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# Theoretical Perspectives on Financial Globalization: Trade Costs and Equity Home Bias\*

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## 1 Introduction

Standard finance theory would predict that investors should hold a diversified portfolio of equities across the world if capital is mobile across borders. Because foreign equities provide great diversification opportunities, a point made early on in Grubel (1968), Levy and Sarnat (1970) and Solnik (1974), falling barriers to international trade in assets over the last twenty-years should have led investors across the world to re-balance their portfolio away from national assets towards foreign assets. The process of 'financial globalization' fostered by capital account liberalizations, electronic trading, increasing exchanges of information across borders and falling transaction costs has certainly led to a large increase in cross-border asset trade (Lane and Milesi-Feretti (2003)). However, investors are still reluctant to reap the full benefits of international diversification and tend to hold a disproportionate share of local equities: the 'home bias in equities'. Since the seminal paper of French and Poterba (1991), the home bias in equities constitutes one of the major puzzle in international finance. Despite better financial integration, it has not decreased sizeably: in 2007, US investors still hold more than 80% percent of domestic equities and the home bias in equities is observed in all developed countries.

As people hold mostly local assets, they also consume mostly locally produced goods: the 'home bias in consumption'. There is now quite a consensus that the home bias in consumption can be explained by the presence of international trade costs understood in a broad sense. According to the survey of Anderson and Van Wincoop (2004), international trade costs are very large, roughly

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70% of production costs. Trade costs encompass various barriers to international trade in goods such as transport costs, tariffs and other policy induced restrictions to trade, various barriers at the borders.

In an influential contribution, Obstfeld and Rogoff (2000) argue that home bias in equities might also be due to shipping costs in international goods markets rather than frictions in financial markets: people hold local assets because they mostly consume local goods due to the mere presence of trade costs. The home bias in equities would be the mirror of the home bias in consumption. In this chapter, we explore the validity of this argument from an empirical and theoretical perspective and describe the key mechanisms behind such a hypothesis.

We will first review the extent of the equity and consumption home biases across countries and discuss the empirical evidence showing a link between the two biases. Then, we will discuss theoretically the possible channels through which trade costs in goods markets can affect portfolio decisions.

## 2 The equity and consumption home biases: facts and figures

### 2.1 The equity home bias

The proportion of local equity in investors' portfolios is not fully indicative of the intensity of the home bias. In a world with homogenous investors and perfectly integrated financial and goods markets, the proportion of local equities in investors' portfolios should be equal to the share of the country considered in the world market capitalization. Hence, to illustrate the equity home bias, Table 1 shows the difference between the proportion of local equities in a country's portfolio and the relative market capitalization of that country at the end of 2005. We measure the degree of home bias in country  $i$  as:

$$HB_i = 1 - \frac{\text{Share of Foreign Equities in Country } i \text{ Equity Holdings}}{\text{Share of Foreign Equities in the World Market Portfolio}} \quad (1)$$

where  $HB_i$  is between 0 and 1;  $HB_i = 1$  if full equity home bias and  $HB_i = 0$  if no equity home bias.

Data on portfolio holdings are from the Coordinated Portfolio Investment Survey (IMF) held by the IMF (see Sercu and Vanpee (2007)). Table 1 shows that all countries have a significant equity home bias, Netherlands having the lowest degree of home bias while Japan and Greece have the largest.

Source Country	Domestic Market in % of World Market Capitalization (1)	Share of Portfolio in Domestic Equity in % (2)	Degree of Home Bias = $HB_i$ (3)
Australia	1.9	83.6	0.832
Austria	0.3	58.5	0.583
Belgium	0.7	49.8	0.494
Canada	3.5	76.6	0.757
Denmark	0.4	62.7	0.625
Finland	0.5	63.3	0.631
France	4.2	68.8	0.674
Germany	2.9	57.5	0.562
Greece	0.3	93.4	0.933
Italy	1.9	57.1	0.562
Japan	13.2	91.9	0.906
Netherlands	1.4	32.1	0.311
New-Zealand	0.1	59.8	0.597
Norway	0.5	52	0.517
Portugal	0.2	77.8	0.777
Spain	2.3	86.3	0.859
Sweden	1	59.4	0.589
Switzerland	2.2	59.9	0.589
United Kingdom	7.3	65	0.622
United States	40.5	82.2	0.700
Average	3.67	70.58	0.70

Table 1: Home Bias in Equities in 2005 (source CPIS).

## 2.2 The consumption home bias and the size of trade costs

While investors hold mostly local equities, consumers have a strong bias towards locally produced goods: the 'consumption home bias'. Looking into consumption baskets, countries are not very open to trade. In the US, the openness to trade ratio measured by the sum of exports and imports over GDP is only 26% over the period 2000-2007. Given that the US account for about a third of world production, one could expect in a workhorse model of trade with fully tradable differentiated products that the US import and export about two thirds of their GDP. This would lead to an openness ratio higher than 120%! Not all output produced within an economy can be shipped across borders but even when focusing on manufacturing goods, the consumption home bias remains large. Obstfeld and Rogoff (2000) put forward trade costs as the main explanation for the consumption home bias: indeed, in presence of trade costs, households consume essentially locally produced goods as imported goods are relatively more expensive. In a survey, Anderson and van Wincoop (2004) provides an estimate of the tax equivalent of international trade costs for industrialized

countries as large as 74%. This number breaks down as follows: 21% transportation costs (freight costs and tax equivalent of the time value of goods in transit) and 44% border related trade barriers (tariffs and other trade policies, language barrier, currency barrier, information cost and security barrier).<sup>1</sup>

### **2.3 Equity and consumption biases: are they empirically related?**

Obstfeld and Rogoff (2000) argues that trade costs in goods markets lead to both consumption and equity home bias. If this is true, then one should observe that both are related in the data: countries which are more open to trade should also have more internationally diversified portfolios. In other words, everything else equal, countries with higher import (or export) shares should have larger stocks of foreign equities. This is exactly what the data tell us: looking at panel data of a cross-section of countries, Lane (2000), Aizenman and Noy (2004), Heathcote and Perri (2008) among others show this positive relationship between trade openness and foreign asset holdings. Although one should be cautious with such evidence as causality is hard to infer from these regressions, this is an indication that trade costs might affect international portfolios.

Another piece of evidence is provided when looking at bilateral data on trade in goods and asset holdings. In a gravity-like framework, Aviat and Coeurdacier (2007) and Lane and Milesi-Feretti (2008) show that country equity portfolios are strongly biased towards trading partners. Using instrumental variables, Aviat and Coeurdacier (2007) show that the causality goes essentially in one direction: reducing trade costs between countries enhances cross-border asset holdings.

These empirical observations are challenging for economic theory. We now turn to the potential theories linking trade costs in goods markets and portfolio decisions.

## **3 Why investors would hold different equity portfolios?**

While the purpose of this chapter is not to review extensively the various explanations proposed to explain the equity home bias puzzle, it is useful to understand the main reason why investors from different countries hold different portfolios before looking at the role of trade costs specifically. As stated above, in a world with perfect financial markets, homogenous investors should hold the same portfolio, the world market portfolio, thus diversifying optimally idiosyncratic national risks. Thus, the home bias in equities is seen as a failure of the standard diversification motive in portfolio

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<sup>1</sup>This gives a total of 74%:  $0.74=1.21*1.44-1$

theory. However, one should be cautious with such a statement: investors across the world would hold the same portfolio, the market 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 towards national assets. Various sources of heterogeneity leading to equity home bias have been explored in the literature. Following the survey of Sercu and Vanpee (2007), one can distinguish among the following set of candidates: (i) hedging domestic risk, (ii) implicit and explicit costs of foreign investments (such as transaction costs, differences in tax treatments between national and foreign assets...), (iii) information asymmetries, (iv) corporate governance, transparency and expropriation risk, and (v) behavioral biases (such as 'familiarity biases').

We will start with the first explanation since this is the main channel through which trade costs in goods markets interact with portfolio decisions. Later in the chapter, we will briefly discuss how information flows, familiarity biases or expropriation risks can affect portfolio decisions in the presence of trade costs. We mean by hedging domestic risk, choosing the appropriate financial assets that insulate at best investors from local sources of risk that affect their income streams. The sources of domestic risk extensively developed in the literature are of mostly two kinds:

- The presence of real exchange rate risk: prices of investors' consumption goods are fluctuating which affects the purchasing power of their income.

- The presence of non-tradable income risk: investors have a part of their income (in the form of wages in particular) that cannot be traded in financial markets.

In other words, because investors in different countries have different exposure both to real exchange rate risk and/or to non-tradable income risk, they will hold different portfolios. We now turn to the interaction between trade costs in goods markets and the hedging of these domestic risks.

## **4 Home bias in equities and the hedging of real exchange rate risk**

### **4.1 From partial equilibrium ...**

As explained in section 1.2, trade costs generate some 'home bias in consumption' by increasing the price of imported goods compared to local goods. Hence fluctuations in the relative price of local goods (over foreign goods), or equivalently fluctuations in the real exchange rate affect the purchasing power of investors across countries differently. This source of heterogeneity among

investors can lead them to choose different portfolio of assets. In other words, households have the desire to build the appropriate portfolio to hedge against fluctuations in the real exchange rate.

The optimal hedging of real exchange rate risk depends on two forces going in opposite direction: when local goods are more expensive, consumers need to generate more income in order to stabilize their purchasing power. On the other hand, since local goods are more expensive, households could be better off consuming when goods are cheaper. The dominating effect depends on how much households want to smooth their consumption (across states of nature), in other words how risk averse they are. For consumers sufficiently risk-averse (with a relative risk aversion above unity as usually assumed), the former effect dominates and households want to increase their income when their consumption goods are more expensive. Thus, they build their portfolio by choosing assets with a high pay-off when local goods are expensive. 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 (see Adler and Dumas (1983)). The key issue is whether local equities are a good hedge against relative price (real exchange rate) fluctuations, i.e 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.

## 4.2 ...To general equilibrium

In general equilibrium, the exact same main mechanism is at work but relative prices are determined endogenously in the model (rather than taken as given in partial equilibrium models). As recently emphasized by Coeurdacier (2009), standard general equilibrium models cast doubt on the ability of local equities to provide a good hedge against real exchange rate risk (see also Uppal (1993)).

Coeurdacier (2009) solves for equity portfolios in a two-country/two-good stochastic equilibrium model with trade costs in goods markets. Uncertainty in the model is driven by supply (endowment) shocks in both countries. Due to the presence of trade costs, the real exchange rate fluctuates following supply shocks, which in turn affect portfolio decisions. Unfortunately, trade costs do not turn to be helpful to solve for the equity home bias. The main intuition goes as follows: when local output is low (relative to foreign output), the price of local goods increases due to their scarcity and investors require a high return on their equity portfolio to stabilize their purchasing power. They would rather bias their portfolio towards foreign equities as foreign equities have a higher pay-off than local equities when local output is lower. Contrary to conventional wisdom, trade costs generate equity foreign bias and make the equity home bias puzzle worse than we think!

Such a result relies on three important assumptions:

First, as explained above investors must be sufficiently risk averse (they must have a relative risk aversion above unity as usually assumed). Second, a fall in the supply of local goods must lower the return of local equity. This is not always true as it depends on the response of relative prices. If consumers cannot substitute easily local and foreign goods (technically speaking if the elasticity of substitution between local and foreign goods is below unity; see Kollmann (2006)), the fall in supply triggers a large increase in local goods prices which can increase local equity returns. In that case, local equity returns are precisely high when prices of local goods are high. Investors would rather hold local equities. The response of relative prices depends on the elasticity of substitution between local and foreign products. While time series macro data estimating the response of trade to exchange rate changes suggests a low elasticity of substitution, between 0.5 and 1.5 (see Hooper and Marques (1995), Backus, Kehoe and Kydland (1994) and Heathcote and Perri (2002)), bilateral trade data suggests a large elasticity, above 5 for most sectors (see see Harrigan (1993), Hummels (2001) and Baier and Bergstrand (2001) among others). The parameter uncertainty makes it hard to get a conclusive answer from this class of models. Third, output fluctuations in this class 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 pay-off of local firms increase. Hence, demand shocks can generate positive co-movements between local equity returns and the price of local goods (see Pavlova and Rigobon (2007)). In order to be able to consume when demand is high, local investors would prefer local equities.

### **4.3 Are equities empirically a good hedge against real exchange rate fluctuations?**

While relaxing these assumptions could theoretically help to solve the equity home bias puzzle, such an explanation would still face a major empirical issue. Both in the partial and general equilibrium literature, the hedging of real exchange rate risk would lead to equity home bias if local equities have higher returns (than abroad) when local prices are higher (than abroad). In other words, equity home bias appears if excess local equity returns (over foreign) increase when the real exchange rate appreciates. As shown by van Wincoop and Warnock (2006), the empirical correlation between excess equity returns and the real exchange rate is very low, too low to explain observed equity home bias. Furthermore, most of the fluctuations in the real exchange rate represent fluctuations in the nominal exchange rate: this could be easily hedged using positions in the forward currency

markets or the currency bond market (see van Wincoop and Warnock (2006) and Coeurdacier and Gourinchas (2009)). In other words, equities do not seem empirically to be an appropriate asset to insure investors against real exchange rate fluctuations. Hence, there is now quite a consensus that the hedging of real exchange rate risk cannot account for the equity home bias.

We now investigate another source of domestic risk, namely the presence of non-tradable income risk.

## 5 Home bias in equities and the hedging of non-tradable risk

### 5.1 The international diversification puzzle is worse than we think...

In an influential paper, Baxter and Jermann (1997) argues that the presence of non-tradable income risk worsen the equity home bias puzzle. Their argument goes as follows: in a standard two-country real business cycle model, productivity shocks in one country increases output and this additional output is shared in constant proportion between capital and labor (assuming a Cobb-Douglas production function using capital and labor). Hence, labor and capital incomes are perfectly correlated in this class of models. As investors are already strongly exposed to domestic risk due to their labor income, they should not hold local capital whose returns move in lock-steps with returns on non-tradable wealth. Investors should short-sell local equities and diversify their non-tradable risk buy holding foreign equities. The equity home bias puzzle is worse than we think!

### 5.2 or better than we think...

Heathcote and Perri (2008) show that Baxter and Jermann (1997)'s result relies on a very strong assumption: one unique and perfectly tradable good. Relaxing this hypothesis (as in the benchmark two-country/two-good RBC model of Backus, Kehoe and Kydland (1994)) and introducing differentiated product across countries together with trade costs (or equivalently *ad-hoc* consumption home bias) changes drastically the picture and help to solve the equity home bias puzzle. Their result relies on two key elements: endogenous investment and a strong adjustment of relative prices.

The main intuition goes as follows: suppose a positive (persistent) productivity shock hits the Home economy. This leads to:

- (i) a fall in the relative price of Home goods (Foreign goods are scarcer).
- (ii) an increase in Home investment (more than abroad) as Home investment uses more intensively cheaper Home goods (due to trade costs).

(iii) an increase in Home wage incomes (more than abroad) and in the return on non-tradable wealth (thus despite the fall in the price Home goods).

(iv) A decrease in the returns on Home capital (relative to Foreign) if the (relative) price response of Home goods is strong enough.

The main difference with Baxter and Jermann (1997) is the last point (iv): excess returns on Home capital fall following a positive productivity shock if the adjustment of (relative) prices is large enough. Indeed, if the market price of Home goods falls sufficiently and Home investment is increasing, dividends distributed by Home firms (which are net of investment) are lower than abroad so are Home returns to capital following the shock. Hence the model is able to generate negative co-movements between Home (excess) return on non-tradable wealth and Home excess returns to capital. Contrary to Baxter and Jermann (1997)'s argument, if the response of relative prices is strong enough, hedging non-tradable income risk can lead to home bias in equities. In other words, when productivity is high at Home, Home households have a wage increase and can finance the increase in investment at Home without cutting their consumption, the reason why ex-ante they hold more shares of Home firms.

Trade costs (or consumption home bias) are important as they trigger a stronger response of investment at Home (see (iii)). This is why in such a set-up trade costs do help to solve the home equity bias. Importantly, the model generates a positive link between consumption home bias and equity home bias as found in the data and argued by Obstfeld and Rogoff (2000).

Finally, one could argue that the hedging of real exchange rate risk, still operating in their framework due to consumption home bias, should play in the opposite direction as explained in section 4.2.<sup>2</sup> In related work, Coeurdacier, Kollmann and Martin (2009) show that Heathcote and Perri (2008)'s findings are robust when investors want to hedge real exchange rate risk (and are more risk averse than the log-investor) as long as real exchange rate risk can be hedged by using the appropriate position in the currency bond market. This theoretical result echoes the empirical findings of van Wincoop and Warnock (2006) and Coeurdacier and Gourinchas (2009) described in section 4.3: equities are not the appropriate asset to hedge real exchange rate risk once bond trading is allowed.

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<sup>2</sup>Note that Heathcote and Perri (2008) focuses on log-utility which cancels out any real exchange rate risk hedging.

## 6 Trade costs and portfolio home bias: alternative stories

### 6.1 The role of expropriation/sovereign risk

Rose and Spiegel (2002) propose a model of international lending where cross-border capital flows are sustainable because of trade in goods markets. The paper is in the vein of the literature on sovereign risk (Bulow and Rogoff (1989); see Eaton and Fernandez (1995) for a survey). Because debt contracts cannot be enforced internationally and foreign creditors face a risk of expropriation, they are willing to lend capital to foreign countries only if they can threaten debtor countries with a credible sanction in case of default. In their model, penalties go through trade: creditors exclude their defaulting partners from trade relationships. The intuition is similar to the one developed by Guibaud (2008) in a set-up with endogenous borrowing constraints (like in Kehoe and Perri (2002)) and trade costs. Countries cannot commit to repay their debt and are excluded from trade relationships in case of default. When trade costs are lower, gains from trade increase and so does the cost of being in autarky. This endogenously relaxes the borrowing constraint and fosters international risk sharing. In other words, trade acts as a collateral which relaxes credit constraints in international markets. As a consequence, falling trade costs increase cross-border capital flows and international risk-sharing.

### 6.2 The role of information and behavioral biases

An alternative story could be based on information asymmetries: because trading partners share information, the information flows through trade will enhance trade in assets (and vice versa). In other words, because information flows (or social networks) positively affect both cross-border finance and trade, trade in goods and trade in assets are mutually reinforcing: firm managers learn about each other by trading goods and/or securities. Therefore, lowering trade costs reduces informational asymmetries in the financial markets. Empirically, Portes and Rey (2005) (see also Ahearne, Grier and Warnock (2004)) shows how information flows are a strong determinant of cross-border equity trade.

In a similar vein, studies by Huberman (2001), Benartzi (2001) and Grinblatt and Keloharju (2001) (see also Barberis and Thaler (2003)) put forward a behavioral explanation for the equity home bias: they suggest that *familiarity* might be the main determinant of portfolio choice. One could argue that foreign firms which sell domestically become more familiar to investors and are favored in their investment decisions. Economies more opened in goods markets will be more likely

to diversify internationally in asset markets.

## 7 Conclusion

The consumption and equity home biases are two of the main puzzles in international finance (Obstfeld and Rogoff (2000)). They seem to be empirically related: countries more opened to international trade have larger stocks of foreign equities. This would suggest a common explanation and Obstfeld and Rogoff (2000) claim that international trade costs can solve both puzzles simultaneously. While there is quite a consensus that international trade costs can explain the consumption home bias, the trade costs explanation for the equity home bias remains an open question. In this chapter, we have reviewed the different theoretical channels through which trade costs might affect equity portfolio decisions. The most natural one related to the hedging of real exchange rate risk turned out to be challenged by the data: equities are empirically a poor hedge for real exchange rate risk. Heathcote and Perri (2008) provides a new channel based the hedging of non-tradable risk (driven by fluctuations in labor income): in their model, trade costs are key to generate a negative covariance between returns on non-tradable wealth and returns on local capital, making local equities attractive to insure against fluctuations in labor income. Finally, we explored how a decrease in trade costs can relax some financial markets imperfections such as expropriation/sovereign risk, information asymmetries and foster cross-border equity flows and international risk-sharing. This is unfortunately hard to disentangle empirically between the various potential channels and there is certainly scope to test one theory against the other.

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