International Portfolio Diversification Is Better Than You Think

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Abstract

Using aggregate data on bilateral cross-border equity holdings, we investigate whether investors correctly hedge their over-exposure to domestic risk (the well-known *equity home bias*) by investing in foreign stock markets that have low correlation with their home stock market. To deal with the endogeneity of stock return correlations, we instrument current correlations with past correlations. Controlling for many determinants of international portfolios, we find that, *all else equal*, investors do tilt their foreign holdings towards countries which offer better diversification opportunities. The diversification motive that we uncover is stronger for source countries exhibiting a higher level of home bias.

Keywords: International Portfolio Choice, Bilateral Equity Holdings, Portfolio Diversification, International Stock Return Correlations, Financial Integration, Endogeneity Bias

JEL Codes: G11, G15

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1 Introduction

Foreign equities provide great diversification opportunities.[1] However, despite an increase in cross-border equity holdings over the last two decades, investors still tend to keep a disproportionate share of domestic equities in their portfolios.[2] This well-known *equity home bias* constitutes a challenge for portfolio choice theory. Yet a large literature reconciles the lack of international diversification with rational portfolio choice by invoking frictions in international markets.[3] In this view, portfolio choice is driven by a logic of diversification but due to the presence of frictions, holding a portfolio biased towards domestic equities is optimal. If this view is correct, after controlling for frictions one should be able to uncover the logic of portfolio diversification. This is what we attempt to do in this paper, using aggregate data on cross-border bilateral equity holdings.

The basic prediction we want to test is the following: given their large exposure to domestic risk, investors should favor foreign stocks that are a good hedge against their domestic risk, i.e., *holding frictions constant*, they should invest in foreign equities that have low correlation with their domestic stock market. To test this idea, we focus on the part of investors' equity portfolios which is invested abroad and we attempt to identify the impact of bilateral stock return correlations on bilateral equity holdings.

Our estimation is complicated by endogeneity issues. For instance, geographical proximity and bilateral trade are known to be positively correlated both with bilateral equity holdings and with GDP comovements and stock return correlations.[4] Failing to control for trade and geography would result in a positive bias when estimating the impact of bilateral stock return correlations on bilateral equity holdings. The major endogeneity problem that we need to deal with comes from the common impact of financial integration on holdings and returns correlations. The level of financial

[1] This point was made early on in Grubel (1968), Levy and Sarnat (1970) and Solnik (1974).

[2] See French and Poterba (1991) for early evidence on the home bias, Lewis (1999) and Chan, Covrig and Ng (2005) or Sercu (2007) for more recent estimates across countries (see also Appendix, Table 7). Lane and Milesi-Feretti (2003) document the increase in cross-border equity holdings.

[3] The imperfections considered include, among others: (i) non-diversifiable labor income (Heathcote and Perri, 2007; see also Baxter and Jermann, 1997 for the opposite view); (ii) transaction costs (Martin and Rey, 2004; Heathcote and Perri, 2004); (iii) informational asymmetries (Gehrig, 1993; Hatchondo, 2008; Van Nieuwerburgh and Veldkamp, 2006); (iv) trade costs and non-tradable goods (Obstfeld and Rogoff, 2000; Dellas and Stockmann, 1989; Baxter, Jermann and King, 1998); (v) expropriation risk and corporate governance (Dahlquist et al., 2003; Stulz, 2005; Kraay, Loayza, Serven and Ventura, 2005); (vi) portfolio constraints. DeMarzo, Kaniel, Kremer (2004) suggest a mechanism by which an entire community may herd into biased portfolios even though only a few members are directly facing frictions.

[4] See Chan, Covrig and Ng (2005), Portes and Rey (2005), Aviat and Coeurdacier (2007) and Lane and Milesi-Feretti (2004), as well as Frankel and Rose (1998, 2002), Imbs (2004) and Baxter and Kouparitsas (2005).

integration between two countries is defined here to measure how easy or costly it is for an investor from a given country to trade and hold equities in another country. It is inversely related to the size of financial frictions between those countries − such as transaction costs, portfolio constraints, regulatory barriers, informational asymmetries or other capital markets imperfections.[5] Both theory and empirical evidence suggest that the level of financial integration between countries has a positive impact on the correlation of their stock markets.[6] This can be understood as resulting from portfolio rebalancing or, more fundamentally, from convergence between the stochastic discount factors pricing national stock markets (Cochrane et al., 2008; Martin, 2007). Therefore, we instrument bilateral stock return correlations. We use past correlations, measured before the mid-1970s, i.e., at a time when all stock markets were closed to foreign investors, as an instrument. We argue that these past correlations capture variations in current correlations that are exogenous to financial integration.

Our main finding is that, all else equal, investors do tilt their foreign equity holdings towards countries which offer better diversification opportunities, i.e., towards countries whose stock markets are less correlated with their own. We perform a number of robustness checks. Our result holds for different country sub-samples and is not driven by outliers. We also show that the diversification motive that we uncover is stronger for source countries exhibiting a higher level of home bias. Finally, we show that failing to take into account the endogeneity of stock return correlations would induce a bias strong enough to overturn our main finding that bilateral equity holdings are negatively related to bilateral stock return correlations.

Throughout, we conduct our analysis in a gravity equation framework (Portes and Rey, 2005). Specifically, we regress log bilateral equity holdings on the log market capitalizations of source and destination countries and other explanatory variables. This essentially amounts to taking the log difference between observed portfolio weights and the world market portfolio weights as the dependent variable.[7]

Our paper relates to the growing literature on the empirical determinants of bilateral asset hold-

[5] In principle, the level of financial integration is not necessarily symmetric for a given pair of countries.

[6] For a theoretical analysis, see Dumas, Harvey and Ruiz (2003), and Coeurdacier and Guibaud (2008). For empirical evidence, see Bekaert and Harvey (2000), Goetzman, Li and Rouwenhorst (2002), Walti (2005), and Quinn and Voth (2006).

[7] This approach is justified in the context of a model where deviations from the world market portfolio are multiplicative (e.g., Martin and Rey, 2004). See equations (8) and (9) below.

ings.[8] Recent studies point to the role of geography, culture and information costs (Chan, Covrig and Ng, 2005; Portes and Rey, 2005; Ahearne, Griever and Warnock, 2004);[9] trade (Aviat and Coeurdacier, 2007; Lane and Milesi-Feretti, 2004); exchange rate risk and currency unions (Lane, 2006; Coeurdacier and Martin, 2009; De Santis and Gerard, 2006; Fidora et al., 2007); institutions (Wei and Gelos, 2005; Vlachos, 2004; Daude and Fratzscher, 2008) and corporate governance (Dahlquist et al., 2003) as important determinants of cross-border asset holdings. Our contribution is to test for the presence of a diversification motive in foreign equity holdings, controlling for these determinants and for the endogeneity of stock return correlations.[10]

Our findings bear on the ability of rational portfolio theory to describe investors asset allocation decisions. Studies by Huberman (2001), Benartzi (2001) and Grinblatt and Keloharju (2001) (see also Barberis and Thaler, 2003) suggest that *familiarity* (independently of information) might be the main determinant of portfolio choice. By uncovering some rational diversification pattern in the way people invest abroad, we provide evidence that at least not all investors ignore the basics of portfolio theory.

The paper proceeds as follows. Section 2 provides a simple theoretical model of international portfolio choice and derives testable hypotheses. Section 3 describes the data and empirical methodology. Section 4 presents our main results and robustness checks. Section 5 concludes.

2 Theoretical Motivation

This section formalizes the following idea: if investors are rational but face frictions making them hold a disproportionate share of domestic equities, we should observe, *ceteris paribus*, a negative relationship between bilateral equity holdings and bilateral stock return correlations. Consider a model with N countries and mean-variance investors. Each country is populated by a representative investor and all investors have access to the same investment opportunities: a global riskfree technology with rate of return r^f and N national stock markets. Let $\boldsymbol{\mu}$ and $\boldsymbol{\Omega}$ denote the N-

[8] A distinct literature analyzes international portfolio investment flows and their relationship with equity returns. See for instance Bohn and Tesar (1996), Brennan and Cao (1997); see also Froot, O'Connell and Seasholes (2001) for a high frequency analysis using disaggregated data.

[9] See also Coval and Moskowitz (1999) for earlier evidence on the role of geography and information in a domestic context.

[10] Portes and Rey (2005), Lane and Milesi-Feretti (2004), Chan, Covrig and Ng (2005), and Aviat and Coeurdacier (2007) use some measure of returns correlation as an explanatory variable but they do not control for endogeneity. In their data, Portes and Rey (2005) report "weak evidence for a diversification motive".

dimensional vector of stock market expected returns and the (non-singular) variance-covariance matrix of returns. Let μ_j and σ_j^2 denote the expected return and variance of country j's stock market returns. Later we adopt the viewpoint of an investor in country H. For that reason, we single out country H and decompose $\boldsymbol{\mu}$ and $\boldsymbol{\Omega}$ as follows:

$$\boldsymbol{\mu} = \begin{pmatrix} \mu_H \\ \boldsymbol{\mu_F} \end{pmatrix} \qquad \boldsymbol{\Omega} = \begin{pmatrix} \sigma_H^2 & \boldsymbol{\omega}^T \\ \boldsymbol{\omega} & \boldsymbol{\Omega_F} \end{pmatrix},$$

where $\boldsymbol{\mu_F}$ represents the $(N-1)$-dimensional vector of expected returns on foreign assets, $\boldsymbol{\Omega_F}$ is the variance-covariance matrix of foreign stock market returns and $\boldsymbol{\omega}$ is the $(N-1)$-dimensional column vector of covariances of foreign stock returns with country H stock market. We assume all representative investors have the same mean-variance objective, with coefficient of risk aversion κ. An investor chooses his portfolio to maximize

$$\mathbb{E}(r_p) - \frac{\kappa}{2}\mathrm{Var}(r_p),$$

where r_p denotes the portfolio rate of return.

Frictionless benchmark. Absent frictions, all representative investors hold the same portfolio. The portfolio shares on the N risky national assets are given by

$$\boldsymbol{\alpha}^* = \frac{1}{\kappa}\boldsymbol{\Omega}^{-1}(\boldsymbol{\mu} - r^f \mathbf{1}_N), \tag{1}$$

where $\mathbf{1}_N$ denotes an N-dimensional vector of ones. Because all investors hold the same portfolio, the share of country i portfolio invested in country j is independent of i, i.e., $\alpha_{ij}^* = \alpha_j^*$ for all i. Therefore, if m_j^* denotes the market capitalization of country j and W the world's aggregate wealth, we have

$$\frac{m_j^*}{W} = \alpha_j^* \qquad \forall j. \tag{2}$$

Let W_i be the wealth of country i. The total amount invested by country i in country j, denoted by e_{ij}^*, is given by $e_{ij}^* = \alpha_j^* W_i$. Substituting for α_j^* from (2) and taking logs, we have

$$\log(e_{ij}^*) = \log(W_i) + \log(m_j^*) - \log(W). \tag{3}$$

This equation can be viewed as a benchmark frictionless gravity equation where the mass terms $\log(W_i)$ and $\log(m_j^*)$ fully explain bilateral log asset holdings up to a constant $\log(W)$.

Constrained portfolios. We now assume that, in each country, the share of wealth invested in domestic stocks must exceed a certain threshold[11] and that these restrictions are binding.[12] This assumption captures the home bias and its simplicity allows us to give a stark characterization of the constrained optimal portfolios. Let α_H denote the fraction of country H wealth invested in the domestic stock market, α_j the fraction invested in a foreign country j and $\boldsymbol{\alpha_F}$ the $(N-1)$-dimensional vector of α_j's (as a residual the share of country H wealth invested in the global riskfree technology is equal to $1-\alpha_H-\sum_{j=1}^{N-1}\alpha_j$). The binding portfolio constraint for investor H implies

$$\alpha_H = \underline{\alpha}_H > \alpha_H^*, \tag{4}$$

where $\underline{\alpha}_H$ denotes the minimal fraction of country H wealth invested in country H's stock market. The portfolio choice problem of investor H is therefore

$$\max_{\boldsymbol{\alpha_F}} \quad \underline{\alpha}_H(\mu_H - r^f) + \boldsymbol{\alpha_F}^T(\boldsymbol{\mu_F} - r^f \mathbf{1}_{N-1}) - \frac{\kappa}{2}\begin{pmatrix} \underline{\alpha}_H & \boldsymbol{\alpha_F}^T \end{pmatrix} \boldsymbol{\Omega} \begin{pmatrix} \underline{\alpha}_H \\ \boldsymbol{\alpha_F} \end{pmatrix},$$

which can be rewritten as

$$\max_{\boldsymbol{\alpha_F}} \quad \boldsymbol{\alpha_F}^T(\boldsymbol{\mu_F} - r^f \mathbf{1}_{N-1}) - \frac{\kappa}{2}\left(2\underline{\alpha}_H \boldsymbol{\alpha_F}^T\boldsymbol{\omega} + \boldsymbol{\alpha_F}^T\boldsymbol{\Omega_F}\boldsymbol{\alpha_F}\right).$$

From first-order conditions, the optimal choice of foreign equities is given by

$$\boldsymbol{\alpha_F} = \frac{1}{\kappa}\boldsymbol{\Omega_F}^{-1}(\boldsymbol{\mu_F} - r^f \mathbf{1}_{N-1}) - \underline{\alpha}_H \boldsymbol{\Omega_F}^{-1}\boldsymbol{\omega} = \boldsymbol{\alpha_F}^* - (\underline{\alpha}_H - \alpha_H^*)\boldsymbol{\Omega_F}^{-1}\boldsymbol{\omega}. \tag{5}$$

The last equality (proved in the Appendix) shows that, in the presence of frictions, the vector of portfolio weights on foreign assets can be decomposed into the sum of two terms: the vector of portfolio weights in the frictionless case $\boldsymbol{\alpha_F}^*$ and a hedging component, $-(\underline{\alpha}_H - \alpha_H^*)\boldsymbol{\Omega_F}^{-1}\boldsymbol{\omega}$, due to the portfolio constraint.[13] When the portfolio constraint is binding (i.e., $\underline{\alpha}_H > \alpha_H^*$), the presence of the hedging term in (5) makes country H investors tilt their foreign holdings towards assets that are less correlated with their own stock market (this is proved in the Appendix).

[11] Portfolio constraints of this type can arguably capture regulatory constraints faced by pension funds or insurance companies on the fraction of wealth they can invest abroad. Such constraints have been widely used in the literature, initially in the static international CAPM literature, e.g., Errunza and Losq (1985), Eun and Janakiramanan (1986), Hietala (1989), and more recently in dynamic models of international portfolio choice, e.g., Sellin and Werner (1993), Bhamra (2004), Pavlova and Rigobon (2008) or Soumare and Wang (2006).

[12] In the symmetric case where all assets have the same risk-return profile and are uncorrelated, it is sufficient that the lower bound be higher than $\frac{1}{N}$.

[13] If the riskless technology were replaced by a riskfree asset in zero net supply, this decomposition would only hold as an approximation as it would neglect the change in the riskfree rate caused by the introduction of portfolio constraints.

Proposition 1 *In the presence of binding portfolio constraints inducing a home bias, the share of wealth invested in a foreign country decreases when its stock market is more correlated with the domestic stock market. With ρ_{ij} the stock return correlation between countries i and j, we have*

$$\frac{\partial \alpha_{ij}}{\partial \rho_{ij}} < 0. \tag{6}$$

Furthermore, the share of wealth α_{ij} invested by country i in country j can be written as

$$\alpha_{ij} = (1 - \delta_{ij})\alpha_j^*, \tag{7}$$

where α_j^* corresponds to country j's share in the frictionless portfolio and δ_{ij} is increasing in the coefficient of correlation between country i and country j's stock markets.

Proposition 1 summarizes our main hypothesis, namely the negative sign of the partial derivative in (6). Before testing this hypothesis, one comment is in order. Proposition 1 was derived in the context of a model featuring no bilateral investment cost. Allowing for a general structure of bilateral frictions would certainly affect the analysis. For instance, a negative relationship between bilateral investment costs and bilateral return correlations could possibly reverse the sign of the derivative in (6). But it would remain that, *holding bilateral frictions constant*, bilateral equity holdings decrease with bilateral stock return correlations. Therefore in our empirical analysis, holding bilateral frictions constant is a primary concern.

3 Methodology and Data

3.1 Empirical Methodology

Our model provides guidance for our regression specification. From (2) and (7), the share of country i wealth invested in country j stock market is

$$\alpha_{ij} = (1 - \delta_{ij})\frac{m_j^*}{W}. \tag{8}$$

The holdings of country i in country j are $e_{ij} = \alpha_{ij} W_i$, where W_i denotes the wealth of country i. Taking logs, we obtain the following equation for bilateral asset holdings

$$\log(e_{ij}) = (-\log W) + \log(W_i) + \log(m_j^*) + \log(1 - \delta_{ij}). \tag{9}$$

In our estimations, we adopt the following baseline specification to model bilateral cross-border equity holdings:

$$\log(Equity_{ijt}) = a_t + \beta \log(MktCap_{it} MktCap_{jt}) + \gamma Correlation_{ijt} + \boldsymbol{\eta} \mathbf{Z}_{ijt} + \varepsilon_{ijt}, \qquad (10)$$

where $Equity_{ijt}$ denotes the amount of country j equities held by country i investors in year t, $MktCap_{it}$ (resp. $MktCap_{jt}$) denotes the stock market capitalization of country i (resp. j), $Correlation_{ijt}$ denotes the bilateral stock return correlation, $\boldsymbol{Z}_{ijt}$ denotes a vector of control variables and ε_{ijt} denotes an error term.

This specification is common in the gravity literature in international finance. As compared with Eq. (9), in specification (10) we use the stock market capitalization of country i as a proxy for its wealth W_i, we use the observed capitalization of country j as a proxy for the frictionless capitalization m_j^* and we linearize the impact of the bilateral stock return correlation. Besides, we introduce a set of control variables $\boldsymbol{Z}_{ij}$ to capture bilateral variations in the size of frictions. Previous studies have shown that together with market sizes, variables capturing financial market development as well as variables that proxy for informational and transaction costs between countries go a long way into explaining patterns of bilateral asset holdings.

Our simple model leads us to expect β to be close to one and γ to be negative, capturing the hedging motive induced by the existence of obstacles to foreign investment: holding everything else constant, higher bilateral correlation should reduce bilateral equity holdings. The null hypothesis, by contrast, is that deviations from the world market portfolio are unrelated to stock return correlations, i.e., $\gamma = 0$.

3.2 Data and Variables

To construct our dependent variable, we use annual data on cross-border equity holdings over the period 2001-2005, obtained from the IMF's Coordinated Portfolio Investment Survey (CPIS). Holdings are measured in US dollars.[14] Our dataset contains 27 source countries and 41 destination countries (see the list of countries and descriptive statistics in the Appendix). While CPIS covers more countries, we restricted our sample according to missing values and availability of historical

[14]The CPIS reports some zeros for very small amounts. We report 0.01 million USD instead of zero except in the Tobit regression.

stock returns over long period.[15] The total market capitalization of all countries in our sample accounts for approximately 95% of world market capitalization. Though the CPIS data certainly suffer from measurement errors (Lane and Milesi-Feretti, 2004), the reporting of holdings by developed markets is of high quality. In particular, the geographical distribution of CPIS aggregate data is found to be strongly correlated with micro data on international mutual funds equity holdings (Hau and Rey, 2007).

To construct the variable $\log(MktCap_{it}MktCap_{jt})$, we use market capitalization data each year from Global Financial Data.

We construct $Correlation_{ijt}$ by computing the empirical stock return correlation over ten-year rolling windows for each country pair, using monthly US dollar returns for national stock indices from Global Financial Data.[16]

Controls. We control for many determinants of bilateral equity holdings identified in earlier studies (see the Appendix for data sources and summary statistics, Table 8).

To control for the degree of financial development and for the institutional quality of both source and destination countries, we use the log of the product of GDP per capita, $\log(GDP/Cap)_{ijt}$.[17]

We consider two geographical control variables: $\log(Dist_{ij})$ is the distance (in log) between the two main cities and $Border_{ij}$ is a dummy variable equal to one when country i and j have a common border.

To control for bilateral trade flows, we use the CHELEM database, provided by the CEPII.[18] $Trade_{ijt}$ is the log of total trade flows (imports plus exports) between country i and country j in year t divided by the product of countries GDP, reflecting trade relationships between countries that are not induced by countries sizes.[19]

[15] We include all countries for which we have stock returns back to 1990. In the instrumented regressions, we have to drop Indonesia, Morocco, Nigeria, Thailand and Turkey because returns before the mid-1970s are not available for these countries. The fact that our results hold when we consider the constant sample of rich countries alleviates the concern that they might be due to a sample effect.

[16] Following Otto, Voss and Willard (2001), we also used the transformation $\log((1 + Correlation_{ijt})/(1 - Correlation_{ijt}))$ as an alternative measure of comovement. Our results were not affected.

[17] Using other proxies of institutional quality and expropriation risk (variables from La Porta et al. (2006) or from Transparency International) does not affect our results.

[18] Trade data are not available for Luxembourg. Therefore we drop observations for this country whenever we control for trade in our regressions.

[19] Using other measures of trade intensity, such as $\log\left(\frac{\text{Exp}_{ijt}+\text{Imp}_{ijt}}{GDP_{it}+GDP_{jt}}\right)$ or "directed trade" using only imports or

We add a dummy variable for currency unions ($CurrencyUnion_{ij}$) as these are likely to foster trade in assets by eliminating transaction costs on foreign exchange markets and by removing exchange rate uncertainty.[20]

To take into account the informational and cultural determinants of portfolio allocation, we use a dummy for common language ($Language_{ij}$) equal to one if country i and country j share the same language and a dummy for colonial links ($ColonialLink_{ij}$) equal to one if country j is a former colony of country i or vice versa.

Legal system similarities might reduce information asymmetries and contracting costs. To control for the legal determinants of transaction costs in financial markets, we use a dummy for the proximity of legal systems from La Porta et al. (1997, 1998). We distinguish between English, French, German and Scandinavian law systems. The dummy variable $LegalSystem_{ij}$ equals one when source and destination countries have the same legal system.[21]

Following Chan, Covrig and Ng (2005) and Bohn and Tesar (1996), we also control for expected equity returns in the destination country ($ExpRet_{jt}$). Expected returns are notoriously hard to estimate. The historical mean has long been known to be a poor estimator of mean returns (Merton, 1980). The literature on return predictability (e.g., Campbell, 1987; Campbell and Shiller, 1988; Fama and French, 1988, 1989; Keim and Stambaugh, 1986) suggests using state variables such as valuation ratios or yields on short- and long-term treasury and corporate bonds to predict future returns but unfortunately, this approach cannot be implemented for our cross-section of countries for lack of data availability. Instead, we use as a proxy for expected returns in a given year the average realized stock return over the subsequent twelve months.[22]

exports, does not affect our results.

[20]Including a separate control for exchange rate volatility (e.g., the standard deviation of the monthly rate of appreciation of the bilateral exchange rate over ten-year rolling windows) does not affect our results. Since the coefficient on this variable appeared to be unstable across specifications and typically not significant, we dropped this control in the reported regressions.

[21]We initially also controlled for bilateral tax treaties. Although most countries in our sample have a residence-based tax system, they charge withholding taxes when foreigners repatriate dividends, capital gains or interests. Bilateral tax treaties, where they exist, allow investors to claim tax rebates domestically to avoid double taxation. Our results are robust to the inclusion of a bilateral dummy accounting for the existence of such treaty. However, since the coefficient on this variable was unstable across specifications and typically not significant, we dropped it in the reported regressions.

[22]Using historical average returns does not affect our main results but regression coefficients for expected returns become very unstable. In some specifications, past average returns enter with a negative sign, which is actually consistent with optimal portfolio rebalancing in the presence of mean-reverting stock returns (Hau and Rey, 2008).

Fixed effects. All our regressions control for year fixed effects. In some of our regressions, we also control for country fixed effects in the source and/or destination country dimensions, using the following three specifications:

$$\log(Equity_{ijt}) = a_t + s_i + \beta \log(MktCap_{jt}) + \gamma Correlation_{ijt} + \boldsymbol{\eta} \boldsymbol{Z}_{ijt} + \varepsilon_{ijt}, \quad (11)$$

$$\log(Equity_{ijt}) = a_t + d_j + \beta \log(MktCap_{it}) + \gamma Correlation_{ijt} + \boldsymbol{\eta} \boldsymbol{Z}_{ijt} + \varepsilon_{ijt}, \quad (12)$$

$$\log(Equity_{ijt}) = a_t + s_i + d_j + \gamma Correlation_{ijt} + \boldsymbol{\eta} \boldsymbol{Z}_{ijt} + \varepsilon_{ijt}. \quad (13)$$

By default, whenever we do not include destination country fixed effects, we systematically include regional dummies (Europe, North America, Central and South America, Africa, and Asia and Oceania) to control for unobservable characteristics in the destination dimension.[23]

4 Regression Results

4.1 OLS Regressions

Table 1 shows the results of OLS regressions, which we later argue are misspecified. Country sizes enter with an elasticity close to one in all specifications, while our variable of interest, $Correlation_{ij}$, enters with a positive sign (significantly so in three specifications).[24] Taken at face value, this result goes against the logic of portfolio diversification outlined in Section 2. Column (1) shows the naive correlation between bilateral equity holdings and stock return correlation, just controlling for size. Column (2) shows that the point estimate for γ remains positive (though reduced and no longer significant) after controlling for trade, geography and financial development. These are natural control variables. Indeed, they are positively correlated both with GDP and stock return correlations (Frankel and Rose, 1998; Imbs, 2004; Baxter and Kouparitsas, 2005; Walti, 2005; Flavin et al., 2001) and with cross-border equity holdings (Portes and Rey, 2005; Chan, Covrig and Ng, 2005; Lane and Milesi-Feretti, 2004; Aviat and Coeurdacier, 2007). Adding more controls (column (3)) further reduces the point estimate of γ but the positive relationship remains. Columns (4)-(5) control for country fixed effects, respectively in the source and destination country dimensions, while column (6) controls for country fixed effects in both dimensions.[25] In the last two specifications,

[23] We also note that all reported standard errors are robust to clustering in the source country dimension.

[24] The same positive correlation appears, without being emphasized, in previous studies by Portes and Rey (2005), Lane and Milesi-Feretti (2004), Chan, Covrig and Ng (2005), and Aviat and Coeurdacier (2007).

[25] Controlling for source country fixed effects allows us to control in particular for discrepancies between source-country wealth (the relevant variable in theory, see Eq. (9)) and market capitalization (the proxy we use).

the positive sign on $Correlation_{ij}$ is significant at the 1% significance level. We also note that many of our control variables (such as distance, trade, common law or common language) enter significantly with the expected sign, confirming the robustness of previous studies. Interestingly, the negative sign on border suggests a non-linear impact of distance on holdings.

Because $Correlation_{ij}$ is an estimated regressor, it may be the case that our estimate of γ is biased towards zero because of measurement error.[26] This would only reinforce our finding of a positive relationship between bilateral equity holdings and bilateral stock return correlations. A related concern is that OLS standard errors understate true standard errors when one uses estimated regressors. This would cast doubt on the significance of γ in our OLS regressions. However, Pagan (1984) shows that the OLS t-statistic remains a valid statistic to test the null hypothesis $\gamma = 0$.

[Table 1 here]

4.2 Endogeneity Bias and Instrumented Regressions

The regressions in Table 1 suffer from misspecification. The reason is that portfolio holdings and stock return correlations are jointly determined in equilibrium and their equilibrium values both depend on the level of financial integration between countries. Therefore one cannot identify the impact of bilateral returns correlation on bilateral equity holdings without taking into account the fact that comovements between country stock markets are endogenous. If stock return correlations between countries are positively affected by their degree of financial integration, OLS estimates of γ suffer from a positive bias because the returns correlation variable captures the positive impact of financial integration on bilateral equity holdings.

The prediction that financial integration has a positive impact on stock return correlations follows naturally from any dynamic asset pricing model with multiple assets, decreasing absolute risk aversion and fixed asset supply (e.g., Dumas, Harvey and Ruiz, 2003; Bhamra, 2004; Cochrane et al., 2008; Martin, 2007). The intuition is simple. For illustration, consider the case of two countries and two assets, one in each country, with imperfectly correlated dividends. If markets are *completely segmented*, a good shock on the domestic asset drives its price up without affecting the foreign asset's price. By contrast, if markets are *perfectly integrated*, the increase in the domestic

[26] This is assuming that measurement errors are orthogonal to other variables of interest, i.e., a case of "classical attenuation bias" (see, e.g., Woolridge, 2002, chap. 4).

asset price leads the representative investor to rebalance part of his portfolio towards the foreign asset because his exposure to domestic risk has mechanically increased with the increase in the domestic asset price. In other words, the required rate of return on the foreign asset decreases because its diversification property are now more desirable, which induces an increase in the foreign asset price. This rebalancing effect leads to more comovement between domestic and foreign asset prices than in the complete segmentation case.[27] This effect has been established empirically by Bekaert and Harvey (2000), Goetzmann, Li and Rouwenhorst (2002) and Quinn and Voth (2006).

Our strategy to deal with endogeneity is to instrument current stock market correlations with *past* correlations. We construct historical correlations ($Correlation50\text{-}75_{ij}$) using monthly stock market dollar returns over the period 1950-1975, i.e., over a period when national stock markets were all highly segmented.[28] Of course, past correlations are not directly affected by subsequent stock market liberalization. To be a valid instrument, $Correlation50\text{-}75_{ij}$ should also be unrelated to determinants of current cross-border equity holdings which we do not control for in the regression. This *exclusion* condition cannot be tested (since past correlation is our unique instrument) but constitutes *a priori* a reasonable assumption. We should note that, even if some variable affecting bilateral equity holdings is omitted in our regression, as long as this variable is orthogonal to our instrument, our estimate of the impact of stock return correlation on equity holdings is unbiased. And if one's prior is that country pairs which had high stock return correlations in the past were more likely to integrate financially in the future (in a way that we cannot observe and do not already control for), then our IV coefficient $\hat{\gamma}$ would be biased upwards, i.e., we would be underestimating the strength of the diversification motive.[29]

In the first-stage of the procedure, we regress current return correlations on past correlations, controlling for a subset of fixed geographical and institutional characteristics ($\boldsymbol{z}_{ij}$):

$$Correlation_{ijt} = \alpha + \phi Correlation50\text{-}75_{ij} + \boldsymbol{\eta}\boldsymbol{z}_{ij} + \varepsilon_{ijt} \tag{14}$$

[27]Between the two polar cases, Coeurdacier and Guibaud (2008) show that stock return correlation increases monotonously with the level of financial integration.

[28]Stock market liberalization occurred in the 1980s for most countries, see, e.g., Obstfeld and Taylor (2002). For a precise timing, see Kaminsky and Schmuckler (2003) and also Bekaert, Harvey and Lundblad (2003) for the opening of emerging markets. In earlier decades, cross-border shareholdings were very limited and international asset trade consisted mainly of borrowing and lending (Kraay et al., 2005). For a sample of OECD countries, Lane and Milesi-Ferreti (2003) show that even at the beginning of the 1980s, aggregate cross-border equity and FDI assets represented only 10% of aggregate GDP, whereas in 2000 this ratio had jumped to 80%.

[29]We also note that, in the context of IV regressions, the fact that stock return correlations are estimated with error is not a concern: our estimates of γ are unbiased as long as past correlations are uncorrelated with measurement errors in current correlations, which is a reasonable assumption (see Wooldridge, 2002, Chap. 5).

Table 2 reports the results of this regression. The impact of past correlation on current correlation is positive and highly significant (the t-statistic for ϕ is equal to 10), which is not surprising as one would expect fundamental comovements to be quite persistent. The overall fit of the regression is reasonable (R^2-statistic of 0.21). In view of these results, our instrument being "weak" is not a concern.

[Table 2 here]

Table 3 contains the main finding of the paper. It shows our IV regression results with the same set of control variables as in Table 1. Columns (2)-(4) control for country fixed effects. In column (5), we run a Tobit regression (with source country fixed effect and regional dummies in the destination dimension), to take care of the concern that our holdings data are left-censored (with zero trade between some country pairs). In all specifications, we find that bilateral return correlations have a *negative* impact on bilateral equity holdings − significantly so, at the 1% level, in three specifications. These results are in sharp contrast contrast with those of Table 1. They indeed suggest that the positive OLS endogeneity bias is large enough to reverse the sign of the estimated coefficient. In principle, the endogeneity bias is increasing in the magnitude of the impact of financial integration on portfolio holdings and decreasing in the magnitude of its impact on stock return correlations. In Coeurdacier and Guibaud (2008), we provide a model of imperfectly integrated stock markets where stock return correlations and country portfolios are endogenously determined: our numerical simulations suggest that the degree of financial integration indeed has a large impact on portfolio holdings but a small impact on stock return correlations, which is consistent with a large endogeneity bias.

We interpret our finding of a negative γ as evidence that international equity allocations decisions are at least partly driven by a diversification motive. The order of magnitude of the point estimate of the elasticity of foreign asset demand to stock return correlation (between -4 and -7) is fairly large: our point estimates imply that a 0.01 increase in correlation translates into a 4 to 7% decrease in holdings.

[Table 3 here]

4.3 Robustness Checks

Rich country sub-sample. As a robustness check, we restrict our sample to "rich" countries, for which holdings data are probably more accurate. We keep countries whose annual GDP per capita is more than $10,000$ USD (the cut-off country is Greece). Columns (1) and (2) of Table 4 report the results of OLS regressions, while columns (3)-(5) correspond to instrumented regressions. The results of Tables 1 and 3 are confirmed qualitatively and quantitatively.

[Table 4 here]

Heterogeneity across countries. While we found that on average countries portfolios are partly driven by a diversification motive, it may be that some countries exhibit a stronger diversification motive than others. To investigate this issue, we estimate the following equation:

$$\log(Equity_{ijt}) = a_t + \beta \log(MktCap_{it} MktCap_{jt}) + \gamma_i Correlation_{ijt} + \boldsymbol{\eta} \mathbf{Z}_{ijt} + \varepsilon_{ijt}, \qquad (15)$$

where γ_i captures the impact of stock return correlation on foreign equity holdings by country i investors. This specification allows us to look at the dispersion across source countries of the impact of stock return correlation on equity holdings. We run two versions of this regression: one with current observed correlation (OLS regression) and the other with instrumented correlation (IV regression). Our estimates of the coefficients γ_i's for all source countries are shown in Table 5. Obviously, one should consider these estimates with caution as the coefficients γ_i's are estimated for each source country on fewer observations. It is noticeable that our estimates of γ_i are systematically lower when using instrumented as opposed to OLS regression (see column (3) of Table 5). Interestingly the size of the OLS bias shows little variability across source countries. Moreover, most estimates of country-specific γ's are positive for the OLS regression while all but one are negative for the IV estimation (most of them significantly so), which indicates that our main result is not driven by only a few countries.

[Table 5 here]

Interaction with Equity Home Bias. So far, we have tested our model's prediction that investors should prefer foreign stocks that are less correlated with their home stock market. We

now test the additional prediction that the effect should be stronger for source countries where the home bias is high:[30] *the more* exposed investors are to their domestic risk, *the more* they should prefer stocks that have low correlation with their domestic assets.[31]

We interact our instrumented stock return correlation with a measure of equity home bias. We measure the degree of home bias in country i as:

$$\text{HB}_i = 1 - \frac{\text{Share of Foreign Equities in Country } i \text{ Equity Holdings}}{\text{Share of Foreign Equities in the World Market Portfolio}}. \tag{16}$$

By definition HB_i is equal to zero if the share of domestic equities in country i's portfolio is equal to the share of domestic equities in the world market portfolio and HB_i is equal to 1 if country i is fully biased towards domestic equities (see Appendix, column (3) of Table 7). If countries with a higher degree of home bias diversify more aggressively their foreign holdings, we expect this interacted variable to enter with a negative sign.

Table 6 shows that the impact of the interacted variable is strong. When holdings are regressed on both the instrumented correlation and our interacted variable (columns (2), and (4)), only the latter variable is significant at the 1% level. This makes sense because, in the absence of home bias, bilateral return correlations should have no systematic impact on bilateral holdings.

[Table 6 here]

5 Conclusion

Rational portfolio choice theory predicts that, in the presence of frictions on cross-border equity investments: (a) investors hold portfolios which exhibit a home bias; and (b) they hedge their exposure to domestic risk by holding foreign equities that have low correlation with their own stocks. We test for the latter prediction, taking into account the fact that the level of stock return correlations is endogenously determined and is positively affected by the level of financial integration. Instrumenting current stock return correlations with past correlations to control for endogeneity led us to recover a negative impact of return correlations on foreign equity holdings.

[30] Our model predicts that $\frac{\partial}{\partial \underline{\alpha}_i} \left| \frac{\partial \alpha_{ij}}{\partial \rho_{ij}} \right| > 0$.

[31] Admittedly, equity positions constitute an imperfect measure of country risk exposures, but other components of wealth such as human capital, bonds or real estate are harder to measure.

We interpret our finding as evidence in favor of the empirical validity of portfolio choice theory at the international level.[32] For instance, it is consistent with a view of the world where investors have some informational advantage at home which induces them to overweigh their domestic stock market, leading their demand for foreign securities to be partly driven by their willingness to hedge domestic risk exposure. This is not to say that familiarity does not matter: it could be that some people invest only domestically due to a familiarity bias − but our findings indicate that those who diversify internationally do it properly. It would be interesting to confirm and refine our results using micro data, looking at different kinds of investors (mutual funds, pensions funds, hedge funds, individuals) and at more disaggregated levels of holdings.

[32]More indirect supporting evidence comes from tests of international asset pricing models, as reviewed for instance in Karolyi and Stulz (2003).

References

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

Aviat, A., Coeurdacier, N., 2007. The geography of trade in goods and asset holdings. Journal of International Economics, 71, 22-51.

Barberis, N., Thaler, R., 2004. A survey of behavioral finance. in G. Constantinides, M. Harris, and R.M. Stulz, eds.: Handbook of the Economics of Finance (Elsevier North-Holland).

Baxter, M., Jermann, U., 1997. The international portfolio diversification puzzle is worse than you think. American Economic Review, 87, 170–180.

Baxter, M., Jermann, U., King, R., 1998. Nontraded goods, nontraded factors, and international non-diversification. Journal of International Economics, 44, 211-229.

Baxter, M., Kouparitsas, M.A., 2005. Determinants of business cycle comovement: A robust analysis. Journal of Monetary Economics, 52, 113-157.

Bekaert, G., Harvey, C., 2000. Foreign speculators and emerging equity markets. Journal of Finance, 55, 564-614.

Bekaert, G., Harvey, C., Lundblad, C., 2003. Equity market liberalization in emerging markets. Journal of Financial Research, 26, 275-299.

Benartzi, S., 2001. Excessive extrapolation and the allocation of 401(k) accounts to company stock. Journal of Finance, 56, 1747-1764.

Bhamra, H., 2004. International stock market integration: A dynamic general equilibrium approach. Unpublished working paper, London Business School.

Bohn, H., Tesar,L., 1996. U.S. equity investment in foreign markets: portfolio rebalancing or return chasing?. American Economic Review, 86, 77-81.

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

Campbell, J., 1987. Stock returns and the term structure. Journal of Financial Economics, 18, 373-399.

Campbell, J., Shiller, R., 1988. Stock prices, earnings, and expected dividends. Journal of Finance, 43, 661-676.

Chan, K., Covrig, V.M. Ng, L.K., 2005. What determines the domestic and foreign bias? Evidence from mutual fund equity allocations worldwide. Journal of Finance, 60, 1495-1534.

Cochrane, J., Longstaff, F., Santa Clara, P., 2008. Two Trees. Review of Financial Studies, 21, 347-385.

Coeurdacier, N., Guibaud, S., 2008. A dynamic equilibrium model of imperfectly integrated financial markets. Unpublished working paper, London School of Economics.

Coeurdacier, N., Martin, P., 2009. The geography of asset trade and the Euro: Insiders and outsiders. Journal of the Japanese and International Economies, 23 (2), 90-113.

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

Dahlquist, M., Pinkowitz, L., Stulz, R., Williamson, R., 2003. Corporate governance and the home bias. Journal of Financial and Quantitative Analysis, 38, 87-110.

Daude, C., Fratzscher, F., 2008. The pecking order of cross-border investment. Journal of International Economics, 74 (1), 94-119.

Dellas, H., Stockman, A., 1989. International portfolio nondiversification and exchange rate variability. Journal of International Economics, 26, 271-90.

DeMarzo, P., Kaniel, R. Kremer, I., 2004. Diversification as a public good: Community effects in portfolio choice. Journal of Finance, 59, 1677-1715.

De Santis, R.A., Gerard, B., 2006. Financial integration, international portfolio choice and the european monetary union. European Central Bank working paper, 626.

Dumas, B., Harvey, C. Ruiz, P., 2003. Are correlation of stock returns justified by subsequent changes in national outputs?. Journal of International Money and Finance, 22, 777-811.

Errunza, V., Losq, E., 1985. International asset pricing under mild segmentation: Theory and test. Journal of Finance, 40, 105-124.

Eun, C., Jannakiramanan, S., 1986. A model of international asset pricing with a constraint on the foreign equity ownership. Journal of Finance, 41, 897-914.

Fama, E., French, K., 1988. Dividend yields and expected stock returns. Journal of Financial Economics, 22, 3-24.

Fama, E., French, K., 1989. Business conditions and expected returns on stocks and bonds. Journal of Financial Economics, 25, 23-49.

Fidora, M., Fratzscher, M., Thimann, C., 2007. Home bias in global bond and equity markets: The role of real exchange rate volatility. Journal of International Money and Finance, 26, 631-55.

Flavin, T.J., Hurley, M.J., Rousseau, F., 2001. Explaining stock market correlation: A gravity model approach. The Manchester School, 70, 87-106.

Frankel, J., Rose, A., 1998. The endogeneity of the optimum currency area criteria. Economic Journal, 108, 1009-1025.

Frankel, J., Rose, A., 2002. An estimate of the effect of common currencies on trade and income. Quarterly Journal of Economics, 117, 437-466.

French, K., Poterba, J., 1991. Investor diversification and international equity markets. American Economic Review, 81, 222-26.

Froot, K., O'Connell, P., Seasholes, M., 2001. The portfolio flows of international investors. Journal of Financial Economics, 59, 151-193.

Gehrig, T., 1993. An information based explanation of the domestic bias in international equity investment. Scandinavian Journal of Economics, 95, 97109.

Goetzmann, W., Li, L., Rouwenhorst, K., 2002. Long-term global market correlation. Unpublished working paper, Yale University.

Grinblatt, M., Keloharju, M., 2001. How distance, language, and culture influence stockholdings and trades. Journal of Finance, 56, 1053-1073.

Grubel, H., 1968. Internationally diversified portfolios: Welfare gains and capital flows. American Economic Review, 58, 89-94.

Hatchondo, J.C., 2008. Asymmetric information and the lack of international portfolio diversication. International Economic Review, 49 (4), 1297-1330.

Hau, H., Rey, H., 2007. Global portfolio rebalancing under the microscope. Unpublished working paper, London Business School.

Heathcote, J., Perri, F., 2004. Financial globalization and real regionalization. Journal of Economic Theory, 119, 207-243.

Heathcote, J., Perri, F., 2007. The international diversification puzzle is not as bad as you think. Unpublished working paper, Federal Reserve Bank of Minneapolis.

Hietala, P.T., 1989. Asset pricing in partially segmented markets: Evidence from the Finnish market. Journal of Finance, 44, 697718.

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

Imbs, J., 2004. Trade, finance, specialization and synchronization. Review of Economics and Statistics, 86, 723-734.

Imbs, J., 2006, The real effects of financial integration. Journal of International Economics, 68, 296-324.

Kaminsky, G., Schmukler, S., 2003. Short-run pain, long-run gain: The effects of financial liberalisation. IMF Working Paper, 34.

Karolyi, A., Stulz, R., 2003. Are assets priced locally or globally?, in G. Constantinides, M. Harris, and R. Stulz, eds., Handbook of the Economics of Finance (Elsevier North Holland).

Keim D., Stambaugh, R., 1986. Predicting returns in the stock and bond markets. Journal of Financial Economics, 17, 357-390.

Kraay A., Loayza, N., Servén, L., Ventura, J., 2005. Country portfolios. Journal of the European Economic Association, 3, 914-945.

Lane, P., Milesi-Feretti, G.M., 2003. International financial integration. IMF Staff Paper, 50.

Lane, P., Milesi-Feretti, G.M., 2004. International investment patterns. Review of Economics and Statistics (forthcoming).

Lane, P., 2006. Global bond portfolios and EMU. International Journal of Central Banking, June issue.

La Porta, R., Lopez-de-Silanes, F., Schleifer, A., Vishny, R.W., 1997. Legal determinants of external finance. Journal of Finance, 52, 1131-1150

La Porta, R., Lopez-de-Silanes, F., Schleifer, A., Vishny, R.W., 1998. Law and finance. Journal of Political Economy, 106, 1113-1155.

La Porta, R., Lopez-de-Silanes, F., Schleifer, A., 2006. What works in securities laws?. Journal of Finance, 61, 1-32.

Levy, H., Sarnat, M., 1970. International diversification of investment portfolios. American Economic Review, 60, 668-75.

Lewis, K., 1999. Explaining home bias in equities and consumption. Journal of Economic Literature, 37, 571-608.

Martin, I., 2007. The Lucas orchard. Unpublished working paper, Harvard University.

Martin, P., Rey, H., 2004. Financial super-markets: size matters for asset trade. Journal of International Economics, 64, 335-361.

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

Obstfeld, M., Rogoff, K., 2000. The six major puzzles in international macroeconomics: Is there a common cause?. NBER Macroeconomics Annual, 339-390.

Obstfeld, M., Taylor, A.M., 2002. Globalization and capital markets. NBER working paper 8846.

Otto, G., Voss, G., Willard, L., 2001. Understanding OECD output correlations. Unpublished working paper, Reserve Bank of Australia.

Pagan, A., 1984. Econometric issues in the analysis of regressions with generated regressors. International Economic Review, 25, 221-247.

Pavlova, A., Rigobon, R., 2008. The role of portfolio constraints in the international propagation of shocks. Review of Economic Studies 75 (4), 1215-1256.

Portes, R., Rey, H., 2005. The determinants of cross-border equity flows. Journal of International Economics, 65, 269-296.

Quinn, D., Voth, J., 2006. The diversification fata morgana: Capital account openness and the fall and rise of stock market correlations, 1890-2000. Unpublished working paper, CREI.

Sellin, P., Werner, I., 1993. International investment barriers in general equilibrium. Journal of International Economics, 34 , 137-151.

Sercu, P., Vanpee, R., 2007. Home bias in international equity portfolios: A review. Unpublished working paper, Leuven School of Business and Economics.

Solnik, B., 1974. An equilibrium model of the international capital market. Journal of Economic Theory, 4, 500-524.

Soumare, I., Wang, T., 2006. International risk sharing, investment restriction and asset prices. Unpublished working paper, Sauder School of Business, University of British Columbia.

Stulz, R. M., 2005. The limits of financial globalization. Journal of Finance, 60, 1595-1638

Van Nieuwerburgh, S., Veldkamp, L., 2007. Information immobility and the home bias puzzle. Unpublished working paper, NYU Stern.

Vlachos, J., 2004. Does regulatory harmonization increase bilateral asset holdings?. Unpublished working paper, Stockholm School of Economics.

Walti, S., 2005. The macroeconomic determinants of stock market synchronization. Unpublished working paper, Trinity College Dublin.

Wei, S.J., Gelos, G., 2005. Transparency and international portfolio holdings. Journal of Finance, 60, 2987-3020.

Wooldridge, J.M., 2002. Econometric Analysis of Cross-Section and Panel Data, MIT Press, Cambridge Massachusetts.

TABLES

	$\log(\text{Equity}_{ijt})$					
	(1)	(2)	(3)	(4)	(5)	(6)
$\log(\text{MktCap}_{it}\text{MktCap}_{jt})$	.754***	.865***	.820***	.898***	.757***	
	(.151)	(.108)	(.100)	(.051)	(.028)	
Correlation_{ijt}	3.880***	1.017	1.007	.510*	1.761***	1.063***
	(.996)	(.822)	(.779)	(.306)	(.234)	(.245)
ExpRet_{jt}		.421*	.436*	-.202	1.423***	.681***
		(.252)	(.245)	(.210)	(.194)	(.183)
$\log(\text{GDP/Cap})_{ijt}$		.758***	.787***	.036	2.136***	.494*
		(.182)	(.181)	(.076)	(.064)	(.288)
$\log(\text{Dist}_{ij})$		-.952***	-1.079***	-1.228***	-.073	-.412***
		(.288)	(.283)	(.103)	(.064)	(.083)
Border_{ij}		-.313	-.764*	-.545**	-.385**	-.274
		(.420)	(.418)	(.219)	(.164)	(.175)
Trade_{ijt}		.205	.131	-.018	.620***	.427***
		(.238)	(.242)	(.072)	(.051)	(.066)
$\text{CurrencyUnion}_{ijt}$			-.435**	-.148	.062	.196
			(.217)	(.163)	(.133)	(.147)
LegalSystem_{ij}			.113	.267***	.161*	.259***
			(.243)	(.103)	(.083)	(.081)
Language_{ij}			.633**	.371***	.680***	.411***
			(.285)	(.121)	(.091)	(.107)
ColonialLink_{ij}			.170	.394	.065	.176
			(.364)	(.256)	(.193)	(.205)
Source Country Dummies	no	no	no	yes	no	yes
Destination Country Dummies	no	no	no	no	yes	yes
Nb. Obs	4731	4388	4388	4388	4388	4388
R^2	.379	.514	.519	.473	.524	.59

Table 1: Gravity Model for Equity Holdings: OLS estimations

Robust standard errors are in parenthesis. Statistical significance at the 1% level (resp. 5% and 10%) is denoted by *** (resp. ** and *). Regression (1)-(3) without country fixed effects (FE), (4) with source country FE, (5) with destination country FE, (6) with source and destination FE. Regional and time dummies are always included but estimates are not reported.

	Correlation_{ijt}
$\text{Correlation50-75}_{ij}$	.160***
	(.016)
$\log(\text{Dist}_{ij})$	-.065***
	(.003)
Border_{ij}	-.042***
	(.013)
LegalSystem_{ij}	-.018***
	(.006)
Language_{ij}	.076***
	(.006)
ColonialLink_{ij}	-.004
	(.013)
Nb. Obs	4725
R^2	.211

Table 2: First-Stage Regression: $\text{Correlation}_{ijt}=\alpha+\phi\text{Correlation50-75}_{ij}+\boldsymbol{\eta z}_{ij}+\varepsilon_{ijt}$
Robust standard errors are in parenthesis. Statistical significance at the 1% level (resp. 5% and 10%) is denoted by *** (resp. ** and *).

	$\log(\text{Equity}_{ijt})$				
	(1)	(2)	(3)	(4)	(5)
$\log(\text{MktCap}_{it}\text{MktCap}_{jt})$	.932***	1.176***	.793***		1.213***
	(.093)	(.055)	(.029)		(.048)
$\text{IV-Correlation}_{ijt}$	-6.910	-5.760***	-6.667***	-4.526*	-7.265***
	(4.726)	(2.108)	(2.019)	(2.375)	(2.463)
ExpRet_{jt}	.023	-.019	1.703***	.819***	.002
	(.248)	(.259)	(.227)	(.217)	(.246)
$\log(\text{GDP/Cap})_{ijt}$	1.103***	-.001	2.163***	.300	-.019
	(.194)	(.097)	(.067)	(.319)	(.093)
$\log(\text{Dist}_{ij})$	-1.079***	-1.165***	-.479***	-.699***	-1.223***
	(.324)	(.152)	(.117)	(.153)	(.162)
Border_{ij}	-.704*	-.568**	-.642***	-.480**	-.649**
	(.378)	(.242)	(.198)	(.204)	(.269)
Trade_{ijt}	.368*	.208***	.650***	.397***	.251***
	(.213)	(.073)	(.057)	(.071)	(.078)
$\text{CurrencyUnion}_{ijt}$	.274	.324	.487***	.649***	.435**
	(.350)	(.199)	(.161)	(.198)	(.216)
LegalSystem_{ij}	.0002	.147	.099	.268***	.108
	(.236)	(.110)	(.098)	(.094)	(.135)
Language_{ij}	1.003**	.723***	1.254***	.788***	.882***
	(.509)	(.188)	(.199)	(.218)	(.249)
ColonialLink_{ij}	.110	.163	-.092	-.037	.152
	(.269)	(.243)	(.205)	(.214)	(.252)
Source Country Dummies	no	yes	no	yes	yes
Destination Country Dummies	no	no	yes	yes	no
Nb. Obs	3915	3915	3915	3915	3915
R^2	.516	.454	.518	.591	

Table 3: Gravity Model for Equity Holdings using Instrumented Stock Return Correlation
Robust standard errors are in parenthesis. Statistical significance at the 1% level (resp. 5% and 10%) is denoted by *** (resp. ** and *).
Regression (1) without country fixed effects (FE), (2) with source country FE, (3) with destination country FE, (4) with source and destination country FE, (5) Tobit with source country FE. Regional and time dummies are always included but estimates are not reported. Correlation_{ijt} is instrumented according to the following first-stage regression: $\text{Correlation}_{ijt}=\alpha+\phi\text{Correlation50-75}_{ij}+\boldsymbol{\eta z}_{ij}+\varepsilon_{ijt}$.

	$\log(\text{Equity}_{ijt})$				
	(1)	(2)	(3)	(4)	(5)
$\log(\text{MktCap}_{it}\text{MktCap}_{jt})$	.790***		.832***	.925***	
	(.068)		(.065)	(.073)	
Correlation_{ijt}	.884	.659**			
	(.623)	(.271)			
$\text{IV-Correlation}_{ijt}$			-9.451**	-10.290***	-5.313*
			(4.524)	(3.192)	(2.894)
ExpRet_{jt}	-1.992***	.391	-2.020***	-2.039***	.389
	(.328)	(.257)	(.331)	(.412)	(.257)
$\log(\text{GDP/Cap})_{ijt}$	2.501***	.987**	2.495***	1.924***	.974**
	(.290)	(.426)	(.292)	(.199)	(.429)
$\log(\text{Dist}_{ij})$	-.492**	-.227**	-.829***	-1.472***	-.518***
	(.221)	(.105)	(.267)	(.228)	(.185)
Border_{ij}	-.554	-.413**	-.826*	-.818***	-.552***
	(.422)	(.197)	(.425)	(.273)	(.212)
Trade_{ijt}	.141	.400***	.232	-.100	.424***
	(.199)	(.091)	(.199)	(.105)	(.092)
$\text{CurrencyUnion}_{ijt}$	.544*	.480***	.972***	1.180***	.876***
	(.302)	(.158)	(.346)	(.229)	(.230)
LegalSystem_{ij}	.261	.395***	.114	.095	.248**
	(.199)	(.104)	(.235)	(.163)	(.117)
Language_{ij}	.784***	.394***	1.522***	1.176***	.827***
	(.178)	(.125)	(.419)	(.266)	(.254)
ColonialLink_{ij}	.409	-.431**	.172	.273	-.380*
	(.249)	(.215)	(.311)	(.301)	(.214)
Source Country Dummies	no	yes	no	yes	yes
Destination Country Dummies	no	yes	no	no	yes
Nb. Obs	2562	2562	2562	2562	2562
R^2	.447	.509	.44	.366	.509

Table 4: Gravity Model for Equity Holdings: Rich Country Sample

Robust standard errors are in parenthesis. Statistical significance at the 1% level (resp. 5% and 10%) is denoted by *** (resp. ** and *).

Estimation on sub-sample of countries with annual GDP per capita > 10,000$. Regression (1) is OLS without country fixed effects (FE), (2) OLS with source and destination country FE, (3) IV without country FE, (4) IV with source country FE, (5) IV with source and destination country FE. Regional and time dummies are always included but estimates are not reported. Correlation_{ijt} is instrumented according to the following first-stage regression: $\text{Correlation}_{ijt}=\alpha+\phi\text{Correlation50-75}_{ij}+\boldsymbol{\eta}\boldsymbol{z}_{ij}+\varepsilon_{ijt}$.

	γ_{OLS}	γ_{IV}	γ_{IV} - γ_{OLS}
Source Country	(1)	(2)	(3)
Australia	3.97	-2.72	-6.68
Austria	0.69	-4.59	-5.28
Belgium	0.28	-6.23	-6.51
Canada	0.22	-6.89	-7.12
Chile	-6.70	-14.77	-8.07
Denmark	0.95	-4.00	-4.95
Finland	1.72	-4.54	-6.27
France	0.43	-7.69	-8.13
Germany	0.00	-7.57	-7.57
Greece	-5.25	-11.29	-6.03
Hong-Kong	0.45	-7.36	-7.81
Ireland	4.69	-0.08	-4.78
Italy	2.04	-5.18	-7.23
Japan	0.66	-9.01	-9.68
Malaysia	-4.24	-12.84	-8.59
Netherlands	1.44	-5.65	-7.10
New Zealand	4.77	0.16	-4.61
Norway	2.67	-2.31	-4.99
Portugal	-3.90	-10.31	-6.41
Singapore	4.31	-2.82	-7.14
South Africa	-0.62	-9.61	-8.98
Spain	-1.14	-9.75	-8.60
Sweden	2.12	-4.04	-6.16
Switzerland	2.58	-4.61	-7.19
United Kingdom	2.04	-5.81	-7.84
United States	3.69	-5.30	-8.99
Average	0.69	-6.34	-7.03

Table 5: Estimates of γ for various source countries

The regression specification is given by Eq. (15). In column (1), the coefficients γ_i are estimated by OLS regression with observed stock return correlations. In column (2), the coefficients γ_i are estimated using IV regression on instrumented stock return correlations. Control variables, including regional and time dummies, are included but not reported.

	(1)	(2)	(3)	(4)
HB×IV-Correlation$_{ijt}$	-9.135***	-9.046***	-5.714***	-5.514***
	(2.394)	(2.482)	(.888)	(.894)
IV-Correlation$_{ijt}$		-1.192		-4.231**
		(4.176)		(2.072)
Nb. Obs	3758	3758	3758	3758
R^2	.54	.54	.536	.537

Table 6: Gravity Model for Equity Holdings Interacted with Home Bias

Robust standard errors are in parenthesis. Statistical significance at the 1% level (resp. 5% and 10%) is denoted by *** (resp. ** and *). Regressions (1)-(2) without country dummies, (3)-(4) with destination country fixed effects. Control variables, including regional and time dummies, are included but not reported. Correlation$_{ijt}$ is instrumented according to the following first-stage regression:
Correlation$_{ijt}$=$\alpha + \phi$Correlation50-75$_{ij}$+$\boldsymbol{\eta z}_{ij} + \varepsilon_{ijt}$.

APPENDIX

Proof of Proposition 1

The vector of portfolio weights on foreign assets for country H investor is

$$\boldsymbol{\alpha_F} = \frac{1}{\kappa}\boldsymbol{\Omega_F}^{-1}(\boldsymbol{\mu_F} - r^f \mathbf{1}_{N-1}) - \underline{\alpha}_H \boldsymbol{\Omega_F}^{-1}\boldsymbol{\omega}. \tag{A-1}$$

Therefore $\frac{\partial \alpha_j}{\partial \omega_j} = -\underline{\alpha}_H \left(\boldsymbol{\Omega_F}^{-1}\right)_{jj}$, where $\left(\boldsymbol{\Omega_F}^{-1}\right)_{jj}$ is the j^{th} coefficient on the diagonal of the inverse of $\boldsymbol{\Omega_F}$. Because $\boldsymbol{\Omega_F}$ is a non-singular covariance matrix, it is definite positive. Then $\boldsymbol{\Omega_F}^{-1}$ is also definite positive, which implies $\left(\boldsymbol{\Omega_F}^{-1}\right)_{jj} > 0$. This proves that $\frac{\partial \alpha_j}{\partial \omega_j} < 0$. Therefore, letting ρ_j denote the correlation of asset j with the domestic asset, we get

$$\frac{\partial \alpha_j}{\partial \rho_j} = \sigma_H \sigma_j \frac{\partial \alpha_j}{\partial \omega_j} < 0. \tag{A-2}$$

This analysis can be generalized to any source country, therefore inequality (6) follows.

We now derive equations (5) and (7). First-order optimality of the frictionless portfolio implies

$$\boldsymbol{\Omega}\begin{pmatrix} \alpha_H^* \\ \boldsymbol{\alpha_F^*} \end{pmatrix} = \frac{1}{\kappa}\begin{pmatrix} \mu_H - r^f \\ \boldsymbol{\mu_F} - r^f \mathbf{1}_{N-1} \end{pmatrix}. \tag{A-2}$$

Using the definition of $\boldsymbol{\Omega}$, the left-hand side can also be written

$$\boldsymbol{\Omega}\begin{pmatrix} \alpha_H^* \\ \boldsymbol{\alpha_F^*} \end{pmatrix} = \begin{pmatrix} \sigma_H^2 & \boldsymbol{\omega}^T \\ \boldsymbol{\omega} & \boldsymbol{\Omega_F} \end{pmatrix}\begin{pmatrix} \alpha_H^* \\ \boldsymbol{\alpha_F^*} \end{pmatrix} = \begin{pmatrix} \sigma_H^2 \alpha_H^* + \boldsymbol{\omega}^T \boldsymbol{\alpha_F^*} \\ \alpha_H^* \boldsymbol{\omega} + \boldsymbol{\Omega_F}\boldsymbol{\alpha_F^*} \end{pmatrix},$$

therefore (5) implies

$$\frac{1}{\kappa}(\boldsymbol{\mu_F} - r^f \mathbf{1}_{N-1}) = \alpha_H^* \boldsymbol{\omega} + \boldsymbol{\Omega_F}\boldsymbol{\alpha_F^*}.$$

Substituting this expression for $\frac{1}{\kappa}(\boldsymbol{\mu_F} - r^f \mathbf{1}_{N-1})$ in (A-1), we obtain

$$\boldsymbol{\alpha_F} = \boldsymbol{\Omega_F}^{-1}\left(\alpha_H^* \boldsymbol{\omega} + \boldsymbol{\Omega_F}\boldsymbol{\alpha_F^*} - \underline{\alpha}_H \boldsymbol{\omega}\right) = \boldsymbol{\alpha_F^*} - (\underline{\alpha}_H - \alpha_H^*)\boldsymbol{\Omega_F}^{-1}\boldsymbol{\omega}.$$

This is Eq. (5). The share of country H wealth invested in country j can therefore be written as

$$\alpha_j = (1 - \delta_{Hj})\,\alpha_j^*,$$

where $\delta_{Hj} \equiv \frac{\underline{\alpha}_H - \alpha_H^*}{\alpha_j^*} \sum_{k=1}^{N-1} (\boldsymbol{\Omega_F}^{-1})_{jk}\omega_k$. Because this derivation holds for any source country, we can express the share of wealth (α_{ij}) invested in country j by country i as

$$\alpha_{ij} = (1 - \delta_{ij})\alpha_j^*,$$

where δ_{ij} is increasing in the level of correlation between market i and market j. This is Eq. (7).

Data Sources

- **Bilateral Equity Holdings:** in US dollars, annual data over the period 2001-2005, from the Coordinated Portfolio Investment Survey, http://www.imf.org/external/np/sta/pi/datarsl.htm. When equity holdings are "very small" (the smallest value reported is 10,000$), the dataset reports a zero. We consider those zeros to be equal to 0.01 million USD (except in the Tobit estimation).
- **Market Capitalization:** in USD, Global Financial Data.
- **GDP and GDP/capita:** in USD, from the International Financial Statistics (IMF).
- **Bilateral Exports and Imports:** in US dollars from the CHELEM dataset (Centre d'Etudes Propectives et d'Informations Internationales, CEPII, Paris).
- **Geography Variables:** in km, from S.-J. Wei's website and from various sources ("How far is it?", http://www.indo.com/distance).
- **Common Language and Colonial Link:** various sources (for colonial link, mainly summaries of country history in Encyclopedias).
- **Legal Variable:** mainly La Porta et al. (1998), plus various sources for missing countries.[33]
- **Tax Treaty Variable:** IBFD Tax Treaty Database (http://www.ibfd.org).
- **Stock Market Returns:** monthly end-of-period data from 1950 to 2005 in USD from Global Financial Data.
- **Currency Exchange Rates:** Global Financial Data.

[33] http://www.llrx.com

Sample of Countries

Source Countries
Australia, Austria, Belgium, Canada, Chile, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Italy, Japan, Luxembourg, Malaysia, Netherlands, New Zealand, Norway, Portugal, Singapore, South Africa, Spain, Sweden, Switzerland, United Kingdom, United States
Destination Countries
Europe: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland,United Kingdom Israel, Turkey
Asia & Oceania: Australia, Hong Kong, Indonesia, Japan, Malaysia, New Zealand, Philippines, Singapore, South Korea, Taiwan, Thailand
North America: Canada, United States
Central & South America: Argentina, Brazil, Chile, Colombia, Mexico, Peru
Africa: Morocco, Nigeria, South Africa

	Domestic Market in % of World Market Capitalization	Share of Portfolio in Domestic Equity in %	Degree of Home Bias $= HB_i$
Source Country	(1)	(2)	(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
Chile	0.3	85	0.849
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
Hong-Kong	2.5	80.4	0.798
Italy	1.9	57.1	0.562
Japan	13.2	91.9	0.906
Malaysia	1.7	97.4	0.973
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
Singapore	0.6	75	0.748
South Africa	1.3	89	0.888
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 7: Equity Home Bias across Source Countries (from Sercu and Vanpee, 2007; source CPIS).

Source Country	Variable	Mean	Std. Dev.	Min.	Max.	Nb. Obs
Australia	Equity_{ijt}	3163.8	10206.5	2.56	53225.19	29.2
	Dist_{ij}	12148	4296	2811	16347	40
	Exp_{ijt}+Imp_{ijt}	3298.2	5269.9	21.7	25742.9	39
	Correlation_{ijt}	0.39	0.17	-0.15	0.67	40
	$\text{Correlation50-75}_{ij}$	0.15	0.13	-0.07	0.48	35
Austria	Equity_{ijt}	1002.6	2201.1	0.0	9105.6	40
	Dist_{ij}	5897	4863	395	18360	40
	Exp_{ijt}+Imp_{ijt}	3650.2	10888.6	25.7	67118.8	39
	Correlation_{ijt}	0.31	0.19	-0.02	0.69	40
	$\text{Correlation50-75}_{ij}$	0.13	0.10	-0.08	0.35	35
Belgium	Equity_{ijt}	3469.6	10776.1	0.0	62143.1	40
	Dist_{ij}	5886	4986	190	18727	40
	Exp_{ijt}+Imp_{ijt}	11232.1	21456.2	167.4	90391.5	39
	Correlation_{ijt}	0.33	0.20	-0.04	0.78	40
	$\text{Correlation50-75}_{ij}$	0.24	0.15	-0.13	0.53	35
Canada	Equity_{ijt}	6511.9	23838.6	0.0	149098.9	40
	Dist_{ij}	8188	3121	2453	14886	40
	Exp_{ijt}+Imp_{ijt}	12844.8	62840.3	170.9	394552.3	39
	Correlation_{ijt}	0.42	0.17	-0.13	0.76	40
	$\text{Correlation50-75}_{ij}$	0.20	0.20	-0.07	0.73	35
Chile	Equity_{ijt}	286.1	1114.2	0.0	6377.6	40
	Dist_{ij}	11762	4385	796	19026	40
	Exp_{ijt}+Imp_{ijt}	1052.6	1692.3	12.8	8609.3	39
	Correlation_{ijt}	0.34	0.12	-0.04	0.53	40
	$\text{Correlation50-75}_{ij}$	0.10	0.07	-0.09	0.21	35
Denmark	Equity_{ijt}	1331.6	2880.0	0.0	15902.5	40
	Dist_{ij}	5909	4793	507	18003	40
	Exp_{ijt}+Imp_{ijt}	2611.4	4629.5	30.1	22884.0	39
	Correlation_{ijt}	0.32	0.22	-0.03	0.74	40
	$\text{Correlation50-75}_{ij}$	0.17	0.13	-0.13	0.43	35
Germany	Equity_{ijt}	10539.0	27395.2	-459.4	153957.0	40
	Dist_{ij}	5852	4930	269	18435	40
	Exp_{ijt}+Imp_{ijt}	26301.1	34715.4	564.6	119611.1	39
	Correlation_{ijt}	0.41	0.21	-0.01	0.81	40
	$\text{Correlation50-75}_{ij}$	0.18	0.14	-0.09	0.49	35
Finland	Equity_{ijt}	1441.8	2027.9	8.8	6985.8	24.8
	Dist_{ij}	6210	4302	598	16752	40
	Exp_{ijt}+Imp_{ijt}	1845.1	2855.3	23.1	13056.4	39
	Correlation_{ijt}	0.33	0.17	-0.03	0.63	40
	$\text{Correlation50-75}_{ij}$	0.15	0.08	-0.02	0.30	35
France	Equity_{ijt}	7615.2	14049.6	0.0	51032.1	40
	Dist_{ij}	5987	5005	473	19185	40
	Exp_{ijt}+Imp_{ijt}	16105.9	27034.5	234.1	119611.1	39
	Correlation_{ijt}	0.40	0.23	-0.14	0.85	40
	$\text{Correlation50-75}_{ij}$	0.09	0.11	-0.06	0.54	35

Table 8: Descriptive statistics for main bilateral variables presented by source country

For a given source country i, these statistics summarize the variation in the destination country j dimension. "Nb. Obs" is the average number of observations per year. Equity_{ijt} denotes equity holdings by country i in country j averaged over the period 2001-2005, in millions of US dollars. Dist_{ij} is the distance between countries i and j, in km. Exp_{ijt}+Imp_{ijt} is the sum of trade flows between countries i and j averaged over the period 2001-2005, in millions of US dollars. Correlation_{ijt} is the average over the period 2001-2005 of stock return correlations between countries i and j computed over a 10-year rolling window.

Source Country	Variable	Mean	Std. Dev.	Min.	Max.	Nb. Obs
Greece	Equity_{ijt}	146.1	344.7	0.5	1396.1	29.6
	Dist_{ij}	6189	4508	890	17649	40
	Exp_{ijt}+Imp_{ijt}	1042.4	1772.1	6.2	7582.2	39
	Correlation_{ijt}	0.25	0.16	-0.02	0.57	40
	$\text{Correlation50-75}_{ij}$	0.07	0.07	-0.15	0.20	35
Hong-Kong	Equity_{ijt}	2783.9	6897.6	4.8	33584.2	25
	Dist_{ij}	9168	4795	720	19026	40
	Exp_{ijt}+Imp_{ijt}	2261.4	3375.1	7.1	13750.7	39
	Correlation_{ijt}	0.39	0.18	-0.16	0.71	40
	$\text{Correlation50-75}_{ij}$	0.21	0.16	-0.07	0.83	35
Ireland	Equity_{ijt}	6020.0	14340.8	1.2	71232.1	36.6
	Dist_{ij}	6146	4855	412	18693	40
	Exp_{ijt}+Imp_{ijt}	3639.5	7563.0	16.7	38244.9	39
	Correlation_{ijt}	0.35	0.21	-0.06	0.77	40
	$\text{Correlation50-75}_{ij}$	0.13	0.10	-0.16	0.35	35
Italy	Equity_{ijt}	7730.4	24788.2	0.0	150941.1	39.4
	Dist_{ij}	6007	4816	526	18495	40
	Exp_{ijt}+Imp_{ijt}	11592.1	19482.9	356.1	91951.7	39
	Correlation_{ijt}	0.31	0.18	-0.18	0.70	40
	$\text{Correlation50-75}_{ij}$	0.18	0.13	-0.14	0.45	35
Japan	Equity_{ijt}	6592.3	23821.6	0.0	148730.1	40
	Dist_{ij}	9243	3947	963	18023	40
	Exp_{ijt}+Imp_{ijt}	15623.1	29728.1	373.6	177383.1	39
	Correlation_{ijt}	0.25	0.13	-0.09	0.48	40
	$\text{Correlation50-75}_{ij}$	0.13	0.12	-0.15	0.43	35
Luxembourg	Equity_{ijt}	11199.9	21705.2	0.3	117738.5	40
	Dist_{ij}	5869	4985	190	18704	40
	Exp_{ijt}+Imp_{ijt}	–	–	–	–	0
	Correlation_{ijt}	0.34	0.18	-0.02	0.75	40
	$\text{Correlation50-75}_{ij}$	0.19	0.14	-0.10	0.45	35
Malaysia	Equity_{ijt}	21.2	46.0	0.0	200.1	28.4
	Dist_{ij}	10010	4881	989	19188	40
	Exp_{ijt}+Imp_{ijt}	3989.5	7601.1	30.4	34596.6	39
	Correlation_{ijt}	0.21	0.17	-0.04	0.66	40
	$\text{Correlation50-75}_{ij}$	0.35	0.24	-0.15	0.96	35
Netherlands	Equity_{ijt}	7850.7	22591.0	0.0	137334.7	39.8
	Dist_{ij}	5874	4944	224	18509	40
	Exp_{ijt}+Imp_{ijt}	10384.3	19017.4	165.0	90725.8	39
	Correlation_{ijt}	0.41	0.23	-0.11	0.86	40
	$\text{Correlation50-75}_{ij}$	0.22	0.20	-0.14	0.61	35
New-Zealand	Equity_{ijt}	846.0	1683.0	4.0	6108.9	15.6
	Dist_{ij}	14212	4554	4047	19834	40
	Exp_{ijt}+Imp_{ijt}	739.6	1538.9	5.9	8268.5	39
	Correlation_{ijt}	0.37	0.14	0.03	0.62	40
	$\text{Correlation50-75}_{ij}$	0.12	0.09	-0.07	0.42	35

Table 8: Descriptive statistics for main bilateral variables presented by source country (cont.)
For a given source country i, these statistics summarize the variation in the destination country j dimension. "Nb. Obs" is the average number of observations per year. Equity_{ijt} denotes equity holdings by country i in country j averaged over the period 2001-2005, in millions of US dollars. Dist_{ij} is the distance between countries i and j, in km. Exp_{ijt}+Imp_{ijt} is the sum of trade flows between countries i and j averaged over the period 2001-2005, in millions of US dollars. Correlation_{ijt} is the average over the period 2001-2005 of stock return correlations between countries i and j computed over a 10-year rolling window.

Source Country	Variable	Mean	Std. Dev.	Min.	Max.	Nb. Obs
Norway	Equity_{ijt}	2042.4	4466.0	0.0	24315.7	36.2
	Dist_{ij}	6065	4570	261	17466	40
	Exp_{ijt}+Imp_{ijt}	2634.2	4300.0	31.9	16404.0	39
	Correlation_{ijt}	0.38	0.17	0.05	0.67	40
	Correlation50-75ij	0.17	0.11	-0.12	0.49	35
Portugal	Equity_{ijt}	315.8	743.1	0.9	4060.2	34.4
	Dist_{ij}	6433	4931	352	19783	40
	Exp_{ijt}+Imp_{ijt}	1875.5	4134.1	10.1	21771.9	39
	Correlation_{ijt}	0.32	0.22	-0.06	0.77	40
	$\text{Correlation50-75}_{ij}$	0.11	0.13	-0.04	0.59	35
Singapore	Equity_{ijt}	1231.5	2133.2	1.1	9032.7	32.4
	Dist_{ij}	9819	4705	989	19269	40
	Exp_{ijt}+Imp_{ijt}	4001.9	6577.0	11.1	26948.9	39
	Correlation_{ijt}	0.32	0.18	-0.13	0.71	40
	$\text{Correlation50-75}_{ij}$	0.22	0.21	-0.21	0.96	35
South Africa	Equity_{ijt}	1316.8	4667.7	0.4	23961.4	27.2
	Dist_{ij}	9818	2152	4669	14638	40
	Exp_{ijt}+Imp_{ijt}	1498.2	2319.0	25.6	9170.0	39
	Correlation_{ijt}	0.33	0.12	0.02	0.57	40
	$\text{Correlation50-75}_{ij}$	0.08	0.08	-0.12	0.21	35
Spain	Equity_{ijt}	2075.6	4542.2	0.2	22050.9	39
	Dist_{ij}	6301	4962	352	19834	40
	Exp_{ijt}+Imp_{ijt}	8111.5	14381.8	213.8	64926.9	39
	Correlation_{ijt}	0.41	0.20	0.02	0.79	40
	$\text{Correlation50-75}_{ij}$	0.10	0.08	-0.07	0.24	35
Sweden	Equity_{ijt}	3822.6	8902.1	2.7	44771.6	36.4
	Dist_{ij}	6067	4528	261	17311	40
	Exp_{ijt}+Imp_{ijt}	4191.5	6120.4	74.5	26370.5	39
	Correlation_{ijt}	0.39	0.20	-0.15	0.77	40
	$\text{Correlation50-75}_{ij}$	0.20	0.16	-0.08	0.45	35
Switzerland	Equity_{ijt}	6754.1	17015.7	0.3	85992.2	35.8
	Dist_{ij}	5894	4962	307	18735	40
	Exp_{ijt}+Imp_{ijt}	4777.1	9664.1	64.1	53873.7	39
	Correlation_{ijt}	0.37	0.20	-0.09	0.80	40
	$\text{Correlation50-75}_{ij}$	0.23	0.19	-0.10	0.61	35
United Kingdom	Equity_{ijt}	16455.2	33438.4	-2589.4	184156.5	38.4
	Dist_{ij}	6006	4889	412	18560	40
	Exp_{ijt}+Imp_{ijt}	15559.8	22326.4	270.4	95183.2	39
	Correlation_{ijt}	0.42	0.20	-0.07	0.80	40
	$\text{Correlation50-75}_{ij}$	0.19	0.18	-0.11	0.63	35
United States	Equity_{ijt}	46821.5	83836.1	7.3	413085.2	39
	Dist_{ij}	9201	3304	1736	15245	40
	Exp_{ijt}+Imp_{ijt}	40440.6	74518.1	946.7	394552.3	39
	Correlation_{ijt}	0.41	0.19	-0.10	0.76	40
	$\text{Correlation50-75}_{ij}$	0.17	0.22	-0.15	0.73	35

Table 8: Descriptive statistics for main bilateral variables presented by source country (cont.)
For a given source country i, these statistics summarize the variation in the destination country j dimension. "Nb. Obs" is the average number of observations per year. Equity_{ijt} denotes equity holdings by country i in country j averaged over the period 2001-2005, in millions of US dollars. Dist_{ij} is the distance between countries i and j, in km. Exp_{ijt}+Imp_{ijt} is the sum of trade flows between countries i and j averaged over the period 2001-2005, in millions of US dollars. Correlation_{ijt} is the average over the period 2001-2005 of stock return correlations between countries i and j computed over a 10-year rolling window.