Available online at www.sciencedirect.com
ScienceDirect
Journal of International Money and Finance 26 (2007) 606–630
Journal of International Money and Finance
www.elsevier.com/locate/jimf

Model uncertainty, financial market integration and the home bias puzzle

Lieven Baele [a,b,c,1], Crina Pungulescu [a,b,*], Jenke Ter Horst [a,b,c,2]

[a] Department of Finance, Tilburg University, P.O. Box 90153, 5000 LE Tilburg, The Netherlands
[b] CentER for Economic Research, Tilburg University, P.O. Box 90153, 5000 LE Tilburg, The Netherlands
[c] Netspar, Tilburg University, P.O. Box 90153, 5000 LE Tilburg, The Netherlands

Abstract

This paper investigates to what extent ongoing integration has eroded the equity home bias. To measure home bias, we compare observed foreign asset holdings of 25 markets with optimal portfolio weights obtained from five benchmark models. The International CAPM optimal weights equal the relative world market capitalization shares. Alternative models that allow for various degrees of mistrust in the I-CAPM and involve returns data in computing optimal weights indicate a substantially lower yet positive home bias. For many countries, home bias decreases sharply at the end of the 1990s, a development which we link to time-varying globalization and regional integration.
© 2007 Elsevier Ltd. All rights reserved.

JEL classification: F36; G11; G15

Keywords: Home bias; Market integration; Euro; Model uncertainty

1. Introduction

Despite the well documented gains from international diversification, investors continue to have a strong preference for domestic assets. For instance, French and Poterba (1991) document

* Corresponding author. Tel.: +31 13 466 2020; fax: +31 13 466 2875.
E-mail addresses: lieven.baele@uvt.nl (L. Baele), c.pungulescu@uvt.nl (C. Pungulescu), j.r.terhorst@uvt.nl (J. Ter Horst).
[1] Tel.: +31 13 466 3257; fax: +31 13 466 2875.
[2] Tel.: +31 13 466 8211; fax: +31 13 466 2875.

0261-5606/$ - see front matter © 2007 Elsevier Ltd. All rights reserved.
doi:10.1016/j.jimonfin.2007.03.007

that US equity traders allocate nearly 94% of their funds to domestic equities, even though the US equity market comprises less than 48% of the global equity market. Based on a simple mean–variance optimization exercise, Lewis (1999) and Britten-Jones (1994) estimate that the US investor's optimal weight on foreign assets is about 40%, far lower than the observed 94%. This tendency to overinvest in domestic stocks, now dubbed the 'home bias puzzle', is not only a US phenomenon, but has been observed in nearly all other markets as well (see French and Poterba, 1991; Cooper and Kaplanis, 1994; Tesar and Werner, 1995). Lewis (1999) mentions costs of home bias due to forgone gains from international diversification in the range of 20% to almost double of lifetime (permanent) consumption.

Academics have come up with a host of possible explanations for the home bias puzzle. The prime targets were transaction costs such as fees, commissions and higher spreads (see Tesar and Werner, 1995; Glassman and Riddick, 2001; Warnock, 2001) and direct barriers to international investment (see Black, 1974; Stulz, 1981; Errunza and Losq, 1981). Evidence in Tesar and Werner (1995) and more recently Glassman and Riddick (2001) and Warnock (2001), however, rules out transaction costs as an important driver of the equity home bias. Moreover, the home bias puzzle persists even in times when most direct obstacles to foreign investment have disappeared. Important contributions focus on differences in the amount and quality of information between domestic and foreign stocks (see Gehrig, 1993; Brennan and Cao, 1997; Veldkamp and Van Nieuwerburgh, 2006), on hedging of non-traded goods consumption as a motive for holding domestic securities (see Adler and Dumas, 1983; Stockman and Dellas, 1989; Cooper and Kaplanis, 1994), and more recently on psychological or behavioral factors (see Huberman, 2001; Coval and Moskowitz, 1999; Grinblatt and Keloharju, 2000). However, also these alternative explanations do not fully account for the observed home bias in international financial markets (see Ahearne et al., 2004, among others).

Any meaningful explanation of the equity home bias requires a correct characterization of the benchmark weights, i.e. those to which actual holdings can be compared. Most studies have conveniently assumed that asset returns are well described by the International Capital Asset Pricing Model (I-CAPM), in which case the benchmark weights are simply given by the proportion each country has in the global equity market portfolio. Another stream of papers has generated benchmark weights from a mean–variance optimization with sample estimates of the mean and covariance matrix of asset returns as inputs. Both approaches are, however, not without problems. In the first, 'model-based' approach, investors are assumed to have a dogmatic belief in the I-CAPM, despite the reasonable doubt about the validity of the model. The 'data-based' approach on the contrary completely ignores asset pricing models, and calculates weights in a standard mean–variance framework by relying solely on return data. An important disadvantage of this approach is that the weights are extremely sensitive to the assumed vector of expected returns, an input that is notoriously difficult to estimate (see Merton, 1980). Given that both approaches often yield very different benchmark weights, measures and explanations of the equity home bias will be very sensitive to whether the first or the second approach is chosen.

A first contribution of this paper is that we allow investors to have a degree of skepticism about either modeling approach. We accomplish this by using the Bayesian portfolio selection techniques recently developed by Pástor and Stambaugh (2000), Pástor (2000) and Garlappi et al. (2007). Pástor (2000) investigates to what extent optimal portfolio weights vary with various degrees of mistrust in the asset pricing model. In this Bayesian framework, the investor is neither forced to accept unconditionally the pricing relation nor discard it completely in favor of the data. As the degree of skepticism about the model grows, the resulting optimal weights move away from those implied by the 'model-based' to those obtained from the 'data-based' approach. While this methodology typically produces weights that are much more stable over time compared to the 'data-based' approach, its reliance on sample data for higher levels of model uncertainty means, however, that extreme and volatile weights cannot be ruled out. To address this, we apply the volatility correction technique developed by Garlappi et al. (2007). Their methodology introduces estimation risk in the standard mean–variance framework by restricting the expected return for each asset to lie within a specified confidence interval around its estimated value, rather than treating the point estimate as the only possible value, i.e. they allow for multiple priors. Investors' aversion to uncertainty is taken onboard by allowing investors to minimize over the choice of expected returns and/or models.

In total, we calculate measures of the equity home bias for a sample of 25 countries using five frameworks, namely (1) the I-CAPM, (2) the 'data-based' standard mean–variance optimization, (3) the Bayesian approach of Pástor (2000), (4) the Multi-Prior technique of Garlappi et al. (2007) applied to the 'data-based' approach, and (5) the same volatility correction mechanism of Garlappi et al. (2007) combined with the Bayesian approach of Pástor (2000). In line with other empirical evidence (see Pástor, 2000; Li, 2004; Asgharian and Hansson, 2006), we find that reasonable degrees of mistrust in the model lead to lower, yet mostly positive, home bias measures. In a panel of 25 developed and emerging markets we find that average Bayesian home bias is lower by 22% if we depart from the rather restrictive prediction of the I-CAPM. In the case of the Netherlands for instance, a plausible degree of mistrust in I-CAPM leads to a sharp decrease in home bias, to the extent that the bias is completely eliminated after the introduction of the euro.

A second contribution of this paper is that we investigate the determinants of home bias, by relating the various home bias measures to a large set of explanatory variables. As dependent variables, we use the I-CAPM home bias that has typically been used in previous literature and the two (more stable) volatility corrected measures obtained by applying the Multi-Prior technique of Garlappi et al. (2007) to the 'data-based' and Bayesian approaches. We consider several proxies for time-varying market development and integration as well as indicators of diversification potential, trade and investment openness, and corporate governance quality. We conjecture that the processes of globalization and regional economic integration erode the potential causes of home bias through their impact on barriers to cross-border equity trade, transaction costs, and information and perception asymmetries. We expect financial market integration to eliminate remaining institutional obstacles to foreign equity investment, decrease significantly international transaction costs and fees (especially within a currency union) and facilitate information exchange, thereby affecting also the less tangible (rational or psychological) factors linked to home bias. We observe that the recent surge in international integration appears to challenge the puzzle both at the global and regional level. Equity home bias exhibits a significant negative trend for our entire panel of countries, suggesting that the puzzle is eroding at a global level. At the same time, we find that the decrease is much more pronounced in the countries that are now part of the European Monetary Union. Our finding of a downward trend in the equity home bias – especially in the Euro Area – is robust across different home bias measures.

The remainder of this paper is structured as follows. Section 2 compares the standard methodology to obtain benchmark weights with the Bayesian approach. Section 3 presents the data set and the methodology for computing the home bias. Section 4 reports our empirical results concerning the home bias, while Section 5 examines the sensitivity of the time-varying measures of (volatility corrected) home bias to several integration proxies and factors relevant to international investment decisions. Finally, Section 6 summarizes our main findings.

2. Optimal portfolio weights

In this section, we discuss alternative ways to calculate theoretically optimal portfolio weights with which observed weights can be compared. Section 2.1 reviews the standard mean–variance model of portfolio choice. Section 2.2 discusses the International CAPM. Sections 2.3 and 2.4 present the Bayesian modeling approaches of Pástor (2000) and Garlappi et al. (2007), respectively.

2.1. Classical mean–variance portfolio model

The common starting point is the mean–variance framework of Markowitz (1952) and Sharpe (1963) where the investor makes his portfolio choice in order to maximize his expected utility,

$$\max_{\omega}\ \omega'\mu - \frac{\gamma}{2}\omega'\Sigma\omega, \tag{1}$$

where ω is the N-vector of portfolio weights allocated to N assets, i.e. domestic and foreign equity holdings ($N=2$), μ is the N-vector of expected returns, Σ is the $N \times N$ variance–covariance matrix and γ is the coefficient of relative risk aversion. Under the assumptions that $\omega'\iota = 1$ (the budget constraint), a risk-free rate is available and chosen as the zero-beta portfolio, the analytical portfolio choice solution in the mean–variance framework, when short sales are allowed is:

$$\omega^* = \frac{\Sigma^{-1}\mu_e}{\iota'\Sigma^{-1}\mu_e}, \tag{2}$$

where μ_e is the vector of the expected excess returns (over the risk-free rate). The solution involves the true (unobserved) expected returns and variance–covariance matrix of the returns. Available returns data enable us to use the sample moments as estimates of the true parameters. However, Merton (1980) shows that while the sample variance–covariance matrix gives an accurate estimate of the true parameter, expected returns estimates based on historical data are very unreliable due to the high volatility of returns. The impact of the mean estimated imprecisely, is amplified in the context of international portfolio choice, as the inverse of the variance–covariance matrix tends to be a large number when the correlations between the countries are high (Jenske, 2001). Therefore, the 'data-based' approach (i.e. substituting the sample mean and variance in Eq. (2)) directs investors to take extreme and volatile positions.

2.2. International CAPM

An asset pricing model, such as the International Capital Asset Pricing Model (I-CAPM), provides an alternative to the 'data-based' approach. The I-CAPM is valid in a perfectly integrated world, where the law of one price holds universally and markets clear (total wealth is equal to total value of securities). The portfolio implication of the CAPM is that the average mean–variance investor holds the market portfolio (Lintner, 1965). In an international setting, the optimal investment weights of a country according to this so-called 'model-based' approach are given by the relative shares of domestic and foreign equities in the world market capitalization.

The I-CAPM results in the well-known linear beta relationship between risk premium on the domestic portfolio and the expected excess return on the world market benchmark[3]:

$$E(r_{\mathrm{d}}) - r_{\mathrm{f}} = \beta_{\mathrm{d}}\left[E\left(r_{\mathrm{w}} - r_{\mathrm{f}}\right)\right], \tag{3}$$

where r_{d} is the return on the domestic market portfolio, r_{f} is the risk-free rate, $\beta_{\mathrm{d}} \equiv \mathrm{cov}(r_{\mathrm{w}}, r_{\mathrm{d}})/\mathrm{var}(r_{\mathrm{w}})$ is the world beta of the domestic market and r_{w} is the return on the world market portfolio. The empirical counterpart of Eq. (3) is given by

$$r_{\mathrm{d}} - r_{\mathrm{f}} = \alpha + \beta_{\mathrm{d}}\left(r_{\mathrm{w}} - r_{\mathrm{f}}\right) + \varepsilon, \tag{4}$$

where α and ε are, respectively, the intercept and the error term. The I-CAPM is considered valid if estimates of the intercept, $\widehat{\alpha}$, are zero. However, an intercept different than zero, even if insignificant, can be used by a Bayesian investor to question the optimality of the portfolio prediction of the I-CAPM.

2.3. Bayesian mean–variance portfolio weights

Considering the stringency of the assumptions of the I-CAPM, it is reasonable to expect that some investors do not accept the model unconditionally. When the I-CAPM holds, the world benchmark fully describes the asset returns and captures all sources of priced risk. In terms of the beta pricing relationship (4), a valid model results in a zero value for the intercept $\widehat{\alpha}$. In the Bayesian framework developed by Pástor (2000), when there is mistrust in the I-CAPM, the data become informative and are involved in the portfolio allocation decision. The degree of trust (i.e. the belief that the intercept $\widehat{\alpha}$ is zero) is expressed in values of the standard errors of the intercept σ_{α}. A small value indicates a strong belief that the theoretical model is valid and results in optimal portfolio weights that closely correspond to the 'model-based' approach. A higher value involves data to a larger extent in the computation of optimal weights leading to optimal weights closer to the results of the 'data-based' approach. Full mistrust in the model (i.e. $\sigma_{\alpha} \to \infty$) coincides with the 'data-based' optimal weights. This Bayesian interpretation is an insightful reconciliation of the 'model' and 'data-based' approaches. For instance, a nonzero value for $\widehat{\alpha}$, even if insignificant according to a standard *t*-test (and therefore failing to reject the I-CAPM), could become instrumental in explaining why observed allocations deviate from the model prescriptions.

The starting point of the Bayesian analysis is a *prior* (non-data) belief in the model, in this case, the belief in a zero intercept and no mispricing. The prior is updated using returns data to a certain extent depending on the chosen degree of mistrust in the model. The sample mispricing, α, is "shrunk" accordingly towards the prior mean of α to obtain the posterior mean of α.

Using the data in combination with the model's prediction ultimately results in different estimates for the mean and variance–covariance matrix of returns, since now the moments of the predictive distribution are used to compute the portfolio weights. These Bayesian mean–variance optimal weights are computed as:

[3] This model makes the additional assumption that currency risk is not priced. See De Santis and Gérard (2006) and Fidora et al. (2006) for an analysis of exchange rate risk on home bias measures.

$$\omega^* = \frac{\Sigma^{*-1}\mu_e^*}{\iota'\Sigma^{*-1}\mu_e^*} \tag{5}$$

where μ_e^* and Σ^* are the predictive mean and variance that replace in this approach the sample moments of the distribution of returns.

The predictive density of returns (entering the utility function of the investor that maximizes next period wealth) is defined as:

$$p(r_{t+1}|\Phi) = \int_\theta p(r_{t+1}|\theta,\Phi)p(\theta|\Phi)\mathrm{d}\theta \tag{6}$$

where $p(r_{t+1}|\Phi)$ is the probability density function of excess returns conditional on Φ (the sample data) and θ is the set of parameters of the statistical model that describes the stochastic behavior of asset returns. To treat the estimates of the parameters $\widehat{\theta}$ as the true values is to ignore estimation risk. An alternative is to use Bayesian analysis to account for estimation risk. The predictive density (Eq. (6)) involves $p(\theta|\Phi)$, the conditional probability of the parameters of the model given the data available. According to Bayes' Rule, the *posterior density*, $p(\theta|\Phi)$, is proportional to the product of the *likelihood function*, or probability distribution function for the data given the parameters of the model, $p(\Phi|\theta)$, and the *prior density*, $p(\theta)$, that reflects the non-data information available about θ (see Koop, 2003):

$$p(\theta|\Phi) \propto p(\Phi|\theta)p(\theta). \tag{7}$$

In our setting, the prior of a zero intercept follows from assuming a valid I-CAPM. This prior is subsequently updated through partial incorporation of the information revealed by the data. In order to obtain the mean and variance of the predictive density and thus, the optimal portfolio weights of the Bayesian investor, we use the analytical solutions derived in Pástor (2000). A sufficient degree of mistrust in the I-CAPM may result in optimal weights that are closer to the observed allocations and hence in a lower home bias than implied by I-CAPM.

2.4. Bayesian Multi-Prior framework

The Bayesian approach presented above uses the I-CAPM as the starting point and departs from its prediction in proportion with the investors' degree of mistrust in the model. Larger mistrust in the I-CAPM makes historical return data more relevant in estimating the optimal allocations, which become in turn, more volatile. Garlappi et al. (2007) tackle the problem of volatile data by extending the mean–variance framework to incorporate the investors' aversion to uncertainty around the estimate of the mean returns. This changes the standard mean–variance problem in two ways: (1) it binds the expected returns to a confidence interval around their estimate, thus taking into account the eventual estimation error; and (2) it allows the investor to minimize over the choice of expected returns, thus manifesting its aversion to uncertainty. The Multi-Prior framework of Garlappi et al. (2007) is defined by the following problem:

$$\max_\omega \min_\mu \omega'\mu - \frac{\gamma}{2}\omega'\Sigma\omega, \tag{8}$$

subject to

$$f\left(\mu, \widehat{\mu}, \Sigma\right) \leq \varepsilon \tag{9}$$

$$\omega' \iota = 1 \tag{10}$$

where $\widehat{\mu}$ is the sample mean of asset returns. If the confidence intervals are defined jointly for all assets, f can be taken as $(T(T-N)/((T-1)N))(\widehat{\mu}-\mu)'\Sigma^{-1}(\widehat{\mu}-\mu)$ and ε as a quantile for the F-distribution,[4] where N is the number of assets and T, the number of observations. The constraint translates into $P(f \leq \varepsilon) = 1 - p$ for a corresponding probability level. The solution to the Multi-Prior max–min problem is a set of optimal weights with considerably smoother behavior compared to the ones obtained through the direct influence of the data. We compute the optimal weights using the analytical results obtained by Garlappi et al. (2007) for the case when short sales are allowed.

3. Home bias measures and data issues

The previous section presented alternative ways of defining optimal portfolio allocations. This section introduces our measure of home bias in terms of actual and optimal portfolio weights, as well as the main characteristics of the data set used.

3.1. Home bias measures

We quantify the home bias of country i as the relative difference between actual (ACT_i) and optimal (OPT_i) foreign portfolio weights:

$$\mathrm{HB}_i = 1 - \frac{\mathrm{ACT}_i}{\mathrm{OPT}_i}. \tag{11}$$

Optimal portfolio weights are calculated using the alternative methodologies described in Section 2. The actual portfolio holdings (ACT_i) are determined using data from the International Investment Position (reported to the IMF as part of the Balance of Payments). More specifically, the share of foreign equity in the total equity portfolio of country i is computed as the ratio of its foreign equity holdings[5] (FA_i) and the total (foreign and domestic) equity holdings. The domestic equity holdings are calculated as the difference between the country's total market capitalization (MC_i) and the amount of stocks held by foreign investors[6] (FL_i):

$$\mathrm{ACT}_i = \frac{\mathrm{FA}_i}{\mathrm{FA}_i + \mathrm{MC}_i - \mathrm{FL}_i}. \tag{12}$$

In the typical case, when actual foreign involvement is lower than the optimal share of international assets, and the country is subject to home bias, the measure takes values between 1 (when the investors hold only domestic assets) and 0 (when actual and optimal portfolio weights are equal). For instance, if a country should optimally hold 80% of its portfolio in for-

[4] If asset returns are normally distributed and Σ is known, f has a χ^2 distribution with N d.f. If Σ is not known, it follows a F-distribution with $N, T-N$ d.f. (Garlappi et al., 2007).

[5] Reported in International Investment Position/Assets/Portfolio Investment/Equity.

[6] Reported in International Investment Position/Liabilities/Portfolio Investment/Equity.

eign stocks and has an actual allocation of 20%, its home bias has a value of 0.75. However, at times, the data might offer cases when the actual weights exceed optimal weights, for instance when negative or very low weights are assigned to the world market index in the optimization framework. In such instances the country appears not home biased, but on the contrary, overinvesting abroad and the former measure of home bias would be misleading. Therefore, we modify the formula to take into account the case of overinvestment abroad (negative 'home bias') and obtain comparable results, as follows:

$$\mathrm{HB}_i = \frac{\min(|\mathrm{OPT}_i|, \mathrm{ACT}_i)}{\mathrm{sign}(\mathrm{OPT}_i)\max(|\mathrm{OPT}_i|, \mathrm{ACT}_i)} - 1. \tag{13}$$

We use this formula to compute a negative measure of 'home bias' when optimal allocations are lower than the observed foreign investment. For example, if actual foreign holdings are 20% and the optimal weight in foreign assets is 1%, the negative 'home bias' is −0.95. A negative value implies that the country is overinvesting abroad and a value lower than −1 indicates that short sales of foreign equities are optimal.[7]

3.2. Data and possible biases

We investigate the home bias behavior of 25 countries of which 19 are European and 6 form a non-European control group. Because our sample contains both developed and emerging countries, members of the European Union (EU) and the European Monetary Union (EMU) together with outsiders, it is particularly useful for isolating any EU/euro effect in the evolution of home bias. Several types of data serve our analysis. First, we compute weekly Dollar-denominated total returns for the 25 countries as well as for the global market portfolio over the period January 1973–December 2004 based on Datastream's total market indices. For a number of countries, data are only available after January 1973 (see first column of Table 2). The risk-free rate is the one-month Treasury Bill rate from Ibbotson and Associates Inc.[8] Market capitalization figures are obtained from Datastream (for developed countries) and Standard & Poor's Emerging Markets Database, respectively.

Second, we calculate actual portfolio weights based on foreign portfolio assets and liabilities reported in IMF's International Financial Services database. The information is part of the International Investment Position (IIP) (a chapter of the country's Balance of Payments). The IIP is defined by the IMF as a balance sheet of a country's stock of financial assets and liabilities at the end of year. The IIP data are a comprehensive source for international portfolio holdings. However, there are several possible biases associated with it. First, if a foreign subsidiary located in the reference country invests (for the ultimate benefit of its foreign owner) in a third country, the reference country appears as the foreign investor and not the country of the parent company. Moreover, the measure of foreign portfolio holdings does not take into account the possibility that a multinational company listed in a reference country may provide the required international diversification. Our measure of home bias would then overstate the phenomenon, an effect that might be more relevant in small markets dominated by a few global firms (see IMF, 2005; De Santis and Gérard, 2006). However, Lewis (1999) argues that even multinational

[7] The main use of this extended formula is to illustrate the phenomenon of home bias in a descriptive manner; estimations further on are based on home bias variables computed using smoothed optimal weights.

[8] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

companies tend to move closer together with the index of the home country and hence cannot substitute the diversification benefits of holding foreign stocks. Finally, the accuracy of data collection (Tesar and Werner, 1995) and the choice of a price index used for revaluating IIP holdings (Griever et al., 2001) can be questioned. Warnock (2001) points out that a 1994 benchmark survey in the US to re-estimate positions in foreign holdings for the previous years led to substantial upward corrections and consequently lower figures for home bias. However, given that the frequency of surveys increases, backward corrections of such magnitudes are becoming less likely. Table 1 presents average portfolio holdings of foreign assets and liabilities (in millions USD) for the 25 countries in our data set. For all countries, without exception, average foreign assets and liabilities increase dramatically in the second half of the sample, suggesting a boom in foreign equity holdings over the 1990s. Market capitalization figures (as percentages from the world market) are relatively stable, though there is a discernable shift from the US, Japan and Canada towards the European countries.

The third type of data we use consists of development and financial indicators that are based on data from International Financial Services and on the updated version of the database on the structure and development of the financial sector compiled by Beck et al. (2000). Finally, we use the Shareholder Protection Index from the Martynova–Renneboog corporate governance database. The higher the index, the higher is the power of shareholders to mitigate opportunistic behavior of managers. The index is available for the period 1990–2004 for all European countries in our sample except Turkey and for the US (see Goergen et al., 2005; Martynova and Renneboog, 2006).

4. Empirical analysis

This section discusses measures of the equity home bias obtained from five alternative investment benchmarks. In Section 4.1, we first test the validity of the I-CAPM as the return generating model, and obtain a measure of trust in the I-CAPM. In Section 4.2, we investigate to what extent mistrust in the I-CAPM leads to different measures of the equity home bias. We consider the Bayesian approach of Pástor (2000) and the Multi-Prior correction of Garlappi et al. (2007), respectively.

4.1. I-CAPM

Most previous studies have assumed that the I-CAPM provides a reasonably good description of the data. According to this model, the optimal domestic allocation equals the relative market capitalization share of a country in the global market portfolio. More concretely, this means that domestic allocations should not exceed 10% for any European country. Similarly, from the 25 countries in our sample, only Japan and the US can justify higher domestic allocations, of about 20% and 40%, respectively. In this section, we investigate whether the assumption that the I-CAPM is fully credible is warranted by providing empirical tests of the model for each country. Table 2 summarizes the main test results.[9] All markets are positively and significantly related to the global market shocks. Beta estimates range from 0.08 in Iceland to 1.09 in Finland. The global market shocks explain a considerable proportion of local market

[9] We use the first 2 years of available data for each country to compute the Bayesian prior information. To facilitate comparison between results further on, we exclude the first 2 years of data for the I-CAPM tests and all subsequent calculations of optimal weights.

Table 1
Descriptive statistics – International Investment Position

Country	Foreign assets (million USD)				Foreign liabilities (million USD)				Relative market shares (%)			
	#	Mean	Mean1	Mean2	#	Mean	Mean1	Mean2	#	Mean	Mean1	Mean2
Austria	25	12 048	1522	23 450	25	8172	756	16 206	32	0.11	0.05	0.16
Belgium	23	53 038	17 438	91 874	24	8355	2771	14 447	32	0.55	0.49	0.62
Czech Rep	7	1423	484	2361	12	3724	2549	4899	7	0.07	0.07	0.07
Denmark	11	24 102	9440	41 699	11	13 322	6001	22 107	11	0.26	0.19	0.34
Finland	25	7140	45	14 825	19	53 626	4116	108 635	17	0.44	0.19	0.70
France	16	137 178	51 334	223 024	16	254 586	91 366	417 806	32	2.51	1.51	3.63
Germany	25	193 688	27 447	373 783	25	137 101	42 031	240 094	32	4.04	4.30	3.73
Greece	7	2214	1269	3476	7	13 923	11 127	17 650	30	0.24	0.21	0.26
Hungary	8	296	103	489	8	4450	3045	5854	14	0.06	0.02	0.09
Iceland	14	1249	109	2388	10	268	16	519	8	0.03	0.01	0.04
Italy	33	58 226	2867	117 044	19	26 620	7200	48 199	32	1.39	0.99	1.84
Netherlands	23	111 613	25 866	205 155	23	145 207	43 871	255 755	32	1.98	1.79	2.19
Poland	9	154	25	316	11	4531	2668	6767	14	0.08	0.03	0.13
Portugal	9	7989	6124	10 321	12	16 764	8037	25 491	28	0.12	0.05	0.19
Spain	24	15 706	742	30 671	24	44 111	7455	87 431	18	1.23	1.04	1.46
Switzerland	22	127 279	40 034	214 524	22	182 392	69 452	295 332	24	2.61	2.49	2.73
UK	25	315 889	121 646	526 320	25	320 550	57 633	605 335	32	8.11	7.29	9.02
Sweden	22	36 831	4539	69 124	22	39 356	6809	78 412	23	0.67	0.38	0.96
Turkey	9	35	5	72	9	7750	7113	8545	28	0.15	0.04	0.17
Australia	18	38 735	16 329	61 142	18	61 867	27 231	96 503	32	1.34	1.21	1.48
Canada	6	131 240	115 033	147 447	6	60 054	51 527	68 580	32	2.40	2.50	2.28
Hong Kong	5	126 190	92 887	176 140	5	115 830	106 733	129 480	32	1.32	0.84	1.86
Japan	10	229 420	190 930	267 914	10	240 890	72 159	419 317	32	23.57	27.28	19.35
New Zealand	14	4989	1141	8837	14	2885	920	5130	17	0.12	0.13	0.10
US	25	741 070	110 252	1 424 461	25	638 190	177 118	1 137 665	32	44.62	48.27	40.48

This table presents some descriptive statistics (number of observations (#), mean of the full sample (Mean) and means of the first and second halves of the sample (Mean1 and Mean2)) for the main data needed to compute home bias: portfolio holdings of foreign assets and foreign liabilities (in million USD) reported in the International Investment Position of the Balance of Payments and recorded in IMF International Financial Services Database, as well as relative market share in percentages (computed as the ratio of the domestic market capitalization to the MSCI World Market Capitalization). The dates of the sample splits based on the number of observations are: 1993 (Austria, Belgium, Germany, Spain, UK, Japan and US), 1994 (Netherlands, Switzerland and Sweden), 1996 (Finland, Italy and Australia), 1997 (Denmark and France), 1998 (New Zealand), 1999 (Czech Republic and Portugal), 2000 (Poland and Iceland), 2001 (Hungary and Turkey), 2002 (Greece and Canada) and 2003 (Hong Kong). All series are recorded with annual frequency.

Table 2
Test of I-CAPM

Country	First obs.	Alpha	Std. Err.	Beta	Std. Err.	R^2 (%)
Austria	09/01/1975	0.03	0.05	0.35***	0.02	9
Belgium	09/01/1975	0.05	0.04	0.53***	0.02	23
Czech Rep	16/11/1995	0.10	0.12	0.57***	0.06	11
Denmark	09/01/1975	0.10*	0.05	0.42***	0.02	11
Finland	22/03/1990	0.13	0.12	1.09***	0.06	25
France	09/01/1975	0.08	0.05	0.73***	0.02	26
Germany	09/01/1975	0.00	0.04	0.65***	0.02	29
Greece	09/12/1993	0.26*	0.14	0.70***	0.07	11
Hungary	17/06/1993	0.27	0.13	0.92***	0.07	18
Iceland	05/01/1995	0.25***	0.06	0.08***	0.03	1
Italy	09/01/1975	0.10	0.07	0.61***	0.03	13
Netherlands	09/01/1975	0.04	0.04	0.69***	0.02	35
Poland	07/03/1996	0.00	0.19	0.91***	0.10	12
Portugal	09/12/1993	0.02	0.07	0.58***	0.03	24
Spain	09/03/1989	0.08	0.07	0.84***	0.03	36
Switzerland	09/01/1975	0.00	0.04	0.60***	0.02	31
UK	11/01/1973	0.08	0.05	0.76***	0.02	31
Sweden	12/01/1984	0.10	0.07	0.93***	0.04	30
Turkey	11/01/1990	1.09***	0.23	0.85***	0.12	5
Australia	09/01/1975	0.08	0.05	0.58***	0.02	19
Canada	09/01/1975	0.02	0.03	0.72***	0.01	45
Hong Kong	09/01/1975	0.13	0.09	0.92***	0.04	17
Japan	09/01/1975	−0.06	0.04	0.76***	0.02	37
New Zealand	11/01/1990	0.07	0.07	0.46***	0.03	14
US	09/01/1975	0.01	0.02	0.99***	0.01	71

This table reports the results of the OLS regressions of weekly (excess) returns on domestic market indices on a constant and the (excess) returns on the World Market Index for 25 countries. As the length of time series varies across the countries, the date of the first observation included in the estimation is reported in the second column of the table. Values of the coefficients, their respective standard errors and (unadjusted) R^2, as a measure of goodness of fit of the model are reported subsequently. Significance is denoted by *** (at 1%), ** (at 5%) and * (at 10%).

returns (on average 23%), except in Iceland (1%), Turkey (5%), and Austria (9%). More interesting for the purpose of this paper are the point estimates and standard errors for the alphas. We note a number of interesting findings. First, the alphas are not statistically different from zero in all countries except Denmark, Greece, Iceland and Turkey. In other words, we cannot reject the I-CAPM for 21 of the 25 countries. Second, while not being statistically significant the alphas are predominantly positive (all countries except Germany, Switzerland, and Japan). Positive alphas make domestic investment more attractive to domestic investors who have incomplete trust in the I-CAPM, and should hence contribute to lower measures of the equity home bias. Similarly, negative alphas will induce such investors to take a domestic position that is lower than the country's weight in the global market portfolio. We expect to see this effect in the case of Japan, given that its alpha is negative and economically relevant (−0.06 per week, i.e. more than 3% annually). Third, the alphas typically have a large standard error, ranging from 0.02 for the US to more than 0.10 for the Czech Republic, Finland, Greece, Hungary, Poland, and Turkey. Recall from Section 2 that the Bayesian approaches take the standard error on the alphas as an indicator of the degree of mistrust in the I-CAPM. A high degree of mistrust means that the optimal weights will deviate more from the I-CAPM, towards those obtained from a 'data-based' standard mean–variance optimization using sample estimates. In the following section, we compare the home bias measures obtained from the I-CAPM weights with those determined by the Bayesian approach of Pástor (2000) and the Multi-Prior correction of Garlappi et al. (2007).

4.2. Home bias results

We compute optimal portfolio holdings and home bias under five optimization frameworks. Table 3 reports the average values of home bias measures obtained using these five different approaches. The results are based on models without short sales constraints. Qualitatively similar results are found when short sales are imposed. Across the entire set of 25 countries, we observe a number of interesting patterns.

First, the I-CAPM based home bias measure confirms that investors predominantly invest in domestic assets. The bias ranges from 0.55 in Belgium to more than 0.98 in Greece, Poland, and Turkey. Notice that the latter equity markets are among the most volatile in our sample, suggesting that by not geographically diversifying their equity portfolios, domestic investors bear a substantial amount of country-specific (and hence not rewarded) risk. Between those two extremes, we find that most countries exhibit an average home bias of around 0.70–0.80.

Second, we find that the 'data-based' approach leads to a substantial reduction in measures of the equity home bias. When investors are supposed to have full confidence in the I-CAPM, the average home bias (over time and across countries) amounts to 0.80. If, on the other hand, the investors have no confidence at all in the I-CAPM, and hence follow a purely 'data-based' approach, the average home bias drops to 0.42, a decrease of nearly 50%. In Belgium, Greece, Iceland, the Netherlands, and the UK, the home bias even drops below 0.10.

Third, we find that allowing for a reasonable degree of mistrust[10] in the I-CAPM leads to a substantial reduction in the home bias measures. More concretely, average home bias drops to 0.63 when Pástor's Bayesian approach is used (or with 22%) and to about 0.72 in case the Multi-Prior method of Garlappi et al. (2007) is applied (or with 10%) (see columns 4 and 5 of Table 3). The partial reliance of Pástor's method on sample data leads to occasionally unstable optimal weights, and hence home bias measures. A large part of this variability disappears when the Multi-Prior approach of Garlappi et al. (2007) is used, i.e. when expected returns are restricted to a certain interval and investors minimize over the choice of expected returns. Home bias estimates using this approach are higher compared to the 'data-based' and Pástor's method, but still about 10% lower on average compared to those implied by the I-CAPM.

To illustrate further the effects of introducing uncertainty in the model using the Bayesian approach we compute several measures of home bias for different degrees of trust in I-CAPM. We choose several levels of (squared) standard errors based on the results of the I-CAPM tests (Table 2): minimum standard errors ($\sigma_\alpha = 0.02$) corresponding to the US, maximum standard errors ($\sigma_\alpha = 0.23$) obtained for the case of Turkey, as well as three intermediate (quartile) values, $\sigma_\alpha = 0.04$, the level of standard errors for four countries in our sample (Belgium, the Netherlands, Switzerland and Japan), $\sigma_\alpha = 0.06$ (Iceland) and $\sigma_\alpha = 0.09$ (Hong Kong). Columns 6–15 of

[10] The Bayesian home bias results are computed using country-specific values of σ_α^2 corresponding to (squares of) the standard errors of the estimates of the intercepts in the I-CAPM tests reported in Table 2. In computing the Multi-Prior home bias the value of ε (the bound on the added constraint) is chosen so that the percentage size of the confidence interval for $F_{N,T}$ implied by ε is 90%. This rather high value results in substantial smoothing of the optimal portfolio weights and subsequently of home bias figures.

Table 3
Home bias measures − average values

Country	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-	-9-	-10-	-11-	-12-	-13-	-14-	-15-
	I-CAPM	DATA	MPC DATA	BAYS	MPC BAYS	BAYS	MPC BAYS	BAYS	MPC BAYS	BAYS	MPC BAYS	BAYS	MPC BAYS	BAYS	MPC BAYS
				σ_α(country)		$\sigma_\alpha = 0.02$		$\sigma_\alpha = 0.04$		$\sigma_\alpha = 0.06$		$\sigma_\alpha = 0.09$		$\sigma_\alpha = 0.23$	
	Mean														
Austria	0.58	0.24	0.08	0.26	0.36	0.29	0.21	0.26	0.37	0.25	0.09	0.25	0.01	0.24	0.08
Belgium	0.55	−0.03	0.23	0.29	0.30	0.42	0.32	0.37	0.30	0.30	0.28	0.22	0.27	0.00	0.25
Czech Rep	0.88	0.88	0.87	0.88	0.87	0.88	0.87	0.88	0.87	0.88	0.87	0.88	0.87	0.88	0.87
Denmark	0.69	0.37	0.47	0.64	0.59	0.69	0.62	0.67	0.61	0.64	0.60	0.60	0.57	0.47	0.51
Finland	0.87	0.28	0.84	0.42	0.85	0.87	0.87	0.82	0.86	0.70	0.86	0.63	0.85	0.33	0.84
France	0.77	0.42	0.62	0.68	0.70	0.76	0.73	0.73	0.72	0.69	0.70	0.64	0.68	0.49	0.64
Germany	0.73	0.25	0.61	0.46	0.60	0.54	0.59	0.52	0.60	0.47	0.60	0.41	0.60	0.29	0.62
Greece	0.98	0.07	0.95	0.67	0.97	0.97	0.97	0.97	0.97	0.96	0.97	0.94	0.97	0.66	0.96
Hungary	0.98	0.69	0.97	0.70	0.98	0.98	0.98	0.98	0.98	0.97	0.98	0.86	0.98	0.70	0.98
Iceland	0.74	0.06	0.24	0.39	0.41	0.69	0.56	0.58	0.50	0.45	0.44	0.30	0.37	0.11	0.27
Italy	0.82	0.69	0.75	0.78	0.79	0.82	0.81	0.81	0.80	0.80	0.80	0.77	0.79	0.72	0.77
Netherlands	0.60	−0.09	0.21	0.31	0.40	0.51	0.46	0.44	0.42	0.27	0.38	0.15	0.33	−0.04	0.24
Poland	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	1.00	1.00	0.99	0.99
Portugal	0.79	0.31	0.68	0.63	0.71	0.79	0.72	0.77	0.72	0.72	0.71	0.60	0.71	0.38	0.69
Spain	0.91	0.25	0.85	0.62	0.89	0.91	0.90	0.90	0.90	0.88	0.89	0.84	0.89	0.41	0.87
Switzerland	0.61	0.38	0.57	0.43	0.46	0.46	0.40	0.43	0.43	0.43	0.46	0.46	0.50	0.38	0.55
UK	0.69	−0.06	0.47	0.46	0.61	0.61	0.66	0.56	0.65	0.48	0.63	0.42	0.60	0.07	0.53
Sweden	0.73	0.51	0.63	0.66	0.68	0.73	0.71	0.72	0.70	0.70	0.70	0.68	0.69	0.61	0.66
Turkey	0.99	0.32	0.99	0.77	0.99	0.99	0.99	0.99	0.99	0.99	0.99	1.00	1.00	0.78	0.99
Australia	0.83	0.69	0.75	0.80	0.79	0.83	0.81	0.82	0.80	0.80	0.80	0.78	0.79	0.72	0.76
Canada	0.81	0.64	0.68	0.76	0.73	0.79	0.75	0.76	0.73	0.72	0.71	0.69	0.70	0.65	0.69
Hong Kong	0.77	0.61	0.71	0.75	0.76	0.77	0.77	0.77	0.77	0.76	0.77	0.75	0.76	0.70	0.74
Japan	0.90	0.94	0.91	0.93	0.90	0.91	0.89	0.92	0.90	0.93	0.90	0.94	0.91	0.95	0.92
New Zealand	0.83	0.50	0.74	0.79	0.78	0.83	0.79	0.82	0.79	0.81	0.78	0.78	0.77	0.84	0.76
US	0.82	0.45	0.79	0.61	0.81	0.79	0.82	0.58	0.80	0.53	0.80	0.49	0.79	0.77	0.79
Average	0.80	0.42	0.68	0.63	0.72	0.75	0.73	0.72	0.73	0.69	0.71	0.64	0.70	0.51	0.68

This table presents mean country values for several measures of home bias: (1) home bias computed in I-CAPM framework (I-CAPM), (2) ‘data-based’ home bias (DATA), (3) home bias computed by applying the Multi-Prior correction to the ‘data-based’ approach (MPC DATA), (4) home bias computed in a Bayesian framework, where σ_α is equal to the country-specific standard errors of the intercept in the I-CAPM tests (BAYS), (5) home bias computed by applying the Multi-Prior correction to the Bayesian approach (MPC BAYS). Columns 6−15 present Bayesian measures of home bias computed before and after applying the Multi-Prior correction (MPC) for five other values of standard errors (σ_α) based on the country tests of I-CAPM as follows: minimum ($\sigma_\alpha = 0.02$), maximum ($\sigma_\alpha = 0.23$) and intermediary quartiles ($\sigma_\alpha = 0.04$, $\sigma_\alpha = 0.06$ and, respectively, $\sigma_\alpha = 0.09$). All data consists of end-of-year values.

Table 3 show that, on average, home bias decreases with the degree of mistrust in the model from a high value of I-CAPM home bias of 0.80 to 0.51 when Pástor's Bayesian approach is used (or with 36%) and to about 0.68 (or with 15%) when applying the Multi-Prior correction method of Garlappi et al. (2007) at the highest level of mistrust in the model. Even for our most conservative degree of mistrust (corresponding to $\sigma_\alpha = 0.02$), we still find a substantial decrease in the average home bias, i.e. with 7–9% compared to the I-CAPM home bias. For a number of countries, the decrease is considerably larger, namely by more than 20% in Austria, Belgium and Germany and by over 10% in the Netherlands and UK.

Fourth, we observe a substantial decrease in the I-CAPM equity home bias for many countries, especially in the 1990s. Fig. 1 plots the alternative home bias measures over time for selected countries in our sample: Denmark, Iceland, Japan and the Netherlands.[11] The cases are representative examples of country-specific home bias behavior. In Denmark, alternative measures of home bias follow the dynamics of the I-CAPM home bias but at significantly lower levels, while a high and stable I-CAPM home bias virtually disappears when the (rejected) model is discarded in Iceland. Interestingly, the decrease in home bias especially after 1999 is in many cases more pronounced when the alternative models to the I-CAPM are used (as illustrated by the case of the Netherlands). In fact, for a reasonable degree of mistrust in the I-CAPM the same pattern is encountered in Austria, Belgium, France, Finland, Italy and Spain. On the other hand, deviations from I-CAPM can worsen the puzzle when the domestic index underperforms the world benchmark (as is the case for Japan). In some emerging countries, like the Czech Republic and Poland, home bias is extreme and largely unaffected by the way it is measured.

5. The link between financial market integration and home bias

In the previous section, we showed that the equity home bias remains substantial for many of the countries in our sample, even when we allow for a reasonable degree of mistrust in the I-CAPM. At the same time, we observe a downward trend in the home bias of many countries. The aim of this section is to increase our understanding of the dynamics and drivers of changes in the equity home bias.

5.1. Hypotheses

Increasing financial integration arises as a key candidate to explain the observed decrease in the equity home bias. In integrated equity markets, investors can trade international equities freely and at low cost. Similarly, deeper financial and also economic integration contribute to lower information asymmetry between foreign and domestic investors. The home bias may erode further with improved quality of corporate governance (see Kho et al., 2006). While further integration also tends to increase cross-market correlations (see Baele, 2005; Bekaert et al., 2005; Bekaert and Harvey, 1997, 2000; Longin and Solnik, 1995), the benefits from international diversification continue to be large (see Heston and Rouwenhorst, 1994; Griffin and Karolyi, 1998; Baele and Inghelbrecht, 2006).

A first hypothesis is whether further integration has reduced the equity home bias. To test this hypothesis, we use three integration proxies. First, we proxy integration with a simple linear time trend. While admittedly a crude measure, it has the advantage of being simple and easy

[11] For brevity, we do not present here the figures for all the 25 countries in our sample. However, a complete set of graphs is available from the authors on request.

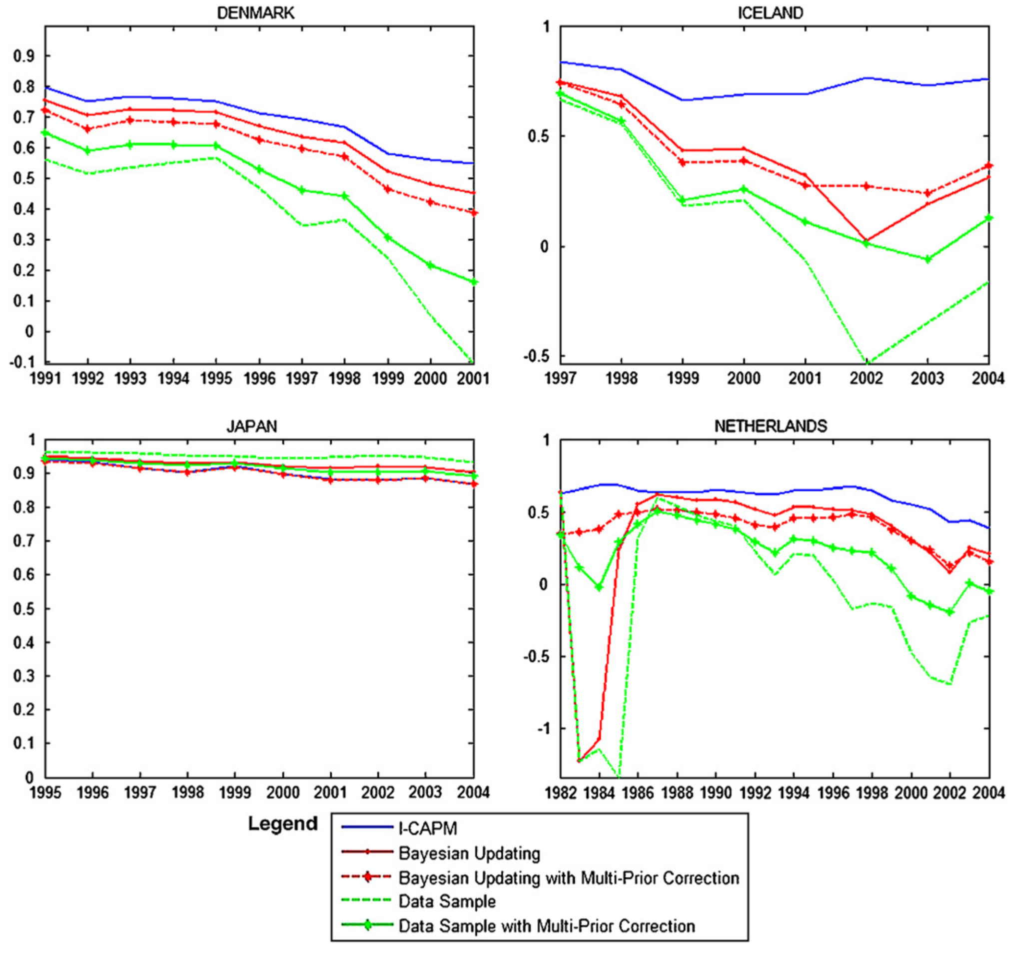

Fig. 1. Home bias measures for selected countries (short sales allowed).

to interpret. Second, we take the time-varying global market beta as an alternative integration proxy. This measure has recently gained popularity as an indirect integration indicator (see Bekaert and Harvey, 1997, 2000; Fratzscher, 2002; Baele, 2005; Baele et al., 2004; Eiling et al., 2004). These papers present strong evidence that global (regional) market betas tend to increase with integration. Here, we use the end-of-year global market betas estimated from weekly data. Third, we use the ratio of a country's import plus export over GDP and alternatively the sum of a country's foreign direct investments (assets and liabilities) scaled by GDP as indicators of international exposure of a country. Previous research has found these variables to be relevant proxies not only for economic but also for financial integration (see Bekaert and Harvey, 1995; Chen and Zhang, 1997; Lane and Milesi-Ferretti, 2003, for a more detailed discussion). In addition, the information carried by both international trade and foreign direct investments should make investors more familiar with foreign stocks, and should reduce the (perceived) information disadvantage (see Lane and Milesi-Ferretti, 2003).

A second hypothesis we test is whether the home bias has decreased faster in the European (Monetary) Union compared to the rest of the world. Over the last two decades, this region has gone through a period of extraordinary economic, financial, and monetary integration culminating in the introduction of the euro in January 1999. We differentiate between Euro and non-Euro Area countries for a number of reasons. First, due to the single currency, at least within the Euro Area, some direct barriers to foreign equity holdings have been de facto eliminated. An example is the EU currency matching rule, which required insurance companies and pension funds, among others, to match liabilities in a foreign currency for a large percentage by assets in the same currency. Second, indicators of financial integration have increased faster in Europe relative to the rest of the world. Baele and Inghelbrecht (2006) found for a sample of 21 countries that global and regional market betas have increased relatively faster for European countries. In a study related to ours, De Santis and Gérard (2006) find that Euro Area investors have a strong preference for stocks and bonds in other Euro Area countries, indicative of strong regional integration. Third, by investigating the differential impact of the euro on home bias, we contribute to the stream of literature trying to determine the contribution of forming a currency union on (regional) financial integration.

Last, we investigate whether home bias exhibits persistence using a framework which is similar to the analysis of β-convergence, a concept introduced in the growth literature. The original question was whether countries with a relatively low initial level of GDP per capita were growing faster (catching up, or experiencing 'β-convergence') than countries with a higher level of initial GDP per capita. β-Convergence was tested by performing a cross-sectional regression of GDP per capita on the different countries' initial GDP per capita. A (larger) negative value for the estimated coefficient of the initial level implied (greater) responsiveness of the average growth rate to the gap between the initial level and the steady state, or otherwise put faster convergence to the steady state (see Barro and Sala-i-Martin, 1992 and Islam, 2003 among many others). In the home bias literature, Ahearne et al. (2004) have applied the same notion of β-convergence to show that US investors have decreased their home bias faster (over the period 1994–1997) with respect to countries for which their initial bias (in 1994 terms) was larger.

5.2. Control variables

We test our main hypotheses in the presence of a set of control factors relevant to international portfolio choice.

The first factor, *country-specific risk*, is defined as the volatility of the residuals from an I-CAPM regression performed on the respective country returns. Investors limited to their home market bear not only systematic but also country-specific risk. Because the latter risk is not compensated by higher expected returns, the incentives for investors to diversify internationally, i.e. to renounce their home bias, should increase with the level of country-specific risk. Alternatively, idiosyncratic risk may just be an instrument for time-varying market integration. Baele and Inghelbrecht (2006) for instance find that further integration in Europe did not only lead to increasing global and regional market betas, but also to lower average country-specific risk. If the latter effect dominates, one would expect a positive relationship between country-specific risk and the equity home bias.

Second, we control for *equity market development*, which we proxy by the ratio of stock market capitalization to GDP.[12] Larger equity markets (relative to the real economy) tend to have lower costs of financial intermediation, higher liquidity, and better investment opportunities

[12] Qualitatively similar results were obtained when we use market liquidity measures, such as the ratio of market turnover over market capitalization, instead of the ratio of market capitalization over GDP.

(see Levine and Zervos, 1996). On one hand, increasing market development makes the local market more attractive to foreign investors, which should have a negative effect on the equity home bias. Alternatively, domestic investors have ceteris paribus less incentives to diversify their portfolios in large and well developed markets. The empirical analysis further on should reveal what effect dominates.

Third, we take *bank assets*, defined as the ratio of deposit money bank assets to GDP as a proxy for the importance of bank finance in a country. Mann and Meade (2002) suggest that countries with a higher share of bank assets and therefore a less diversified financial system are less attractive for foreign investors. To the extent that there is a tradeoff between the bank and stock market development, international markets may become a substitute for an underdeveloped domestic market. Moreover, financial intermediaries may contribute to raising the international awareness of domestic investors (Lane and Milesi-Ferretti, 2003).

Fourth, we use *the Shareholder Protection Index*, from the Martynova–Renneboog corporate governance database (see Goergen et al., 2005; Martynova and Renneboog, 2006), to test whether the corporate environment influences the investment decisions. A country with higher corporate governance standards may be more attractive to investors, especially considering the higher uncertainty associated with foreign equity investments.

5.3. Model specification

We conduct panel data estimation allowing for fixed country effects and using a feasible GLS technique to control for cross-sectional heteroskedasticity, in the following framework:

$$\Delta \text{HB}_{it} = \alpha_i + \beta_1 \text{TIME}_t + \beta_2 \text{HB}_{it-1} + \beta_3 \text{INTEGRATION}_{it} + \beta_4 \text{EXPOSURE}_{it} + \beta_5 X_{it} + \varepsilon_{it}, \tag{14}$$

where $\Delta \text{HB}_{it} = (\text{HB}_{it} - \text{HB}_{it-1})/\text{HB}_{it-1}$ is the annual growth rate (in percentages) of home bias of country i, TIME_t is a trend variable, HB_{it-1} is the level of home bias in the previous year in the country of reference, INTEGRATION_{it} a proxy for market integration which is reflected in turns by the time-varying world market betas (BETAS_{it}) or an indicator function, I_{it} (EU/EMU) taking the value 1 if country i is a member the European Union (respectively the European Monetary Union) at time t and 0 otherwise, EXPOSURE is taken as the annual growth rate (in percentages) of the trade openness index of a country, measured as the ratio of the country's foreign trade (import and export) to its GDP (OPN_{it}), or the annual growth rate (in percentages) of foreign direct investments (assets and liability) scaled by GDP (FDI_{it}), and X_{it} is a set of control variables including: annual growth rate (in percentages) of the variance of the residuals from the I-CAPM regressions (IDSYN RISK_{it}), annual growth rate (in percentages) of the stock market capitalization of a country scaled by GDP (STMKTCAP_{it}), annual growth rate (in percentages) of the deposit money bank assets of a country scaled by GDP (DBAGDP_{it}) as well as the Shareholder Protection Index (SHLD PROT_{it}).

We use a dynamic panel to investigate persistence in home bias behavior. Notice that the traditional literature on β-convergence has related GDP growth to the initial GDP level using a *cross-sectional* regression. In a panel, the time dimension of the data is taken into account by investigating the adjustment or convergence of the dependent variable over a chosen interval (typically 1, 5 or 10 years) (see Islam, 1995). Extensions to the notion of β-convergence have been used also outside the economic growth literature with a similar interpretation. Goldberg and Verboven (2001) test for β-convergence in prices in the European car market using panel data where the dependent variable is the first difference in the log-price and the main regressor is the previous year log-price. Adam et al. (2002) test for β-convergence in a study on various measures of financial market integration, by regressing the change in interest rate spreads of European countries (over Germany) on the previous year level interest rate. In our panel regression (14), we relate the annual change in the equity home bias to the home bias level *in the previous year*. We opt for the annual frequency as it gives us the highest use of our available data while allowing us to interpret the coefficient in a way that is similar to β-convergence. Notice that the estimate of the coefficient of the previous year level of home bias can be interpreted as a measure of home bias persistence. A low or zero estimate of β suggests that home bias is not easily eroded. Alternatively, a large negative estimate for β suggests that β-convergence is taking place and the size of the coefficient is an indicator for the speed of convergence.

5.4. Estimation results

We test the model presented in the previous section on three different measures of home bias, depending on the investment benchmark used: the I-CAPM home bias, the 'data-based' and the Bayesian home bias. For the latter two measures, we apply the correction methodology of Garlappi et al. (2007) in order to minimize unwanted volatility in the dependent variables.[13]

Table 4 presents the results for the first set of estimations, where the dependent variable is the change in the I-CAPM home bias measure. First, we note a moderate negative trend, highly significant and virtually invariable across our specifications. Home bias adjusts downwards at a speed increasing with a third of a percent per year. The effect is remarkably robust to the inclusion of additional instruments, notably dummies for membership in the European Union and the Euro Area, respectively. This suggests that decreasing home bias is not a uniquely European phenomenon, and hints at the role of globalization and technological process as drivers of the equity home bias.

The previous year level of home bias enters the regressions with a robust negative sign, statistically significant at the 1% level. Home bias decreases from a previous (higher) level at a speed ranging from a quarter to (nearly) half of a percent per year.

We test the relationship between the evolution of home bias and the continuing process of financial integration using several possible proxies for integration. First, we find that the increase in global market betas – observed in nearly all countries in our sample – is associated with a decrease in the equity home bias. An increase in the world market beta by one-tenth would decrease the annual growth rate of the home bias by more than 1%. However, these results warrant careful interpretation. Both the dependent variable, the year-on-year change in the equity home bias and the regressor, time-varying global market betas, are indirect measures of the same process, namely of time-varying market integration. They are, however, also *imperfect* (and *incomplete*) integration measures. Consider for instance a country that at time t becomes integrated with world capital markets. Because the relevant discount rate is now the global discount rate instead of the local rate, local equity returns become more correlated with global equity returns, and the global beta shifts up. This does not necessarily mean, however, that investors will decrease their bias with respect to this country, as the increase in betas and hence

[13] Estimates based on the unsmoothed measures are similar in spirit, albeit considerably noisier. Given the notorious variability of the data, this is not unexpected and illustrates the merit of the Multi-Prior correction developed by Garlappi et al. (2007).

Table 4
Estimation results for home bias – the I-CAPM measure

HB measure	I-CAPM											
	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-	-9-	-10-	-11-	-12-
	Number of observations											
	264	270	214	216	264	270	214	216	264	270	214	216
TIME	−0.36***	−0.34***	−0.35***	−0.36***	−0.39***	−0.35***	−0.34**	−0.35**	−0.27***	−0.25***	−0.32***	−0.34***
(Std. Err.)	(0.07)	(0.07)	(0.12)	(0.12)	(0.09)	(0.09)	(0.15)	(0.15)	(0.07)	(0.07)	(0.11)	(0.11)
LEVEL(-1)	−0.31***	−0.30***	−0.34***	−0.34***	−0.26***	−0.25***	−0.29***	−0.29***	−0.38***	−0.38***	−0.42***	−0.44***
(Std. Err.)	(0.06)	(0.06)	(0.07)	(0.07)	(0.06)	(0.07)	(0.08)	(0.08)	(0.06)	(0.06)	(0.07)	(0.07)
BETAS	−11.62***	−10.88***	−12.30***	−12.42***								
(Std. Err.)	(2.00)	(1.85)	(2.53)	(2.36)								
I(EU)					0.69	0.88	1.46	1.83				
(Std. Err.)					(1.52)	(1.42)	(1.84)	(1.77)				
I(EMU)									−7.56***	−7.70***	−8.34***	−8.61***
(Std. Err.)									(1.23)	(1.21)	(1.49)	(1.52)
IDSYN RISK	0.00	0.02	0.01	0.03	0.04	0.03	0.05	0.06	0.02	0.00	0.03	0.05
(Std. Err.)	(0.02)	(0.02)	(0.03)	(0.03)	(0.04)	(0.04)	(0.05)	(0.05)	(0.04)	(0.03)	(0.04)	(0.04)
STMKTCAP	0.03***	0.04***	0.04***	0.04***	0.02***	0.03**	0.03	0.02	0.02***	0.03***	0.02	0.02
(Std. Err.)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
DBAGDP	−0.03	−0.06*	−0.03	−0.04	−0.03	−0.05	−0.03	−0.04	−0.04	−0.07***	−0.06*	−0.06**
(Std. Err.)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
FDI	−0.02		−0.03		−0.01		−0.03		−0.02**		−0.04*	
(Std. Err.)	(0.01)		(0.02)		(0.01)		(0.02)		(0.01)		(0.02)	
OPN		−0.06**		−0.08		−0.05		−0.05		−0.07***		−0.07
(Std. Err.)		(0.03)		(0.05)		(0.03)		(0.06)		(0.02)		(0.05)
SHLD PROT			−0.20	−0.19			−0.45	−0.39			0.12	0.22
(Std. Err.)			(0.24)	(0.24)			(0.29)	(0.29)			(0.22)	(0.21)
Adj R^2 (%)	34	35	29	32	25	21	14	13	34	34	29	30

This table reports the results of (fixed effects) panel regressions of annual growth rate of home bias (in percentages) on selected variables including: the trend (TIME), previous year levels of home bias -LEVEL(-1)-, annual global market betas (estimated on cumulated samples of weekly return data) (BETAS), EU/EMU dummy variables -I(EU/EMU)-, annual growth rate (in percentages) of the variance of the residuals from the I-CAPM regressions (IDSYN RISK), annual growth rate (in percentages) of stock market capitalization scaled by GDP (STMKTCAP), annual growth rate (in percentages) of deposit money bank assets scaled by GDP (DBAGDP), annual growth rate (in percentages) of international trade (imports plus exports) scaled by GDP (OPN), annual growth rate (in percentages) of foreign direct investments (assets and liabilities) scaled by GDP (FDI) and the Shareholder Protection Index (SHLD PROT). The results are obtained through feasible GLS, to control for cross-section heteroskedasticity. Values of the coefficients, standard errors corrected for period heteroskedasticity and serial correlation and adjusted R^2, are reported. For models 1–4, the standard errors are adjusted to correct for the fact that BETAS are generated regressors, based on Shanken (1992). Significance of the coefficients is denoted by *** (at 1%), ** (at 5%) and * (at 10%).

correlations makes the country less attractive for diversification purposes. In other words, while integration makes it possible for foreign countries to participate in the local equity market, it also reduces the country's diversification potential. From our analysis, we can learn what effect is most important for the equity home bias. Our empirical results indicate a negative relation between home bias and betas, suggesting that the first effect – easier market access – dominates. In addition, we find substantial evidence that home bias and global market betas do not fluctuate simultaneously. In fact, global market betas have been increasing gradually since the end of the 1980s, while home bias has only decreased substantially at the end of the 1990s. When we perform a causality test, we do find evidence that the increase in betas Granger causes home bias (negatively) for most countries, while the opposite is not true.

Second, we find that the home bias is decreasing faster for countries that are part of the Euro Area. Interestingly, a mere membership of the broader European Union has no such effect. Within the European Monetary Union, the home bias decreases at a speed that is higher by 7–8% annually. While it is difficult to distinguish among the array of factors causing home bias, a prime candidate explanation is that with the introduction of the euro, currency matching rules faced by many institutional investors have de facto been abolished. Another widely acknowledged benefit of the common currency that may affect home bias is the elimination of exchange rate risks and related transaction costs within the Euro Area.

Third, we find a consistently negative relationship between trade openness and home bias. This finding brings support to the hypothesis that trade facilitates the flow of information, hereby reducing costs of asymmetric information. However, while statistically significant for some specifications, the economic impact of this variable is generally small.

The additional control variables allow us to make several inferences about alternative drivers of the home bias. First, we do not find support for the hypothesis that idiosyncratic risk plays a significant role as a driver of international diversification. Second, we note that there is a positive relationship between the (change in) home bias and the relative importance of stock market in the economy. The coefficient is small in size even though predominantly significant or marginally insignificant. However, it suggests that domestic investors are more reluctant to leave a thriving market than foreign investors are eager to enter. Third, we observe the opposite effect with respect to financial structure. A higher share of bank assets, interpreted as a sign of lower financial diversification might lead to lower home bias through two channels. First, foreign markets appear more attractive as means of diversification and second, banks might act as a reliable channel of information to local investors, thereby narrowing the information gap.

In Tables 5 and 6, we repeat the panel estimations for two alternative home bias measures, calculated using, respectively, the data-based and Bayesian weights as benchmarks. As argued before, we apply the Multi-Prior correction of Garlappi et al. (2007) in both cases to make the home bias measures less sensitive to data volatility and outliers. We obtain qualitatively similar results as for the I-CAPM home bias. We observe a negative trend, β-convergence as well as a strong and highly significant Euro Area effect.

Overall our results substantiate the fact that home bias is decreasing consistently over time and more intensely in the Euro Area, over and above controls related to the development and structure of the stock market or a simple time trend.

6. Concluding remarks

We investigate home bias behavior in a group of 25 countries and observe the way it responds to two challenges. The first challenge is methodological. We apply alternative measures

Table 5
Estimation results for home bias − the Multi-Prior correction of the data measure

HB measure	Multi-Prior Correction DATA											
	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-	-9-	-10-	-11-	-12-
	Number of observations											
	264	270	214	216	264	270	214	216	264	270	214	216
TIME	−0.67***	−0.58**	−0.89**	−0.69*	−0.81***	−0.80***	−0.97**	−0.68	−0.32	−0.26	−0.73**	−0.64*
(Std. Err.)	(0.24)	(0.24)	(0.41)	(0.40)	(0.28)	(0.26)	(0.45)	(0.44)	(0.21)	(0.21)	(0.36)	(0.34)
LEVEL(-1)	−0.16*	−0.12	−0.31***	−0.32***	−0.14	−0.11	−0.28**	−0.27**	−0.21**	−0.19**	−0.37***	−0.36***
(Std. Err.)	(0.09)	(0.09)	(0.12)	(0.12)	(0.09)	(0.08)	(0.12)	(0.12)	(0.08)	(0.08)	(0.11)	(0.11)
BETAS	−5.22	−4.34	−8.89	−10.02*								
(Std. Err.)	(5.63)	(5.38)	(6.82)	(6.38)								
I(EU)					2.08	2.44	2.19	1.53				
(Std. Err.)					(2.80)	(2.84)	(4.34)	(4.03)				
I(EMU)									−8.77***	−8.30***	−11.66***	−12.05***
(Std. Err.)									(2.91)	(2.91)	(2.90)	(2.75)
IDSYN RISK	0.02	0.06	0.03	0.11	0.06	0.11*	0.07	0.18**	−0.02	0.05	0.03	0.11
(Std. Err.)	(0.08)	(0.07)	(0.09)	(0.08)	(0.06)	(0.06)	(0.09)	(0.09)	(0.08)	(0.08)	(0.08)	(0.07)
STMKTCAP	0.02	0.01	0.03	0.03	0.03	0.01	0.03	0.03	0.02	0.02	0.02	0.00
(Std. Err.)	(0.02)	(0.01)	(0.03)	(0.03)	(0.02)	(0.01)	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)
DBAGDP	−0.10	−0.14	−0.15	−0.18*	−0.10	−0.13	−0.16*	−0.19**	−0.12	−0.17*	−0.18*	−0.21**
(Std. Err.)	(0.12)	(0.09)	(0.11)	(0.10)	(0.11)	(0.09)	(0.09)	(0.09)	(0.10)	(0.09)	(0.09)	(0.09)
FDI	−0.10*		−0.11		−0.13**		−0.14**		−0.11**		−0.12*	
(Std. Err.)	(0.04)		(0.08)		(0.05)		(0.07)		(0.05)		(0.06)	
OPN		−0.05		−0.12		−0.06		−0.09		−0.06		−0.08
(Std. Err.)		(0.07)		(0.12)		(0.06)		(0.14)		(0.07)		(0.11)
SHLD PROT			0.18	0.06			0.14	−0.14			0.89	0.94
(Std. Err.)			(0.90)	(0.86)			(0.85)	(0.83)			(0.73)	(0.73)
Adj R^2 (%)	5	9	7	7	7	12	6	5	8	12	12	13

This table reports the results of (fixed effects) panel regressions of annual growth rate of home bias (in percentages) on selected variables including: the trend (TIME), previous year levels of home bias -LEVEL(-1)-, annual global market betas (estimated on cumulated samples of weekly return data) (BETAS), EU/EMU dummy variables -I(EU/EMU)-, annual growth rate (in percentages) of the variance of the residuals from the I-CAPM regressions (IDSYN RISK), annual growth rate (in percentages) of stock market capitalization scaled by GDP (STMKTCAP), annual growth rate (in percentages) of deposit money bank assets scaled by GDP (DBAGDP), annual growth rate (in percentages) of international trade (imports plus exports) scaled by GDP (OPN), annual growth rate (in percentages) of foreign direct investments (assets and liabilities) scaled by GDP (FDI) and the Shareholder Protection Index (SHLD PROT). The results are obtained through feasible GLS, to control for cross-section heteroskedasticity. Values of the coefficients, standard errors corrected for period heteroskedasticity and serial correlation and adjusted R^2, are reported. For models 1−4, the standard errors are adjusted to correct for the fact that BETAS are generated regressors, based on Shanken (1992). Significance of the coefficients is denoted by *** (at 1%), ** (at 5%) and * (at 10%).

Table 6
Estimation results for home bias − the Multi-Prior correction of the Bayesian measure

HB measure	Multi-Prior correction BAYESIAN											
	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-	-9-	-10-	-11-	-12-
	Number of observations											
	264	270	214	216	264	270	214	216	264	270	214	216
TIME	−0.44***	−0.43***	−0.51	−0.51	−0.50***	−0.46***	−0.60*	−0.62*	−0.27	−0.27	−0.39	−0.45
(Std. Err.)	(0.16)	(0.15)	(0.35)	(0.35)	(0.18)	(0.17)	(0.35)	(0.36)	(0.18)	(0.18)	(0.33)	(0.34)
LEVEL(-1)	−0.34***	−0.34***	−0.37***	−0.41***	−0.30***	−0.31***	−0.35***	−0.39***	−0.32***	−0.33***	−0.37***	−0.41***
(Std. Err.)	(0.11)	(0.10)	(0.14)	(0.14)	(0.10)	(0.10)	(0.13)	(0.13)	(0.10)	(0.10)	(0.13)	(0.13)
BETAS	−13.36**	−11.94**	−14.33*	−15.26**								
(Std. Err.)	(5.79)	(5.07)	(7.26)	(7.08)								
I(EU)					0.47	0.52	1.21	1.54				
(Std. Err.)					(4.02)	(3.91)	(4.61)	(4.53)				
I(EMU)									−8.30***	−8.02***	−10.01***	−9.60***
(Std. Err.)									(2.57)	(2.50)	(3.28)	(3.34)
IDSYN RISK	0.03	0.04	0.03	0.05	0.07	0.04	0.06	0.08	0.05	0.05	0.03	0.06
(Std. Err.)	(0.09)	(0.09)	(0.10)	(0.11)	(0.11)	(0.11)	(0.13)	(0.14)	(0.10)	(0.09)	(0.11)	(0.12)
STMKTCAP	0.04**	0.04**	0.05*	0.05*	0.05**	0.04**	0.06*	0.05	0.04**	0.04**	0.04*	0.04
(Std. Err.)	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)
DBAGDP	−0.07*	−0.09**	−0.07*	−0.09*	−0.07**	−0.09**	−0.07**	−0.09**	−0.08***	−0.09***	−0.09***	−0.10***
(Std. Err.)	(0.04)	(0.04)	(0.04)	(0.05)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.04)
FDI	−0.03		−0.05		−0.03		−0.08		−0.04		−0.08*	
(Std. Err.)	(0.03)		(0.05)		(0.02)		(0.05)		(0.03)		(0.05)	
OPN		−0.08		−0.10		−0.06		−0.04		−0.07		−0.07
(Std. Err.)		(0.08)		(0.14)		(0.08)		(0.15)		(0.07)		(0.11)
SHLD PROT			−0.08	−0.03			−0.25	−0.15			0.39	0.51
(Std. Err.)			(0.71)	(0.72)			(0.71)	(0.71)			(0.64)	(0.65)
Adj R^2 (%)	4	4	3	2	4	2	3	1	9	8	8	6

This table reports the results of (fixed effects) panel regressions of annual growth rate of home bias (in percentages) on selected variables including: the trend (TIME), previous year levels of home bias -LEVEL(-1)-, annual global market betas (estimated on cumulated samples of weekly return data) (BETAS), EU/EMU dummy variables -I(EU/EMU)-, annual growth rate (in percentages) of the variance of the residuals from the I-CAPM regressions (IDSYN RISK), annual growth rate (in percentages) of stock market capitalization scaled by GDP (STMKTCAP), annual growth rate (in percentages) of deposit money bank assets scaled by GDP (DBAGDP), annual growth rate (in percentages) of international trade (imports plus exports) scaled by GDP (OPN), annual growth rate (in percentages) of foreign direct investments (assets and liabilities) scaled by GDP (FDI) and the Shareholder Protection Index (SHLD PROT). The results are obtained through feasible GLS, to control for cross-section heteroskedasticity. Values of the coefficients, standard errors corrected for period heteroskedasticity and serial correlation and adjusted R^2, are reported. For models 1−4, the standard errors are adjusted to correct for the fact that BETAS are generated regressors, based on Shanken (1992). Significance of the coefficients is denoted by *** (at 1%), ** (at 5%) and * (at 10%).

of home bias that depart from the standard I-CAPM framework, allowing for certain degrees of mistrust in the model and also correcting for uncertainty about the sample estimates of expected returns. These alternative measures achieve two goals. First, they show that for many countries, home bias becomes significantly lower when these concerns are taken into account and that the I-CAPM framework is not always an appropriate investment benchmark. Second, these measures offer a more comprehensive view of the phenomenon and support our conclusion that while home bias has decreased substantially over time, it continues to be a puzzle. The second challenge involves the effects of market integration. We find compelling evidence that globalization and regional integration, and especially its most intense form in the Euro Area, relate significantly to the decrease of home bias.

Acknowledgments

The authors would like to thank Marina Martynova and Luc Renneboog for access to the Martynova–Renneboog corporate governance database and Alan Coen, Esther Eiling, Roberto A. de Santis, Marta Szymanowska, Laura Veldkamp as well as participants in the INFINITI Conference on International Finance, European Financial Management Association Conference and European Central Bank Conference on ‘‘Financial Globalisation and Integration’’ 2006 for helpful comments.

References

Adam, K., Jappelli, T., Menichini, A., Padula, M., Pagano, M., 2002. Analyse, compare and apply alternative indicators and monitoring methodologies to measure the evolution of capital market integration in the European Union. CSEF.

Adler, M., Dumas, B., 1983. International portfolio choice and corporation finance: a synthesis. Journal of Finance 38, 925–984.

Ahearne, A.G., Griever, W.L., Warnock, F.E., 2004. Information costs and home bias: an analysis of U.S. holdings of foreign equities. Journal of International Economics 62, 313–336.

Asgharian, H., Hansson, B., 2006. Home bias among European investors from a Bayesian perspective. Journal of International Financial Markets, Institutions and Money 16, 397–410.

Baele, L., 2005. Volatility spillover effects in European equity markets. Journal of Financial and Quantitative Analysis 40, 373–401.

Baele, L., Ferrando, A., Hördahl, P., Krylova, E., Monnet, C., 2004. Measuring European financial integration. Oxford Review of Economic Policy 20, 509–530.

Baele, L., Inghelbrecht, K., 2006. Structural versus temporary drivers of country and industry risk. Working Paper.

Barro, R.J., Sala-i-Martin, X., 1992. Convergence. Journal of Political Economy 100, 223–251.

Beck, T., Demirgüç-Kunt, A., Levine, R., 2000. A new database on financial development and structure. World Bank Economic Review 14, 597–605.

Bekaert, G., Harvey, C.R., 1995. Time-varying world integration. Journal of Finance 50, 403–444.

Bekaert, G., Harvey, C.R., 1997. Emerging equity market volatility. Journal of Financial Economics 43, 29–77.

Bekaert, G., Harvey, C.R., 2000. Foreign speculators and emerging equity markets. Journal of Finance 55, 565–613.

Bekaert, G., Hodrick, R.J., Zhang, X., 2005. International stock returns comovements. Working Paper.

Black, F., 1974. International capital market equilibrium with investment barriers. Journal of Financial Economics 1, 337–352.

Brennan, M.J., Cao, H.H., 1997. International portfolio investment flows. Journal of Finance 52, 1851–1880.

Britten-Jones, M., 1994. The sampling error in estimates of mean–variance efficient portfolio weights. Journal of Finance 54, 655–671.

Chen, N.-F., Zhang, F., 1997. Correlations, trades and stock returns of the Pacific-Basin markets. Pacific-Basin Finance Journal 7, 559–577.

Cooper, I., Kaplanis, E., 1994. Home bias in equity portfolios, inflation hedging, and international capital market equilibrium. Review of Financial Studies 7, 45–60.

Coval, J.D., Moskowitz, T.J., 1999. Home bias at home: local equity preference in domestic portfolios. Journal of Finance 54, 2045–2073.

De Santis, R.A., Gérard, B., 2006. Financial integration, international portfolio choice and the European Monetary Union. ECB Working Paper 626.

Eiling, E., Gerard, B., De Roon, F., 2004. Asset allocation in the euro-zone: industry or country based? Working Paper.

Errunza, V., Losq, E., 1981. International asset pricing under mild segmentation: theory and test. Journal of Finance 40, 105–124.

Fidora, M., Fratzscher, M., Thimann, C., 2006. Home bias in global bond and equity markets: the role of real exchange rate volatility. Working Paper.

Fratzscher, M., 2002. Financial market integration in Europe: on the effects of EMU on stock markets. International Journal of Finance and Economics 7, 165–193.

French, K.R., Poterba, J.M., 1991. Investor diversification and international equity markets. American Economic Review 81, 222–226.

Garlappi, L., Uppal, R., Wang, T., 2007. Portfolio selection with parameter and model uncertainty: a multi-prior approach. Review of Financial Studies 20, 41–81.

Gehrig, T., 1993. An information based explanation of the domestic bias in international equity investment. Scandinavian Journal of Economics 95, 97–109.

Glassman, D.A., Riddick, L.A., 2001. What causes home asset bias and how should it be measured? Journal of Empirical Finance 8, 35–54.

Goergen, M., Martynova, M., Renneboog, L., 2005. Corporate governance convergence, evidence from takeover regulation reforms. Oxford Review of Economic Policy 21, 243–268.

Goldberg, P.K., Verboven, F., 2001. Market integration and convergence to the law of one price: evidence from the European car market. NBER Working Paper.

Griever, W.L., Lee, G.A., Warnock, F.E., 2001. The U.S. system for measuring cross-border investment in securities: a primer with a discussion of recent developments. Federal Reserve Bulletin 87, 634–650.

Griffin, J.M., Karolyi, G.A., 1998. Another look at the role of the industrial structure of markets for international diversification strategies. Journal of Financial Economics 50, 351–373.

Grinblatt, M., Keloharju, M., 2000. The investment behavior, and performance of various investor types: a study of Finland's unique data set. Journal of Financial Economics 55, 43–67.

Heston, S.L., Rouwenhorst, K.G., 1994. Does industrial structure explain the benefits of international diversification? Journal of Financial Economics 36, 3–27.

Huberman, G., 2001. Familiarity breeds investment. Review of Financial Studies 14, 659–680.

IMF, 2005. Global financial stability report, September Issue.

Islam, N., 1995. Growth empirics: a panel data approach. Quarterly Journal of Economics 110, 1127–1170.

Islam, N., 2003. What have we learnt from the convergence debate? Journal of Economic Surveys 17, 309–362.

Jenske, K., 2001. Equity home bias: can information cost explain the puzzle? Economic Review, Federal Reserve Bank of Atlanta Q3, 31–42.

Kho, B.-C., Stulz, R., Warnock, F.M., 2006. Financial globalization, governance, and the evolution of the home bias. Working Paper.

Koop, G., 2003. Bayesian Econometrics. John Wiley and Sons Ltd.

Lane, P.R., Milesi-Ferretti, G.M., 2003. International financial integration. Centre of Economic Policy Research, Discussion Paper 3739.

Levine, R., Zervos, S., 1996. Stock market development and long-run growth. World Bank Policy Research Working Paper 1582.

Lewis, K.K., 1999. Trying to explain home bias in equities and consumption. Journal of Economic Literature 37, 571–608.

Li, K., 2004. Confidence in the familiar: an international perspective. Journal of Financial and Quantitative Analysis 39, 47–68.

Lintner, J., 1965. The valuation of risky assets and the selection of risky investments in stock portfolios and capital budgets. Review of Economics and Statistics 47, 13–37.

Longin, F., Solnik, B., 1995. Is the correlation in international equity returns constant: 1960–1990? Journal of International Money and Finance 14, 3–26.

Mann, C.L., Meade, E.E., 2002. Home bias, transaction costs, and prospects for the euro: a more detailed analysis. IIE Working Paper.

Markowitz, H.M., 1952. Portfolio selection. Journal of Finance 7, 77–91.

Martynova, M., Renneboog, L., 2006. A corporate governance index: convergence and diversity of national corporate governance regulations. Working Paper.

Merton, R.C., 1980. On estimating the expected return on the market. Journal of Financial Economics 8, 323–361.

Pástor, L., 2000. Portfolio selection and asset pricing models. Journal of Finance 55, 179–223.

Pástor, L., Stambaugh, R.F., 2000. Comparing asset pricing models: an investment perspective. Journal of Financial Economics 56, 335–381.

Shanken, J., 1992. On the estimation of beta-pricing models. Review of Financial Studies 5, 1–33.

Sharpe, W., 1963. A simplified model for portfolio analysis. Management Science 9, 277–293.

Stockman, A.C., Dellas, H., 1989. International portfolio nondiversification and exchange rate variability. Journal of International Economics 26, 271–289.

Stulz, R., 1981. On the effects of barriers to international investment. Journal of Finance 36, 923–934.

Tesar, L.L., Werner, I., 1995. Home bias and high turnover. Journal of International Money and Finance 14, 467–492.

Veldkamp, L., Van Nieuwerburgh, S., 2006. Information immobility and the home bias puzzle. Working Paper.

Warnock, F.E., 2001. Home bias and high turnover reconsidered. Working Paper.