given its high correlation with HB and the availability of a strong instrument: the PISA math scores discussed by Hanushek and Woessmann (2008). The test scores are considered the most informative indicator of financial skills prior to labor market participation, as they reflect 15-year-old students' cognitive skills in mathematics and science.

In Table 5, Columns (2) and (3), we report the IV (2SLS) regression results depicting the instrumenting of financial education using the cross-country average PISA math score. In a later step, we use the interaction between kinship and the PISA math scores as an instrument for the interaction effect between CTL and financial education. In both cases, the test scores are shown to be strong predictors of financial education, as evidenced by the results from Panel A. The test suggests, through the rejection of the null hypothesis, that there is sufficient correlation between the instruments and the endogenous variables. The diagnostic tests employed in our regressions confirm the strength of our instruments, and the model is not under-identified.

Table 5. HB, CTL and financial education: instrumental variable approach

	CTL	**Financial Education**	**CTL and Financial Education**
	(1)	**(2)**	**(3)**
Panel A: First-stage regression			
Kinship	-49.7692*** (4.515)	-54.5374*** (3.840)	-56.6425*** (3.194)
Pisa Math scores		0.0120*** (0.002)	0.0240*** (0.002)
Pisa Math scores * Kinship			-1.1500*** (0.164)
Control variables	*Yes*	*Yes*	*Yes*
Panel B: Second-stage regression - Dependent variable = Home bias			
CTL	-0.0033*** (0.0005)	-0.0065*** (0.0005)	-0.0069*** (0.0007)

	CTL	Financial Education	CTL and Financial Education
	(1)	(2)	(3)
Financial Education		-0.0921*** (0.018)	-0.1340*** (0.018)
Financial Education × CTL			-0.0015* (0.0007)
Cragg-Donald Wald F statistic (critical value)	*159.90 (16.38)*	*25.859 (7.03)*	*14.013 (8.54)*
Anderson canon. corr. LM statistic (p-value)	*76.818 (0.000)*	*53.139 (0.000)*	*15.736 (0.000)*
Kleibergen-Paap rk LM statistic (p-value)	*121.49 (0.000)*	*40.46 (0.000)*	*21.84 (0.000)*
Number of obs.	*616*	*550*	*550*

*The equations from Columns (1) – (3) are IV (2SLS) regressions. The robust standard errors are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.*

Robustness

Alternative Measure of Home Bias

In an empirical study where various HB measures were tested for validity, Cooper et al. (2013) criticized the normalized home bias measure, indicating that it contains a violation against its own premise. The authors highlight that assuming a maximum home weight of 100% implies that a country's wealth equals its market capitalization, an assumption that holds only in a hypothetical world where international investments are happening for the first time. They propose scaling the raw version of home bias with the maximum feasible home bias, as shown in the calculation below:

$$HB_{i_{Cooper}} = (a_{i,i} - w_i)/\sqrt{w_i(1-w_i)}, \quad (7)$$

Table 6. Robustness: Alternative home bias measure

	Main model	Financial Education	Economic Openness	Interaction term Financial Education	Interaction term Economic Openness
	(1)	(2)	(3)	(4)	(5)
CTL	-0.1311*** (0.012)	-0.0579*** (0.012)	-0.0660* (0.010)	-0.0689*** (0.011)	-0.1036*** (0.012)
Financial Education		-0.4701** (0.202)		-0.5009** (0.206)	
Financial Openness			-4.4402*** (0.832)		-3.6782*** (0.819)
Financial Education * CTL				-0.0239** (0.010)	
Financial Openness * CTL					-0.1397*** (0.027)
Control variables	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Number of obs.	*616*	*616*	*616*	*616*	*616*
R^2	*0.6704*	*0.4761*	*0.5106*	*0.4803*	*0.5403*

*The equations from Columns (1) – (5) are OLS regressions where the HB measure by Cooper et al. (2018) was employed. The robust standard errors are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.*

We have reproduced the estimates of our main model specifications, as well as those including the interaction terms, using the alternative HB measure described above. The results reported in Table 6 suggest that our results are not dependent on the specific choice of HB measure. CTL remains a strong predictor of HB in this alternative specification, while financial education and economic openness alleviate the negative effect tightness has on international portfolio diversification.

Moderator Alternative Measures

Bellofatto et al. (2018) discuss the subject of measuring financial literacy that can reflect either an objective or subjective perspective. Our employed financial education measure is built on results that mostly rely on survey-based data, which solely captures the perception of financial literacy and not the actual financial competence of investors. To circumvent the issues related to our main selected financial education measure, we employ the S & P's Financial Literacy Survey indicator (Lusardi et al., 2014) that evaluates the actual financial skill level for each sample country based on fundamental concepts in finance.

Regarding our second moderator, we follow related literature (Mondria et al., 2010) and test whether our results are sensitive to the choice of financial openness indicator. We employ the *de facto* measure, based on the volume of a country's stocks of external assets and liabilities relative to its GDP, as introduced by Lane and Milesi-Feretti (2007). Our findings are maintained as reported in results from Table 7, reinforcing the validity of our H2 and H3 hypotheses by reproducing statistically significant coefficients for the interaction terms between CTL and financial literacy, as well as for the interaction term between CTL and the de facto measure of financial openness.

Table 7. Robustness: Alternative measure - financial literacy and financial openness

	Financial Literacy	**Financial Openness**	**Interaction term Financial Literacy**	**Interaction term Financial Openness**
	(1)	**(2)**	**(3)**	**(4)**
CTL	-0.0021*** (0.0003)	-0.0028*** (0.0002)	-0.0028*** (0.0003)	-0.0033*** (0.0003)
Financial Literacy	-0.0016** (0.0006)		-0.0013*** (0.0006)	
Financial Openness		-0.0790*** (0.012)		-0.0798*** (0.011)
Financial Literacy * CTL			-0.0001*** (0.00002)	
Financial Openness * CTL				-0.0018*** (0.0003)
Control variables	*Yes*	*Yes*	*Yes*	*Yes*
Year effects	*Yes*	*Yes*	*Yes*	*Yes*
Number of obs.	*616*	*616*	*616*	*616*
R^2	*0.7624*	*0.7420*	*0.7737*	*0.7459*

*The equations from Columns (1) – (4) are OLS regressions where the alternative moderator's measures have been used. The robust standard errors are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.*

Additionally, we were interested in exploring the marginal effects of these alternative measures on HB at different levels of CTL. Figure 2 displays the marginal effect of financial literacy and financial openness measures across different values of HB, showing results consistent with those obtained using the standard financial education and economic openness measures in the main results part.

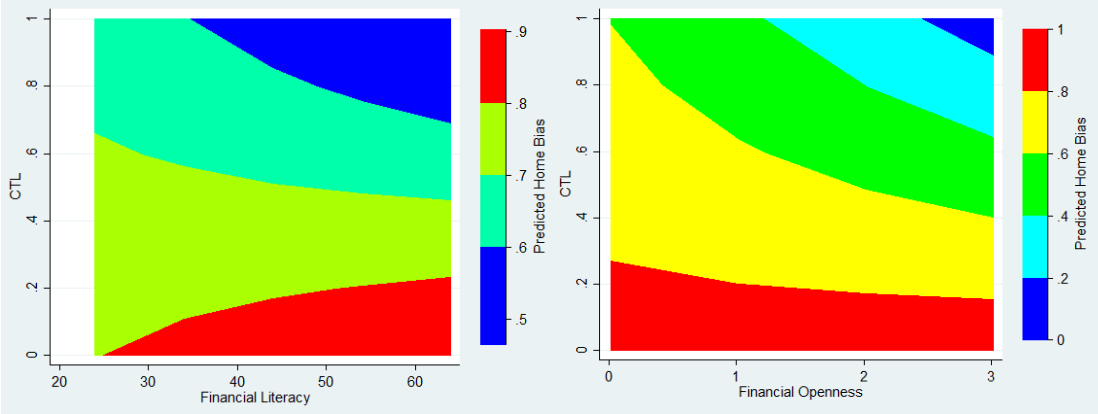

Figure 2. The average marginal effect of Financial Literacy and Financial Openness on HB for different levels of CTL

Source: Author's computations

ALTERNATIVE METHODS

To strengthen confidence in our reported results, we employ several alternative estimation methods. Since our main independent variable, CTL, is time-invariant, it does not contribute to explaining the within-group variation in the time-varying HB variable. To address this, we re-estimate our specification in Table 8, Panel A, using random effects, following Bose (2015). Bounded outcomes often suffer from heteroskedasticity. We follow Gyu (2022) and transform our main measure of HB to range from – ∞ to + ∞ and test whether a log-linear relationship between the predictors and the log-odds of the endogenous variable provides a better fit than a linear relationship in the original scale, as presented in Panel B. Finally, to overcome the lack of time variance in our main independent variable, we follow Giofré (2017) and Kim (2022) and test the robustness of our results using the feasible generalized linear squared regression (FGLS) method as relayed in Panel C. The maintained sign and significance of the coefficients reported in Table 8 support our previous findings.

Table 8. Robustness: Alternative methods

	Main model	**Interaction term Financial Education**	**Interaction term Economic Openness**
	(1)	**(2)**	**(3)**
Panel A: OLS with random effects			
CTL	-0.0037*** (0.001)	-0.0061*** (0.001)	-0.0060*** (0.001)
Financial Education * CTL		-0.0005* (0.0003)	
Economic Openness * CTL			-0.001** (0.0005)
Panel B: Logit transformed home bias			
CTL	-0.0335*** (0.003)	-0.0346*** (0.002)	-0.0351*** (0.002)
Financial Education * CTL		-0.0053*** (0.002)	
Economic Openness * CTL			-0.0018* (0.001)
Panel C: FGLS			
CTL	-0.0025*** (0.0004)	-0.0035*** (0.003)	-0.0037*** (0.0004)

	Main model	Interaction term Financial Education	Interaction term Economic Openness
	(1)	(2)	(3)
Financial Education * CTL		-0.0003* (0.0001)	
Economic Openness * CTL			-0.0007* (0.0004)

*The equations from Columns (1) – (2) are OLS regressions while column (3) employs FGLS method. The robust standard errors are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.*

CONCLUSION

In this paper, we explored the influence of cultural value heterogeneity within countries, measured through the strength of social norms, on the investors' bias to deviate from the benchmark allocation by overinvesting in domestic markets. Using foreign portfolio holdings data from investors in 28 countries over the period from 2001-2022, we tested and validated three main hypotheses using the OLS framework. We found empirical support that investors from culturally tighter countries experience higher degrees of equity home bias channeled through aversion towards foreign stocks and the perceived unfamiliarity. On the opposite end, investors from looser countries manage to overcome the cost associated with unfamiliarity through means of higher risk-taking behavior and openness to cultural exchange. Additionally, we identify that financial education and economic openness at the aggregated country level can act as moderators on the relationship between CTL and HB and corroborate on their power to alleviate the impact of homogeneity of social norms on increasing HB levels.

We evaluated the robustness of our results by employing alternative proxies both for our dependent and independent variables, thus proving the gravity of our hypotheses. Furthermore, we applied different estimation methods to account for the lack of variability in our measure of CTL and ensured the validity of the causal inferences made in our regression analysis by instrumenting CTL through the measure of kinship and financial education through the PISA math scores.

Overall, the empirical results support the implication that investors from societies with stronger norms are more prone to over-allocate to domestic equity markets. This relationship is alleviated by higher financial education and economic openness of the source country. As far as we are aware, this is the first study to explore the association between CTL and HB with an in-depth focus on the moderators of this relationship. Furthermore, this paper follows recommendations from previous studies, such as Kirkman et al. (2016) that criticized the use of Hofstede's cultural values, opting for measures that more effectively capture the cultural diversity within a country, namely CTL.

While this study provides valuable insights into the role of CTL in shaping international portfolio allocation, several limitations should be acknowledged. First, the measure of CTL is time-invariant, which restricts the ability to introduce fixed effects to control for omitted variable bias, a limitation that also applies to the financial education measure. Second, our analysis focuses exclusively on 28 developed markets, which limits the generalizability of our findings. Given that developing markets often exhibit different institutional frameworks and cultural dynamics, future research could explore how CTL affects international portfolio allocation in these contexts. Finally, we recognize that the multicollinearity issue resulting from using both CTL and IDV in our regressions could be mitigated using alternative approaches. For instance, Minkov and Kaasa's (2022) approach suggests redefining dimensions to separate distinct cultural effects. As a future research direction, we could explore whether a principal component analysis or factor analysis could extract a composite cultural factor that retains meaningful variation while avoiding multicollinearity. Furthermore, the study paves the way for future research with a larger dataset,

both by expanding the country sample—particularly to include developing markets—and by incorporating additional asset classes such as debt instruments, real estate, and alternative investments. This would allow for a deeper examination of whether cultural influences extend beyond equity markets and shape broader portfolio diversification strategies.

The results provide meaningful policy implications. Specifically, policymakers should interpret our estimates as an acknowledgment of the power that cultural variation exerts over financial outcomes and promote cross-cultural awareness and integration. Additionally, both governments and portfolio managers should promote global investment education. Governments should integrate international diversification concepts into financial literacy programs, while portfolio managers should actively educate clients on the benefits of global diversification and help address perceived risks, particularly in tight countries with strong cultural constraints on risk-taking. Furthermore, regulators in culturally tight markets should work on reducing psychological and bureaucratic barriers that deter investors from participating in foreign markets.

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Article history:	Received: 10.3.2025.
	Revised: 1.4.2025.
	Accepted: 14.4.2025.