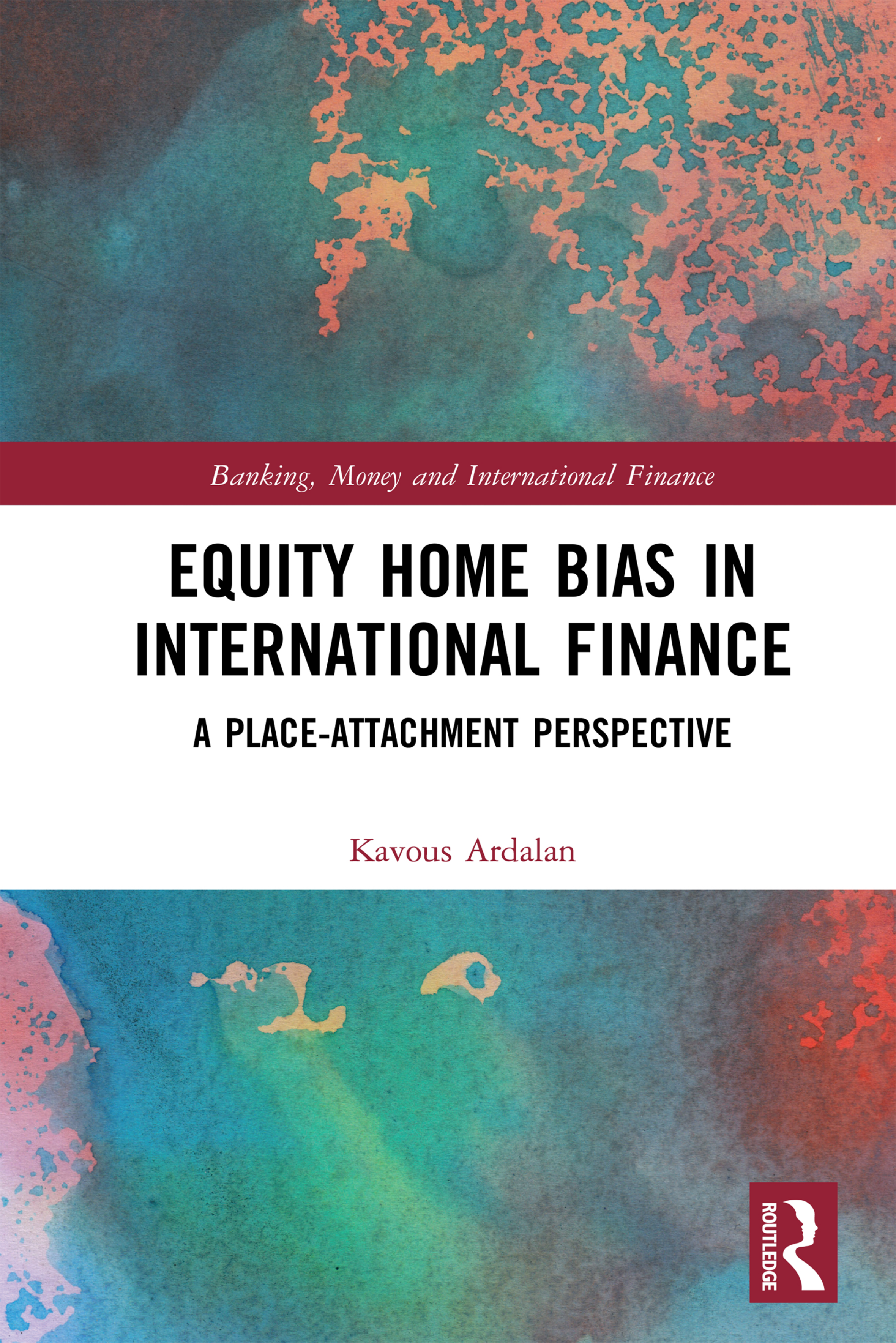

Banking, Money and International Finance

EQUITY HOME BIAS IN INTERNATIONAL FINANCE

A PLACE-ATTACHMENT PERSPECTIVE

Kavous Ardalan

Equity Home Bias in International Finance

This book provides a comprehensive and critical analysis of research outcomes on the equity home bias puzzle – that people overinvest in domestic stocks relative to the theoretically optimal investment portfolio. It introduces place attachment – the bonding that occurs between individuals and their meaningful environments – as a new explanation for equity home bias, and presents a philosophically multi-paradigmatic view of place attachment.

For the first time, a comprehensive and up-to-date review of the extant literature is provided, demonstrating that place attachment is a contributing factor to 22 different topics in which variations of home bias are present. The author also analyses the social-psychological underpinnings of place attachment, and considers the effects of multiculturalism on the future of equity home bias.

The book's unique approach discusses the issues in conceptual terms rather than through data and statistical methods. This multi- and inter-disciplinary book is an invaluable resource for graduate students and researchers interested in economics, finance, philosophy, and/or methodology, introducing them to a new line of research.

Kavous Ardalan is a Professor of Finance at Marist College, Poughkeepsie, New York, U.S.A. He holds PhDs in both economics and finance. His research interests are in the theoretical, practical, educational, social, and philosophical aspects of economics and finance.

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A Place-Attachment Perspective

Kavous Ardalan

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Contents

List of figures viii
Preface ix

1 The equity home bias puzzle 1
2 Place attachment 82
3 The equity home bias puzzle: a place-attachment explanation 122
4 A look into the future 198

Index 220

Figures

2.1 The tripartite model of place attachment 84
2.2 The four paradigms 93

Preface

This book introduces "place attachment" as a new explanation for the "equity home bias" puzzle – the empirical finding that people overinvest in domestic stocks relative to the theoretically optimal investment portfolio. Chapter 1 provides a comprehensive review of the extant literature on the equity home bias puzzle, and Chapter 2 offers an overview of the literature on place attachment. Chapter 3 crosses the two lines of research to propose place attachment as a new explanation for the equity home bias puzzle. Chapter 4 looks into the future of place attachment and its effect on home bias. The chapter synopses are as follows.

Chapter 1: The equity home bias puzzle

This chapter reviews the literature on equity home bias – the empirical finding that people overinvest in domestic stocks relative to the theoretically optimal investment portfolio. It reviews six broad classes of explanation of this puzzling phenomenon: (1) hedging home risks; (2) barriers to foreign investments; (3) information asymmetries; (4) risk-aversion instability; (5) corporate governance and transparency; and (6) behavioral factors. The consensus is that none of the proposed theories can explain the full extent of the bias by itself, thus the international portfolio choice should be explained by a mixture of rational and behavioral factors.

Chapter 2: Place attachment

This chapter discusses the concept of place attachment – the bonding that occurs between individuals and their meaningful environments. Place attachment has been examined in many fields of study, therefore it has been conceptually defined in various ways and through different methodological approaches. This situation could be regarded as chaotic, and some organizing frameworks would be helpful. Section 2.1 of this chapter discusses a tripartite framework for organizing definitions, and Section 2.2 provides a multi-paradigmatic framework for organizing methodologies.

Chapter 3: The equity home bias puzzle: a place-attachment explanation

This chapter views place attachment as a contributing factor to equity home bias. It provides overviews of the literature on 22 topics in which variations of home bias are present, and notes that "equity home bias" is only one of these variations. The common contributing factor to all of the 22 home bias topics – including equity home bias – is place attachment. The 22 topics discussed in this chapter are: (1) equity investment, (2) bond investment, (3) equity analysts, (4) loan market, (5) saving-investment, (6) foreign stock listing, (7) currency, (8) international business, (9) international trade, (10) international marketing, (11) mergers and acquisitions, (12) economic nationalism, (13) corporate governance, (14) accounting standards, (15) government procurement, (16) academic research citations, (17) patent citations, (18) entrepreneurship, (19) entrepreneur location choice, (20) forum selection in law, (21) real estate, and (22) sport competition.

Chapter 4: A look into the future

This chapter discusses "us and them" – a distinction that accompanies place attachment. The chapter argues that monoculturalism creates tension as it converts "us and them" to "us vs. them," whereas multiculturalism mitigates the tension as it converts "us and them" to "us with them." The chapter begins in Section 4.1 with a discussion of dual-process social psychology, which considers a spectrum with two extreme processes of effortless "heuristic" and effortful "systematic." Whereas the heuristic process is more prone to bias, the systematic process tends to reduce the bias. Section 4.2 discusses place attachment as a cultural group's definition of and relationship with place. Section 4.3 discusses the monoculture–multiculture spectrum, which contains the following stages: (1) monoculturalism, (2) cross-cultural contact, (3) cultural conflict, (4) educational interventions, (5) disequilibrium, (6) awareness, and (7) multiculturalism. The monoculture–multiculture spectrum operates in a parallel fashion to the heuristic–systematic spectrum. A typical resident who is socialized into the culture of a place takes such culture for granted and acts on it as his/her heuristic. However, if this typical resident of the place learns about multiculturalism, then he/she modifies the taken-for-granted culture and acts on it as his/her systematic. Section 4.4 argues that whereas the monoculture heuristic pair is biased, creates tension, and converts "us and them" to "us vs. them," the multiculture systematic pair is unbiased, avoids tension, and converts "us and them" to "us with them." In Section 4.5, the chapter concludes by stating that multiculturalism mitigates home bias.

Writing the chapters of this book has involved extensive work over several years. It required peace of mind and extended uninterrupted research time. My deepest expressions of gratitude go to my wife Haleh, my son Arash, and my daughter Camellia for their prolonged patience, unlimited understanding, sustained support, constant cooperation, and individual independence during all these long years. I hold much respect for my late parents (Javad and Afagholmolouk) who instilled in their children (Ghobad, Golnar, Alireza, and Kavous) the grand Ardalan family's values of respect, openness, and love of learning, among others. I sincerely appreciate the heartfelt support of my in-laws (Farideh, Parviz, and Houman) who have always been in close contact with us since the formation of my immediate family.

The ideas expressed in this work are based on the teachings, writings, and insights of Professor Gareth Morgan, to whom the nucleus of this work is owed. Needless to say, I stand responsible for all the errors and omissions. I would like to thank Professor Gareth Morgan who taught me how to view the world diversely and accordingly inspired my work.

I am thankful to the Marist College library staff for their timely provision of the requested literature, which they obtained from various sources. I would also like to thank the publishers, referenced in the endnotes of each chapter, who allowed me to use their materials. Certainly, I would like to thank the respectable people who work at Routledge for their recognition of the significance of my work, and for their publication of the book with utmost professionalism.

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1 The equity home bias puzzle

This chapter reviews the literature on "equity home bias" – the empirical finding that people overinvest in domestic stocks relative to the theoretically optimal investment portfolio. It reviews six broad classes of explanation of this puzzling phenomenon: (1) hedging home risks; (2) barriers to foreign investments; (3) information asymmetries; (4) risk-aversion instability; (5) corporate governance and transparency; and (6) behavioral factors. The consensus is that none of the proposed theories can explain the full extent of the bias by itself, thus the international portfolio choice should be explained by a mixture of rational and behavioral factors.

Standard finance theory predicts that investors hold a diversified portfolio of equities across the world if capital is fully mobile across borders. More specifically, in a world with frictionless financial markets, the most basic international capital asset pricing model (CAPM) with homogenous investors across the world would predict that the representative investor of a given country should hold the world market portfolio. In other words, the share of his/her financial wealth invested in local equities should be equal to the share of local equities in the world market portfolio. This prediction contradicts the most casual observation of the data on portfolio holdings, which is the well-known home equity puzzle in international finance: Because foreign equities provide great diversification opportunities – a point made by DeSantis and Gerard (1997), Eldor, Pines, and Schwartz (1988), Grauer and Hakansson (1987), Grubel (1968), Kaplanis and Schaefer (1991), Lessard (1976, 1983), Levy and Sarnat (1970), Solnik (1974a) – falling barriers to international trade in financial assets over the past thirty years should have led investors across the world to rebalance their portfolio away from national assets toward foreign assets. The process of financial globalization fostered by capital account liberalizations, electronic trading, increasing exchange of information across borders, and falling transaction costs has certainly led to a large increase in cross-border asset trade (Lane and Milesi-Ferretti 2003). However, investors seem still reluctant to reap the full benefits of international diversification, and hold a disproportionate share of local equities. Despite better financial integration, the home bias has not decreased sizably: in 2007, U.S. investors still held more than 80% of domestic equities, a much higher proportion than the share of U.S. equities in the world market portfolio. Such home bias is often labelled as investors' suboptimal decision (Feldstein and Horioka 1980; Li, Sarkar, and Wang 2003). Indeed, home bias in equities is still observed in most countries and tends to be higher in emerging markets. Since the seminal paper of French and Poterba (1991), the home bias in equities has continued to intrigue and fascinate both financial economists and international macroeconomists. After French and Poterba (1991) brought home bias to prominence, Obstfeld and Rogoff (2001) nominated home bias as one of the six major puzzles in international macroeconomics.

Papers such as Tesar and Werner (1995) show that home bias appears in bonds as well as equity, further deepening the home bias puzzle. Most of the literature has studied the more general case where individuals may invest in multiple assets in many countries (Adler and Dumas 1983; Stulz 1981a). It has been shown that home bias is not restricted to an international setting. Even within borders, there seems to be a tendency for investors to bias their portfolios towards firms that are situated in their own region.

Many explanations have been put forward in the literature to explain this very robust portfolio fact, and these alternatives contribute to explaining parts of the gap. A number of studies have documented a significant yet slowly falling home bias in international financial portfolios among industrialized countries (Baele, Pungulescu and Ter Horst 2007; Cooper and Kaplanis 1986, 1994; French and Poterba 1990, 1991; Golub 1990; Heathcote and Perri 2013; Kang and Stulz 1997; Lane and Milesi-Ferretti 2006; Lewis 1995; Obstfeld 1995, Solnik 1991; Tesar and Werner 1994, 1995, 1998). This chapter reviews both the finance literature and the open economy financial macroeconomics literature, which has embedded nontrivial portfolio choices in standard two-country general equilibrium macro models – dynamic stochastic general equilibrium (DSGE) models.[1]

Cooper and Kaplanis (1994) report for several countries the proportion of equity investment in domestic equities and the domestic market capitalization as a proportion of the world equity market capitalization. For example, as of December 1987, U.S. investors placed 98% of their equity portfolios in domestic equities, against a figure of 36.4% for the U.S. market as a proportion of the world equity market capitalization. Comparative figures for other countries were: 78.5% against 10.3% for the United Kingdom; 86.7% against 43.7% for Japan; and averages of 85% against 1.9% for five continental European countries.

French and Poterba (1991) document the domestic ownership of shares across countries. Using data for the United States, Japan, the United Kingdom, France, and Germany, they show that investors hold a disproportionate share of domestic assets in their equity portfolios. In 1989, 92% of the U.S. stock market was held by U.S. residents. Analogous numbers for Japan, the United Kingdom, France, and Germany were 96%, 92%, 89%, and 79%, respectively. Bohn and Tesar (1996) estimated the share of foreign equities in the U.S. portfolio to be still very low in 1995, equal to 8%.

Tesar and Werner (1998) show that by the end of 1996 the fraction of stock-market wealth invested in foreign assets was 10% for the United States, 11% for Canada, 18% for Germany, and 22% for the United Kingdom. These numbers have increased from a decade ago. In 1987 U.S. residents invested 4% abroad, Canadian investors 6%, and British investors 17%.

Lewis (1999) reports that during 1970–1996 the correlation between the monthly returns on the U.S. and EAFE (Europe, Australia, and Far East) stock market indices was only 0.48. This modest correlation implies an allocation of at least 40% of the U.S. investors' portfolio to foreign stocks. The actual U.S. allocation to foreign stocks is 8%.

Ahearne, Griever, and Warnock (2004) show that at the end of 1997, U.S. stocks comprised 48.3% of the world market portfolio. At that time, foreign stocks represented only 10.1% of the stock portfolios of U.S. investors.

Kollmann (2006a), based on the portfolio data from Kraay et al. (2005), shows that the average locally owned capital share for 17 Organisation for Economic Co-operation and Development (OECD) countries was 91% in 1997.

Sercu and Vanpee (2007) analyze the data from the Coordinated Portfolio Investment Survey (held by the International Monetary Fund) and find that on average 70% of the total equity portfolio was invested in domestic stocks in all developed countries at the end of 2005.

Sercu and Vanpee (2007) show that, at the end of 2005, all of the countries investigated held significantly home-biased equity portfolios. The equity home bias was lowest in the Netherlands, where only 32% of the total equity portfolio is invested in domestic stocks; and highest in Indonesia, where nearly all equity investments are domestic. In general, the equity home bias is lower in developed countries and higher in emerging markets.

Coeurdacier and Rey (2013) note that in 2008, domestic equities constituted around 77.2% of equity portfolios of investors in the United States. This value is significantly larger than the United States' 32.6% share in world equity market capitalization.

Warren (2010) shows that, based on Australian Bureau of Statistics data, Australian superannuation fund assets as of December 2008 consisted of 82% in local assets, with an estimated 73% of the equity component comprised of local securities. At the same time, Australian equities comprised only 2.6% of the Financial Times Stock Exchange (FTSE) Global Equity Index Series.

Evidence also points toward significant domestic bias in international bond portfolios. For example, Burger and Warnock (2003) find that foreign bonds comprised about 6% of U.S. investors' bond portfolios in 1997, and 4% in 2001. Corroborating this evidence further, Fidora, Fratzscher, and Thimann (2007) show that there is substantial home bias in bond holdings for several advanced countries: Japan, the United Kingdom, Germany, Italy, and France.

A measure of equity home bias that is most commonly used is the difference between actual holdings of domestic equity and the share of domestic equity in the world market portfolio. When the home bias measure for a country is equal to one, there is full equity home bias; when it is equal to zero, the portfolio is optimally diversified according to the basic international CAPM.

On average, the degree of home bias across the world is 0.63 (lower in Europe where monetary union after 1999 appears to have had an effect (see Coeurdacier and Martin 2009 and Fidora et al. 2007 for studies on the impact of monetary union on cross-border equity diversification; Kalemli-Ozcan, Papaioannou, and Peydro 2010 show that the euro's impact on financial integration was primarily driven by eliminating the currency risk). For the developed world, this means that the share of foreign equities in investors' portfolios is roughly a third of what it should be if the benchmark is the basic international CAPM. Emerging markets have less diversified equity portfolios than developed countries and do not exhibit any clear downward trend in home bias. The average degree of home bias in these countries is 0.9 (smaller in emerging Asia and larger in Latin America), and investors in these countries hold one-tenth of the amount of foreign equities they should be holding according to the basic international CAPM model. Hau and Rey (2008) provide facts and relationships on home bias at the fund level.

This robust evidence has received considerable attention in both the finance literature and the macroeconomics literature. The main difference between these two literatures relies on some modeling assumptions. To simplify, the traditional finance literature has tried to rationalize the equity home bias in multi-country models of portfolio choice where asset prices and their second moments are given (in particular in these models the risk-free interest rate is given exogenously). The finance models that use the portfolio approach to explain the home bias all proceed similarly. They posit an indirect utility function that depends on wealth and state variables. The investor maximizes the expected indirect utility function based on their expectation of the joint distribution of asset returns and state variables. Investors differ across countries because indirect utility functions and/or expectations of the joint distribution of returns and state variables differ across countries. These differences lead to a home bias. The macroeconomics literature has tried to integrate international portfolio decisions in otherwise standard DSGE models of the international economy. These models have a fully general equilibrium structure and asset prices and their second moments are determined endogenously. The finance literature tends to focus on the diversification gains, looking at asset price data to evaluate how an increase in the share of foreign equities would improve the portfolio performance, based on some criteria. The macrofinance literature tends to use consumption data to measure the potential welfare gains from international risk-sharing. The motivation is, however, the same: foreign equities seem to offer diversification benefits that are not reaped by investors, and both financial economists and macroeconomists are intrigued by this fact.

The theoretical macroeconomic literature points toward potential gains from international diversification to hedge national production risk. In the presence of imperfectly correlated productivity shocks or output shocks across countries, owning foreign equity could help to smooth consumption. This is most obvious in the context of a two-country model with one single tradable good, as for example in Lucas (1982): in such a world, domestic and foreign investors hold an identical portfolio of claims to output (equities), the market portfolio, thus diversifying optimally national output risks. As in the textbook finance portfolio theory, in such a world the home bias in equities is seen as a failure of the standard diversification motive. However, one should be cautious: investors across the world would hold the same portfolio, only if they were homogenous. In reality, heterogeneity across investors from different countries leads to departure from the world market portfolio and potentially a bias toward national assets. Various sources of heterogeneity leading to equity home bias have been explored in the macro literature. They fall into two broad classes of explanation: hedging home risks – deviations from purchasing power parity (PPP) and nontradable assets risk; and barriers to foreign investments – such as transaction costs, differences in tax treatments and in legal frameworks, and other policy-induced barriers to foreign investment.

The remainder of this chapter reviews the six broad classes of explanation for the equity home bias that have been brought forward in the literature. Section 1.1 discusses hedging home risks (deviations from PPP; nontradable assets risks; liabilities risks); Section 1.2 presents barriers to foreign investments (capital controls; transaction costs); Section 1.3 covers information asymmetries; Section 1.4 discusses risk aversion instability; Section 1.5 considers corporate governance and transparency; and Section 1.6 discusses behavioral factors. Section 1.7 concludes the chapter by summarizing the consensus that no single explanation can capture the full extent of international underdiversification on its own. Home bias is probably caused by a mixture of both institutional and behavioral factors, and therefore it is a very complex task to find a theoretical model that correctly describes actual portfolio choice.

1.1 Hedging home risks

One potential explanation for the home bias in equity portfolios is that domestic assets serve as a better hedge for risks that are home country-specific. This is because investments in domestic assets are likely to follow the performance of the domestic market in general. Six home country-specific risks are considered that fall into three categories: deviations from PPP risks (inflation risk, real exchange rate risk, domestic consumption risk, nontradable goods risk); nontradable assets risk; and liabilities risk.

1.1.1. Deviations from purchasing power parity risks

To understand the first source of risk, note that the framework used in the literature assumes that all investors perceive the same real returns as currency-adjusted inflation rates are equalized through PPP (Solnik 1974b). However, a large empirical literature has decisively rejected the hypothesis of PPP except perhaps in the very long run (Froot and Rogoff 1995). Thus, it would seem important to allow goods prices, and hence inflation rates, to differ across countries.

Adler and Dumas (1983) point out an important feature that appears in international portfolio theory but not in domestic portfolio theory. Investors in different countries consume different bundles of goods. With inflation risk and deviations from PPP, investors in different countries are induced to hold portfolios that differ by a component designed to hedge inflation risk (Adler and Dumas 1983; Stulz 1981a). Thus, the home bias could be explained, as discussed by Sercu (1980) and Solnik (1974b), if domestic equities provide a hedge against inflation risk for some investors.

It is possible to hedge inflation risk with domestic stocks only if the domestic stock returns and inflation rates are positively correlated. Empirical evidence for a positive correlation between stock returns and inflation rates is weak (Adler and Dumas 1983; Cooper and Kaplanis 1994; Sercu and Vanpee 2008), indicating that hedging inflation risk cannot explain the observed home bias.

Cooper and Kaplanis (1994) test whether the home bias in equity portfolios is caused by investors trying to hedge inflation risk. They use data on foreign equity holdings across eight countries to ask whether inflation hedge motives can explain home bias. Their empirical evidence is consistent with this motive only if investors have very high levels of risk tolerance and if equity returns are positively correlated with domestic inflation. They find that the model is rejected and that sometimes the hedge motives are in the opposite direction to explain home bias. They conclude that the home bias cannot be explained by inflation hedging unless investors have very low levels of risk aversion. Thus, PPP deviations do not seem to explain the home bias phenomenon. Uppal (1992) has also contributed to this literature.

Deviations from PPP not only create inflation risk, but also result in real exchange rate risk. Fidora et al. (2007) focus on the role of real exchange rate volatility as a key determinant of international portfolio allocation decisions. An interesting feature of their study is that it does not focus solely on stock holdings, but provides a link between the home bias in the stock and in the bond markets. Their model implies that real exchange rate volatility induces a higher home bias for assets with lower local currency return volatility, that is, a higher home bias for bonds than for equities. Fidora et al. (2007) find that for 40 home countries and up to 120 destination countries, real exchange rate volatility explains 20% to 30% of the cross-country variation in equity home biases and even a larger part of the variation in bond home biases.

Another explanation given for the home bias is the existence of nontraded goods. This considers the desire of investors to hedge against the price uncertainty of nontraded goods that, in turn, leads to home bias. The hedging motive emanates from the difference in consumption bundles, as in the Adler and Dumas (1983) model. However, there is ample empirical evidence documenting incomplete international consumption risk-sharing. Indeed, Backus and Smith (1993), Kollmann (1995), and many other studies go by the names "Backus–Smith puzzle" or "consumption-real-exchange-rate anomaly."

Chue (2007) proposes a Euler equation to measure the extent to which foreign securities can serve as a better hedge against domestic consumption risks, relative to domestic assets. Chue finds that even though foreign equities can help diversify away domestic stock market risks, their ability in hedging domestic consumption risks is much weaker. Based on the Euler equation approach, there is only weak evidence that the existing degree of equity home bias for U.S. investors is suboptimal. Thus, Chue's (2007) work provides no evidence that hedging domestic consumption risk can explain the observed home bias in equity portfolios.

Lauterbach and Reisman (2004) offer a possible rational explanation for the home bias phenomena. They argue that since Duesenberry (1949), economists recognize people's fundamental habit of comparing their economic welfare with that of their neighbors, peers, and social reference group. Individuals desire, first of all, to "keep up with the Joneses," that is, preferences are defined over relative consumption (the ratio of individual consumption to that of their neighbors). Investors wishing to keep up with their neighbors (their compatriots, in our case) consider investments in domestic stocks favorably because they provide a better link to the local economy and to their compatriots' economic welfare. Accordingly, investors seek some correlation with their compatriots' future return and future consumption, that is, to the future domestic labor income and to the future return of local businesses. Thus, to tie their future economic welfare to that of their neighbors, investors favor domestic stocks. Therefore the home bias is a natural consequence of individuals' desire to compare themselves and keep up with their neighbors. Their model predicts that globalization (increased correlation between the consumption and preferences of different nationals) would mitigate the home bias.

Lewis (1996) shows why we may expect nontradables to play an important role in portfolio choice. Lewis finds that perfect risk-sharing cannot be rejected among a set of countries with unrestricted capital flows, as long as one allows for nonseparability in preferences between tradables and nontradables (consumption or leisure). In the context of the complete markets of Lewis' (1996) model, the observed home bias can be explained only as the result of an optimum hedge against nontradables uncertainty.

In the finance literature, optimal portfolios are structured to hedge the risk arising from real exchange rate fluctuations. This is at the heart of the potential divergence of portfolios across investors in the partial equilibrium portfolio choice models with real exchange rate risk. The key issue is whether local equities are a good hedge against relative price (real exchange rate) fluctuations, that is, whether local equities have higher returns when local goods are (relatively) more expensive. If this is the case, then local investors should favor local equities. Examples of this hypothesis are Adler and Dumas (1983), de Macedo (1983), de Macedo, Goldstein, and Meerschwam (1984), Krugman (1981), Solnik (1974a, 1974b), and Stulz (1981a, 1981b). Cooper and Kaplanis (1994) start with the premise that for equity home bias to be rooted in a desire to hedge against relative inflation, equity returns need to be positively correlated with inflation. They test for such a correlation and reject it for all countries considered. These papers take relative prices (and the real exchange rate) and asset returns as given, while in open economy financial macroeconomics the dynamics of goods prices and asset returns are endogenous, as is the covariance between the two.

In the open economy financial macroeconomics literature, which is discussed in the rest of this section, some contributions focus on the hedging of the relative price of tradable goods (terms-of-trade), and some focus on the hedging of the relative price of nontradable goods. It is worthwhile to review a set of three approaches.

One approach, exemplified in important papers by Kollmann (2006a) and Obstfeld (2006), focuses on a preference bias of agents toward consuming domestic goods. This bias is motivated by the empirical observation that the majority of private consumption falls on domestic goods. Then, with only country-specific endowment shocks, these models generate domestic bias in equity if the elasticity of substitution between domestic and foreign goods is less than one. The intuition for this result is the following. When a positive endowment shock hits the domestic economy, the terms of trade deteriorate and the real exchange rate depreciates. Since the domestic agent is biased toward consuming the domestic good, and that good has become cheaper, risk sharing involves holding an asset whose returns are relatively lower. With an elasticity of substitution lower than one, the deterioration in terms of trade is so strong that the return on domestic equity is, in fact, lower than that on foreign equity. Therefore, agents are biased toward holding domestic equity.

A second important approach, best exemplified by Heathcote and Perri (2013), explains the observed equity bias by a negative correlation between relative domestic equity returns and relative non-diversifiable labor income. In their business cycle model with production and investment, domestic equity bias is an optimal way to risk share against country-specific productivity shocks. Given a positive productivity shock, labor income is higher, and therefore agents will hold primarily domestic equity if the return on it is lower than foreign equity. In their setup, equity is a claim to the capital stock, and the relative price of capital is equal to the relative price of consumption. A positive productivity shock depreciates the real exchange rate and thereby leads to a devaluation of the domestic capital stock. Under a range of parameter values, this devaluation is so strong that the return on domestic equity is lower than foreign equity. This mechanism relies on a preference bias toward the domestic goods in consumption and investment.

In a third approach, Coeurdacier, Kollmann, and Martin (2009) generate home bias in equities without requiring equity positions to hedge against real exchange rate risk. In their endowment economy model, a new set of shocks, called redistributive shocks, redistribute income randomly between equity and non-diversifiable income. These break the perfect correlation between the real exchange rate and relative equity returns, while creating an incentive to hold domestic equity. In the presence of such shocks, to hedge against them, agents want to hold domestic equity because in states of the world where domestic equity income is lower due to a positive redistribution shock, non-diversifiable income will be higher.

In their influential contribution, Obstfeld and Rogoff (2001) argue that trade costs in goods markets help to solve the equity home bias puzzle. The model of Coeurdacier and Rey (2013), in line with Coeurdacier (2009), shows the opposite result for most parameter values. Indeed, in Obstfeld and Rogoff (2001), the coefficient of risk aversion is below unity (and equal to the inverse of the elasticity of substitution between the two goods), which allows the model to be solved in closed form. With such preferences, agents prefer to hold local equities that pay less when local consumption is expensive. A similar point is made by Uppal (1993) in a two-country/onegood model in continuous time with trade costs: he shows that home bias arises only for the coefficient of relative risk aversion (CRRA) smaller than one. One can potentially restore the argument of Obstfeld and Rogoff (2001) if some parameter values are altered, such as if the elasticity of substitution between goods is below unity. In that case, a fall in home supply triggers a very large increase in the home terms-of-trade such that home equity returns are high when prices of home goods are high. Hence, investors would rather hold local equities (Kollmann 2006b). In this class of models, equity home bias relies on the response of relative prices, that is, on the elasticity of substitution between local and foreign products. While time series macro data estimating the response of trade to exchange rate changes suggest a low elasticity of substitution, between 0.5 and 1.5 (Backus, Kehoe, and Kydland 1994; Heathcote and Perri 2002; Hooper and Marquez 1995), bilateral sectoral trade data suggest a large elasticity – above five for most sectors (Baier and Bergstrand 2001; Harrigan 1993; Hummels 2001). The parameter uncertainty makes it hard to get a conclusive answer from this class of models. It is also important to note that output fluctuations in all these classes of models are driven by supply shocks. In the presence of demand shocks, equilibrium portfolios could turn out to be different: when local demand is high, both prices of local goods and payoffs of local firms increase. Hence, demand shocks can generate positive co-movements between local equity returns and the price of local goods (Pavlova and Rigobon 2007). In order to be able to consume when demand is high, local investors would prefer local equities.

Similarly, the presence of nontradable consumption exposes domestic agents to real exchange rate risk (driven by fluctuations in the relative price of nontradable goods). Stockman and Dellas (1989) develop a twocountry model with endowment economies. Each country has random endowments of a (single) traded good and a nontraded good. There is trade in equities of tradable and nontradable goods firms. With utility separable in tradable and nontradable consumption, optimal portfolios imply that domestic agents hold all of the equity of domestic nontradable firms. By holding all of the equity of nontraded goods, domestic agents hold an asset whose return is perfectly correlated with their expenditure on nontraded goods. Domestic agents hold the same share of home and foreign equity of tradable firms, implying perfect diversification in the tradable sector, as in Lucas (1982). Thus, this model generates home bias in equity positions, and the home bias increases in the share of nontradable consumption in total output. Various papers have extended this framework to more general preferences, investigating in particular the nonseparability between tradable and nontradable consumption together with multiple tradable goods (Baxter, Jermann, and King 1998; Collard et al. 2009; Hnatkovska 2010; Matsumoto 2012; Obstfeld 2006; Serrat 1997, 2001). In these papers, the presence of nontradable consumption interacts with tradable consumption, and some degree of home bias in nontradable equities obtains. The precise structure of portfolios is strongly dependent on preference parameters, in particular the substitution elasticities between tradable and nontradable goods (and also between domestic and foreign tradable goods). The mechanism at the heart of the home bias toward nontradable equity is, however, essentially similar to the one described in the previous paragraph: investors want to hold equities whose payoff is high when the real exchange rate appreciates, that is, when the consumption of nontradable goods is expensive. It turns out that for a sufficiently low elasticity of substitution between tradable and nontradable goods [i.e., roughly below unity as found in the empirical literature – typical values used for the elasticity of substitution between tradable and nontradable goods are: 0.44 (Stockman and Tesar 1995); 0.74 (Mendoza 1995); from 0.6 to 0.8 (Serrat 2001); from 0.6 to 1.4 for developing countries (Ostry and Reinhart 1992); and see Matsumoto (2012) for a more detailed discussion], a fall in local nontradable output implies a strong increase in the relative price of nontradable goods together with an increase in local nontradable equity returns. Hence, local nontradable equity returns co-move positively with the price of nontradable goods (and the real exchange rate), leading to local equity bias in that sector. Jermann (2002) studies optimal portfolios in a multi-country general equilibrium model with endogenous labor-choice and non-separable preference between consumption and leisure. The returns to human capital and the returns to domestic equities are positively correlated. However, since consumption and leisure are substitutes, consumption is highly valued in periods when work effort is high. Therefore, domestic claims provide the right hedge – local stocks serve as a good hedge against the labor income risk.

Hnatkovska (2010) examines equity home bias and high turnover of international capital flows jointly in a two-country model with production and trade in equities. She finds that equity home bias can arise naturally in the presence of nontradable consumption risk, consumption home bias, and incomplete asset markets.

Eldor, Pines, and Schwartz (1988), in a general equilibrium model, study N countries, each producing a nontradable good and the single tradable good that is consumed in all countries. The assets traded are "real equities" for the tradable and nontradable good. Tradable equities pay one unit of the traded good in each state of the world, while nontradable equity pays out "teta" units of the nontradable good, where "teta" is state-contingent nontradable output. They point out that for home bias to arise, the returns of nontraded equities have to be positively correlated with the price of the nontradable good and derive conditions for the risk aversion parameter, the price elasticity of demand for tradable goods, and the income elasticity of demand for tradable goods such that it would be the case.

Feng (2014) proposes a DSGE model and demonstrates that shocks to consumption tastes (taste shocks) are an effective explanation for the equity home bias puzzle. In this model, home assets provide insurance for home agents to hedge against domestic taste fluctuations, whereas such insurance cannot be offered by foreign assets. The empirical evidence shows that, in explaining equity home bias, hedging against consumption taste risks is more relevant than hedging against labor income risks or real exchange rate risks. The author remains agnostic about the source of taste shocks, but adds that they can be interpreted as sudden changes in the opinions of agents or a form of consumer confidence (Pavlova and Rigobon 2007). The intuition for the insurance property of home assets is as follows. Suppose that there are two states of the world. In the state with a positive realization of home taste shock, home marginal utility becomes higher. With an endogenous labor supply, agents will consume more and accept a lower wage level, thus leading to a drop in the marginal cost of home production. The home firm thus increases production and earns a larger profit, which in turn boosts home equity return. Because home equities pay off well when home consumers want to consume more, home equities are attractive to home agents. The intuition also applies to the state with a negative realization of home taste shocks, where home assets pay off less when home consumers want to consume less; home assets are again attractive to home agents. The studies that are closest to Feng (2014) are those of Coeurdacier, Kollmann, and Martin (2007), Heathcote and Perri (2013), and Pavlova and Rigobon (2007), which show that taste shocks are important in producing equity home bias. Unlike these papers, Feng (2014) makes the labor supply endogenous, thus making it unnecessary for home asset returns to move in the same direction as domestic real exchange rates. Therefore, Feng's (2014) model is not subject to van Wincoop and Warnock's (2010) critique.

On the empirical front, Pesenti and van Wincoop (2002) derive an expression that relates home bias to the correlation between equity returns and nontradable consumption growth. Using data on 14 OECD countries from 1970 to 1993, they find that, on average, nontradable consumption growth is positively correlated with the return on domestic capital. This would imply that home bias would arise if tradables and nontradable goods are complementary. The authors find, however, that even in those cases, hedging nontradable consumption could at best explain a relatively small fraction of the home bias observed in the data.

More specifically, Pesenti and van Wincoop (2002) investigate to what extent nontradables (consumption and leisure) can affect the portfolio allocation decision in otherwise integrated capital markets. They note that about half of a consumer's budget is spent on items that can be qualified as nontradable. Moreover, leisure can be considered a nontraded good as well. Fluctuations in nontradables can affect the optimal portfolio choice through their impact on the marginal utility from tradables consumption. They explain, for example, the case where leisure and consumption are substitutes. Intuitively, one can interpret leisure as nonmarket production (staying at home to take care of the baby) that can be substituted for market production (hiring a baby-sitter). When nonmarket production is low (that is, a cyclical upturn), the need to finance a larger amount of market consumption is strong. Investing in domestic assets makes it easier on average to finance such additional consumption, since the payoff on domestic assets is likely to be high relative to foreign assets during a boom. In other words, it is optimal to invest at home because there is a negative correlation between domestic asset returns and leisure. With regard to nontradable consumption, on the other hand, one might expect a positive correlation between asset returns and nontradables. In that case it becomes attractive to invest at home when tradables and nontradables consumption are complements. The authors cast their empirical analysis in the context of a simple continuous-time, infinite-horizon model with state-dependent utility of tradables consumption, where the state variable represents the stochastic endowment of nontradables. In the empirical application, asset returns are either equity returns or approximations of "fundamental returns" associated with claims on one period's profits or claims on the present discounted value of firms' profits. Their findings indicate that the explanatory power of their approach is, from any reasonable vantage point, very limited. They find that accounting for nontradables leads to only a small bias toward domestic assets. The bias is no larger than 27%, and probably much smaller than that. Current data, in contrast, show that the average bias toward domestic assets is close to 70% of the total portfolio. They conclude that hedging against nontradables shocks can account for only a small portfolio bias toward domestic assets.

Berriel and Bhattarai (2013) explain why both international nominal bonds and equity portfolios are biased domestically. In their model, holding domestic government nominal debt provides a hedge against shocks to bond returns and the impact on taxes they induce. For this result, only two features are essential: nominal risk and taxes only on domestic agents. A third feature explains domestically biased equity holdings: government spending falls on domestic goods. Then, an increase in government spending raises the returns on domestic equity, providing a hedge against the subsequent increase in taxes. A calibrated version of their model predicts asset holdings that quantitatively match the data.

Overall, there are two empirical difficulties with an explanation of the equity home bias that relies on the presence of a nontradable sector. The first one is that the structure of portfolios is strongly dependent on preference parameters, which are not easy to estimate. The second is that the home bias result relies on the ability of investors to hold separate claims on tradable and nontradable output: as most products contain both tradable and nontradable components, shares of firms automatically involve joint claims on tradables and nontradables. This difficulty is made all the more relevant by the fact that, when agents are allowed to trade separate claims on tradable and nontradable output, optimal equity positions are very different across the two sectors. This different structure of portfolios across traded and non-traded sectors seems inconsistent with casual empiricism, as argued by Lewis (1999). More broadly, empirical analysis of this channel is also hindered by the difficulty in identifying precisely nontradable consumption and tradable/nontradable equity.