HOME BIAS: EVIDENCE FROM THE STOCK EXCHANGE Olha Zadorozhna¹, Bogna Gawrońska-Nowak²

Abstract: This paper deals with issues connected to the home bias, which is a tendency of investors to keep more domestic assets versus foreign ones. We use annual data on the value of share trading of 68 stock exchanges in 68 countries for the period of 2003-2015 to find out if home bias exists given domestic and foreign shares are traded under the same regulatory framework, with the same transaction costs and rules for information availability applied; and if it does, then what factors are responsible for it. We find that the home bias increases in periods of crisis and becomes lower in periods of relative stability. In addition, home bias tends to be smaller in countries with better control of corruption and that are more open to investments. A Hausman-Taylor estimation confirms this result and suggests that countries with better institutional environments tend to have smaller home bias. Moreover, countries that are more open to investments have more foreign companies listed on their stock exchanges.

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Keywords: home bias, investors, optimal portfolio, shares

Introduction

One of the main assumptions of classical macroeconomic and financial models is that investors are rational and should invest in assets that yield the highest returns (provided they have the same risk levels). As rational agents, investors are expected to diversify their portfolios by investing not only into different types of assets, but also into assets located in different countries. This geographical diversification allows to lessen country-specific risks and maximize portfolio returns. However, such behavior is not observed in practice. Investors are often more likely to invest into domestic assets as opposed to foreign ones (French and Poterba, 1991; Cooper and Caplanis, 1994; Portes and Rey, 2005; Forbes, 2010; etc.). Possible causes of this so called *home bias* have been said to be transaction costs (Coeurdacier, 2009; Coeurdacier and Rey, 2013), transportation costs (Obstfeld and Rogoff, 2000; Lane and Milesi-Ferretti, 2008) that are high enough to prevent or limit investors from investing in foreign assets; capital controls (Black, 1974; Stulz, 1981); asymmetric information when access to important information is limited for foreign investors as opposed to domestic ones (Ahearne et al., 2004; Lau et al., 2010; Hamberg et al., 2013); patriotism (Morse and Shrive, 2011), cultural and historical similarities/differences between countries (Anderson et al., 2011; Kim et al., 2015) etc. However, nowadays integration between countries is increasingly removing barriers to trade and information, reducing the costs of investing in foreign assets and stimulating unification of standards, policies and good practices (Levy and Levy, 2014). Nevertheless, recent research shows that home bias remains there even though one would expect it to disappear or to be reduced significantly, especially in countries with high capital mobility and low investment barriers, like the US or the EU (Levy and Levy, 2014; Maier and Scholz, 2016).

Hence, the aim of this research is to estimate the home bias effect under the lack of traditional investment barriers and to analyze what factors determine it. We achieve this aim by testing the following hypotheses: home bias exists even in the absence of traditional barriers determined by the previous research; it can largely be explained by not only macroeconomic fundamentals, but also non-economic variables such as ethnic, language and religious diversity; moreover, the degree of the home bias is more prominent in culturally closed to investments countries, and is less so in countries that are more culturally open to investments.

To the best of our knowledge, this is the first paper that analyzes the impact of ethnic, linguistic and religious diversity, as well as cultural openness to investments, on home bias.

Methodology

In order to quantify home bias, we follow the most popular approach used in recent research and define it as a deviation of the actual portfolio from the optimal one (Anderson et al., 2011; Shingava, 2014; Mishra, 2015; Maier and Scholz, 2016). An optimal portfolio is derived from the international capital asset pricing model (ICAPM) assuming no transaction costs, equal access of investors to foreign and domestic shares and no exchange rate risks. One of the main caveats of the previous research is that those assumptions do not necessarily hold under imperfectly functioning institutions which is the case

¹ Lazarski University, Poland. Email: olha.zadorozhna@lazarski.pl

² Lazarski University, Poland. Email: b.gawronska@lazarski.edu.pl

of most developing and transition economies. The data used in this paper, however, allows for ICAPM assumptions to hold due to its nature – both foreign and domestic shares are available to domestic investors under the same regulatory framework. Following Schoenmaker and Bosch (2007), home bias is calculated as:

$$HB_{it} = 1 - \frac{Foreign_{it}}{(1 - \frac{MktCap_{it}}{TotalMktCap_{t}})}$$

where HB_{it} is the home bias of country *i* at time *t*, *Foreign_{it}* is a share of foreign equity traded on country *i*'s stock exchange at time *t*, *MktCap_{it}* is country *i*'s market capitalization at time *t*, *TotalMktCap_t* is a world's market capitalization at time *t*. According to ICAPM, home bias should be equal to 0 as portfolios should be geographically diversified. Hence, the further away from zero the estimate of HB is, the more home bias the country has.

To explain home bias in equity markets we develop the following model:

$$HB_{it} = \alpha + \sum \beta_j MF_{it} + \sum \gamma_k NMF_{it} + \varepsilon_{it}$$
(1)

where MF_{it} are macroeconomic fundamentals of country *i* at time *t* such as GDP growth, net foreign direct investment and inflation rate; NMF_{it} are non-macro fundamental variables of country i at time t such as ethnic/language/religion fractionalization indices, cultural attitude preferences towards investments, and regulatory quality index; ε_{it} is an error term. The model is estimated with panel data methods with residuals clustered at a country level and country specific effects. Net FDI is defined as a difference between the outflow and inflow of FDI from/to a country. Ethnic/language/religion fractionalization indices are often used in development economics literature and show the probability of two randomly selected from the population individuals belonging to different ethnicities/speaking different languages/belonging to different religions. The higher the value of the index, the more ethnically/language-wise/religiously diverse the country is. Cultural attitude towards investment is proxied by a long-term orientation (LTO) index developed by Geert Hofstede. The higher the value of the index is, the more long-term oriented the country is and, hence, is more open to investments. Ethnic/linguistic/religious fractionalization and LTO indices are time invariant. In order to be able to use them in panel data analysis, we have created interaction terms: Corruption*EthnicFr, Corruption*LanguageFr, Corruption*ReligionFr, Corruption*LTO, where Corruption is an index measuring control over corruption in a country (World Bank, 2016). The higher the value of the *Corruption* index, the higher the quality and efficiency of institutions are and the higher control over corruption the country has. The coefficients on the interaction terms are interpreted as follows: as the control over corruption and ethnic/linguistic/religious diversity of a country increases by 1%, home bias changes by the value of the coefficient³.

As an additional exercise we have run the following model:

$$NumberListedForeign_{it} = \alpha + \sum \beta_j M F_{it} + \sum \gamma_k N M F_{it} + \varepsilon_{it}$$
(2)

where $NumberListedForeign_{it}$ is the number of foreign companies listed on a stock exchange *i* at time *t*.

Model 1 and 2 were estimated both by pooled OLS and random and fixed effects models. According to the Hausman test though, the fixed effects model is the one preferred for model (2) and the random effects model is preferred in the estimation of model (1). Only the time variant variables (including interaction terms discussed above) are used in fixed effects estimations.

Data

We use annual data on value of share trading and market capitalization of 68 stock exchanges in 68 countries for the period from 2003 to 2015 from the World Federation of Exchanges⁴. Data on GDP, FDI, inflation rate, and Governance Indicators⁵ is taken from the World Bank⁶. Unfortunately, there are

³ Similar interaction terms were also created with other indices (Governance Indiactors) that measure the quality of institutions developed by the World Bank. Those indices are: Voice Accountability, Political Stability, Government Effectiveness, Regulatory Quality and Rule of Law. Model estimated with those interaction terms give similar results as those presented in the main text.

⁴ http://www.world-exchanges.org/home/index.php/statistics/monthly-reports

⁵ http://info.worldbank.org/governance/wgi/index.aspx#home

⁶ http://data.worldbank.org/

only 171 observations available for the Net FDI and, hence, the use of this variable in the regressions may limit the significance of the results. In the next section the regression results with and without FDI will be presented.

Ethnic/language/religion composition data is taken from the PRIO⁷ database. The ethnic fractionalization index shows the probability of two randomly selected from the population individuals belonging to different ethnic groups. The language fractionalization index shows the probability of two randomly selected from the population individuals belonging to different linguistic groups. And finally, the religious fractionalization index shows the probability of two randomly selected from the population individuals belonging to different religious groups. The higher the value of the indices, the more ethnically/language-wise/religiously diverse the country is. The value of the index varies between 0 and 1.

Finally, data on the cultural attitude towards investment is taken from the Hofstede Centre for Cultural Distance⁸ database. According to Hofstede et al. (2010) some countries (long-term oriented) are more prone to invest in shares and mutual funds than others (short-term oriented) and adapt to changing circumstances more easily. We use the Country Orientation Index as a proxy for openness to investing in foreign assets and hypothesize that long-term oriented countries tend to have lower levels of home bias.

Results

Table 1 and 2 below present results of econometric estimations using pooled OLS and random or fixed effects models. Given the high correlation between GDP growth and FDI, in some estimations GDP growth has been dropped to avoid multicollinearity. Due to the same reason, we do not include *Corruption*EthnicFr, Corruption*LanguageFr,* and *Corruption*ReligionFr* together into the same regression.

According to Table 1, the only significant variable is *Corruption*LTO*. The coefficient on it is negative and robust to different estimation methods and inclusion/exclusion of other explanatory variables. It suggests that home bias is lower in countries with better control of corruption and those more culturally open to investments. Among the macroeconomic variable the only variable that appears to be significant at the 10% level in the OLS estimation is *Inflation*. However, this result is not robust and disappears in all random effects estimations. R-squared of regressions in which home bias is the dependent variable is rather small, however.

According to Table 2 there is a significant positive effect of *FDI* and *Inflation* on the number of foreign companies listed on the stock exchange. However, this effect is present only in OLS estimation and disappears in fixed effects regressions. Also, there seems to be a positive and significant effect of control of corruption and ethnic/religious diversity on the dependent variable in OLS regressions (panels 2, 4 and 10, 12). Coefficients on *Corruption*EthnicFr* and *Corruption*ReligionFr* are significant at the 10% level. The coefficient on *Corruption*EthnicFr*, however, increases almost twofold in size in the FE estimation and becomes insignificant. The coefficient on *Corruption*ReligionFr* in the FE estimations not only decreases, but changes sign. The only robust result that remains significant in the different estimations is the one on *Corruption*LTO*. However, the coefficient changes sign in FE and OLS regressions – it is positive in OLS and is negative in FE regressions. Even though panel data models are usually preferred to OLS, the results on *Corruption*LTO* are still rather contradictory and do not seem to be very robust.

The possible reason for that may be a small sample size of 161 observations. To increase it, we have drop *FDI* variable from both models and rerun all the regressions. Their results are presented in Table 3. According to panels 1- 6, *Inflation* is the only macro variable that affects the number of foreign companies listed in the SEs. However, this effect is only present in the OLS estimation again. The coefficient on *Corruption*LTO* is again significant in almost all the models, however, it changes signs in the OLS and FE regressions. The coefficient on *Corruption*ReligionFr* is negative and significant in the FE regression.

⁷ https://www.prio.org/Data/Economic-and-Socio-Demographic/Ethnic-Composition-Data/

⁸ http://www.geerthofstede.com/dimension-data-matrix

Table 1: Estimation Results of Model	ts of Model	1										
Dep.Var.: Home Bias	RE	SIO	RE	STO	RE	OLS	RE	OLS	RE	SIO	RE	OLS
	(1)	(2)	(3)	(4)	(2)	(9)	(2)	(8)	(6)	(10)	(11)	(12)
GDPgrowth	-0.0008	-0.0007			-0.0008	-0.0008			-0.0007	-0.0008		
	(-0.0036)	(-0.0026)			(-0.0036)	(-0.0026)			(-0.0036)	(-0.0026)		
InFDI	-0.004	-0.0019	-0.004	-0.0018	-0.004	-0.0022	-0.004	-0.0022	-0.0039	-0.0016	-0.0039	-0.0016
	(-0.0084)	(-0.0046)	(-0.0083)	(-0.0046)	(-0.0084)	(-0.0045)	(-0.0083)	(-0.0045)	(-0.0084)	(-0.0047)	(-0.0083)	(-0.0046)
Inflation	-0.0041	-0.0084	-0.0045	-0.0086*	-0.004	-0.0082	-0.0044	-0.0085*	-0.0042	-0.0082	-0.0046	-0.0084*
	(-0.0070)	(-0.0044)	(6900.0-)	(-0.0043)	(-0.0070)	(-0.0044)	(-0.0069)	(-0.0043)	(-0.0070)	(-0.0044)	(-0.0069)	(-0.0042)
Corruption*EthnicFr	-0.0028	-0.0221	-0.0035	-0.0223								
	(-0.0408)	(-0.0341)	(-0.0401)	(-0.0343)								
Corruption*LTO	+8000.0-	-0.0009***	-0.0008*	***6000.0-	-0.0008*	-0.0009***	-0.0008*	-0.0009***	-0.0007	+*8000.0-	-0.0007	-0.0008**
	(-0.003)	(-0.0002)	(-0.0003)	(-0.002)	(-0.0004)	(-0.0002)	(-0.0004)	(-0.0002)	(-0.0004)	(-0.0002)	(-0.004)	(-0.0002)
Corruption*LanguageFr					0.0081	-0.0131	0.0074	-0.0132				
					(-0.0426)	(-0.0394)	(-0.0419)	(-0.0396)				
Corruption*ReligionFr									-0.0204	-0.0257	-0.021	-0.0258
									(-0.0465)	(-0.0213)	(-0.0459)	(-0.0215)
Constant	1.0297***	1.0383***	1.0295***	1.0369***	1.0295***	1.0397***	1.0293***	1.0383***	1.0307***	1.0360***	1.0305***	1.0345***
	(-0.0742)	(-0.0465)	(-0.0737)	(-0.0462)	(-0.0742)	(-0.0464)	(-0.0737)	(-0.0459)	(-0.0741)	(-0.0462)	(-0.0736)	(-0.0460)
R-sqr	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Obs	161	161	161	161	161	161	161	161	161	161	161	161
Notes: Standard errors are in parenthesis. *** - significance at 1% level: ** - significance at 5% level: ** - significance at 10% level. <i>InFDI</i> is a natural	e in parenth	esis. *** -	significanc	ce at 1% le	evel: ** - 5	significance	at 5% lev	rel: * - sig	nificance a	t 10% leve	al. InFDI is	a natural
locarithm of FDI RE stands for random effects. The decisions whether to choose FE vs. RE model is based on the results of the Hausman test. OI S stands	de for rando	m effects	The derici	one whethe	ar to choose	EE ve BE	l si lebom	hased on th	e reculte o	f the Haner	man tect O	I S stands
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			(1)	(2)		(3)	(4)	(5)	(9)	(1)	(8)	(6)	(10)	(11)	(12)
		GDPgrowth	-0.944	-4.118				-0.964	-3.884			-0.826	4.023		
			(-1.12)	(-2.41)				(-1.12)	(-2.55)			(-1.12)	(-2.57)		
		InFDI	5.608	25.135**	5.4	25	.249**	5.572	25.347**	5.432	25.439**	5.52	24.523**	5.385	24.637**
			(-3.09)	(77.7-)	(-3.0		(-7.80)	(-3.09)	(-7.75)	(-3.08)	(-7.76)	(-3.13)	(-7.61)	(-3.12)	(-7.63)
		Inflation	2.697	24.584***	2.2	_	8.141** / : :	2.998	23.823***	2.55	22.466**	2.748	24.186***	2.367	22.786**
			(-2.37)	(-7.00)	(-2.3		(-7.14)	(-2.37)	(-6.90)	(-2.32)	(-7.05)	(-2.39)	(56:9-)	(-2.33)	(-7.11)
		Corruption*EthnicFr	99.139	44.777*	96.2		t3.830*								
			(-65.29)	(-21.69)	(-65.1										
		Corruption*LTO	-1.501***	1.056***	-1.541*			-1.424***	1.284***	-1.467***	1.291***	-0.827	0.833**	-0.846	0.841**
			(-0.40)	(-0.25)	-0.4		(-0.25)	(-0.37)	(-0.27)	(-0.36)	(-0.27)	(-0.70)	(-0.26)	(-0.70)	(-0.26
		Corruption*LanguageFr					+	90.541	-18.542	87.368	-19.179				
		`ouruntion‡PolicionEe					-	(60.86-)	(0/.07-)	(00.10-)	(02.62-)	22 0/1	55 310 *	37 20K	54 621
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		10000	(-35.00)	(-72.60)	(-34.6			(-34.99)	(-71.05)	(-34.62)	(-72.22)	(-35.45)	(-71.32)	(-35.04)	(-72.68
		-sor	16%	36%	16		36%	17%	35%	16%	34%	15%	36%	15%	35%
		0bs	161	161		61	161	161	161	161	161	161	161	161	161
		otes: Standard errors a	re in parenthe ade for fived e	esis. *** Affante T	- signifi	icance at	t 1% leve	el; ** - { hooce EI	significance	e at 5% le	yvel; * - sig ved on the re	nificance a	it 10% leve	LT.	s a natur
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As for panels 7-12 of Table 3, none of the macroeconomic variables is significant this time, while the coefficient on *Corruption*LTO* is significant at the 1% level and negative in all OLS regressions. In general, an increase in the sample size and omission of the *FDI* variable do not seem to affect the results and they remain almost the same as presented in Tables 4 and 5. According to literature on corruption (Bellos and Subasat, 2012 and 2013; Lui, 1985; Aidt, 2003), some companies prefer to invest in countries with wide-spread corruption, because it is easier to work in the environment where all the problems may be resolved with a bribe as opposed to a situation when a firm has to go through many official channels to get a proper decision. Our result may be consistent with this so-called "greasing the wheels" concept of corruption and its effect on investments in transition and less developed economies.

The most robust result is on the coefficient of LTO – it is positive and significant. Its size is also stable and changes only slightly. This means that countries that are more open to investments and can adapt to changing circumstances faster on average and have more foreign companies listed on their exchanges. This is consistent with the regression results presented in Tables 2 and 3.

Conclusions

In this study we have explored issues connected to the home bias, which is a tendency of investors to keep more domestic assets versus foreign ones. Among the reasons for the home bias are transaction costs, transportation costs, asymmetric information, patriotism, cultural and historical similarities/differences between countries etc. However, home bias should disappear or at least become smaller with the increase of integration and the removal of trade and other cross-country barriers. This is not observed in practice though.

The results of the OLS and FE/RE methods yield rather contradictory results. The most robust one shows that home bias tends to be smaller in countries with better control of corruption and that are more open to investments. Moreover, countries that are more open to investments have more foreign companies listed on their stock exchanges.

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