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Ph.D. Dissertation

文化特徵、國家治理與資訊滲透對國外投資之研究

The Role of Culture Characteristics, Governance and Information Penetration in Foreign Portfolio Investment

袁正達

Cheng-Da Yuan

指導教授：陳思寬　博士

Advisor：Shikuan Chen, Ph.D.

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謝　辭

隨著博士論文的完成以及口試的進行，彷彿宣告離開校園的腳步近了，學生生活也即將告一段落，步伐往另一個人生階段邁進。在台大攻讀博士的求學過程能夠順利圓滿，首先必須由衷地感謝陳思寬老師、林修葳老師、張元晨老師、萬哲鈺老師以及張銘仁老師對於口試以及論文內容提出許多寶貴的意見，讓論文發表以及後續的研究方向更為豐富。尤其特別要感謝指導教授陳思寬老師，在台大國企所博士班攻讀學位期間，提供正達許多的幫助與指導，老師在國際經濟與金融方面的研究成果豐碩且學養深厚，不僅在論文題目上給予學生最大的彈性，且在論文寫作與投稿過程也都獲得陳思寬老師的悉心指導，才能在博士的養成過程中獲得最大的收穫與成長。

攻讀博士學位的契機與推手來自於就讀世新大學碩士期間多位老師的指導。世新大學郭迺鋒老師、郭敏華老師以及楊浩彥老師的一路提攜與照顧，讓正達可以在多元的學術領域中探索，接觸資料、學習不同的研究方法並獲得許多實際應用的機會，是正達研究興趣的啟蒙階段。尤其是郭迺鋒老師從碩士班階段，近十年時間不間斷地給予學習的機會，並引薦正達進入世新大學與景文科技大學兼課，才得以累積寶貴的教學經驗。另外，郭敏華老師對於論文寫作邏輯的嚴格訓練，奠定了我日後研究論文寫作的基礎，並不時提供在每一個求學階段的我可以有反思的機會，讓我在自我成長方面有很大的助益。

此外，博士班的求學階段少不了一起奮鬥的同窗戰友，感謝國企所博士班的每一位同學。包含一起修課鑽研市場微結構的瑞文大哥，常一起聊天寫作業的賽局高手一誠，總是在學校大操場運動不期而遇的碧娟，在北京大學研討會難得遇到的陽照與瑞容，公司理財模型推得天昏地暗的同組夥伴信夫以及傳授投資組合理的玄啟，承蒙多位同窗好友的指教，每每在討論賽局、隨機微積分、公司理財等科目的過程中，累積了抽象的理論基礎與研究的能量，同時學校生活也因有了大家的參與，留下許多難忘的回憶。另外，研究過程中每當遇到瓶頸或需要靈感時，政勳學長總能適時地給予珍貴建議，教學與研究過程中也常常受到秀秀學姐，鼎宇與曉園學長等多位學長姐的鼓勵與照顧，在此也一併深深致謝。

攻讀博士學位期間，並非一帆風順。何其幸運在人生最低潮的時刻，有小翰哥與小微姐一家人的支持與鼓勵，讓來自嘉義鄉下的我能夠適應台北的生活，重新找回生活的重心與節奏；在許多無所適從，茫然無頭緒的時刻，多虧小翰哥無數個伴隨著便當與咖啡的對話，意外地成為求學過程中一段特別值得回味的午茶時光。感謝一路上陪伴在正達身邊許多人的付出與關愛，因為有了您們，才能在人生與求學這一條路上不是踽踽獨行，而是途經滿地的盛放。

最後，謹獻給親愛的家人與從小辛苦撫養我長大的爺爺袁炳煌先生、奶奶黃夜好女士，有您們的教養，正達今日才有機會完成博士學位；也勉勵自己記得這段最特別的求學時光，在未來的日子裡，樂觀積極並且要能笑得燦爛。

摘　要

本博士論文主要由二篇有關文化特徵與國家治理如何影響海外投資組合的文章所組成，其中我們也探討了資訊網路在跨國投資行為裡的角色。第一篇文章探討不同的文化特徵如何影響跨國投資行為?並透過引力模型的建置以了解國家文化的特性以及文化距離等因素是否會影響海外投資組合的持有。模型的實證結果發現，不同構面的文化因子不僅對於投資組合有顯著的影響，並且兩國之間的文化距離愈遠，過度投資在母國的現象就愈形嚴重。另外，資訊距離的落差更會進一步擴大文化距離，使得資訊不對稱與交易成本的提高，間接導致跨國之間的投資更形困難。因此，無法達到最佳化的資產配置與分散風險的效果。

第二篇文章主要探討國家治理的概念與資訊滲透的程度對跨國投資的影響。實證結果發現，擁有較佳治理機制的國家能夠吸引較多的國外投資，能夠降低過度投資在母國的現象。另外，更發現國家治理穩定且擁有高度通訊網絡的國家，可更進一步吸引外國投資並使得本國投資者更易於持有海外資產，以分散投資組合的風險。該結果說明資訊滲透的程度可以加強國家治理的力量，並使得投資組合更國際化，能降低過度投資在本國的偏誤。因此，國家應該致力於建立更透明、有效率的國家治理機制，並建設普及化的網路通訊設施來有效地分散資產投資組合的風險。

關鍵詞: 母國偏誤，文化特徵，引力模型，國家治理，資訊滲透

Abstract

The Ph. D. dissertation is a collection of two essays on equity home bias, national culture characteristics and information technology. Chapter 1 addresses the role of national culture played in the cross-border investment. We first investigate the effects of various culture dimensions on foreign portfolio investment constructing gravity model. Our evidence indicates that various culture characteristics exert different impact on foreign portfolio holdings. We also incorporate cultural distance and it's interaction with information distance to home bias. The empirical result suggests that culture distance have significant positive effect on equity home bias. Moreover, the information gap between originating country and destination country can increase the culture distance that discourages foreign diversification.

In Chapter 2, we examine the addressed issue of governance regime and information penetration on cross-border investment. The estimated result shows that better regulatory has a negative but insignificant effect on reducing home bias. Nevertheless, we further find that a country with greater governance appears to decrease cross-border investment bias under higher information penetration. This implies that information penetration can moderate the strength of the relationship between governance quality and home bias. The implication is that for a country tries to diversify internationally should devote themselves into developing better governance environment and information infrastructure.

Keywords: home bias, culture characteristics, gravity model, regulatory governance, information penetration

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Introduction

The home bias phenomenon is firstly observed by French and Poterba (1991) in equity market. However, the author argue that the national wealth not always move together, investors can diversify their assets in foreign countries. Despite the international diversification can decrease the non-system risk and benefits portfolio holdings, investors merely invest their wealth in their own countries. Moreover, the home bias emerges in various fields such as consumption, debt and equity investment, mutual fund and bank loans. Previous literature provides plenteous theories to explain why investors allocate less proportion of their wealth in foreign market, despite the fact that diversification benefits are recognized for decades. For example, the home bias can be attributed to transaction costs and barriers to international investments (see Errunza and Losq, 1985; Warnock, 2002).

Lewis (1999) and Sercu and Vanpée (2007) summarize that the equity home bias can be explained by hedging for domestic risks, such as inflation risk, real exchange rate risk, domestic consumption risk, and the risk of non-tradable wealth components like human capital (see Baxter and Jermann, 1997; Obstfeld and Rogoff, 1996; Wheatley, 2001). Cooper and Kaplanis (1994) argue that the departure of purchasing power parity could be another reason to explain home bias, while Brennan et al (2005) suggest that information asymmetry could be a potential explanation for home bias. The latest study addresses the role of cultural characteristics on foreign investment since country-specified culture can deeply affects investment behavior. We argue culture traits can be factors that influence foreign portfolio investment. Therefore, our first paper related our foreign investment issue to country-specified cultural dimensions.

In particular, this dissertation focuses on the roles of country-specified culture characteristics, governance environment on international diversification. The thesis addresses two parts of survey-based data conducted by Hofsted's (2001) and Kauffman et al (1999). According to Hofsted's (2001), the rooted culture is transmitted generation by generation and is a pattern of thinking, feeling and reaction. In fact, national culture is a traditional value, beliefs that distinguished from another group. Hofstede (2001) identifies the culture traits into the following primary dimensions, power distance, uncertainty avoidance, individualism, masculinity, and long-term orientation. These variables reveal the differences in thinking, values, and social behaviors among people from more than 50 countries. Thus, we argue that national cultural characteristics can exert significant effect on home bias.

The major variables regard to the governance concept of interest are Worldwide

Governance Indicators (WGI) conducted by Kauffman et al (1999). In particular, these variables are obtained from 25 important sources and covering various aspects of governance quality. These indicators include voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. These indicators are compiled every year and cover more than 245 countries, including most of the developed and emerging markets. This allows us to relate culture and governance dimensions to cross-border investment. Therefore, we use these two survey-based data to revisit the home bias issue.

In Chapter 1, we find that culture characteristics exert different influences on international diversification while traditional gravity model focuses on country characteristics variables such as GDP, population, and geographic distance. In particular, countries characterized by higher uncertainty avoidance tend to exhibit less diversification in their foreign holdings and display greater home bias. Moreover, portfolios from countries with higher levels of higher power distance and geographic distance display higher home bias. The significant interaction effect of culture distance and information distance implies that information distance increases culture distance and discourages foreign investment. Therefore, culture impacts investor behavior directly and not merely though indirect channels such as legal and regulatory framework. Our findings also suggest that culture distance has significant impacts on international investment behavior after control geographic distance. This result is consistent with the conclusion of Anderson et al. (2011).

In Chapter 2, we argue the legal regime in a country can affect international portfolio holdings. However, previous studies use corporate governance such as investors' protection to explain home bias, how governance quality in macroeconomic level affects home bias is not investigated. Hence, we adopt Kauffman (1999) governance matter survey data to construct panel data consisting more than 40 countries to explore this issue. Our result shows that better governance has a negative but insignificant effect on reducing home bias. Nevertheless, we further find that a country with greater governance appears to decrease cross-border investment bias under higher information penetration. That is the development of information communication technology can moderate the effect of governance mechanism.

This dissertation is organized as following. In Chapter 1, we use gravity model to analyze the relation between culture characteristics and foreign portfolio allocation. In Chapter 2, we discuss how governance quality and information penetration impact international diversification. Finally, we conclude this thesis and shed the light for further research.

Chapter 1

Gravity Analysis on Culture and Information Distance in Home Bias

This study uses the IMF's Coordinated Portfolio Investment Survey data across 45 countries during 2001-2009 to examine the relationship between national culture characteristics and equity home bias. We find different culture characteristics exert significant influences on international diversification. Despite the fact that geographic distance and language consistently have a significant effect on home bias, distance in the degree of a different culture has a positive effect on home bias, implying that cultural difference discourages foreign investment. Furthermore, we show that information distance increases culture distance, thus leading to more home bias.

1.1 Introduction

The asset allocation theory suggests that a country should diversify its investments internationally, but investment in foreign markets is far from a market portfolio as predicted. This phenomenon is referred to the famous puzzle, "home bias". The traditional explanation proposes that home bias is affected by trading barriers, transaction cost, information asymmetry and familiarity, foreign exchange rate risk, corporate governance, corruption, and the regulatory system. We argue that national culture characteristics, such as the attitude towards taking risk, a system of values and beliefs, and perception toward the future, affect the preference for international investment. Furthermore, these culture characteristics vary across countries.

Culture is a framework that stands for the foundational institutions of society. It also can be seen as a system of values and beliefs underlying more specific formal institutions and informal ones (North, 1990; Williamson, 2000). Tabellini (2008) describes the national culture as a system of values and core beliefs that provide guidance for behavior and perceptions of the world. We conjecture that the rooted culture and beliefs in a country do affect its preference for foreign portfolio holdings. Therefore, we address the interesting issue of whether culturally-rooted behavior impacts cross-border investment.

Previous literature has provided abundant explanations for home bias. Tesar and

Werner (1995) suggest that differences in language and legal environment and the cost for obtaining information from the foreign market make investors prefer to invest domestically. Grinblatt and Keloharju (2001) confirm that investors tend to invest in stocks of firms located close to them. Moreover, the Chief Executive Officer's (CEO) native tongue and culture background exert significant effects on investors' portfolio holdings. Coval and Moskowitz (1999) use airfares and phone rate to explain home bias. Huberman (2001) finds evidence that investors tend to invest in the company they are familiar with and ignore that their assets should be diversified. In particular, culture is a composite concept locally rooted in the home country, including values, judgment, beliefs, and attitudes.

We propose that culture characteristics such as decisiveness, assertiveness, competitiveness, subject perspective, and attitude toward risk affect foreign investment. Aggarwal, Kearney and Lucey (2011) identify the culture distance on cross-border investment both in debt and equity. The estimated coefficients of distance in masculinity and the degree of individualism are positively significant in both the debt and equity equations, implying that a country with a more aggressive attitude has more foreign investment in equity. They also confirm that culture distance increases the geographic distance, which has a reverse effect on foreign investment.

Anderson et al (2011) address the function of culture in determining the asset allocation in a foreign market by exploring mutual fund data. Huang (2008) and Chui et al. (2010) utilize the culture distance to explain investors' trading behavior and industrial growth. Thus, the geographic distance, the place where a company's headquarters is located, and whether two countries share a common language and religion are important determinants that influence international diversification. The culture difference thus can affect the preference for cross-border investment.

To examine the effect of culture characteristics on equity home bias, we apply the quantitative data from the International Monetary Fund's (IMF) Coordinated Portfolio Investment Survey (CPIS) data across 45 countries during 2001-2009. Our hypothesis is that a country with a greater culture distance implies more divergence in preferences for foreign investment, attitude towards risk, beliefs, and perception. Nevertheless, the home country will underweight its investments in a foreign country and exhibit more home bias towards the target market, because the culture gap between the home country and the host country is large.

Another part of this study examines how information distance interacts with culture distance. This article uses the number of Internet users per 100 people between the originating and destination countries to proxy for information distance. Since the speed of information transmission is accelerated, information infrastructure development improves the accuracy and efficiency of acquiring and processing

information for investors. From this point of view, we argue that two countries with greater information distance incur more information asymmetry and transaction costs that discourage investors to invest in the foreign market. Thus, information distance significantly increases the cultural difference in determining cross-border investment. Though culture distance significantly influences foreign investment, we conjecture that information distance raises gap and makes investors allocate their assets domestically. Mondria and Wu (2010) apply variables such as the number of people with Internet access, the number of mobile telephone subscribers, and the average circulation of newspapers to proxy information capacity and conclude that home bias increases with information capacity.

This study constructs a gravity model to examine the effect of culture distance on international portfolio allocation and offers the following empirical insights. First, we find each culture dimension has a different effect on home bias. For example, a country with high uncertainty avoidance tends to allocate less proportion of its portfolio in foreign markets and exhibits higher home bias. On the contrary, culture characteristics such as masculinity and long-term orientation are reversely associated to home bias while a country with more individualism displays less home bias. Second, we confirm that a greater culture distance discourages foreign investment and affects international asset allocation, leading to more home bias. Third, we further investigate how information distance interacts with culture distance. Our empirical evidence shows that a country with higher information distance can significantly increase the culture distance, which results in more home bias in equity investment.

This article is organized as follows. Section 2 reviews the linkage between national culture characteristics and international investment bias. Section 3 describes the data and model specifications. Section 4 presents empirical results and the implication for cross-border investment. Section 5 uses an alternative estimation to check the robustness. Section 6 concludes this study and provides implications for further research.

1.2 The Linkage between International Diversification and Culture Characteristics

Though previous literature proposes various explanations for home bias, the culture dimensional impacts on the decision-making process related to international investment, financial intermediation, and corporate finance have become more and more important. Stulz and Williamson (2003) show that a country's principal religion predicts the cross-sectional variation in creditor rights better than other variables such as language and trade openness. Chang and Noorbakhsh (2009) suggest that national

culture influences corporate managers' cash holding behavior, even controlling for governance and financial development. The empirical finding is that corporations hold larger cash and liquid balances in countries where people tend to avoid uncertainty.

Rossi and Volpin (2004) and di Giovanni (2005) use language similarity and geography as proxies to examine the effect of cultural distance on merger and acquisition activity, while Chan, Covrig, and Ng (2005) take variables for common language, geographical proximity, common colonial ties, and bilateral trade to address the role of informational asymmetry in the home bias. Anderson et al. (2011) examine the role of national culture from the view of institutional investors, concluding that culture characteristics indeed influence home bias and foreign diversification. Lin (2009) confirms that culture affects foreign investment where investors perform superior in a foreign market that has a formal regime and culture similar to their own country. The culture distance therefore creates information asymmetry, and thus culture difference and governance mechanism affect cross-border investment. Aggarwal and Goodell (2010) suggest that a country characterized by society openness, economic inequality, and lower uncertainty avoidance prefers to finance through the equity market while a society engraved by regulatory and ambiguity aversion would rather have more bank-based financing.

Zheng et al. (2011) propose that national culture explains cross-country variations in the maturity structure of corporate debt. They conclude that firms prefer to use short-term debt when a country is characterized with high scores in uncertainty avoidance, power distance, and masculinity. While many studies apply culture variables from Hofstede (2001), Siegel, Licht and Schwartz (2011) use egalitarianism distance to capture the degree of institutional compatibility. They find the larger egalitarianism distance between the home country and host country decreases cross-border bonds, equity investment, syndicated loans, and mergers and acquisitions.

Slangen (2006) finds strong empirical evidence for greater differences in national culture reducing foreign acquisition performance by analyzing 102 cross-border acquisitions by Dutch firms in 30 countries. However, Diyarbakirlioglu (2011) finds culture distance provides a limited explanation for international portfolio holdings. Cho and Padmanabhan (2005) present that cultural distance is positively associated with full ownership of Japanese foreign manufacturing entities. Aggarwal and Goodell (2009) examine the role of national culture in determining the preferences of financial intermediation (markets versus institutions), showing a country characterized by higher uncertainty avoidance is more bank-based instead of market-based. Beugelsdijk and Frijns (2010) apply a society's culture and the cultural

distance between two markets to explain the foreign bias. In particular, the authors find that an uncertainty-avoiding country allocates less to foreign markets while a country with a higher degree of individualism tends to invest more in foreign markets. However, though various culture dimensions are related to economic issues, national culture characteristics' influence on cross-border investment is rarely examined.

This study uses cross-border equity investment data from 45 countries to examine whether culture distance affects foreign portfolio investment by constructing a gravity model. Hofstede's survey including power distance, uncertainty avoidance, individualism, masculinity, and long-term orientation allows us to relate these culture characteristics to the international investment issue. However, various culture dimensions capture different effects on equity investment, and these concepts can be translated into investment behavior. Following Anderson et al. (2011), we categorize national culture components into corresponding investment behavior and form testable hypotheses as follows.

The concept of power distance is associated with the content of hierarchy. A high power distance society tends to limit the opportunity for education and controls the media and information. In contrast, a country with a lower power distance can freely disseminate information and encourages personal development and access to education. Therefore, we expect a power distant society will allocate less assets to foreign markets, resulting in a higher degree of the home bias measure.

Hypothesis 1. Countries characterized by a high power distance tend to allocate assets domestically and exhibit more home bias.

We conjecture that a country with a higher ranking of uncertainty avoidance prefers to invest its wealth domestically and in a country they are familiar with. We predict that a country with the propensity to avoid uncertainty toward the future will allocate its wealth in the home country instead of oversea markets. Therefore, this leads to higher home bias.

Hypothesis 2. Countries characterized by high uncertainty avoidance tend to underweight their investment in foreign markets and exhibit more home bias in their investment behavior.

A higher score in individualism implies that a country behaves more aggressive and undertakes more risk taking in foreign investment. A country with this property is confident about itself that it can process information efficiently and correctly. Such a country interprets information from foreign markets better to improve its decision

making process. We argue that a country with a high score in this culture dimension of individualism prefers to hold foreign assets and has less home bias.

Hypothesis 3. Countries characterized by high individualism diversify their wealth in foreign markets and therefore have a lower home bias than countries with low individualism scores.

According to the suggestion in the field of behavior finance, gender can affect investment behavior. Barber and Odean (2001) confirm that male investors suffer more investment loss than female investors due to over-trading, which is attributed to psychological bias such as over-confidence and self-attribution. Thus, we expect a more masculine society is more willing to hold or trade securities in foreign markets. Therefore, we predict that masculinity exerts a negative effect for home bias.

Hypothesis 4. Countries characterized by high masculinity scores have more equity ownership abroad and therefore a lower home bias than countries with low scores.

The characteristic for the dimension of long-term orientation often implies that investors are more patient and forward looking and believe that long-term investment lowers systematic risk, which is consistent with the diversification theory. A country with higher scores on this dimension is more likely to diversify its portfolio internationally. Thus, this type of country exhibits less home bias in equity investment than countries with lower scores.

Hypothesis 5. Countries characterized by high long-term orientation have more ownership abroad and therefore have a lower home bias than countries with low scores in this dimension.

Hypothesis 6. A greater distance in the level of culture dimension discourages foreign portfolio holdings from the originating country to the destination country and leads to more home bias.

We further argue that the information gap between two countries increases the culture distance and hurts international diversification. We use the difference of Internet users per 100 people from two countries as a proxy of information distance. We predict that the information gap between the home country and host country increases culture distance and raises home bias.

Hypothesis 7. Countries with a higher information distance can strengthen the culture distance between the source and destination countries, and thus the originating country exhibits more home bias toward the destination country.

1.3 Data and Methodology

1.3.1 Home Bias Measure

The Coordinated Portfolio Investment Survey (CPIS) conducted by the IMF provides bilateral equity investment data for more than 70 countries. The CPIS breaks down offshore investment into 255 foreign countries for an individual country during the period 2001 to 2009.[1] More than 70 countries report their international equity portfolio investments in foreign countries, but CPIS data do not identify domestic securities holdings. Therefore, the aggregate portfolio investment in a selected country, as reported by the remaining countries, serves as an estimate of that country's liabilities. This allows us to calculate the domestic portfolio holdings by subtracting the foreign liabilities from the local market capitalization. Moreover, we calculate the equity investment across major countries, which is intensively used in home bias related research. Following Chan et al. (2005), we calculate the country home bias that describes the deviation from the foreign market, while we extend the scope to the bilateral home bias. Since source country i may not invest in target country j for $i \neq j$, we exclude all missing values and extreme observations when estimating our model.

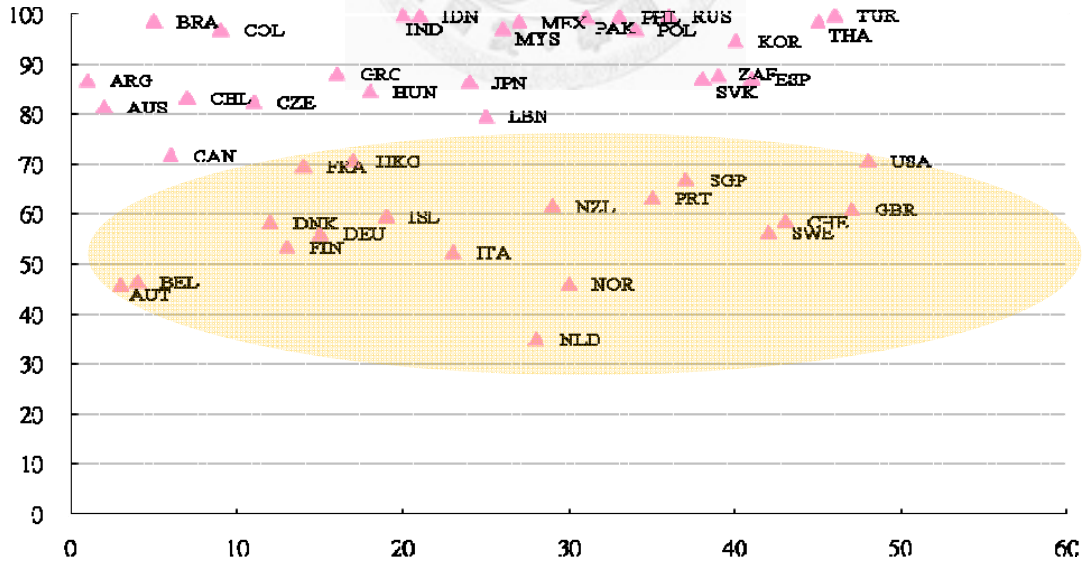

Figure 1.1 Home bias for year 2009

[1]Participation in the Coordinated Portfolio Investment Survey (CPIS) is voluntary and 75 economies currently participate in the survey. The foreign holding data for each country provided by CPIS are available annually for the period 2001-2009 and some data are also available for 1997.

In this study the subscript *i* and *j* denote the home country and the host country, respectively. The share of *i*'s equity investment in country j (w_{ij}) is the ratio of domestic country *i*'s holdings of country *j* equities to country *i*'s total equity portfolio. The total equity portfolio for country *i* is calculated as country *i*'s market capitalization less equities held by foreign investors plus foreign equities held by domestic investors.

$$w_{ij} = \frac{country\ i's\ holdings\ of\ country\ j\ equities}{country\ i's\ total\ equity\ portfolio} \tag{1.1}$$

$$w_j^* = \frac{country\ j's\ market\ capitalization}{world\ market\ capitalization} \tag{1.2}$$

Here, the optimal portfolio allocation w_j^* is the ratio of target country *j*'s equity capitalization relative to the world market and is used as the benchmark of optimal portfolio holdings.

Following Chan et al. (2005) and Fidora et al. (2007), Equation (1.3) defines the home bias measure of country *i* toward country *j*. The under/overweighting of the target countries is calculated as the actual allocation by each target country deviating from the market portfolio as suggested by the Capital Asset Pricing Model (CAPM). This measures how far the actual portfolio allocation deviates from the market portfolio w_j^* as suggested by CAPM.

$$Home\ Bias_{ij} = \frac{w_j^* - w_{ij}}{w_j^*} = 1 - \frac{w_{ij}}{w_j^*} \tag{1.3}$$

This paper addresses the issue of how cross-cultural differences affect foreign portfolio holdings. According to the well-known survey conducted by Hofstede (2001), the culture attributes can be identified into the following primary dimensions, including the differences in thinking, values, and social behaviors among people from more than 50 countries. This allows us to relate culture dimensions to international asset allocation. These culture dimensions are power distance index (pdi), uncertainty avoidance index (uai), individualism (idv), masculinity (mas), and long-term orientation (lto).

According to Hofstede's framework, the cultural dimension of power distance is associated with the content of hierarchy. In a high power distant society, we expect the power imbalance to cause unequal resource distribution, a limited

decision-making process, and a lack of social mobility. These will allow a powerful authority to pursue private interest and privilege, which will lead to a corrupt and bureaucratic government that lowers the level of trust and increases opportunistic behaviors. The extent to uncertainty avoidance is related to a society's tolerance for uncertainty and ambiguity, indicating that people will feel either nervous or anxious in unpredicted situations. A country with a higher degree of uncertainty avoidance will expect its investment to be protected by strict laws and rules, in particular for investors preferring to allocate their assets in a safe and secure market.

Individualism is the degree to which individuals are integrated into groups. A country with a greater degree of individualism focuses on individual motivation, self-interest, and ambitions and one is expected to look after his immediate family. By contrast, a collectivism society refers to the extent that people are strongly connected and prefer group decision-making. Masculinity refers to a society that emphasizes assertiveness, competitiveness, and success instead of femininity, such as nurturance, support, and attentiveness. The last culture dimension of Hofsted (2001) is the long-term orientation, which refers to values associated with thrift and perseverance.

Despite the above-mentioned primary dimensions of national culture, we also utilize a composite measure of cultural distance through Kogut and Singh (1988) as follows:

$$CD_I = \sum_{n=1}^{N} \left(\frac{C_{n,I} - C_{n,J}}{V_n} \right) / N , \tag{1.4}$$

where CD_I is the cultural distance of domestic country I from target country J. Here, $C_{n,I}$ is the index for the nth cultural dimension of country I, V_n is the variance of the nth index, and $C_{n,J}$ is the index for the nth cultural dimension of country J. A higher culture distance indicates a greater difference between the source and target countries.

The data analyzed in this study are collected from various sources. The specific country characteristics such as GDP, total population, the ratio of private sector finance to GDP, telephone lines, the number of mobile phone subscribers, and Internet users per 100 people are from World Development Indicators (WDI), while country governance is from governance matters conducted by Kaufmann (1999). Our addressed cultural dimension measures, including power distance, uncertainty avoidance, individualism, masculinity, and long-term orientation versus short-term orientation, are from Hofsted's website (www.geert-hofsted.com/). The gravity variables such as geographic distance between two countries and dummy variables indicating whether the two countries share a common language are drawn from CEPII (http://www.cepii.fr/anglaisgraph/news/accueilengl.htm).

1.3.2 Model Specification

We first examine whether national culture characteristics and culture distance between the home and host countries influence foreign investment. We are also interested in the interaction effect of culture distance and information gap on cross-border investment. We argue that information distance significantly increases the culture distance and discourages foreign investment, thus increasing the home bias measure for the originating country. The gravity model is specified as follows:

$$\begin{aligned} home\ bias_{ijt} = {} & \alpha_0 + \beta_1 \ln(gdp)_{it} + \beta_2 \ln(pop)_{it} + \beta_3 \ln(gdp)_{jt} + \beta_4 \ln(pop)_{jt} + \beta_5 \ln(dist)_{ij} \\ & + \beta_6 comlang_{ij} + \beta_7 \ln(credit)_{it} + \beta_8 \ln(credit)_{jt} \\ & + \beta_9 \ln(culture)_{it} + \beta_{10} \ln(dist^{cul})_{ij} + \beta_{11} \ln(dist^{cul} \times dist^{int})_{ijt} + \varepsilon_{ij}, \end{aligned} \tag{1.5}$$

Here:

- $home\ bias_{ijt}$ is the home bias measure of source country i to target market j at time t.
- $ln(gdp)_{it}$ and $ln(gdp)_{jt}$ are the GDP levels for source country i and target country j in year t.
- $ln(pop)_{it}$ and $ln(pop)_{jt}$ are the populations for source country i and target country j in year t.
- $ln(dist)_{ij}$ is the geographic distance between the capital cities of countries i and j.
- *comlan* is a dummy variable for whether two countries share a common language.
- $ln(credit)_{it}$ and $ln(credit)_{jt}$ are the ratios of private sector debt to GDP for country i and country j in year t.
- $ln(culture)_{it}$ are the scores of Hofsted's culture characteristics.
- $ln(dist^{cul})_{ijt}$ denotes the cultural distance for Hofsted's culture characteristics between the source and target countries.
- $ln(dist^{cul} \times dist^{int})_{ijt}$ denotes the cross product term of culture distance and information distance between the source and target countries.
- ε_{ijt} is the normal error term with mean zero and variance σ^2.

The dependent variable home $bias_{ijt}$ denotes the home bias measure in cross-border equity investment, subscriber i denotes the cross-section country, and the symbol t represents each time period. The term α_0 is a constant term, while the estimated coefficients of β_1 to β_4 capture the economic scale and specific country characteristics that are basic variables in the gravity model. The estimated coefficients for β_5 and β_6 measure the marginal effect of the gravity variables, geographic distance and whether two countries share common language, on international portfolio

holdings. The coefficients for β_7 and β_8 capture the impact of financial development on bilateral home bias. The estimated coefficients for β_9 measure the marginal effects for different national culture characteristics in home bias, while coefficient β_{10} captures the effects of various distances in the level of culture dimensions on home bias.

Shenkar (2001) suggests that national culture can be modified by corporate culture and addresses the interaction effect between culture distance and other interesting variables. Cho and Padmanabhan (2005) investigate the moderating effects of a firm's experience levels in the relationship between cultural distance and foreign ownership mode choice. Slangen (2006) hypothesizes that national culture reduces foreign acquisition performance, depending on the level of post-acquisition integration. This study also interacts the cultural distance with information distance to examine whether the information gap increases this culture distance and result in an increasing home bias. Therefore, we expect the coefficient for β_{11} to be positive for the interaction term. Table 1.1 presents the summary statistics of the related variables used in this paper.

Table 1.1 Summary statistics

Table 1 presents descriptive statistics for the variables used in this study. We constrain our sample by censoring the values of home bias exceeding 0.99 and less than 0, since observations exceeding 0.99 or having a negative value can be seen as extreme values or foreign bias. The control variables include gross domestic product (GDP), total population (pop) for originating and destination countries, geographic distance (dist); a dummy variable indicates whether two countries share a common language (comlan); and the credit to the private sector as a share of GDP is used to proxy financial development (fin) for the originating and destination countries. The culture identifiers are Hofstede's power distance (pdi), uncertainty avoidance (uai), individualism (idv), masculinity (mas), and long-term orientation (lto). The culture distance dimensions include power distance ($dist^{pdi}$), uncertainty avoidance ($dist^{uai}$), individualism ($dist^{idv}$), masculinity ($dist^{mas}$), and long-term orientation ($dist^{lto}$). All these variables are presented in log form. The superscripts OC and DC denote originating country and destination country, respectively.

Variable	Obs	Mean	Std. Dev.	Min	Max
home bias	7894	0.8	0.2	0.0	1.0
gdp^{OC}	7894	26.6	1.5	22.9	30.1
gdp^{DC}	7894	26.6	1.3	22.9	30.1
pop^{OC}	7894	16.7	1.4	12.6	20.9
pop^{DC}	7894	17.2	1.5	12.6	21.0
$credit^{OC}$	7602	4.8	0.5	2.4	5.8
$credit^{DC}$	7717	4.6	0.6	2.4	5.8
dist	7894	8.4	1.1	4.1	9.9
pdi^{OC}	7596	3.7	0.5	2.4	4.6
uai^{OC}	7596	4.0	0.5	2.1	4.7
idv^{OC}	7596	4.1	0.4	2.5	4.5
mas^{OC}	7596	3.7	0.8	1.6	4.7
lto^{OC}	6996	3.6	0.4	2.6	4.6
$dist^{pdi}$	7331	2.9	1.0	0.0	4.5
$dist^{uai}$	7291	3.0	1.0	0.0	4.6
$dist^{idv}$	7317	3.0	1.0	0.0	4.4
$dist^{mas}$	7325	2.9	1.0	0.0	4.7
$dist^{lto}$	5515	2.7	1.0	0.0	4.7
$dist^{int}$	7893	2.9	1.1	0.0	4.5

1.4 Panel Estimation Results

In order to provide insights for the relationship between rooted-cultural difference and equity home bias, we construct a gravity model from CPIS cross-border equity investment data that consist of 45 countries during 2001 to 2009. The following empirical results are estimated by the panel data approach, while the pooled OLS regression is conducted in Appendix.

Our analyses begin by identifying the national culture impacts on home bias by entering the specific culture characteristics into our model separately. Table 1.2 presents panel data estimation for the effects of different cultural dimensions, including power distance, uncertainty avoidance, masculinity, individualism, long-term orientation, and overall cultural distance measure, on international equity holdings. The positive sign of uncertainty avoidance suggests that a home country with a higher score in this cultural dimension exhibits more home bias. In general, a country with higher uncertainty avoidance has a greater risk adverse attitude and is more conservative in investing its wealth in foreign markets. The negative coefficient of individualism (ind) reflects that a country with a higher score in this dimension is confident in the ability to understand and interpret information quickly from the target market. Thus, investors are more willing to allocate their wealth in foreign markets

and exhibits less home bias. This result is consistent to Anderson et al. (2011).

A country characterized by high masculinity is associated with the extent of aggressiveness, taking adventure, and highly confident. Barber and Odean (2001) find that male investors suffer from a lower return than female investors since they typically have higher trading volume. The cultural dimension of masculinity can thus be categorized into overconfidence. Hence, we predict a country prefers to have ownership abroad than those countries with lower scores and therefore behaves with less home bias. The negative estimated coefficient for masculinity indicates that a country prefers to hold foreign assets, because the self-attribution bias makes people believe they can process and interpret more information than other countries. Consequently, our Hypothesis 4 is confirmed.

According to the survey, long-term orientation is related to the value of thrift and perseverance. We predict that a country with a long-term investment view acts patiently and is more willing to diversify its assets internationally, leading to less home bias. However, the estimated coefficient of long-term orientation (lto) is negative, but insignificant. The estimated signs are as expected except for the coefficient of masculinity (mas).

We now turn to the estimated coefficients for the important gravity variables. The expected signs for the gravity variables are consistent with both theoretical predictions and existing findings in the literature. We find that geographic distance consistently enters the model with a positive sign, which implies that geographic distance increases information asymmetry and transaction cost to the target market, thus discouraging foreign investment. On the contrary, the estimated sign for common language is negative as predicted. This confirms that investors prefer to invest in a country with the same language, which makes it easier to extract and interpret information from financial statements. Thus, common language significantly reduces home bias. The negative and significant coefficient for financial development reflects that the originating country with better financial openness exhibits less home bias.

Table 1.2 Panel data estimation: the effects of culture characteristics

Table 2 shows results from panel estimation with random effect. We analyze the relationship between culture identifier and home bias in equity investment after controlling gravity variables. The dependent variable is the home bias measure. We censor the values of home bias exceeding 0.99 and less than 0, since observations exceeding 0.99 or having a negative value can be seen as extreme values or foreign bias. The control variables include gross domestic product (GDP), total population (pop) for originating and destination countries, geographic distance (dist); the dummy variable indicates whether two countries share a common language (comlan); and the credit to the private sector as a share of GDP is used to proxy financial development (fin) for originating and destination country. The culture identifiers added in our model are power distance (pdi), uncertainty avoidance (uai), individualism (idv), masculinity (mas), and long-term orientation (lto). The superscripts OC and DC denote originating country and destination country, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
const.	-0.533	-0.420	-0.053	-0.262	0.029	-1.519*
	(-1.24)	(-1.01)	(-0.13)	(-0.65)	(0.06)	(-1.85)
gdp^{OC}	-0.064***	-0.073***	-0.082***	-0.075***	-0.109***	-0.081**
	(-2.91)	(-3.45)	(-3.64)	(-3.60)	(-4.01)	(-2.10)
gdp^{DC}	-0.077***	-0.074***	-0.075***	-0.077***	-0.082***	-0.066**
	(-4.77)	(-4.63)	(-4.63)	(-4.79)	(-4.70)	(-2.40)
pop^{OC}	0.100***	0.107***	0.129***	0.108***	0.166***	0.111***
	(4.25)	(4.76)	(5.86)	(4.99)	(6.11)	(2.58)
pop^{DC}	0.056***	0.054***	0.055***	0.057***	0.059***	0.058**
	(3.98)	(3.87)	(3.91)	(4.04)	(3.83)	(2.42)
dist	0.203***	0.209***	0.202***	0.202***	0.225***	0.246***
	(15.42)	(15.69)	(15.12)	(15.38)	(15.38)	(12.87)
comlan	-0.248***	-0.220***	-0.243***	-0.266***	-0.256***	-0.345***
	(-5.81)	(-5.07)	(-5.67)	(-6.21)	(-5.32)	(-5.25)
$credit^{OC}$	-0.131***	-0.142***	-0.143***	-0.144***	-0.174***	-0.169***
	(-4.97)	(-5.45)	(-5.47)	(-5.51)	(-5.53)	(-4.12)
$credit^{DC}$	-0.036*	-0.036*	-0.036*	-0.035*	-0.021	-0.007
	(-1.72)	(-1.68)	(-1.67)	(-1.66)	(-0.91)	(-0.16)
pdi^{OC}	0.106***					0.080
	(3.05)					(1.46)
uai^{OC}		0.092***				0.076*
		(3.09)				(1.69)
idv^{OC}			-0.019			-0.055
			(-0.60)			(-0.94)
mas^{OC}				0.091***		0.103***
				(4.38)		(3.35)
lto^{OC}					-0.006	-0.047
					(-0.15)	(-0.79)
pdi^{DC}						0.141**
						(2.40)
uai^{DC}						-0.049
						(-1.16)
idv^{DC}						0.074
						(1.24)
mas^{DC}						0.005
						(0.16)
lto^{DC}						-0.064
						(-1.22)
Obs.	7170	7170	7170	7170	6580	4862
R^2-between	0.249	0.248	0.242	0.253	0.266	0.307
Wald statistic	450.237	449.984	437.631	462.063	421.623	344.969

Note: The t-statistics are in the parentheses, while the symbols *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively. The Wald statistic checks the overall significance of the model against the null that all coefficients are simultaneously zero.

Table 1.3 shows the effects of various culture distances on home bias. The coefficients for culture distance, such as $dist^{pdi}$, $dist^{uai}$, $dist^{lto}$, and composite culture distance (CD), are strongly significant at 0.01. The estimated signs for $dist^{idv}$ and $dist^{mas}$ are positive, however they are insignificant. This result confirms our hypothesis that not only does geographic distance increase transaction cost which prevents portfolio diversification, but also culture distance discourages foreign investment. For models (7) to (9), we further examine the effect of culture distance on an international portfolio after controlling geographic distance, language, and the level of financial development. By adding geographic distance in the model specification, all the coefficients for culture distance remain positive. Our empirical results suggest that investors prefer to invest in a country with a closer culture background and beliefs. The estimation result is similar to the previous result. The coefficients for geographic distance show a persistent positive sign across models. The expected negative sign of the coefficient for common language implies that the two countries tend to invest in target markets when they share the same language. A common language is helpful in decreasing home bias since it is critical for acquiring and processing information. This result is in line with Grinblatt and Keloharju (2001) in that investors tend to invest in a firm where the CEO speaks the same language.

Table 1.3 Panel data estimation: the effects of culture distance

Table 3 shows results from panel estimation with random effect. We analyze the relationship between culture distance and home bias in equity investment after controlling the gravity variables. The dependent variable is the home bias measure. We censor the values of home bias exceeding 0.99 and less than 0, since observations exceeding 0.99 or having a negative value can be seen as extreme values or foreign bias. The control variables include gross domestic product (GDP), total population (pop) for originating and destination countries, geographic distance (dist); the dummy variable indicates whether two countries share a common language (comlan); and the credit to the private sector as a share of GDP is used to proxy financial development (fin) for originating and destination countries. The culture distance identifiers added in our model are power distance ($dist^{pdi}$), uncertainty avoidance ($dist^{uai}$), individualism ($dist^{idv}$), masculinity ($dist^{mas}$), and long-term orientation ($dist^{lto}$), while (CD) denotes the aggregate measure of culture distance for various culture dimensions. The superscripts OC and DC denote originating country and destination country, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
const.	0.774***	0.882***	0.953***	0.953***	1.214***	1.221***	1.458***	1.980***	1.410***	0.964***
	(4.77)	(5.49)	(5.98)	(5.78)	(6.14)	(6.24)	(6.91)	(8.77)	(5.92)	(4.47)
gdp^{OC}	-0.058***	-0.059***	-0.059***	-0.060***	-0.085***	-0.084***	-0.137***	-0.121***	-0.077***	-0.082***
	(-7.66)	(-7.63)	(-7.61)	(-7.79)	(-7.66)	(-7.62)	(-13.87)	(-11.36)	(-6.13)	(-7.18)
gdp^{DC}	-0.025***	-0.029***	-0.029***	-0.029***	-0.033***	-0.032***	-0.045***	-0.042***	-0.031***	-0.028***
	(-4.08)	(-4.73)	(-4.67)	(-4.76)	(-3.90)	(-3.94)	(-6.12)	(-5.32)	(-3.22)	(-3.20)
pop^{OC}	0.080***	0.081***	0.077***	0.079***	0.109***	0.102***	0.150***	0.136***	0.108***	0.110***
	(10.25)	(10.13)	(9.78)	(9.95)	(9.59)	(8.87)	(13.48)	(11.19)	(8.34)	(9.41)
pop^{DC}	0.025***	0.030***	0.028***	0.029***	0.030***	0.035***	0.038***	0.040***	0.036***	0.027***
	(4.78)	(5.52)	(5.21)	(5.30)	(4.25)	(5.14)	(5.47)	(5.28)	(4.37)	(3.62)
dist	0.096***	0.096***	0.094***	0.097***	0.100***	0.104***	0.095***			0.100***
	(18.91)	(18.75)	(17.13)	(18.78)	(15.75)	(17.25)	(13.67)			(14.64)
comlan	-0.102***	-0.100***	-0.102***	-0.111***	-0.125***	-0.132***		-0.115***		-0.130***
	(-6.25)	(-5.78)	(-6.09)	(-6.29)	(-6.06)	(-6.51)		(-4.41)		(-5.54)
$credit^{OC}$	-0.066***	-0.071***	-0.068***	-0.066***	-0.091***	-0.090***			-0.093***	-0.093***
	(-7.23)	(-7.70)	(-7.41)	(-7.27)	(-7.40)	(-7.39)			(-7.05)	(-7.35)
$credit^{DC}$	-0.022***	-0.024***	-0.021***	-0.023***	-0.015	-0.016			-0.011	-0.016
	(-2.88)	(-3.09)	(-2.69)	(-2.92)	(-1.38)	(-1.41)			(-0.91)	(-1.39)
$dist^{pdi}$	0.026***						0.024***	0.024***	0.020**	0.029***
	(4.57)						(2.85)	(2.63)	(2.10)	(3.53)
$dist^{uai}$		0.016***					0.018**	0.000	0.010	0.010
		(2.87)					(2.37)	(0.04)	(1.19)	(1.22)
$dist^{idv}$			0.010				0.004	0.035***	0.038***	-0.002
			(1.64)				(0.53)	(4.08)	(4.38)	(-0.30)
$dist^{mas}$				0.001			0.008	-0.024***	-0.006	-0.008
				(0.09)			(1.09)	(-2.63)	(-0.65)	(-1.00)
$dist^{lto}$					0.019***		0.016**	0.033***	0.036***	0.018**
					(2.72)		(2.20)	(4.18)	(4.45)	(2.57)
CD						0.931***				
						(3.68)				
Obs.	6928	6889	6917	6922	5181	5234	5279	5279	4948	4948
R^2-between	0.357	0.349	0.345	0.345	0.382	0.392	0.373	0.245	0.218	0.402
Wald statistic	767.564	755.586	740.592	738.091	627.308	654.058	547.011	335.586	345.183	641.563

Note: The t-statistics are in the parentheses, while the symbols *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively. The Wald statistic checks the overall significance of the model against the null that all coefficients are simultaneously zero.

Although culture distance can influence international portfolio holdings, we further hypothesize that the information gap increases this culture distance and discourages foreign investment. Table 1.4 re-estimates the gravity model by considering the interaction effect between culture distance and information distance. The estimated result for the gravity variables, such as geographic distance and whether two countries share a common language are similar to the previous result. The adjusted R^2 across the models is about 0.28. Overall, the multiplicative distance term is positive and strongly significant in models (1)-(4). This supports our

hypothesis that the information gap increases the culture distance, leading to more home bias. The coefficients for $dist^{pdi}$ and $dist^{pdi} \times dist^{int}$ are 0.02 and 0.004, respectively. The positive and significant coefficient of the multiplicative term $dist^{pdi} \times dist^{int}$ implies the information distance significantly raises the level of home bias by strengthening the effect of culture distance. Similar results are be found in models (2) to (6). The interaction terms for $dist^{pdi} \times dist^{int}$, $dist^{uai} \times dist^{int}$, $dist^{mas} \times dist^{int}$, and $dist^{idv} \times dist^{int}$ are significant at 0.05 and 0.1 statistically. The statistically significant interaction effect indicates that the effect of national cultural distance on cross-border investment varies with the information distance.

In summary, our primary results show that cultural distance influences equity home bias. Moreover, the multiplicative term enters our model specification with a positive sign as predicted. This result confirms our hypothesis that information distance significantly increases culture distance and discourages foreign portfolio holdings.

Table 1.4 Panel data estimation: the interaction effect

Table 4 shows results from panel estimation with random effect. We analyze the effect of the multiplicative term culture distance and information distance on home bias in equity investment after controlling gravity variables. The dependent variable is the home bias measure. We censor the values of home bias exceeding 0.99 and less than 0, since observations exceeding 0.99 or having a negative value can be seen as extreme values or foreign bias. The control variables include gross domestic product (GDP), total population (pop) for originating and destination countries, geographic distance (dist); the dummy variable indicates whether two countries share a common language (comlan); the credit to the private sector as a share of GDP is used to proxy financial development (fin) for originating and destination countries. The culture distance identifiers added in our model are power distance ($dist^{pdi}$), uncertainty avoidance ($dist^{uai}$), individualism ($dist^{idv}$), masculinity ($dist^{mas}$), and long-term orientation ($dist^{lto}$), while (CD) denotes the aggregate measure of culture distance for various culture dimensions. The superscripts OC and DC denote originating country and destination country, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
const.	0.760***	0.866***	0.927***	0.933***	1.187***	1.227***
	(4.68)	(5.39)	(5.82)	(5.66)	(5.99)	(6.27)
gdp^{OC}	-0.058***	-0.059***	-0.058***	-0.059***	-0.084***	-0.084***
	(-7.58)	(-7.55)	(-7.50)	(-7.70)	(-7.58)	(-7.64)
gdp^{DC}	-0.024***	-0.029***	-0.028***	-0.028***	-0.031***	-0.033***
	(-3.97)	(-4.61)	(-4.51)	(-4.62)	(-3.77)	(-3.95)
pop^{OC}	0.079***	0.080***	0.076***	0.078***	0.108***	0.102***
	(10.17)	(10.06)	(9.71)	(9.88)	(9.52)	(8.88)
pop^{DC}	0.024***	0.029***	0.027***	0.027***	0.029***	0.035***
	(4.56)	(5.31)	(4.95)	(5.05)	(4.06)	(5.13)
dist	0.096***	0.096***	0.093***	0.097***	0.100***	0.104***
	(18.85)	(18.70)	(17.10)	(18.72)	(15.76)	(17.27)
comlan	-0.100***	-0.099***	-0.099***	-0.108***	-0.123***	-0.132***
	(-6.11)	(-5.69)	(-5.95)	(-6.16)	(-5.98)	(-6.52)
$credit^{OC}$	-0.066***	-0.072***	-0.069***	-0.067***	-0.092***	-0.090***
	(-7.31)	(-7.77)	(-7.51)	(-7.36)	(-7.46)	(-7.37)
$credit^{DC}$	-0.021***	-0.023***	-0.020**	-0.022***	-0.015	-0.016
	(-2.77)	(-2.99)	(-2.55)	(-2.78)	(-1.35)	(-1.42)
$dist^{pdi}$	0.020***					
	(3.30)					
$dist^{pdi} \times dist^{int}$	0.004**					
	(2.09)					
$dist^{uai}$		0.012*				
		(1.96)				
$dist^{uai} \times dist^{int}$		0.004*				
		(1.72)				
$dist^{idv}$			0.004			
			(0.63)			
$dist^{idv} \times dist^{int}$			0.005**			
			(2.52)			
$dist^{mas}$				-0.004		
				(-0.68)		
$dist^{mas} \times dist^{int}$				0.005**		
				(2.27)		
$dist^{lto}$					0.015**	
					(2.12)	
$dist^{lto} \times dist^{int}$					0.003	
					(1.37)	
CD						0.783***
						(2.60)
$CD \times dist^{int}$						0.006
						(0.90)
Obs.	6927	6888	6916	6921	5180	5234
R^2-between	0.357	0.350	0.347	0.346	0.382	0.393
Wald statistic	774.248	761.374	750.704	746.965	631.362	655.639

Note: The t-statistics are in the parentheses, while the symbols *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively. The Wald statistic checks the overall significance of the model against the null that all coefficients are simultaneously zero.

1.5 Robustness Checks

Despite results estimated by the panel data approach and pooled OLS regression, we re-estimate the empirical models applying the Hausman-Taylor model (HTM). However, panel data approach allows us to capture the individual effects and time effects and controls for the possibility that the unobserved effects may be correlated with the regressors. The problems occur in the fixed effect estimation when time invariant variables, such as geographic distance and common language, are included in the model specification. This study applies the Hausman-Taylor model as suggested by Egger (2005) to examine cultural characteristics on cross-border investment bias. This approach not only allows us to estimate time invariant variables such as distance and cultural dimensions, but also solves the potential problems of correlation between unobserved individual effects and explanatory variables. The time invariant variables in our model include geographic distance, common language, and different dimensions of culture distance. These variables serve as instrumental variables, which provide additional information from the dataset to eliminate the correlation between the explanatory variables and the unobserved individual effects.

Table 1.5 presents the estimation results for the relationship between culture distance and cross-border equity investment home bias. The estimated coefficients for the basic gravity variables are similar to previous results. Obviously, common language enters the model with a negative and statistical significance, implying that investors rely on common language to interpret information correctly and share common values between two countries. Therefore, the originating country tends to hold foreign securities from a destination country that shares the same language.

We next turn to the role of geographic distance. Not surprisingly, the sign of distance is positive as predicted and is consistent with previous studies. The culture distance remains positive except for $dist^{mas}$, however it is not significant. The interaction effects of culture distance and information distance are positive for $dist^{pdi} \times dist^{int}$, $dist^{mas} \times dist^{int}$, and $dist^{idv} \times dist^{int}$ and significant at the 0.1 and 0.05 statistical levels, respectively. These results support Hypothesis 7 that information distance increases culture distance between the home and source countries and exhibits more home bias.

Table 1.5 Hauseman-Taylor estimation

Table 5 shows results by re-estimating our model using the Hauseman-Taylor model. We analyze the effect of the multiplicative term culture distance and information distance on home bias in equity investment after controlling gravity variables. The dependent variable is the home bias measure. We censor the values of home bias exceeding 0.99 and less than 0, since observations exceeding 0.99 or having a negative value can be seen as extreme values or foreign bias. The control variables include gross domestic product (GDP), total population (pop) for originating and destination countries, geographic distance (dist); the dummy variable indicates whether two countries share a common language (comlan); the credit to the private sector as a share of GDP is used to proxy financial development (fin) for originating and destination countries. The culture distance identifiers added in our model are power distance ($dist^{pdi}$), uncertainty avoidance ($dist^{uai}$), individualism ($dist^{idv}$), masculinity ($dist^{mas}$), and long-term orientation ($dist^{lto}$), while (CD) denotes the aggregate measure of culture distance for various culture dimensions. The superscripts OC and DC denote originating country and destination country, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
const.	1.809***	1.757***	1.760***	1.922***	1.974***	1.986***
	(4.18)	(4.04)	(4.35)	(4.25)	(3.97)	(3.91)
gdp^{OC}	-0.103***	-0.100***	-0.096***	-0.100***	-0.123***	-0.122***
	(-6.45)	(-6.20)	(-6.21)	(-6.35)	(-5.69)	(-5.64)
gdp^{DC}	-0.028**	-0.030**	-0.029**	-0.031***	-0.043***	-0.042***
	(-2.33)	(-2.48)	(-2.53)	(-2.67)	(-2.68)	(-2.67)
pop^{OC}	0.109***	0.108***	0.102***	0.104***	0.141***	0.135***
	(5.50)	(5.44)	(5.55)	(5.33)	(5.39)	(5.03)
pop^{DC}	0.016	0.019	0.019	0.018	0.028*	0.033**
	(1.15)	(1.42)	(1.49)	(1.33)	(1.66)	(1.98)
dist	-0.080***	-0.087***	-0.083***	-0.079***	-0.111***	-0.110***
	(-7.05)	(-7.51)	(-7.38)	(-7.00)	(-7.58)	(-7.57)
comlan	-0.020*	-0.020*	-0.018*	-0.020*	0.005	0.004
	(-1.91)	(-1.87)	(-1.68)	(-1.87)	(0.36)	(0.30)
$credit^{OC}$	0.093***	0.093***	0.090***	0.093***	0.097***	0.102***
	(5.90)	(5.96)	(5.84)	(6.03)	(5.18)	(5.62)
$credit^{DC}$	-0.090*	-0.084	-0.088*	-0.104**	-0.101*	-0.110*
	(-1.81)	(-1.62)	(-1.91)	(-2.04)	(-1.68)	(-1.84)
$dist^{pdi}$	0.014					
	(0.80)					
$dist^{pdi} \times dist^{int}$	0.004*					
	(1.86)					
$dist^{uai}$		0.013				
		(0.75)				
$dist^{uai} \times dist^{int}$		0.003				
		(1.34)				
$dist^{idv}$			0.006			
			(0.36)			
$dist^{idv} \times dist^{int}$			0.004**			
			(2.08)			
$dist^{mas}$				-0.010		
				(-0.55)		
$dist^{mas} \times dist^{int}$				0.004*		
				(1.82)		
$dist^{lto}$					0.016	
					(0.81)	
$dist^{lto} \times dist^{int}$					0.003	
					(1.15)	
CD						0.716
						(0.94)
$CD \times dist^{int}$						0.004
						(0.51)
Obs.	6927	6888	6916	6921	5180	5234
Wald statistic	241.706	251.372	252.494	243.786	228.410	226.476
rho	0.967	0.967	0.961	0.965	0.966	0.967
panel-level standard deviation	0.568	0.565	0.521	0.549	0.578	0.582
standard deviation of epsilon_it	0.104	0.104	0.104	0.104	0.108	0.107

Note: The t-statistics are in the parentheses, while the symbols *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively. The Wald statistic checks the overall significance of the model against the null that all coefficients are simultaneously zero.

1.6 Concluding Remarks

This study extends previous research in terms of culture characteristics to the international diversification issue. To investigate the effect of culture scores and culture distance on equity home bias, we utilize bilateral equity investment data across 45 countries from CPIS to construct the gravity model. Our empirical findings provide the following insights. First, we find that different national culture characteristics exert different influences on international diversification. A society with a higher power distance tends to allocate assets domestically, resulting in an increasing home bias for the originating country. Moreover, a country with the attitude to avoid uncertainty tends to exhibit more home bias in equity investment. This result is consistent with the conclusion of Anderson et al. (2011). Second, despite the fact that geographic distance consistently has a significant effect on home bias, distance in the degree of a different culture discourages foreign investment and provides additional explanation in determining international portfolio allocation. The positive and significant interaction effect of culture distance and information distance supports our hypothesis that information distance increases culture distance and discourages foreign investment. This implies that a country can set up its portfolio holdings more efficiently by reducing both culture distance and information distance.

Appendix 1.1

Table A1.1 Pooled OLS estimation: the effects of culture characteristics

Appendix Table 1 shows results from pooled OLS regression. We analyze the relationship between culture identifier and home bias in equity investment after controlling gravity variables. The dependent variable is the home bias measure. We censor the values of home bias exceeding 0.99 and less than 0, since observations exceeding 0.99 or having a negative value can be seen as extreme values or foreign bias. The control variables include gross domestic product (GDP), total population (pop) for originating and destination countries, geographic distance (dist); the dummy variable indicates whether two countries share a common language (comlan); the credit to the private sector as a share of GDP is used to proxy financial development (fin) for originating and destination countries. The culture identifiers added in our model are power distance (pdi), uncertainty avoidance (uai), individualism (idv), masculinity (mas), and long-term orientation (lto). The superscripts OC and DC denote originating country and destination country, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
const.	0.822***	0.975***	1.223***	1.102***	1.079***	-0.883***
	(10.79)	(13.08)	(16.88)	(15.32)	(13.15)	(-2.59)
gdp^{OC}	-0.044***	-0.047***	-0.046***	-0.052***	-0.066***	-0.076***
	(-9.50)	(-10.11)	(-9.51)	(-11.55)	(-11.52)	(-3.61)
gdp^{DC}	-0.037***	-0.035***	-0.036***	-0.037***	-0.038***	-0.066***
	(-12.20)	(-11.65)	(-11.91)	(-12.24)	(-11.83)	(-4.83)
pop^{OC}	0.049***	0.054***	0.063***	0.058***	0.087***	0.084***
	(10.42)	(11.37)	(13.91)	(12.90)	(15.76)	(3.84)
pop^{DC}	0.029***	0.027***	0.028***	0.029***	0.030***	0.059***
	(11.20)	(10.54)	(10.85)	(11.20)	(11.04)	(5.63)
dist	0.087***	0.091***	0.085***	0.087***	0.092***	0.202***
	(39.61)	(40.72)	(38.04)	(39.44)	(39.51)	(26.10)
comlan	-0.111***	-0.093***	-0.107***	-0.117***	-0.099***	-0.283***
	(-16.13)	(-13.21)	(-15.41)	(-16.92)	(-13.41)	(-11.20)
$credit^{OC}$	-0.036***	-0.058***	-0.054***	-0.053***	-0.072***	-0.085***
	(-5.23)	(-8.64)	(-8.04)	(-7.99)	(-8.88)	(-3.00)
$credit^{DC}$	-0.005	-0.007	-0.006	-0.005	-0.005	0.039
	(-1.10)	(-1.41)	(-1.32)	(-1.15)	(-0.98)	(1.47)
pdi^{OC}	0.078***					0.092***
	(13.74)					(4.13)
uai^{OC}		0.051***				0.065***
		(10.59)				(3.57)
idv^{OC}			-0.049***			-0.096***
			(-8.65)			(-3.82)
mas^{OC}				0.046***		0.094***
				(13.62)		(7.61)
lto^{OC}					0.036***	-0.064***
					(5.52)	(-2.59)
pdi^{DC}						0.113***
						(4.52)
uai^{DC}						-0.043***
						(-2.58)
idv^{DC}						0.030
						(1.22)
mas^{DC}						0.006
						(0.41)
lto^{DC}						-0.077***
						(-3.66)
Observations	7170	7170	7170	7170	6580	4862
Adj. R	0.284	0.276	0.273	0.284	0.285	0.215
F statistic	316.877	305.272	299.615	316.357	291.981	75.120

Note: The t-statistics are in the parentheses, while the symbols *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Table A1.2 Pooled OLS estimation: the effects of culture distance

Appendix Table 2 shows results from pooled OLS regression. We analyze the relationship between culture distance and home bias in equity investment after controlling gravity variables. The dependent variable is home bias measure. We censor the values of home bias exceeding 0.99 and less than 0, since observations exceeding 0.99 or having a negative value can be seen as extreme values or foreign bias. The control variables include gross domestic product (GDP), total population (pop) for originating and destination countries, geographic distance (dist); the dummy variable indicates whether two countries share a common language (comlan); the credit to the private sector as a share of GDP is used to proxy financial development (fin) for originating and destination countries. The culture distance identifiers added in our model are power distance ($dist^{pdi}$), uncertainty avoidance ($dist^{uai}$), individualism ($dist^{idv}$), masculinity ($dist^{mas}$), and long-term orientation ($dist^{lto}$), while (CD) denotes the aggregate measure of culture distance for various culture dimensions. The superscripts OC and DC denote originating country and destination country, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
const.	0.863***	0.980***	1.040***	1.043***	1.186***	1.177***	1.197***	1.371***	1.209***	0.964***
	(11.12)	(12.97)	(13.74)	(13.46)	(12.73)	(12.76)	(12.43)	(13.33)	(10.96)	(9.59)
gdp^{OC}	-0.061***	-0.064***	-0.062***	-0.062***	-0.088***	-0.084***	-0.129***	-0.096***	-0.072***	-0.088***
	(-13.34)	(-13.86)	(-13.39)	(-13.52)	(-13.20)	(-12.65)	(-25.20)	(-17.54)	(-9.55)	(-12.75)
gdp^{DC}	-0.025***	-0.029***	-0.029***	-0.028***	-0.023***	-0.022***	-0.027***	-0.019***	-0.024***	-0.017***
	(-7.84)	(-9.18)	(-9.14)	(-8.97)	(-5.24)	(-5.12)	(-8.38)	(-5.50)	(-4.92)	(-3.92)
pop^{OC}	0.078***	0.081***	0.076***	0.076***	0.102***	0.091***	0.143***	0.112***	0.094***	0.106***
	(17.73)	(18.10)	(17.05)	(17.20)	(16.16)	(14.09)	(25.26)	(18.53)	(13.01)	(16.07)
pop^{DC}	0.024***	0.029***	0.027***	0.027***	0.023***	0.029***	0.027***	0.025***	0.031***	0.020***
	(9.37)	(10.92)	(10.35)	(10.13)	(6.99)	(8.89)	(9.16)	(7.86)	(8.14)	(5.85)
dist	0.089***	0.090***	0.088***	0.090***	0.091***	0.094***	0.086***			0.090***
	(39.67)	(39.96)	(36.48)	(39.69)	(33.47)	(36.50)	(29.73)			(30.86)
comlan	-0.100***	-0.096***	-0.099***	-0.112***	-0.111***	-0.118***		-0.102***		-0.123***
	(-14.43)	(-13.20)	(-13.90)	(-14.88)	(-13.39)	(-14.34)		(-9.91)		(-12.75)
$credit^{OC}$	-0.055***	-0.058***	-0.055***	-0.055***	-0.061***	-0.060***			-0.051***	-0.058***
	(-8.15)	(-8.50)	(-8.09)	(-8.05)	(-6.54)	(-6.48)			(-4.82)	(-6.00)
$credit^{DC}$	-0.010**	-0.013***	-0.010**	-0.011**	-0.018**	-0.018**			0.002	-0.016**
	(-2.04)	(-2.60)	(-1.99)	(-2.29)	(-2.44)	(-2.45)			(0.18)	(-2.03)
$dist^{pdi}$	0.020***						0.025***	0.030***	0.021***	0.028***
	(8.15)						(7.19)	(7.94)	(5.47)	(7.86)
$dist^{uai}$		0.014***					0.015***	-0.005	0.009**	0.008**
		(5.46)					(4.66)	(-1.33)	(2.40)	(2.29)
$dist^{idv}$			0.007***				0.002	0.029***	0.032***	-0.004
			(2.68)				(0.67)	(8.35)	(9.03)	(-1.15)
$dist^{mas}$				-0.004			0.003	-0.026***	-0.008**	-0.013***
				(-1.44)			(1.03)	(-7.01)	(-2.39)	(-3.80)
$dist^{lto}$					0.021***		0.020***	0.034***	0.035***	0.022***
					(7.46)		(6.73)	(10.81)	(10.75)	(7.32)
CD						1.003***				
						(9.39)				
Obs.	6928	6889	6917	6922	5181	5234	5279	5279	4948	4948
adjusted R	0.284	0.284	0.280	0.278	0.294	0.301	0.286	0.182	0.161	0.310
F statistic	305.996	304.357	299.165	296.951	240.930	250.845	212.711	118.275	87.336	171.644

Note: The t-statistics are in the parentheses, while the symbols *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Table A1.3 Pooled OLS estimation: the interaction effect

Appendix Table 3 shows results from pooled OLS regression. We analyze the effect of the multiplicative term culture distance and information distance on home bias in equity investment after controlling gravity variables. The dependent variable is the home bias measure. We censor the values of home bias exceeding 0.99 and less than 0, since observations exceeding 0.99 or having a negative value can be seen as extreme values or foreign bias. The control variables include gross domestic product (GDP), total population (pop) for originating and destination countries, geographic distance (dist); the dummy variable indicates whether two countries share a common language (comlan); the credit to the private sector as a share of GDP is used to proxy financial development (fin) for originating and destination countries. The culture distance identifiers added in our model are power distance ($dist^{pdi}$), uncertainty avoidance ($dist^{uai}$), individualism ($dist^{idv}$), masculinity ($dist^{mas}$), and long-term orientation ($dist^{lto}$), while (CD) denotes the aggregate measure of culture distance for various culture dimensions. The superscripts OC and DC denote originating country and destination country, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
const.	0.809***	0.921***	0.951***	0.962***	1.096***	1.178***
	(10.20)	(11.80)	(12.17)	(12.05)	(11.17)	(12.78)
gdp^{OC}	-0.060***	-0.062***	-0.060***	-0.060***	-0.085***	-0.084***
	(-12.96)	(-13.41)	(-12.88)	(-13.04)	(-12.79)	(-12.65)
gdp^{DC}	-0.022***	-0.026***	-0.025***	-0.025***	-0.018***	-0.021***
	(-6.70)	(-7.83)	(-7.51)	(-7.40)	(-4.05)	(-4.95)
pop^{OC}	0.077***	0.079***	0.075***	0.075***	0.101***	0.091***
	(17.36)	(17.69)	(16.67)	(16.81)	(15.81)	(14.04)
pop^{DC}	0.021***	0.025***	0.023***	0.022***	0.019***	0.028***
	(7.73)	(9.02)	(8.23)	(8.02)	(5.38)	(8.61)
dist	0.089***	0.090***	0.088***	0.090***	0.091***	0.094***
	(39.62)	(39.85)	(36.46)	(39.53)	(33.57)	(36.49)
comlan	-0.096***	-0.093***	-0.094***	-0.107***	-0.107***	-0.118***
	(-13.64)	(-12.65)	(-13.00)	(-14.01)	(-12.68)	(-14.39)
$credit^{OC}$	-0.056***	-0.059***	-0.057***	-0.056***	-0.062***	-0.059***
	(-8.27)	(-8.63)	(-8.29)	(-8.20)	(-6.63)	(-6.31)
$credit^{DC}$	-0.010**	-0.012**	-0.009*	-0.011**	-0.019**	-0.020***
	(-2.01)	(-2.54)	(-1.95)	(-2.20)	(-2.52)	(-2.66)
$dist^{pdi}$	0.011***					
	(2.98)					
$dist^{pdi} \times dist^{int}$	0.008***					
	(3.26)					
$dist^{uai}$		0.005				
		(1.39)				
$dist^{uai} \times dist^{int}$		0.007***				
		(3.06)				
$dist^{idv}$			-0.004			
			(-1.07)			
$dist^{idv} \times dist^{int}$			0.010***			
			(4.35)			
$dist^{mas}$				-0.014***		
				(-3.88)		
$dist^{mas} \times dist^{int}$				0.010***		
				(4.17)		
$dist^{lto}$					0.013***	
					(3.34)	
$dist^{lto} \times dist^{int}$					0.008***	
					(2.89)	
CD						0.720***
						(4.31)
$CD \times dist^{int}$						0.013**
						(2.20)
Obs.	6927	6888	6916	6921	5180	5234
Adj. R^2	0.285	0.285	0.281	0.280	0.295	0.301
F stat.	276.839	275.185	271.827	269.623	217.985	226.409

Note: The t-statistics are in the parentheses, while the symbols *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Chapter 2

Governance Quality, Information Penetration, and Home Bias

This study examines the effects from a governance environment and information penetration on equity home bias by using IMF's Coordinated Portfolio Investment Survey data through 2001-2009. The result shows that better governance has a negative but insignificant effect on reducing home bias. Nevertheless, we further find that a country with greater governance appears to decrease cross-border investment bias under higher information penetration. This implies that information penetration can affect the strength of the relationship between governance quality and home bias. Countries with a higher home bias should improve their governance mechanism by consolidating information penetration channels. A global portfolio diversification can then be attained accordingly.

2.1 Introduction

The portfolio diversification theory suggests that investors should allocate their portfolio holdings optimally, especially on a country level. This perspective suggests that countries are supposed to hold a market portfolio to diversify their risk as stated by the Capital Asset Pricing Model (CAPM). In reality, most countries overweigh their portfolio holdings in their respective domestic markets, prompting a famous puzzle in international finance research. However, home bias has been explored by several views such as trading barriers, corporate governance, and financial integration. The impact of a governance environment on home bias in a particular country has still not been examined.

The literature notes that investors prefer to hold domestic assets rather than foreign securities for many reasons. Errunza and Losq (1985) and Warnock (2002) indicated that home bias is attributed to international trading barriers, transaction costs, and hedging for domestic risks.[2] Lewis (1999) provided a well-documented survey for the implication of home bias in the asset pricing theory. Dahlquist et al. (2003) presented that the home bias can be explained by differences in corporate governance across countries. Because shares issued by firms with poor corporate governance (less investor protection) are held closely by controlling shareholders, only a small fraction

[2] The equity home bias can be explained by hedging for domestic risks, such as inflation risk, real exchange risk, domestic consumption risk, and the risk of a non-tradable wealth component like human capital (see Baxter and Jermann, 1997; Obstfeld and Rogoff, 1996; Wheatley, 2001).

of stocks can be accumulated by portfolio investors. Kho et al. (2007) suggested that it is optimal for an insider to hold large stakes of a stock in a country with poor corporate governance (direct effect). Large shareholders also need more stock holdings in order to monitor insiders (indirect effect). Thus, foreign portfolio investors exhibit large equity home bias against this country, because both effects restrict the chance for portfolio investors to hold this company's shares. A governance environment is an important issue in determining international portfolio investment. Gelos and Wei (2005) provided evidence that both government and corporate transparency have positive effects on attracting investment flows. They also confirm that mutual funds systematically invest less in less transparent countries. In fact, a government should commit to creating an unprecedented level of openness in its administration, which can ensure public trust and establish a system of transparency. Through public participation and collaboration, countries will strengthen their democracy and promote efficiency and effectiveness in a governance environment.

The legal system comprises various aspects of governance such as free media, the capacity to effectively formulate and implement policies, the quality of contract enforcement and property rights, etc. According to the website data.gov, the concept of governance not only focuses on administration transparency, but also encourages citizens to re-use the data and help information diffusion.[3] More citizens participating in public affairs and government decisions will lead to the administration process being more transparent and effective. In addition, higher information penetration may allow people to serve as a monitoring function and lower the possibility of government corruption. In fact, the neoclassical economic theory suggests that institutional quality is fundamental for economic growth. Although governance distance varies across countries, the quality of a governance infrastructure is critical to economic performance and international investment. In general, governance quality comprises public institutions and policies made by governments as a framework for economic and social relations. This study is concerned with those elements of a governance infrastructure that can affect cross-border investment. A superior governance quality therefore includes: an effective, impartial, and transparent legal system that promotes private sector development; quality public services, credibility in the government's commitment and the perceptions of public power exercised for private interest. These conditions presumably encourage foreign direct investment (FDI) and private domestic investments as well protect privately held assets from any arbitrary direct or indirect appropriation.

According to Jalilian et al. (2009), the effective regulatory regime has a positive

[3] For more details, please visit http://www.data.gov/

and significant effect on economic performance. Hines (1995) and Wei (2000) showed that governance corruption has adverse effect on cross-border investments and directly increases the business cost of multinationals. Gani (2007) confirmed that governance quality is positively associated with FDI, especially for developing regions such as Asia and Latin America. Globerman and Shapiro (2002) suggested that governance infrastructure can improve investment environment. Based on the aforementioned studies, we argue that a sophisticated governance system encourages both foreign and domestic investments and creates a favorable environment for business. Moreover, better governance quality facilitates operations and sunk costs for multinational enterprises (MNEs) in the host countries.

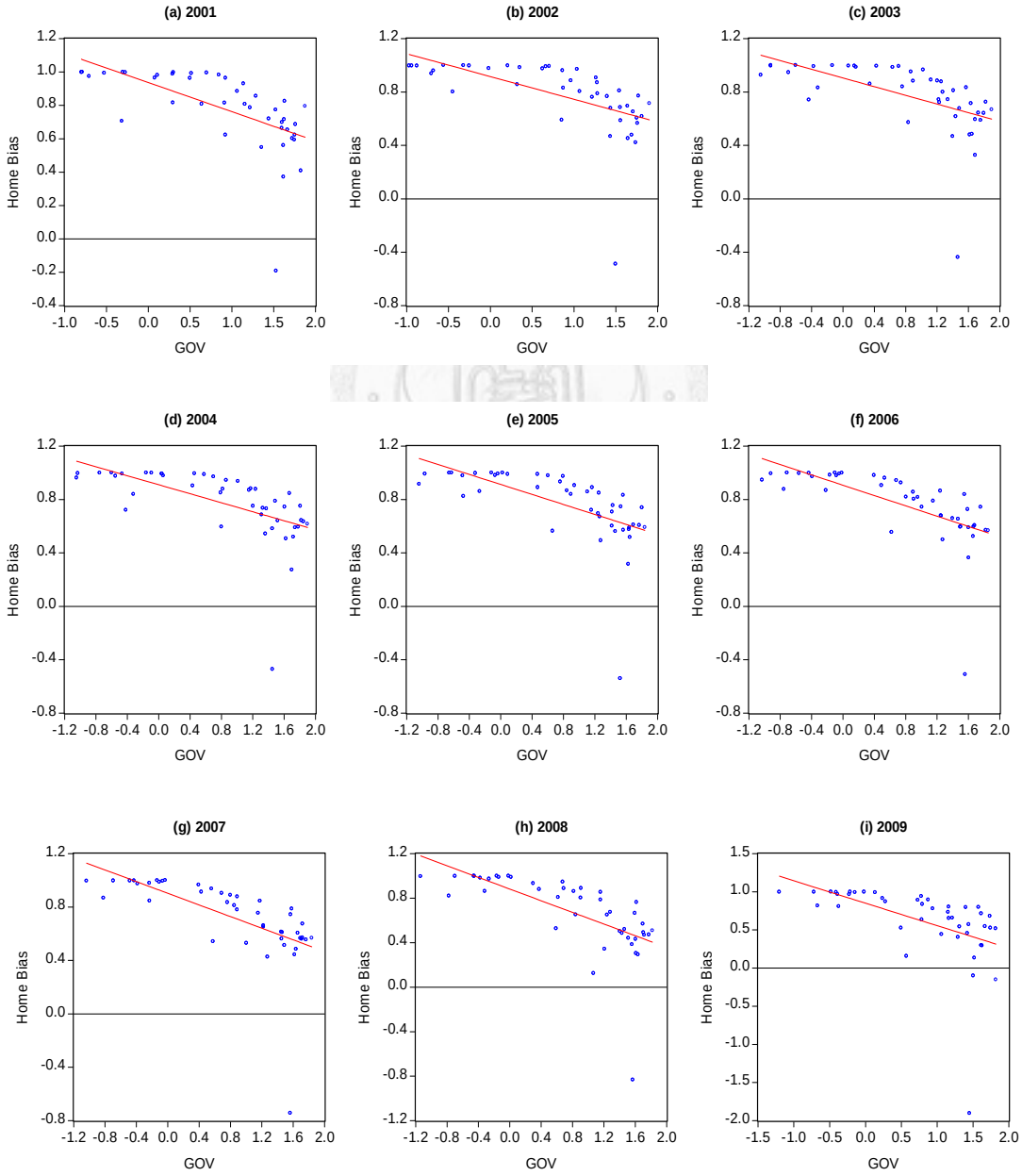

Figure 2.1 Evolution of home bias and governance quality

Despite that a governance environment may influence cross-border investment, we argue that the ease of information accessibility and the accelerated speed of information diffusion can affect an investment decision. Bekaert and Wang (2009) proposed that information and familiarity may be the most popular explanations for both home and foreign investment home biases, because investors have less information about foreign securities and hence underweight their investments abroad (Brennan and Cao, 1997). Additionally, the information-based theory of the home bias addresses the implicit assumption that home investors cannot educate themselves about foreign firms. To solve this problem, Van Nieuwerburgh and Veldkamp (2009) allowed investors to gain domestic or foreign information before deciding which assets to hold. Assuming investors have an informational advantage that makes local investments slightly less risky, the authors prove that domestic investors only obtain information about domestic assets and hold a greater proportion of such assets. Mondria and Wu (2010) extended their model and presumed that investors face information constraints, but the local investors have a magnified informational advantage since information processed under autarky remains useful. Nevertheless, the vanishing relevance of initial information will result in a gradual shift towards foreign assets. Mondria and Wu (2010) utilized the number of telephone mainlines, the number of people with Internet access, the number of mobile telephone subscribers, and the average circulation of newspapers to proxy information capacity. They concluded that home bias increases with information capacity and decreases with financial openness.

Previous studies related to country governance focus on the effects of the governance environment on economic performance and FDI (e.g., Jalilian et al., 2009; Globerman and Shapiro, 2002; Egger and Winners, 2005). However, the impact of governance regimes on cross-border investment remains unclear. This present study is motivated by governance quality and information technology development and tries to bridge these effects to the issue of home bias. This study investigates the effects of the governance environment and informational penetration on international portfolio holdings using a panel data approach through 2001-2009. We use governance indicators developed by Kaufmann et al. (1999) as a composite measure of governance quality, with Internet users per 100 people, the number of secure Internet servers, and the number of mobile telephone subscribers used as proxies for information penetration. The well-developed information and communications technology (ICT) infrastructure improves data accessibility and information diffusion, thus serving as a function of monitoring. Moreover, ICT may increase the efficiency of the administration process and effective policy implementation, which in turn attract institutional investors.

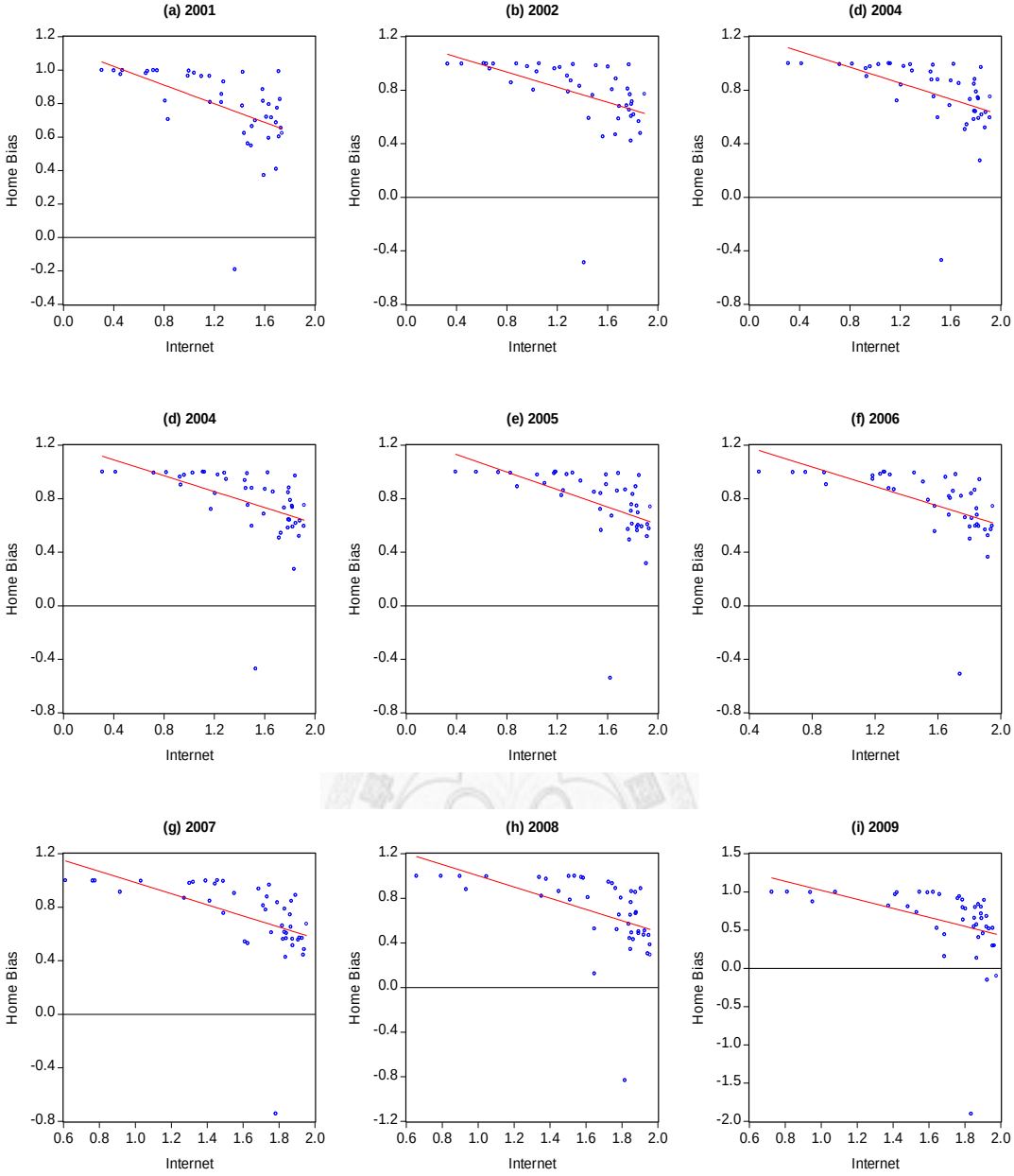

Figure 2.2 Evolution of home bias and internet penetration

To our best knowledge, this is the first paper to examine the relationship between the governance environment, information penetration, and international investment bias. In particular, we examine whether selected information proxies (i.e., Internet users per 100 people, the number of secure Internet servers, and the number of mobile telephone subscribers) moderate the governance quality-home bias relationship. Our paper offers two contributions to the existing literature. First, cross-border investment is affected by the governance quality at the macroeconomics level, which is different from previous corporate governance literature. Second, we examine the nature and significance of the moderating effects of three information channels on the

relationship between governance quality and investment home bias.

The rest of the paper is organized as follows. Section 2 overviews the related literature about governance quality and information infrastructure related to investment activities. Section 3 describes data sources and definitions. Section 4 presents the estimation results, while Section 5 reports robustness checks. Section 6 concludes this paper.

2.2 Literature Review

The traditional governance literature related to international investment focuses on corporate governance instead of a country's legal regime. Dahlquist et al. (2003) showed that closely held firms provide explanatory power for why these countries exhibit home bias and why U.S. investors underweight foreign countries in their portfolios. King and Segal (2003) found that the equity of Canadian-listed firms trades at a discount to U.S.-listed firms due to weaker corporate governance. This fact also can be used to explain U.S. investor home bias. However, a governance environment not only is positively related to economic growth, but also can affect stock market performance. Hopper et al. (2005) depicted that a country with a better governance system has a higher stock market return and lower risk. Therefore, we argue that superior governance quality in a country's legal regime may lead to lower home bias.

The heterogeneity in institutional management and the quality of a governance environment can affect international portfolio holdings in several ways. First, related studies have already shown that a governance infrastructure positively impacts economic growth. Globerman and Shapiro (2002) found that a strong governance infrastructure not only attracts foreign investment, but also creates a condition under which domestic multinational corporations emerge and invest aboard. Thus, institutions and the legal environment are related to economic performance. According to Jalilian et al. (2009), an effective regulatory regime positively impacts economic growth, especially for developing countries. Wu (2006) suggested that MNEs of corrupt countries prefer to locate in countries with a similar level of corruption so as to take advantage of their capacity and engage in bribery. In addition, a vast amount of literature indicates that governance corruption has an adverse effect on cross-border investments and directly increases the business cost of multinational firms (e.g., Hines, 1995; Wei, 2000).

Second, countries with good governance and transparency can attract FDI inflows into the local market. Gelos and Wei (2005) indicated that transparency has a positive and significant effect on a mutual fund's international portfolio holdings. Mutual funds tend to invest less in an opaque country. Gani (2007) confirmed that

governance quality is positively associated with FDI for developing regions such as Asia and Latin America. Moreover, superior governance regimes can stimulate FDI and domestic investment (Globerman et al. 2006), while public sector corruption reduces foreign and local investments (Habib and Zurawicki, 2002). These studies have consistent perspectives that corruption has an adverse influence on investment. Thus, government authorities should maintain their integrity and enhance administrative efficiency.

Third and lastly, a governance environment may affect the investment decision and entry mode of multinational enterprises (MNEs). Slangen and Tulder (2009) argued that governance quality, instead of culture distance and political risks, can serve as a better proxy for external uncertainty. They showed that the MNEs prefer an entrance model with joint ventures over a wholly-owned subsidiary under lower governance quality. On the other hand, Globerman and Shapiro (2002) suggested a governance infrastructure can improve the investment environment. It is well argued that a positive governance environment affects both foreign and domestic investors, as a better governance infrastructure will create a favorable climate for business. A sophisticated law system encourages FDI and domestic investment. Thus, a strong governance environment facilitates operations and sunk costs for MNEs in the host countries. The choice of entrance model depends on the quality of the target country's governance infrastructure.

Although the governance system can affect investment decisions, related studies suggest that the information infrastructure stimulates inward FDI, international trade, and portfolio holdings. Grinblatt and Keloharju (2001) documented that investors prefer to trade stocks of Finnish firms that are located close to investors. Therefore, distance, language, and culture influence stockholdings and trades. We contend that information penetration may have a moderate effect on the association between governance quality and international portfolio investment - that is, we argue that the spread of information may directly affect decision making in regards to investment. In addition, the information infrastructure has an indirect effect on cross-border investment when it influences governance quality. For example, better ICT development can improve the effectiveness of electronic governance and increase transparency in the demonstration process. All these monitoring effects mitigate bureau corruption and improve the quality of the governance environment. While the home bias puzzle has been investigated by the aforementioned theories, the role that governance quality on a country level plays in cross-border investment has not yet been examined.

This paper addresses the effect of a country's legal regime on international portfolio investment. We further consider the moderate effect of the information

infrastructure on investment bias by including these selected information channels. Unlike Gelos and Wei (2005) who used macroeconomic data opacity to capture the frequency and timeliness of released information, we examine the moderate effects of the three channels of information penetration on governance quality-home bias relationships.

2.3 Data and Methodology

2.3.1 Measuring the Equity Home Bias

As other recent home bias-related studies have done (Chan et al., 2005; Gelos and Wei, 2005), we collect suitable data from the International Monetary Fund's (IMF) Coordinated Portfolio Investment Survey (CPIS) which breaks down offshore investment into 255 foreign countries for an individual country during the period 2001 to 2009.[4] More than 70 countries report their international equity portfolio investments in foreign countries, but CPIS data do not identify domestic securities holdings. Therefore, the aggregate portfolio investment in a selected country reporting by the remaining countries serves as an estimate of that country's liabilities. This allows us to calculate the domestic portfolio holdings by subtracting the foreign liabilities from the local market capitalization. To construct a home bias measuring for a particular country, we compare the actual portfolio holdings to our benchmark as suggested by Chan et al. (2005). In other words, the home bias is the deviation of actual portfolio investment to optimal portfolio holdings as suggested by CAPM. Following Fidora et al. (2007), the measure of home bias is defined as follows:

$$Home\ Bias_i = \frac{w_i^* - w_i}{w_i^*} = 1 - \frac{w_i}{w_i^*} \tag{2.1}$$

$$w_i = \frac{country\ i's\ international\ asset}{country\ i's\ equity\ portfolio} \tag{2.2}$$

$$w_i^* = \frac{the\ rest\ of\ the\ world's\ equity\ capitalization}{world's\ equity\ capitalization} \tag{2.3}$$

The weight w_i is country $i's$ share of foreign assets to its domestic equity portfolio, while w^*_i denotes the rest of the world's equity capitalization to the world's

[4]Participation in the Coordinated Portfolio Investment Survey (CPIS) is voluntary and 75 economies currently participate in the survey. The foreign holding data for each country provided by CPIS are available annually for the period 2001-2009 and some data are also available for 1997.

equity capitalization. Intuitively, the home bias is the difference between these two weights. According to the portfolio theory, individual country should hold a world portfolio and the weight w_i should equal w^*_i as suggested by CAPM. This assumption implies that country i exactly holds the world portfolio, and home bias phenomenon should vanish. Unfortunately, this does not hold in the real world and the equity home bias remains. The prevalent fact for this large difference between domestic portfolio holdings w_i and optimal portfolio holdings w^*_i implies that the home bias remains severe. For example, Australia actually allocates w_i=19.57% of its wealth aboard while the rest of the world's equity capitalization to the world's equity capitalization w^*_i=96.96%. Thus, the home bias measure for Australia equals 79.82%.

Table 2.1 presents the stylized facts of equity home bias across countries. It can be seen that home bias is larger in emerging countries than in developed markets. In our data, the home bias for Indonesia, Pakistan, the Philippines, and Turkey is over 99%, while the home bias for Austria and the Netherlands is only 13.30% and 29.38%, respectively.

Table 2.1 Equity Home Bias 2009

Market capitalization is obtained from World Development Indicators (WDI). Foreign assets and liabilities holding data are from the Coordinated Portfolio Investment Survey (CPIS). The home bias can be computed, by which it means the difference between the domestic equity portfolio and world portfolio. All figures are in USD million.

Country	Domestic Market Cap.	Equity Hold by Foreigner	Foreign Equity Hold by Resident	Domestic Equity Portfolio	Market Cap in World Market (%)	Rest of the World Cap / World Cap. (%)	Foreign Securities Holding / Domestic Equity Portfolio (%)	Home Bias (%)
Argentina	48,932	4,245	10,586	55,273	0.12	99.88	19.15	80.83
Australia	1,258,456	278,470	238,464	1,218,450	3.04	96.96	19.57	79.82
Austria	53,578	42,532	71,314	82,360	0.13	99.87	86.59	13.30
Belgium	261,429	96,428	239,712	404,712	0.63	99.37	59.23	40.39
Brazil	1,167,335	307,727	8,499	868,108	2.82	97.18	0.98	98.99
Canada	1,680,958	397,443	485,662	1,769,178	4.06	95.94	27.45	71.39
Chile	209,475	13,438	71,246	267,283	0.51	99.49	26.66	73.21
Colombia	133,301	2,786	4,553	135,068	0.32	99.68	3.37	96.62
Czech Republic	52,688	10,013	12,086	54,761	0.13	99.87	22.07	77.90
Denmark	186,852	60,105	117,306	244,053	0.45	99.55	48.07	51.72
Finland	91,021	103,530	96,249	83,740	0.22	99.78	114.94	-15.19
France	1,972,040	740,237	600,439	1,832,242	4.76	95.24	32.77	65.59
Germany	1,297,568	670,174	707,091	1,334,485	3.13	96.87	52.99	45.30
Greece	54,717	26,314	25,486	53,888	0.13	99.87	47.29	52.64
Hong Kong	2,291,578	238279	498,880	2,552,179	5.53	94.47	19.55	79.31
Hungary	28,288	11,606	9,580	26,262	0.07	99.93	36.48	63.50
Iceland	1,128	1,692	6,251	5,687	0.00	100.00	109.91	-9.92
India	1,179,235	279,587	1,327	900,976	2.85	97.15	0.15	99.85
Indonesia	178,191	44,738	852	134,304	0.43	99.57	0.63	99.36
Ireland	29,883	383,634	539,873	186,122	0.07	99.93	290.06	-190.27
Italy	317,317	242,150	384,077	459,244	0.77	99.23	83.63	15.72
Japan	3,377,892	730,572	594,069	3,241,389	8.15	91.85	18.33	80.05
Lebanon	12,893	730	2,721	14,884	0.03	99.97	18.28	81.71
Malaysia	255,952	37,446	20,150	238,656	0.62	99.38	8.44	91.50
Mexico	340,565	94,533	1,783	247,815	0.82	99.18	0.72	99.27
Netherlands	542,533	298,557	560,996	804,971	1.31	98.69	69.69	29.38
New Zealand	67,061	9,105	27,039	84,995	0.16	99.84	31.81	68.14
Norway	227,233	75,010	354,105	506,329	0.55	99.45	69.94	29.68
Pakistan	33,239	2,500	104	30,843	0.08	99.92	0.34	99.66
Philippines	80,132	11,592	26	68,566	0.19	99.81	0.04	99.96
Poland	135,277	21,642	7,175	120,811	0.33	99.67	5.94	94.04
Portugal	98,650	69,438	36,667	65,879	0.24	99.76	55.66	44.21
Russian	861,424	117,447	2,492	746,470	2.08	97.92	0.33	99.66
Singapore	310,766	103,316	153,639	361,089	0.75	99.25	42.55	57.13
Slovak Republic	4,672	462	817	5,027	0.01	99.99	16.26	83.74
South Africa	704,822	85,609	90,899	710,111	1.70	98.30	12.80	86.98
South Korea	836,462	191,990	76,889	721,361	2.02	97.98	10.66	89.12
Spain	1,297,227	262,473	117,614	1,152,368	3.13	96.87	10.21	89.46
Sweden	432,296	131,959	265,873	566,210	1.04	98.96	46.96	52.55
Switzerland	1,070,694	570,829	398,978	898,843	2.58	97.42	44.39	54.43
Thailand	138,189	43,923	3,323	97,589	0.33	99.67	3.40	96.58
Turkey	225,735	40,863	235	185,107	0.54	99.46	0.13	99.87
United Kingdom	2,796,444	1,323,776	1,109,924	2,582,593	6.75	93.25	42.98	53.91
United States	15,077,286	2,037,013	3,995,298	17,035,571	36.40	63.60	23.45	63.12
Total	**41,421,414**	**10,215,915**	**11,950,349**	**43,155,848**	**100.00**			

2.3.2 Variable Definitions

The major variables regarding the governance concept of interest and employed are World Bank's Worldwide Governance Indicators (WGI) conducted by Kauffman et al (1999), drawing from 25 important sources and covering various aspects of governance such as *International Country Risk Guide*, *Economic Freedom Index*, and *Global Competitiveness Report*. These indicators are compiled every year and cover more than 245 countries, including most of the developed and emerging markets. The governance quality includes six indicators.

- Voice and Accountability (VA)
- Political Stability and Absence of Violence (PS)
- Government Effectiveness (GE)
- Regulatory Quality (RQ)
- Rule of Law (RL)
- Control of Corruption (CC)

According to Kauffman et al (1999), the Voice and Accountability (VA) measures the extent of citizen rights such as election, freedom of expression, freedom of association, and a free media. Political Stability and Absence of Violence (PS) captures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. Government Effectiveness (GE) measures the perceptions of the quality of public services, including the quality of policy formulation and a government's commitment to policies' implementation. Regulatory Quality (RQ) measures the ability of the government to formulate and implement sound policies and regulations that promote private sector development. Rule of Law (RL) captures the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, and the courts, as well as the likelihood of crime and violence. Control of Corruption (CC) measures the extent to which public power is exercised for private gain and corruption.

The measures are scored using the unobservable components model and range from -2.5 to 2.5, with a higher score representing a higher quality of governance in regards to that aspect of the governance infrastructure. Nevertheless, the WGI provides various aspects of governance indicators, and there could be a co-linearity problem in model estimation. Following Globerman and Shapiro (2002), we use the Principal Component Analysis (PCA) approach to extract the first component of the six indicators (VA, PS, GE, RQ, RL, CC) as the composite measure of governance quality (*Gov*).

To avoid model misspecification, we include some control variables based on the existing literature. We control country attributes such as GDP (*GDP*), while equity

market development is controlled by the ratio of stock market capitalization to GDP (*Cap*). In general, better stock market development often implies higher liquidity and more investment opportunities, which will attract more foreign investors by lowering the cost of financial intermediation (Levine and Zervos, 1996). On the one hand, a well developed equity market can attract institutional investors, reducing home bias. Alternatively, domestic investors may *ceteris paribus* have less incentive to diversify their portfolios.

Mondria and Wu (2010) and Baele, et al. (2007) suggested that financial openness and trade openness can reduce home bias. We use two proxies to examine the marginal effects of trade and financial openness on cross-border investment. The sum of imports and exports scaled by GDP is used to proxy trade openness (*Trade*), while credit to the private sector as a share of GDP is employed to proxy financial depth (*Fin*). Moreover, Mann and Meade (2002) proposed that countries with a higher share of financial assets is seen as having a less diversified financial system and are not attractive for institutional investors. We use central government consumption as a share of GDP to proxy government size (*Size*), while the country size is proxied by the total population (*Pop*) in a particular country. Our measure of a country's information penetration (*IP*) includes Internet users per 100 people, the number of secure Internet servers, and the number of mobile telephone subscribers. The $Internet^{norm}$ represents the number of Internet users per 100 people normalized by GDP per capita (in thousands of US dollars). The normalized procedure will be applied to other information channels in our estimation models. The data sources and definitions are summarized in Panel A of Table 2.2, while Panel B presents the descriptive statistics and correlations for variables used in this research.

Table 2.2 Variables' Definitions and Descriptive Statistics

Panel A

Variable	Definition	Source
Home Bias	equity home bias measures the equity portfolio holdings' deviation from CAPM	CPIS
Log GDP	logarithm of real GDP in 1990 US$	WDI
%Trade	sum of exports and imports scaled by GDP	WDI
%Cap	market capitalization of listed companies scaled by GDP	WDI
%Size	central government consumption as a share of GDP	WDI
Log Pop	logarithm of total population	WDI
%Fin	credit to the private sector as a share of GDP	WDI
GOV	first principal component of Governance Indices (VA, PS, GE, RQ, RL, CC developed by Kaufmann et al. (1999)	Kaufmann et al. (1999)
Internet	Internet users per 100 people normalized by GDP per capita	WDI
Servers	number of secure Internet servers normalized by GDP per capita	WDI
Mobiles	number of mobile telephone subscribers normalized by GDP per capita	WDI

Panel B

	Mean	S. D.	1	2	3	4	5	6	7	8	9	10
Home bias	0.74	0.31										
Log GDP	11.28	0.65	-0.03									
Log Pop	7.28	0.75	0.39	0.68								
%Trade	98.89	76.44	-0.19	-0.32	-0.43							
%Cap	76.84	74.44	-0.08	0.11	-0.19	0.54						
%Size	16.94	4.83	-0.32	0.13	-0.29	-0.28	-0.16					
%Fin	93.92	59.68	-0.47	0.32	-0.24	0.10	0.46	0.33				
Gov	0.78	0.85	-0.53	0.19	-0.48	0.23	0.39	0.53	0.68			
$Internet^{norm}$	3.84	2.88	-0.35	-0.26	0.20	0.06	-0.15	-0.26	-0.32	-0.42		
$Servers^{norm}$	8.84	10.97	-0.34	0.18	-0.20	0.03	0.23	0.29	0.54	0.48	-0.10	
$Mobile^{norm}$	10.28	12.41	-0.35	-0.20	0.33	-0.03	-0.18	-0.34	-0.42	-0.53	0.69	-0.25

N = 344; correlations greater than 0.13 are significant at the 0.05 level; correlations greater than 0.17 are significant at the 0.01 level.

2.3.3 Model Specification

To test our argument that both governance quality and information penetration may have a negative effect on investment home bias, we construct an econometric model for home bias as a function of governance and information penetration and other control variables. The basic model we seek to address is whether governance quality affects international investment. We specify our basic model as follows:

$$Home\ Bias_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 Size_{it} + \beta_3 Cap_{it} + \beta_4 Trade_{it} + \beta_5 Pop_{it} + \beta_6 Fin_{it} + \beta_7 Gov_{it} + \beta_8 IP_{it} + v_i + \delta_t + \varepsilon_{it}, \quad (2.4)$$

where $Home\ Bias_{it}$ denotes the home bias measure in the equity market, subscriber i

denotes the cross-section country, and t represents each time period (with t=2001, 2002,…,2009). The term β_0 is a constant term while estimated coefficients β_j (j=1…8) capture the marginal effects of various independent variables. The term v_i captures unobservable country-specific effects, while δ_t denotes the time dummies. Notation ε_{it} is the error term assumed to be independent and identically distributed and uncorrelated across countries and over time.

This study shows how cross-border investment is affected by the quality of governance environment. However, given the quality of governance, information diffusion also affects cross-border investment. As international investment bias can be affected by information penetration, there is no guarantee that governance quality decreases home bias. To address this problem, we analytically show how the change in home bias corresponding to a unit change in governance quality varies depending on the information penetration, as for instance, when *IP* equals $Internet^{norm}$. Since the interaction term attenuates the individual effect of information penetration $Internet^{norm}$ and governance quality *Gov*, omitting a significant interaction term will lead to a specification bias. Without an interaction term, the overall impact of a change in the flow of governance on home bias would be solely measured by β_7. Therefore, we further specify our model by adding an interaction term as follows:

$$\begin{aligned} Home\ Bias_{it} = {} & \beta_0 + \beta_1 GDP_{it} + \beta_2 Size_{it} + \beta_3 Cap_{it} + \beta_4 Trade_{it} + \beta_5 Pop_{it} \\ & + \beta_6 Fin_{it} + \beta_7 Gov_{it} + \beta_8 IP_{it} + \beta_9 (IP_{it} \times Gov_{it}) + v_i + \delta_t + \varepsilon_{it}, \end{aligned} \tag{2.5}$$

In Equation (5), coefficient β_9 captures the interaction effect of information penetration and governance quality on cross-border investment. With the interaction, the net marginal effect of the governance environment on home bias also depends on the level of information penetration. Therefore, the two variables *Gov* and *IP*×*Gov* modify the individual governance effect on home bias by $\beta_7+\beta_9 IP$. Moreover, *ceteris paribus*, the marginal effect of information diffusion is not constant, but varies with governance quality. For example, with the interaction term, the marginal effect of $Internet^{norm}$ on home bias depends on the level of governance quality as:

$$\frac{\partial E[Home\ bias_{it}]}{\partial Internet_{it}} = \beta_8 + \beta_9 Gov_{it} \tag{2.6}$$

Our panel dataset consists of 44 countries and covers the period 2001-2009 (N=44 and t=9) in which the major developed and emerging markets are included. To identify the governance effect on home bias, Model 1 is estimated by pooled OLS,

while Model 2 is estimated by the fixed effect after controlling other country characteristics such as government size and financial openness. For Model 3 to Model 5, we consider effects of information penetration on home bias using three explanatory variables to proxy information penetration (*IP*): Internet users per 100 people ($Internet^{norm}$), number of secure Internet servers ($Servers^{norm}$), and number of mobile telephone subscribers ($Mobile^{norm}$) normalized by GDP per capita. For Model 6 to Model 8, we examine the interaction of governance and information on home bias by including a set of the multiplicative interaction term of governance quality and information penetration in our model. To eliminate heterogeneity and potential misspecification bias, we use fixed effects panel data with the time dummies estimation approach. This procedure allows us to control time-invariant and country-specific unobservable effects, thus capturing the unobservable heterogeneity that causes the bias in the OLS regression.

2.4. Empirical Results

Table 2.3 reports the estimation results with respect to different specifications. For brevity's sake, we do not report the country fixed effect and time effect. We first report the estimation result without interaction terms entering our model. Model 1 shows the pooled estimation result where the coefficient of *Gov* is negative and statistically significant at the 1% level. This suggests that a country with a better governance environment has less home bias. Similarly, Model 2 represents the panel estimation results of country fixed effects with time dummies. The coefficient of *Gov* is negative, however it is insignificant.

For Model 3 to Model 5, each measurement for the channels of information penetration is entered separately. The coefficients for information penetration proxies are -0.035 ($Internet^{norm}$) and -0.016 ($Servers^{norm}$), respectively. However, they are negatively related to home bias, but are not significant. In addition, we find consistently significant and negative effects for financial openness and trade openness. This implies that a market with more openness has less incentive to diversify its portfolios in foreign markets. The fact that financial openness can lower home bias is consistent with the global trend of financial integration (Baele et al., 2007). However, the negative and significant estimated coefficient for *Size* suggests that government size has a negative effect on reducing cross-border investment bias. The positive sign of market capitalization to GDP (*Cap*) can be interpreted that well developed markets not only make it possible for foreign countries to participate in the local country, but also prompt domestic investors to have less incentive to diversify their portfolios internationally. Moreover, both government size (*Size*) and total population (*Pop*) seem to have adverse effects on cross-border investment since the estimated

coefficients are significantly negative.

We now propose that these information penetration channels can either affect cross-border investment directly or indirectly. To identify the moderate effects of various information penetrations, we extend our basic model by adding the multiplicative interaction term of governance quality and information proxies. Model 6 to Model 8 report estimation results with interaction terms added into our regression specifications. The estimated coefficients for *Gov* are respectively -0.509 and -0.283 in Model 6 and Model 7 and are significant at the 1% level. Since the coefficient of a multiplicative interaction term is significantly negative, it is important to notice the presence of the two attributes, $Internet^{norm}$ and $Internet^{norm} \times Gov$. The negative and significant coefficients of the interaction term have critical implications for interpreting empirical results. The variables *IP* and $IP \times Gov$ modify the individual governance quality effect on cross-border investment. The total impact of governance quality on home bias is $\beta_7 + \beta_9 Internet^{norm}$ instead of β_7. In other words, since coefficients $\beta_7 < 0$ and $\beta_9 < 0$, the negative impact of the governance environment on home bias is strengthened by information penetration ($Internet^{norm}$, $Servers^{norm}$, and $Mobile^{norm}$). Thus, greater information penetration reduces the investment bias in countries with higher governance quality. Following the same logic, the estimated coefficients $\beta_8 < 0$ and $\beta_9 < 0$, and greater governance quality appears to decrease cross-border investment bias in countries with higher information adoption. The adjusted R^2 for our regression models range from 0.34 to 0.42, suggesting that home bias is well explained by the variation in cross-country governance quality and information penetration on a significant level.

In summary, the coefficients of interaction terms $Internet^{norm} \times Gov$ and $Servers^{norm} \times Gov$ are significantly negative. This implies that governance affects home bias by the marginal effect of information penetration. Furthermore, there is a negative and significant interaction between governance quality and $Internet^{norm}$, as well as governance quality and $Servers^{norm}$, supporting that information penetration strengthens the governance quality effect on home bias. However, the cross product of governance quality and $Mobile^{norm}$ negatively interacts with the dependent variable, and it is insignificant. Nevertheless, the main message of our analysis is that we find evidence for the investment portfolio holdings in connection with a country's information penetration.

Table 2.3 Panel Estimation with a Fixed Effect for Equity Home Bias

The dependent variable is the equity home bias (*Home bias*). The explanatory variables include: logarithm of GDP (*GDP*); sum of imports and exports scaled by GDP (*Trade*); stock market capitalization (*Cap*); central government consumption as a share of GDP to proxy government size (*Size*); country size is proxied by the logarithm of total population (*Pop*); credit to the private sector as a share of GDP is used to proxy financial depth (*Fin*); the first principal component from various aspects of governance indices (*Gov*). We consider three different variables to proxy information penetration (*IP*): Internet users per 100 people ($Internet^{norm}$), number of secure Internet servers ($Servers^{norm}$), and number of mobile telephone subscribers ($Mobile^{norm}$) normalized by GDP per capita.

	Without Interaction					With Interaction		
	Pooled OLS	Fixed effects				Fixed effects		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Const.	1.11062***	4.318	12.531***	12.838***	16.881***	10.264*	8.038	7.795
	(3.43)	(0.84)	(2.83)	(2.99)	(3.60)	(1.89)	(1.46)	(1.45)
Log GDP	-0.169***	0.193	0.057	0.058	-0.025	0.054	0.098	0.114
	(-3.02)	(1.29)	(0.39)	(0.40)	(-0.17)	(0.35)	(0.63)	(0.74)
Trade	-0.001***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***
	(-3.62)	(-5.27)	(-5.58)	(-5.24)	(-5.57)	(-5.05)	(-5.03)	(-5.17)
Cap	0.002***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(6.35)	(6.24)	(5.57)	(5.56)	(5.38)	(5.58)	(6.08)	(6.05)
Size	0.004	-0.012*	-0.029***	-0.029***	-0.031***	-0.010	-0.015**	-0.014*
	(1.07)	(-1.65)	(-4.47)	(-4.23)	(-4.66)	(-1.30)	(-2.07)	(-1.82)
Log Pop	0.231***	-0.694	-1.580**	-1.617**	-2.012***	-1.293*	-0.998	-1.045
	(3.98)	(-0.98)	(-2.45)	(-2.54)	(-3.04)	(-1.79)	(-1.37)	(-1.45)
Fin	-0.002***	-0.002***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(-4.59)	(-4.74)	(-4.44)	(-4.32)	(-4.20)	(-3.59)	(-4.08)	(-4.23)
Gov	-0.069***	-0.082				-0.509***	-0.283***	-0.312*
	(-2.09)	(-1.57)				(-3.44)	(-3.24)	(-1.97)
$Internet^{norm}$			-0.035			0.018		
			(-0.74)			(0.30)		
$Servers^{norm}$				-0.016			0.128***	
				(-0.66)			(2.95)	
$Mobile^{norm}$					0.043			-0.003
					(0.97)			(-0.04)
$Internet^{norm} \times Gov$						-0.168***		
						(-3.06)		
$Servers^{norm} \times Gov$							-0.075***	
							(-2.82)	
$Mobile^{norm} \times Gov$								-0.103
								(-1.53)
Year dummies included	Yes	Yes				Yes	Yes	Yes
No. of Obs.	344	344	344	344	344	344	344	344
F stastistics	17.65	12.64	21.23	21.21	21.32	12.05	12.28	11.60
R-square within	0.42	0.40	0.34	0.34	0.34	0.42	0.43	0.41

Note: *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively. Numbers in parentheses are White's heteroskedasticity-robust standard errors. Estimated coefficients of country effect and time dummies are not reported to save space.

2.5 Robustness Checks

This section performs a variety of robustness checks of our primary findings. We first address the problem of sensitivity for the estimated coefficients using the bootstrap method. We then analyze the panel data regression after trimming some extreme observations. Table 2.4 presents the robust results for information penetration as a role of a moderate variable for the governance quality-home bias relationship. From Model 9 to Model 11, the coefficients are estimated by the bootstrap method with 2,000 replications to ensure estimation stability. The estimated coefficients for $Internet^{norm} \times Gov$ and $Servers^{norm} \times Gov$ are respectively -0.168 and -0.075. They are

significant at the 5% and 10% statistical levels, respectively. The coefficient for $Mobile^{norm} \times Gov$ is -0.103 and statistically significant at the 10% level. We find a robust result that all interaction terms negatively interact with investment bias.

We re-estimate our regressions after trimming 10% of existing extreme values in our data to avoid estimation bias. The analytic result is equivalent. For Model 12 to Model 14, we find a negative and significant interaction effect for $Internet^{norm} \times Gov$, $Servers^{norm} \times Gov$, and $Mobile^{norm} \times Gov$, indicating that countries with more information penetration are more diversified and have less home bias. The estimated coefficients for interaction terms $Internet^{norm} \times Gov$ and $Servers^{norm} \times Gov$ are respectively -0.221 and -0.090. Both estimated coefficients are statistically significant at the 1% level. The coefficient for $Mobile^{norm} \times Gov$ is -0.145 and is also significant at the 10% level. The overall R^2 exceeds 0.41 for all models, which is greater than acceptable. The estimation results from the bootstrap procedure and trimming extreme values indicate that information penetration has a moderate effect on international asset allocation. These negative and significant coefficients for the multiplicative interaction term of information penetration and governance quality imply that information penetration can affect the strength of the relationship between governance quality and home bias. Overall, the robust analysis consistently suggests that information penetration moderates the governance quality-home bias relationship.

Table 2.4 Robust Estimation

The dependent variable is the equity home bias (Home bias). The explanatory variables include: logarithm of GDP (*GDP*); sum of imports and exports scaled by GDP (*Trade*); stock market capitalization (*Cap*); central government consumption as a share of GDP to proxy government size (*Size*); country size is proxied by the logarithm of total population (*Pop*); credit to the private sector as a share of GDP is used to proxy financial depth (*Fin*); the first principal component from various aspects of governance indices (*Gov*). We consider three different variables to proxy information penetration (*IP*): Internet users per 100 people ($Internet^{norm}$), number of secure Internet servers ($Servers^{norm}$), and number of mobile telephone subscribers ($Mobile^{norm}$) normalized by GDP per capita.

	Bootstrapping			Trimming		
	(9)	(10)	(11)	(12)	(13)	(14)
Const.	10.264	8.038	7.795	15.535**	9.138	12.962**
	(0.82)	(0.72)	(0.66)	(2.57)	(1.54)	(2.16)
Log GDP	0.054	0.098	0.114	0.033	0.075	0.074
	(0.36)	(0.67)	(0.57)	(0.20)	(0.44)	(0.44)
Trade	-0.003***	-0.003**	-0.003**	-0.003***	-0.003***	-0.004***
	(-2.57)	(-2.30)	(-2.42)	(-5.13)	(-4.96)	(-5.18)
Cap	0.001*	0.001	0.001**	0.001***	0.001***	0.001***
	(1.64)	(1.55)	(2.03)	(5.41)	(5.76)	(5.94)
Size	-0.010	-0.015	-0.014	-0.010	-0.018**	-0.016**
	(-0.96)	(-1.07)	(-1.21)	(-1.23)	(-2.23)	(-2.04)
Log Pop	-1.293	-0.998	-1.045	-1.989**	-1.107	-1.684**
	(-0.77)	(-0.64)	(-0.64)	(-2.42)	(-1.37)	(-2.07)
Fin	-0.001	-0.001	-0.001	-0.001***	-0.001***	-0.001***
	(-1.18)	(-1.35)	(-1.30)	(-3.14)	(-3.80)	(-3.82)
Gov	-0.509**	-0.283*	-0.312*	-0.652***	-0.324***	-0.424**
	(-2.01)	(-1.71)	(-1.86)	(-3.80)	(-3.18)	(-2.40)
$Internet^{norm}$	0.018			0.032		
	(0.21)			(0.48)		
$Servers^{norm}$		0.128*			0.153***	
		(1.78)			(2.77)	
$Mobile^{norm}$			-0.003			0.022
			(-0.04)			(0.27)
$Internet^{norm} \times Gov$	-0.168**			-0.221***		
	(-1.99)			(-3.41)		
$Servers^{norm} \times Gov$		-0.075*			-0.090***	
		(-1.82)			(-2.69)	
$Mobile^{norm} \times Gov$			-0.103*			-0.145*
			(-1.64)			(-1.93)
Year dummies included	Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs.	344	344	344	315	315	315
Chi-square	631.4	511.41	264.09			
F stastistics				12.01	11.90	11.61
R-square within	0.42	0.43	0.41	0.44	0.44	0.44

Note: *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively. Estimated coefficients of country effect and time dummies are not reported to save space.

2.6 Concluding Remarks

This study examines whether the difference in governance quality can explain cross-country heterogeneity in international investment behavior. A panel dataset of 44 countries for the period 2001-2009 is employed to test the analytical arguments. We provide theoretical insights that governance quality and information penetration have a stimulative effect on reducing home bias. In addition, we argue that information penetration can affect the strength of the relationship between governance quality and home bias.

We find that a superior governance quality significantly impacts on reducing

cross-border investment bias. In fact, a country with a better governance quality can improve its economic performance and attract foreign institutional investors. Therefore, such a country is more capable to allocate its assets internationally. Our empirical results suggest that information penetration consistently has a negative effect on reducing home bias, although the individual estimated coefficient is insignificant. Finally, the information infrastructure such as Internet users, the number of secure Internet servers, and the number of mobile telephone subscribers moderates the form of the governance quality and home bias relationship. By including a set of multiplicative interaction terms of information penetration and governance quality in our empirical model, we show that the implied effect of governance quality on home bias is negative for countries with higher information adoption. This evidence can be attributed to the fact that an information infrastructure can improve governance effectiveness and accelerate information diffusion. Actually, countries with a higher information adoption have a negative effect of governance quality on home bias. The empirical insight is that countries trying to attract more foreign investment and reduce home bias should devote more energy into maintaining governance quality and the information infrastructure. Hence, a country with a lower home bias will benefit from reducing global systematic risks.

Although we have found possible factors to explain the home bias, this research is not without limitations. The potential shortcomings of this research are as follows: (1) we follow the analytical procedure of Sharma et al. (1981) to identify the moderating effect of selected information penetration channels. This implies that the two effects, governance quality and information infrastructure, are mutually exclusive. However, in reality, an information infrastructure may have both direct and indirect effects. For example, the Internet may not only have a direct effect on the governance quality-home bias relationship when it influences the governance environment, but it also may have an indirect effect in improving the country's general investment activities. Thus, future research may shed more light to identify and separate these effects when the Internet may engender both direct and indirect effects. (2) Our results confirm that heterogeneity of governance quality and information penetration can explain cross-sectional international investment behavior. The home bias measure is more severe for emerging countries than that for developed countries. The emerging countries may have their own unique country attributes and specified constraints such as investment size and capital control that influence international portfolio allocation. Future research may provide insights into the country specific factors that impact various managerial behaviors in different settings.

Conclusions

The famous puzzle home bias is observed in many fields and a body of literature suggests many explanations for this phenomenon. This dissertation investigates the role of unique culture characteristics, governance environment and how they interact with information penetration. In Chapter 1, we provide evidence that culture characteristics can affect cross-border investment differently while the culture distance discourages originating countries to hold foreign portfolio which leads to higher home bias. In addition, our study shows that information distance can further increase culture distance that prevents international diversification. In Chapter 2, we find that better regulatory has a negative but insignificant effect on reducing home bias. Nevertheless, we further find that a country with effective governance regime appears to decrease cross-border investment bias under higher information penetration.

Since home bias exists in various markets, the latest research relates culture characteristics to banking and international investment literature. Aggarwal and Goodell (2009) examine the role of national culture in determining the preferences of financial intermediation, showing a country characterized by higher uncertainty avoidance prefers bank-based financial intermediation instead of market-based. Beugelsdijk and Frijns (2010) apply a society's culture and the cultural distance between two markets to explain the foreign bias. Moreover, Anderson et al. (2011) conclude that culture characteristics indeed influence institutional investors' foreign diversification. To examine the role of information distance and culture distance in cross-border investment. Diyarbakirlioglu (2011) finds that the observed geographical patterns of bilateral portfolio investments can be explained by information asymmetries rather than cultural affinities between countries. Thus, the cultural difference between countries could be an obstacle or barrier in foreign investment.

For further research, we can investigate the home bias in debt market instead of that in equity investment. For example, a country characterized by higher uncertainty avoidance can behave more conserve to equity investment than debt investment. As research topics for corporate finance, future research can relate cultural traits to capital structure and CEO's overinvestment issues in the future. Furthermore, we argue that the cross-border investment behavior can be connected to Euro crisis and global aging. The series problem of fiscal deficit and aged population in developed countries can affect foreign investment directly or indirectly. We conjecture that demographics in a country are expected to have significant effects on home bias. This phenomenon indicates that developed countries with aged population may encounter

serious fiscal deficits, and therefore allows capital flow, such as pension fund, from countries to emerging countries with higher growth and asset return. These addressed topics are influential for financial market and world economics in the future. We left these important international finance and macroeconomics issues for further research.

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