

International Investment Patterns*

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Abstract

We provide a systematic analysis of source, host, and bilateral factors driving portfolio equity investment across countries, using newly published data on cross-country equity holdings at the end of 2001. In particular, we develop a model that links bilateral equity holdings to bilateral trade in goods and services and find that the data support such a correlation. Larger bilateral positions are also associated with more correlated stockmarket returns and output growth rates, plus a shared language. We further document that richer countries and countries with more developed and less volatile stock markets hold larger gross portfolio equity assets vis-à-vis the rest of the world, and that the scale of external equity liabilities is strongly related to domestic stock market development.

JEL Classification:

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I. INTRODUCTION

This paper focuses on the geographical allocation of international investment portfolios and is motivated by the idea that understanding the geography of international investment provides insights into the globalization process. In a fully-integrated global economy without frictions, benchmark economic theory suggests that investors hold identical portfolios, regardless of nationality. Documenting and explaining deviations from this benchmark position potentially reveals the nature of the current limitations on global economic integration. For instance, are regions more financially integrated than the world as a whole? Do frictions in goods markets affect the structure of international financial trade? What is the connection between domestic and international financial development? Are cultural factors important in explaining the bilateral structure of international portfolios? Answers to these questions are of interest for several fields in economics, including international macroeconomics and international finance, portfolio analysis, and behavioral finance.

We may appeal to bilateral factors to explain asymmetries in the geographical allocation of investment: that is, why two source countries may attach different weights to a given host country and, conversely, why two host country may have different dependencies on a given source country as an inward investor. Moreover, the distribution of bilateral determinants also combines to affect aggregate positions. By analogy to the ‘trade remoteness’ index that captures a country’s remoteness from major trading partners, one may envisage a ‘financial remoteness’ index that captures a given location’s net disadvantage as a location for international investment.

Asymmetries in the geography of international investment also have potentially important implications for other international economic linkages. Most obviously, a negative shock in host country C will have a more negative wealth effect on investor country A than investor country B, if country A’s portfolio is more heavily weighted towards country C. From another perspective, the geography of investment positions also heavily shapes the geography of international risk-sharing patterns.

Interest in studying these linkages has been heightened by the increase in international portfolio diversification over the past few years, as well as by evidence of increased co-movements between the main economic and financial variables of the world’s largest economies, over and above what could be explained by trade (see, for example, Forbes and Chinn 2003). The pattern of bilateral financial linkages may also affect the degree of business cycle synchronization (Imbs 2003a, 2003b). Relatedly, it may also affect the covariance structure of real exchange rates: if countries A and B have extensive bilateral financial cross-holdings whereas country C is financially isolated, then we may expect larger real exchange rate movements between countries A and C than between countries A and C.¹

¹ Financial linkages may also affect nominal exchange rate policies. See Devereux and Lane (2003) on evidence that bilateral debt positions affect bilateral nominal exchange rate volatility.

Although some authors have previously considered aspects of the geography of international investment patterns, data limitations have meant that these contributions have been quite narrowly focused: for example, only considering a single source country (most often, the US). In this paper, we make use of a new data set on international portfolio positions in order to explore this topic in a comprehensive manner. The data provide a geographical breakdown of international portfolio holdings at end-2001 by 67 source countries, which include virtually all major international investors. In addition to characterizing the broad features of the data, we extend the work of Obstfeld and Rogoff (2001) in order to present a simple theoretical framework that highlights trade as an important potential determinant of bilateral portfolio equity holdings. In our empirical analysis, we highlight both ‘pure’ bilateral factors explaining the structure of countries’ equity asset portfolios, as well as ‘aggregate’ factors that help explain the overall size of countries’ foreign equity assets and liabilities.

There is a rapidly increasing literature trying to explain international patterns of bilateral investment. Typically, this literature has used empirical methods borrowed from the traditional gravity models of international goods trade, and has focused on direct investment and bank lending, for which data is readily available (from the OECD and the BIS, respectively). Studies focusing on the geography of foreign direct investment include Wei (2000) and Stein and Daude (2003), among many others. Studies on bank lending include Buch (2002, 2003); Buch et al (2003); and Kawai and Liu (2001). Ghosh and Wolf (2001) conducts a comparative analysis of the impact of spatial factors on different international investment categories, as does Sarisoy (2003) and, for the United States, Portes, Rey and Oh (2001).

A number of papers have also focused more specifically on the pattern of bilateral equity investment. For example, Portes and Rey (2003) use portfolio equity flows from Capital Data and show that proxies for informational asymmetries, together with the size of host countries’ stock markets, are key determinants of the pattern of international equity flows. Other studies on the geography of the stock of portfolio equity investment have focused primarily on a single source or destination country: the United States (Ahearne, Grier, and Warnock (2003), Mann and Meade (2002); Pinkowitz, Stulz, and Williamson (2002)) and Ireland (Honohan and Lane (2000)). An exception is a recent paper by Yildirim (2003) that also exploits the 2001 CPIS data: her focus is on examining the role of various corporate governance indicators—limited data availability means that she can only employ a subset of the CPIS data (23 source countries, 49 host countries). From a historical perspective, Clemens and Williamson (2002) study the geographical allocation of United Kingdom outward investment during the nineteenth century.

Several of these studies are related to the voluminous literature on home bias: see Lewis (1999) and Karolyi and Stulz (2001) for recent surveys. This literature is highly relevant: however, our approach is substantially different in focus, in that we also place heavy

emphasis on explaining the structure of the international component of portfolios rather than just the split between domestic and foreign allocations.²

Relative to the existing literature, this project innovates in a number of respects. On the empirical front, the availability of more detailed cross-country data permits a more comprehensive study of the determinants of international investment patterns. Relatedly, we are able to jointly study both bilateral and aggregate positions.

The structure of the rest of the paper is as follows. Section II develops a theoretical framework, and Section III the empirical strategy. Section IV describes the data and discusses some relevant interpretation issues. Econometric results are reported in Section V. The next steps in the project are outlined in Section VI. Some preliminary conclusions are drawn in Section VII.

II. THEORETICAL FRAMEWORK

In respect of theory, we can identify three main approaches to modeling bilateral equity investment positions, illustrated by Obstfeld and Rogoff (2001), Martin and Rey (2003) and Davis, Nalewaik, and Willen (2001) respectively.

In a two-country setting, Obstfeld and Rogoff (2001) authors show that the existence of trading frictions in goods markets naturally generates a home bias in equity positions, even if global financial markets are complete. We develop an N-country generalization of this model later in this section.

In contrast, Martin and Rey (2003) focus on transactional frictions in asset markets.³ Their framework postulates incomplete asset markets, iceberg costs in financial markets and endogenous asset creation: larger countries will have deeper domestic equity markets and a reduction in financial trade costs leads to more risk sharing. This approach generates a bilateral equation for equity positions as a function of the cost of bilateral financial trade and the endogenously-determined market capitalization levels.

Davis, Nalewaik and Willen (2001) also focus on financial market incompleteness. In their setup, a domestic agent faces a risky labor income stream. Domestic financial instruments consist of a riskless and a risky asset. The ability of a domestic agent to diversify risk at home depends on the correlation between (risky) labor income and the return on the risky

² Ahearne et al (2003) and Pinkowitz et al. (2002) treat the domestic allocation of US investors as being symmetric to the foreign allocation: however, some sources of home bias plausibly imply that the determinants of domestic investment are not identical to those for overseas investment.

³ See also the application in Martin and Rey (2000).

asset. The degree to which the availability of a second risky asset (an international equity fund) improves risk allocation depends on its correlation with domestic labor income, in addition to its correlation with the domestic risky asset. The authors develop a procedure to assess the gains to international financial trade in risky assets that depends on these correlations. Importantly, agents from different countries will hold different combinations of risky assets, since the differences in labor income streams means that the “mutual fund separation theorem” does not hold: the returns on the various risky assets will have different correlations with the domestic labor income streams across countries.

In what follows, we rely on an N-country generalization of the Obstfeld and Rogoff (2001) model to generate a benchmark empirical equation but also allow for the financial frictions highlighted by others in our empirical investigation. In a two-country setting, Obstfeld and Rogoff show that the existence of trading costs in the goods market naturally generates a home bias in equity positions, even if global financial markets are complete. These authors also note that an additional potential source of variation in bilateral investment patterns is heterogeneity in consumption preferences.

In the N-country generalization of the Obstfeld-Rogoff model, the share of country i 's equity that is held by country j is: (a) a decreasing function of the bilateral trading cost between i and j , *relative to the average trading costs between country i and all other countries*; and (b) an increasing function of the relative importance of good i in country j 's consumption basket. The relative statement is important: it is the same point made by Anderson and van Wincoop (2003) in respect of “multilateral resistance” in trade.

The setup is as follows. There are N countries, each with a random endowment of a distinct perishable good: there is a symmetric joint distribution across $(Y_1 \dots Y_N)$. A complete set of Arrow-Debreu securities are available. We consider a one-period portfolio problem. An individual agent in country i seeks to maximize expected consumption

$$EU_i = E \left\{ \frac{1}{1-\rho} \left[\left(\sum_{j=1}^{j=N} \omega_j C_{ij}^{\frac{\theta-1}{\theta}} \right)^{\frac{\theta}{\theta-1}} \right]^{1-\rho} \right\} = E \frac{C_i^{1-\rho}}{1-\rho} \quad (1)$$

where ω_j is the relative preference by consumers in country j for good i , C_i is the index of total real consumption, θ is the elasticity of substitution between any two goods and ρ is the coefficient of relative risk aversion. There are iceberg shipping costs: only a fraction $(1 - \tau_{ij})$ of a unit of a good shipped from country i to country j survives the journey. We normalize $\omega_{ii} = 1$, $\tau_{ii} = 0 \quad \forall i$.

We assume competitive product markets such that

$$P_{ii} = (1 - \tau_{ij})P_{ij} \quad (2)$$

where P_{ii} , P_{ij} denotes the prices of good i in countries i and j respectively.

Free trade in Arrow-Debreu securities implies that the ratio of marginal utilities of consumption for good i between agents in countries i and j must reflect the relative price of good i between countries i and j :

$$\frac{1}{P_{ii}} \frac{\partial U}{\partial C_{ii}} = \frac{1}{P_{ij}} \frac{\partial U}{\partial C_{ij}} \quad \forall i, j \quad (3)$$

or

$$C_{ii}^{-1/\theta} C_i^{1/\theta - \rho} = (1 - \tau_{ij}) \omega_{ij} C_{ij}^{-1/\theta} C_j^{1/\theta - \rho} \quad (4)$$

Under the simplifying assumption that $\rho = 1/\theta$, this further reduces to

$$[1 - \tau_{ij}]^\theta \omega_{ij}^\theta C_{ii} = C_{ij} \quad (5)$$

In the goods market, output clearing requires that

$$Y_i = \sum_{j=1}^N \left[\frac{C_{ij}}{(1 - \tau_{ij})} \right] \quad (6)$$

It follows that the portfolio allocations that are required to generate equilibrium consumption shares are of the form

$$x_{ij}^* = \left\{ \frac{(1 - \tau_{ij})^{\theta-1} \omega_{ij}^\theta}{\sum_{j=1}^N \left[(1 - \tau_{ij})^{\theta-1} \omega_{ij}^\theta \right]} \right\} Y_i \quad (7)$$

Under the simplifying assumption that $\rho = 1/\theta$, this allocation can be achieved under equity trade alone. The allocation means that country j holds a larger share in country i 's equity, the lower is the transport cost between countries i and j relative to the average transport cost between country i and all other countries; and the greater is the relevant importance attached to good i in country j 's consumption preferences.

The log of this expression yields

$$\log(x_{ij}^*) = (\theta - 1)\log(1 - \tau_{ij}) + \theta\log(\omega_{ij}) - \log\left(\sum_{j=1}^N [(1 - \tau_{ij})^{\theta-1} \omega_{ij}^\theta]\right) + \log Y_i \quad (8)$$

The latter two terms are constant for fixed- i across all pairs (i, j) and so can be represented by a country- i constant. This allows us to simplify the expression to

$$\log(x_{ij}^*) = \alpha_i + (\theta - 1)\log(1 - \tau_{ij}) + \theta\log(\omega_{ij}) \quad (9)$$

Empirically, transport costs are not directly observable and consumer preferences but may be captured by a host of proxy variables

$$\log(1 - \tau_{ij}) = \gamma Z_{ij}^\tau + u_{ij}^\tau \quad (10)$$

$$\log(\omega_{ij}) = \chi Z_{ij}^\omega + u_{ij}^\omega \quad (11)$$

which gives the regression equation

$$\log(x_{ij}^*) = \alpha_i^* + (\theta - 1)\gamma Z_{ij}^\tau + \theta\chi Z_{ij}^\omega + v_{ij} \quad (12)$$

where $v_{ij} = (1 - \theta)u_{ij}^\tau + \theta u_{ij}^\omega$. Of course, the vectors $(Z_{ij}^\tau, Z_{ij}^\omega)$ could be overlapping sets, such that the parameters may not be separately identifiable. In the end, we obtain a reduced-form specification

$$\log(x_{ij}^*) = \alpha_i^* + \beta Z_{ij} + v_{ij} \quad (13)$$

where Z_{ij} is the union of $(Z_{ij}^\tau, Z_{ij}^\omega)$. Anderson and van Wincoop (2003) also emphasize the importance of including country dummies in gravity trade models, for analogous reasons.⁴

The above analysis assumes symmetry across countries (i.e. identical shares in consumption in the absence of transport costs or heterogeneity in preferences). It is straightforward to allow for differences across countries (e.g. differences in relative wealth levels). In fact, this delivers a revised version of the portfolio allocation equation

$$x_{ij}^* = \left\{ \frac{(1 - \tau_{ij})^{\theta-1} \omega_{ij}^\theta}{\left(\sum_{j=1}^N (1 - \tau_{ij})^{\theta-1} \omega_{ij}^\theta \right)} \right\} Y_i \left[\frac{W_j}{\sum_{j=1}^N W_j} \right] \quad (14)$$

⁴See also Baltagi et al (2003). Strictly speaking, Anderson and van Wincoop (2003) implement a nonlinear estimation method but the application by Rose and van Wincoop (2002) relies instead on country dummies.

where the last term is the share of country j in global wealth.⁵ In the log transformation, this term can be represented by a country- j constant

$$\log(x_{ij}^*) = \alpha_i^* + \alpha_j^* + (\theta - 1)\beta Z_{ij} + v_{ij} \quad (15)$$

Equation (15) suggests that the appropriate specification for a regression explaining bilateral equity investment patterns should include both source country and host country fixed effects.

Clearly, other bilateral factors—in addition to trade costs—matter for equity investment. A simple way to account for these factors is the following. While equation (14) gives the benchmark allocation, frictions in financial markets, information asymmetries or behavioral-finance factors may induce deviations from this benchmark. These factors could be represented by

$$\log(x_{ij}) - \log(x_{ij}^*) = \alpha_i^{**} + \alpha_j^{**} + \gamma F_{ij} + \eta_{ij} \quad (16)$$

where α_i^{**} , α_j^{**} denote “aggregate” financial frictions that apply at the level of the source and host countries and F_{ij} denotes a set of factors that generate financial frictions at the bilateral level. In combination with equation (15), this gives a new equation

$$\log(x_{ij}) = \alpha_i + \alpha_j + (\theta - 1)\beta Z_{ij} + \gamma F_{ij} + \varepsilon_{ij} \quad (17)$$

where $\alpha_i = \alpha_i^* + \alpha_i^{**}$, $\alpha_j = \alpha_j^* + \alpha_j^{**}$ and $\varepsilon_{ij} = v_{ij} + \eta_{ij}$. Of course, Z_{ij} and F_{ij} could be overlapping sets: many gravity-type variables probably belong in both sets (e.g. distance, language etc), since they affect information asymmetries in addition to direct trade costs. If variable V_{ij} is the n -th member of both sets, its regression coefficient will be the n -th element in the vector $(1 - \theta)\beta + \gamma$, but the identification of the individual coefficients will not be possible.

III. EMPIRICAL STRATEGY

Because of data limitations, we focus on a single cross-sectional observation for the structure of external equity portfolios for the year 2001. In line with the theoretical framework developed in the previous section, our empirical strategy is to isolate the relative contributions of (i) bilateral factors; (ii) source-country factors; and (iii) host-country factors. Bilateral factors may explain the heterogeneity in the geographical composition of the asset portfolios of source countries and the investor bases of host countries. Controlling for these bilateral considerations, source country factors help us to explain cross-country differences in

⁵This will reflect the expected output of country j relative to expected global output, in combination with the relative price of good j versus the goods produced elsewhere.

the propensity to invest overseas while host country factors are potentially important in determining variation in the attractiveness of different destinations for overseas investors.

A. Specification

In general, a reduced-form version of equation (17) guides the empirical work

$$\log(x_{ij}) = \alpha_i + \alpha_j + bI_{ij} + u_{ij} \quad (18)$$

where I_{ij} is a set of bilateral determinants. We augment this bilateral equation with equations that seek to explain α_i and α_j

$$\alpha_i = \rho S_i + u_i \quad (19)$$

$$\alpha_j = \rho H_j + u_j \quad (20)$$

Most existing empirical work on the geographical allocation of equity holdings, such as Ahearne et al (2003) and Pinkowitz et al (2002), considers a single source country (the United States) and therefore cannot control for either source-country or host-country fixed effects. Our broader data set allows us to adopt this more general approach.

B. Bilateral Factors

In section II, we developed a benchmark allocation model in which bilateral portfolio positions reflect the costs of trading in goods and services and heterogeneity in consumption preferences. According to this benchmark, the same factors that determine bilateral trade should also determine bilateral investment positions. This suggests that standard gravity-type variables should be included in the set of regressors I_{ij} .

An alternative strategy is to rely on the volume of trade in goods and services as a proxy for the underlying trade costs and patterns of consumption, relying on a standard model of bilateral trade

$$\log(\text{TRADE}_{ij}) = \phi_i + \phi_j + (\theta - 1)\log(1 - \tau_{ij}) + \theta \log(\omega_{ij}) + \eta_{ij} \quad (21)$$

and running the regression

$$\log(x_{ij}) = \alpha_i^T + \alpha_j^T + \sigma \log(\text{TRADE}_{ij}) + v_{ij} \quad (22)$$

If η_{ij} (the error term in the trade equation) is uncorrelated with v_{ij} , then we would expect trade volume to enter with a unit coefficient in a strict version of the benchmark model. More generally, however, the correlation in errors would tend to bias the coefficient downwards. In

addition, of course, trade volume may also matter for other reasons—for instance, trade may also generate a familiarity effect that induces a greater level of investment.

Even if the volume of trade is included directly in the equation, gravity-type variables may still exert an additional impact on investment patterns for several reasons. In one direction, these variables may affect trade volumes due to factors that are not related to trade costs or heterogeneity in preferences. In the other, they may also be associated with non-trade barriers to investment, such as financial or information frictions.

In addition to variation in trade patterns, we also highlighted that incomplete financial markets could justify deviations from the benchmark allocation and provide an additional reason why portfolio composition may vary across countries. For this reason, we experiment in some of the specifications by including some bilateral financial correlations.

The empirical counterpart to the Davis et al (2001) model is that a potential regressor is the adjusted correlation between GDP in country j and the equity return in country i , since country j may wish to hold a disproportionate fraction of the equity of country i to the extent that it does particularly well in diversifying against the domestic risk faced by country j . We also consider directly the co-movement between domestic and foreign stock market returns and domestic and foreign GDP growth rates. In all cases, we experiment with both hedged and unhedged returns on foreign equity (i.e. real returns on dollars versus in local currency in real terms). We additionally include the level of bilateral real exchange rate volatility as a control variable.⁶

Finally, a broader definition of financial frictions also encompasses limited-information and ‘behavioral finance’ factors that may also play a role in determining bilateral positions. In terms of the latter, several authors have argued that it is plausible that ‘gravity’-type variables may proxy for information asymmetries: a source country investor may believe herself to be better informed about investment opportunities in a given host country, the closer the two countries are in distance, the greater the cultural connections (common language; colonial history); and the more intense the economic linkages (bilateral trade volumes; membership of common economic zones).⁷ Of course, many of these variables also matter through their impact on trade patterns.

C. Source Country Factors

Our theoretical framework suggests that larger economies will have correspondingly larger international equity holdings. Moreover, “multilateral resistance” to trade should be an

⁶ Devereux and Lane (2003) show that bilateral nominal exchange rate behavior is itself influenced by bilateral debt holdings. In the next draft, we will seek to address endogeneity issues.

⁷ See Martin and Rey (2003) and Portes and Rey (2003).

important factor in explaining variation in the aggregate propensity to invest overseas. As such, measures of aggregate trade openness should also be important in explaining aggregate international investment activity.

In addition, in previous work, we have argued that a number of other characteristics can help explain variation in the propensity to invest overseas. Under incomplete risk sharing, small countries should be more prone to invest across borders. A volatile domestic economic environment may also prompt international diversification, in that the gain for international risk-sharing is all the greater. As such, it is potentially important to control for domestic risk factors. To the extent that there are fixed costs to overseas investment and that risk aversion is decreasing in wealth, we may also expect richer countries to invest more overseas.

A well-developed domestic financial sector may also affect international investment through a variety of mechanisms. First, a large domestic financial sector facilitates international risk sharing by enabling the issuing of liabilities to foreign investors. Second, the accumulation of domestic financial assets and liabilities may increase the need to diversify overseas, especially if it increases exposure to domestic risk. Third, the sophistication that is acquired through domestic financial transactions may reduce the barriers to international investment. All those factors would lead us to expect a positive correlation between financial market development and international asset holdings. On the other side, domestic investors may be more prone to invest overseas if investment opportunities in a shallow domestic financial market are scarce—hence, for a given level of economic development, a shallower domestic financial market may be associated with higher asset holdings overseas.

Finally, a country's history with capital controls may bind the level of foreign assets: a country with a 'natural' potential to invest overseas may have an artificially small foreign asset position if capital controls are currently in place or have been in the recent past.

D. Host Country Factors

For symmetric reasons, many of the variables just described are also relevant in determining aggregate foreign investment liability positions.⁸ Most directly, the size of the domestic financial market is a basic constraint on the scale of foreign portfolio liabilities: foreign portfolio equity investment in domestic public companies cannot exceed the size of the domestic stock market capitalization.

In general, we expect that the determinants of domestic investment returns and risk will drive aggregate inward investment. As such, indicators of growth potential and volatility are natural candidates to include in explaining variation in host country positions. As has been

⁸ Indeed, in view of the common impact of some of these variables on both sides of the balance sheet, Lane and Milesi-Ferretti (2003) focus on the determinants of gross international investment positions, rather than separately studying the asset and liability components.

highlighted by some authors, the distribution of investment returns between different investor categories will also be important. As such, corporate governance variables that dictate the ability of insiders to cream off profits may influence investment inflows. Financial transaction costs are also potentially important: raw potential returns must be adjusted for the expenses involved in the acquisition and disposal of domestic assets. Finally, a history of binding capital controls may also influence the level of foreign liabilities.

IV. DATA: DESCRIPTION AND ISSUES

The dataset combines data on aggregate and bilateral international portfolio equity investment positions. Since 1997, the International Monetary Fund has published data on international investment positions for a number of countries: the coverage has expanded over time. With regard to bilateral data, the International Monetary Fund has also released two editions of its Coordinated Portfolio Investment Survey (CPIS), for end-1997 (IMF, 2000) and end-2001.⁹ For each participating country, the CPIS reports data on foreign portfolio asset holdings (divided into equity, long-term debt, and short-term debt) by residence of the issuer. The earlier survey covered 29 source countries, but some major investing nations (such as Germany) did not participate. The more recent survey is much broader, with 67 source countries included, and among those are several offshore and financial centers. In each case, the bilateral positions of the source countries in 223 destination countries/territories are reported.¹⁰

The data are based on the residence principle adopted for balance of payments statistics (see IMF, 1993 for a description of the general principles). Problems with the CPIS data can arise for several reasons:

- *Incomplete country coverage.* A number of countries did not participate to the CPIS. Among the likely largest holders of portfolio equity assets among non-participants are the British Virgin Islands, China, Kuwait, Saudi Arabia, Taiwan province of China, and the United Arab Emirates.
- *Under-reporting of assets by CPIS participants.* Under-reporting can be due to incomplete institutional coverage of the survey. For example, the Cayman Islands reported only portfolio holdings by the banking sector (and hence excluding its sizable mutual fund industry); the Bahamas also reported exclusively banking sector holdings,

⁹ Data for the 2001 survey is available at <http://www.imf.org/external/np/sta/pi/datarsl.htm>

¹⁰ For those countries that participated in both 1997 and 2001 surveys, there is considerable persistence in bilateral equity holdings. A log-log regression of 2001 equity positions on 1997 observations gives an elasticity of 0.86 and an overall R-squared of 0.70. See also the scatter plot in Figure A.1.

and the German survey did not cover holdings by households.¹¹ Under-reporting is also likely to occur for countries that experienced periods of substantial capital flight in the past (such as several Latin American countries) and, more generally, for assets held in offshore centers for tax shelter reasons.¹²

- *Third-party holdings.* Third party holdings refer to securities issued by country B and held in an institution residing in country C by a resident of country A. Third-party holdings do not pose a measurement problem when using end-investor surveys, but can lead to mismeasurement if the surveys are based on custodians (typically domestic ones, therefore missing assets held by foreign custodians on behalf of domestic residents). The United States uses a mix of both methods of survey.¹³
- *Problems in collection methods.* For many countries this is the first participation to the CPIS, and therefore collection methods may still be inadequate.

While these shortfalls need to be taken into account when examining the data, the CPIS provides a unique perspective on cross-country equity positions that warrants a detailed analysis.

A. Stylized facts of the 2001 CPIS: aggregate investment

The total recorded level of portfolio equity investment in the CPIS was US\$5.16 trillion. Table 1 lists the 10 largest foreign investors, both in absolute terms and as ratios of domestic GDP. In absolute levels, the largest foreign investors are the main OECD economies; a notable exception is Luxembourg, a very small economy with a large financial center. According to the CPIS, “external” equity holdings of euro area countries amount to US\$893 billion, while intra-euro area holdings are over US\$800 billion. When comparing the CPIS equity holdings with those reported in these countries’ International Investment Position, the

¹¹ For the Cayman Islands, its derived liabilities (themselves likely to be underestimated) exceed its reported assets by close to US\$350 billion. For Germany, the portfolio assets reported in the CPIS survey (US\$800 billion), are over US\$200 billion lower than those reported in the International Investment Position (which are estimated making use of flow data, and therefore include household holdings as well).

¹² With regard to countries that experienced capital flight in the past, some of the gaps may be filled with the help of the United States’ survey of its portfolio liabilities, since a substantial portion of their assets may well be in the US.

¹³ Griever, Lee, and Warnock (2001) discuss in detail the methodology of US surveys and Warnock and Cleaver (2002) highlight the measurement problems posed by third-party holdings.

most notable discrepancy is for Germany that reports IIP equity assets totaling over US\$500 billion, well above the level in the survey.¹⁴

When scaling equity holdings by GDP, financial and offshore centers dominate the picture, with total assets amounting to multiples of their domestic output. Total reported portfolio equity investment by offshore centers and small economies with financial centers (including in the latter category Ireland, Luxembourg, Hong Kong S.A.R., and Singapore, but excluding Switzerland) amounts to over US\$700 billion, notwithstanding the incomplete coverage of the survey highlighted in the previous sub-section.

Table 2 lists the ten largest geographical destinations for portfolio equity investment. Here liabilities are derived from the asset claims of the countries that participated in the CPIS survey, and therefore provide a somewhat incomplete picture of total portfolio equity liabilities. For sake of comparison, the first column reports in brackets the total amount of portfolio equity liabilities reported by countries in their International Investment Position. The overall pattern is similar to the one for assets—the largest OECD economies are the main destination countries for portfolio equity investment.

In terms of ratios to GDP, small economies with financial centers dominate the picture. These centers are very important in absolute terms as well, as highlighted by the presence of Luxembourg and Bermuda among the main destination countries. The total amount of derived equity liabilities of offshore centers and small economies with financial centers is US\$870 billion. It is not surprising that this number is larger than reported offshore center assets, even though holdings in offshore centers by foreign residents are clearly under-reported. First, not all offshore centers participated in the CPIS; and second, the derived equity liabilities of these centers often represent shares in mutual funds, that may invest these funds in portfolio debt instruments, and not exclusively in equities.

B. Stylized facts of the 2001 CPIS: bilateral investment patterns

In order to put the geographical distribution of portfolio equity asset holdings in perspective, Table 3 provides a brief summary of the size of economies, their stock markets, and the share of domestic stocks owned by non residents. A couple of interesting stylized facts emerge from this table. First, at end-2001 exchange rates and prices, the United Kingdom and the United States' stock market capitalization largely exceeded their aggregate weight in world GDP. Second, the fraction of the domestic stock market held by non-resident portfolio investors was substantially higher in the euro area and the United Kingdom (over a third) than in the United States and Japan (13 and 17 percent, respectively).¹⁵

¹⁴ This difference is reflected in the euro area's total holdings—those estimated from the survey are US\$100 billion less than those reported in the euro area's IIP.

¹⁵ Note that Table 3 only reports domestic shares owned by portfolio equity investors (who by definition hold participations below 10 percent). Adding the shares held by direct investors would increase the measured size of non-resident ownership of domestic shares.

Table 4 summarizes the geographical distribution of portfolio equity investment among the main advanced economies. For the euro area, the table also highlights the relative importance of cross-country intra-euro area holdings and claims of euro area residents on nonresidents. One striking feature to emerge from the first column is the importance of other euro area countries and the United Kingdom in euro area portfolios, which far exceeds their relative importance in world stock market capitalization. United Kingdom residents also hold large share positions in the euro area. Japan's external equity holdings broadly reflect the relative size of foreign equity markets, while US holdings tend to be relatively large in the United Kingdom and small in Japan.¹⁶

C. Other Data Sources

We consider a wide range of explanatory variables in our empirical analysis. The data appendix describes the data sources and construction methods for these variables, which include, in addition to standard macroeconomic variables, bilateral trade data from the IMF's Direction of Trade Statistics, stock market capitalization and equity returns from Morgan Stanley Capital International, Datastream, and other sources, and dummies for currency union, common language, and a common colonial past taken from Andy Rose's website.

V. EMPIRICAL RESULTS

In this draft, we focus on explaining the portfolio equity positions for end-2001. In line with the discussion above, we report results for three different dependent variables: bilateral positions; aggregate asset positions; and aggregate liability positions.

A. The Geography of Bilateral Positions

In Tables 5 and 6, we present results of panel regressions of equity holdings that control for both fixed source and host country effects. Hence the only explanatory variables included in the regression are those that have variation along both sample dimensions. Because of the log specification of the regressions, adopted in line with the literature on gravity models, the effect of variables such as the (log) product of host and source country area, population, GDP, etc. are automatically soaked up by the fixed host and source effects.

Among the explanatory variables, tables 5 and 6 include a number of proxies for information barriers and 'cultural' distance that have been widely used in the literature attempting to

¹⁶ Note that since the US represented close to 50 percent of world stock market capitalization (Table 3), the distribution of its external holdings in Table 4 should be compared with the first column of Table 3 multiplied by a factor of 2.

explain trade and capital flows with gravity models.¹⁷ These include: the log of geographical distance; the time difference (to proxy for the difficulties of communication when the overlap between office hours is limited, as suggested by Portes and Rey (2003) and Stein and Daude (2003)); a dummy for countries that have been in a colonial relation; a dummy for countries in a strict currency union; a dummy for a common language; and a dummy for a European Union pair. Other explanatory variables include the log of bilateral trade (for the regressions in Table 6 only); the correlation between stock market returns in the source and host country (measured in US dollars); the correlation in growth rates between source and host country; the correlation between source-country GDP and host-country equity returns (following Davis et al (2001)); and the volatility of monthly bilateral real exchange rate changes.

The number of source countries for which data are available for all our variables is 42, and the number of host countries 52. The main data constraint is the variable measuring correlation between stock market returns. In each table, the first column includes all source countries for which data are available; the second column (and all the following ones) excludes offshore source centers; the third also excludes those countries whose total portfolio equity assets are below US\$500 million; the fourth column includes only OECD source countries (excluding Korea, Mexico, and transition economies); and the last includes EU source countries only.

When bilateral trade is excluded from the explanatory variables (Table 5), log distance and the colony dummy are highly statistically significant in all regressions, with relatively stable coefficients across samples. For example, if a country pair has been in a colonial relation in the past, the level of cross-equity holdings is, *ceteris paribus*, twice as large. In samples which also include emerging markets, the time difference, the common language dummy, the correlation of stock returns, and the correlation of growth rates are significant.¹⁸ However, the stock return and growth rate correlations are positive in sign, contrary to a diversification motive.¹⁹ The correlation between domestic output growth and the foreign stockmarket return is never significant.

¹⁷ See, for example, Frankel and Rose (2002). On the application of gravity models to various components of capital flows, see, among others, Portes and Rey (2003) and Rose and Spiegel (2002).

¹⁸ Yildirim (2003) reports similar findings for distance and language, in a specification without country and host fixed effects. She also considers a variety of corporate governance indicators.

¹⁹ Portes and Rey (2003) find that the covariance of stock returns has a positive impact on bilateral equity flows if distance is excluded from the regression, but turns negative once distance is included. However, in our case, the correlation remains positive even if distance is held fixed. (The results are similar whether we use covariances or correlations. A similar picture applies when we consider real local returns versus real dollar returns.)

Finally, the EU pair dummy is negative and statistically significant in all samples, except the one which includes only EU countries, in which the coefficient becomes significantly positive. In other words, for EU source countries, other EU members are favorite investment destinations, but if we include other source countries the fact that two countries are EU members actually implies on average *lower* cross-equity holdings. The correlation between source-country GDP and host-country equity returns is statistically insignificant in all regressions.

In Table 6 we add the log of (one plus) source country imports from host countries (averaged between the 2000 and the 2001 level) as a control variable. The variable is strongly statistically significant in all specifications.²⁰ In fixed-effect bilateral regressions (of which we report only one, in Table 1), the coefficient is 0.65 or larger, depending on the source country sample. The coefficient is in the range [0.38-0.44] when other controls are added, with the exception of a larger value of 0.64 for the EU source sample. The importance of trade here stands in contrast to the evidence of Ahearne et al (2003) for the US pattern of overseas investment: using 1997 data, they find no role for bilateral trade in explaining the bilateral equity holdings of US investors.²¹

While coefficient and statistical significance for the stock market correlation and growth correlation variables are broadly unchanged from the previous table, the colony dummy and especially the log distance variable have, not surprisingly, a much smaller and less precisely estimated coefficients. The relative insignificance of distance in columns (4)-(6) differs from the results for equity transaction flows in Portes and Rey (2003): one interpretation is that the information frictions captured by distance may matter more for turnover than equity holdings.²² Adding trade has a more modest impact on the time difference variable, which remains statistically significant at the 10 percent level in four of the specifications, as well as on the common language dummy and the EU pair dummy.

In sum, the geography of bilateral portfolio equity holdings is strongly related to bilateral trade, but also to common language and (in the 'wrong' direction) the correlations between

²⁰ Figure A.2 shows the scatter plot of equity positions against imports. The simple pooled regression generates an elasticity of 0.39 (t-statistic of 22.2), with an R-squared of 0.18.

²¹ Their specification includes a different array of control variables and, of course, cannot control for fixed host country effects.

²² The correlation between bilateral equity holdings and bilateral equity flows is significantly positive at 0.55 (re-check!) for the 14 country sample examined by Portes and Rey (2003). (We thank the authors and Capital Data for providing us with their data.) Following Portes and Rey (2003), we also examined bilateral telephone traffic as an information variable but found it to be insignificant once trade is included as a regressor. For the small number of countries with available data, we also tried the share of immigrants from the host country in the source country's population but this variable was also insignificant.

source and host stock returns and growth rates. The impact of distance variables is considerably weakened once we control for bilateral trade, but the time difference remains significant in some specifications.

B. Aggregate Asset Positions

Results are presented in Table 7. We start from a sample of 66 countries (the 67 that participated in the CPIS minus the Cayman Islands that did not report portfolio equity assets). Among the variables explaining cross-country heterogeneity in total external asset holdings, we start in column (1) with a minimum set of variables which includes the size of the domestic economy, its GDP per capita, total exports of goods and services, and the size of the domestic stock market. This set of variables restricts our sample size to 53, on account of lack of data on domestic stock market capitalization, primarily from small economies with offshore centers.²³

In columns (1)-(3), the dependent variable is the fixed source-country effects estimated from the regression of log bilateral equity shares on log source-country imports. This is in line with our theoretical approach (equation (19) in Section II.A). To check robustness, in columns (4)-(6) we present instead results using as dependent variable the overall stock of portfolio assets, taken to be the highest between the one reported in the 2001 CPIS survey and the one reported in the International Investment Position.²⁴

The dominant factors explaining equity asset positions are clearly GDP per capita and domestic stock market development. Also, there is some evidence that capital controls (in this instance measuring restrictions on transactions in capital market securities) discourage foreign portfolio equity investment.²⁵ Columns (2) and (5) add the domestic stock market's "beta" vis-à-vis the MSCI world return index among the explanatory variables—its coefficient is negative and significant, suggesting reduced holdings of external assets when the domestic stock market is strongly correlated with world returns.²⁶ Columns (3) and (6) add two other variables related to domestic stock market performance: mean monthly returns

²³ The missing observations are Aruba, the Bahamas, Bermuda, Costa Rica, Guernsey, the Isle of Man, Jersey, Lebanon, Macao SAR, the Netherlands Antilles, Panama, Uruguay, and Vanuatu.

²⁴ Countries where the largest differences between the CPIS and the IIP arise are Germany, where the IIP reports higher portfolio equity assets (see discussion in the previous section), and Romania, which reports trivial holdings in the CPIS but over \$1 billion in the IIP.

²⁵ The measure of controls used here is an average over the period 1996-2001 of an index of restrictions on capital market securities constructed by Johnston and Tamirisa (1998) and Johnston and others (1999).

²⁶ Missing observations for beta include, in addition to those listed in the previous footnote, Bulgaria, Cyprus, Estonia, Iceland, Kazakhstan, Malta, Mauritius, Romania, Ukraine.

over the period 1995-2001 and their standard deviation. Results show that the volatility of domestic returns is negatively correlated with external equity holdings, and that once we control for this variable both capital controls and the “beta” lose significance.²⁷

In sum, our results suggest that the overall level of development and the depth of the domestic financial market are reflected in increased external diversification—richer countries and those with a stronger “equity culture” hold larger gross foreign equity positions.

C. Aggregate Liability Positions

The final set of empirical results we present refer to aggregate portfolio equity liabilities. In order to explain what makes countries attractive as a destination for non-resident portfolio equity investors, we use a similar set of explanatory variables as those used for explaining asset holdings. One addition is a dummy for Middle-Eastern countries, which is added because the largest holders of equity assets in the region (Kuwait, Saudi Arabia, United Arab Emirates) did not participate in the CPIS. If we assume that proximity matters for portfolio equity investment (either through trade connections or for informational reasons), the derived liabilities for countries in the Middle-Eastern region are likely to substantially under-estimate their total external equity liabilities.

The overall sample size is constrained by the availability of domestic stock market capitalization data, which reduces the sample from 218 countries/territories for which we have data on derived equity liabilities to 70.²⁸ As the dependent variable, in regressions (1)-(3) we use the fixed host-country effect estimated from the regression of log bilateral equity shares on log source imports, in line with our theoretical approach (see equation (20) in Section II.A). To check robustness, in columns (4)-(6), we present instead results using as the dependent variable the overall stock of portfolio liabilities, taken to be the highest between the one reported in the 2001 CPIS survey and the one reported in the International Investment Position.²⁹ Unlike asset holdings, liabilities are not measured directly by the

²⁷ This result is unrelated to the difference in sample between columns 2 and 3 (Bahrain, Israel, Luxembourg, and the Slovak Republic are missing from the latter).

²⁸ In addition to countries in the sample used for equity assets, we have data on derived liabilities and stock market capitalization for 18 countries/territories that did not participate in the 2001 CPIS. These are Bangladesh*, Bolivia*, China, Croatia*, India, Iran*, Jordan, Latvia*, Lithuania*, Mexico, Morocco, Pakistan*, Peru, Saudi Arabia, Slovenia*, Sri Lanka, Taiwan province of China, Trinidad and Tobago. For countries denoted with an asterisk we have no data for beta—these are therefore excluded from the regressions in columns (2), (4) and (6) of Table 6.

²⁹ Results are broadly similar when we restrict the sample to countries that report their IIP or when we use the CPIS derived liabilities as dependent variable.

CPIS, but can be derived by summing the asset holdings that participating countries report in each destination country.

Results are presented in Table 8. The size of the host country's domestic stock market is the key correlate of portfolio equity liabilities. However, the elasticity is below unity: according to the point estimate, a 10 percent increase in the size of the domestic stock market is not accompanied by a proportionate increase in foreign equity liabilities. Also, the offshore and Middle-Eastern dummies are highly significant, with the expected sign. An index of controls on capital inflows is negatively correlated with total equity liabilities, but is statistically significant only in the regressions using the fixed effect as the dependent variable. The failure to obtain stronger results is probably related on the one side to the difficulty in accurately measuring restrictions on foreign equity investment, and on the other to the collinearity of this variable with the other explanatory variables. The "beta" of the domestic stock market is *positively* correlated with foreign holdings, but not statistically significant, and domestic stock returns and stock market volatility are not statistically significant. In column (4), there is some evidence that aggregate trade volumes (imports) are positively associated with greater equity liabilities.

For columns (4)-(6), the last row of the Table reports the fit of the regression when the dependent variable is the log share of the domestic stock market owned by foreigners.³⁰ As for asset regressions, we also experimented with a host of other potential explanatory variables, including inflation and real exchange rate volatility, alternative measures of capital controls (from Quinn (200x)), and transaction costs on domestic stock markets (from Elkins-McSherry). These do not come in significant.

VI. NEXT STEPS

In the next draft, we plan to further refine our empirical analysis of the determinants of international portfolio equity positions, as well as broaden the scope of the analysis to include the portfolio allocation of different asset classes. A brief summary of these extensions is provided below.

A. Portfolio Equity Investment: The Role of Offshore and Financial Centers

In Section III, we have highlighted the substantial importance of financial and offshore centers in global portfolio equity holdings. These centers typically play the role of financial intermediaries, rather than being the final destination of portfolio investment. In future work, we will experiment with alternative methods to deal with the potential biases that foreign portfolio through offshore centers may entail in understanding the geography of international portfolios. For instance, the availability of data on the geography of portfolio investment to

³⁰ In these regressions, the estimated coefficients for stockmarket capitalization are one minus the point estimates from the baseline specifications. It should be noted that these are significant only at the 10 percent level.

and from offshore centers allows for the application of different methods to “allocate” assets held in and by offshore centers to the ultimate investor countries. Potentially, these adjustments can alter our results, both with regard to the geographical distribution of equity assets, but also with regard to their total amount, since part of the funds invested in offshore centers may be then re-invested in the source country.

Table 9 offers some initial ‘geographical’ perspective on the size of investment in offshore and financial centers: it lists, for the main international investors, the amount of equity assets held in offshore and financial centers, and the amount of derived liabilities to these centers. For example, assets held in offshore and financial centers are over 40 percent of total portfolio equity assets for Belgium and Italy, and over 25 percent in Germany (almost entirely reflecting holdings in Luxembourg). Derived liabilities to offshore and financial centers are also significant, albeit less dramatically so in proportion to total derived liabilities.

B. Portfolio Equity Investment: Other Extensions

In future iterations, we also plan to consider other potential determinants of aggregate equity positions, such as corporate governance variables, the impact of listing on international exchanges, the share of market capitalization held by insiders and psycho-cultural factors such the degree of patriotism.³¹ We will explore a variety of sample splits: for instance, are allocations to industrial host countries driven by different factors than allocations to emerging market and low income countries?

In this draft, we have not addressed some potential endogeneity issues. Some of our regressors may be influenced by the level of bilateral financial linkages: an important task is to develop instruments that can help establish lines of causation.

We also plan to develop the economic implications of the asymmetries in the geographical portfolio allocations that have been highlighted in this draft. For instance, these data may be employed to calculate the differential wealth impact across source countries of a financial shock such as a decline in the US stock market: those countries with greater exposures to the US clearly suffer a greater loss. In addition, asymmetries in investment positions also have implications for the behavior of bilateral exchange rates: it should be the case that the bilateral exchange rate response to a given shock is affected by the degree of bilateral financial integration. More broadly, these data are an alternative source in examining whether bilateral financial integration affects other bilateral economic relations.³² Of course, establishing lines of causality between financial and other linkages is a challenging task.

³¹ Each of these variables has been previously examined by other authors. As previously noted, Yildirim (2003) examines corporate governance variables. Ahearne et al (2003) emphasize the cross-listing effect and Edison and Warnock (2003b) the share of closely-held equity. Morse and Shive (2003) highlight the patriotism effect.

³² Imbs (2003a, 2003b) makes some progress on these questions.

C. Other International Investment Assets

This paper has only examined the portfolio equity component of international investment positions. In future work, we plan to be much broader in scope, conducting comparative analysis across different asset classes by looking portfolio debt allocations; bank loans and deposits; and FDI positions. In this way, we will be able to provide a comprehensive account of the various components of the geography of international investment positions and gain further insight into the ‘external capital structure’ of nations.

At a more speculative level, it is also worth exploring whether the bilateral pattern of investment also influences aggregate economic variables: for instance, does ‘financial remoteness’ or the composition of the investor base affect the level of aggregate investment, the cost of capital and the stability of capital flows?

VII. CONCLUDING REMARKS

This paper makes use of a new dataset on bilateral portfolio equity investment, which covers a very significant number of the largest portfolio equity investor countries, including offshore centers. A stylized theoretical model, based on trade costs, provides a simple framework for analyzing cross-country portfolio investment patterns. The theoretical framework informs the empirical analysis, which highlights key correlates of bilateral equity investment patterns, as well as of aggregate portfolio equity assets and liabilities. While bilateral equity investment is strongly correlated with the underlying patterns of trade in goods, it is also associated with other variables such as a common language and (‘perversely’) the correlation between source and host stock returns and growth, and a common language. With regard to the size of overall portfolio equity investment abroad, we find evidence that the overall level of development and the depth of the domestic financial market are reflected in increased opportunities for external diversification—richer countries and those with a stronger “equity culture” hold larger gross foreign equity positions. The size of the host country’s domestic stock market is the key correlate of aggregate foreign portfolio equity liabilities.

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Appendix

A. Countries and regions participating in the 2001 Coordinated Portfolio Investment Survey:

Argentina, Aruba, Australia, Austria, the Bahamas, Bahrain, Belgium, Bermuda, Brazil, Bulgaria, Canada, Cayman Islands, Chile, Colombia, Costa Rica, Cyprus, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, Guernsey, Hong Kong SAR of China, Hungary, Iceland, Indonesia, Ireland, Isle of Man, Israel, Italy, Japan, Jersey, Kazakhstan, republic of Korea, Lebanon, Luxembourg, Macao SAR of China, Malaysia, Malta, Mauritius, Netherlands, Netherlands Antilles, New Zealand, Norway, Panama, Philippines, Poland, Portugal, Romania, Russian Federation, Singapore, Slovak Republic, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, United Kingdom, United States, Uruguay, Vanuatu, Venezuela.

B. Variables: sources and definitions

Bilateral portfolio equity holdings: Portfolio equity instruments issued by host country residents and held by source country residents. Source: 2001 Coordinated Portfolio Survey.

Total portfolio equity holdings, CPIS: Total portfolio equity holdings held by source country residents as reported in the 2001 Coordinated Portfolio Survey.

Total portfolio equity assets and liabilities, IIP: Total portfolio equity assets and liabilities reported in countries' International Investment Position. Source: International Monetary Fund, International Financial Statistics and national sources.

Source-country imports: Imports of goods by source countries from host countries (average 2000-01). Source, International Monetary Fund, Direction of Trade Statistics.

Log distance:

Time difference:

Common Language:

Colony dummy:

Strict Currency Union:

Correlation of stock returns: Correlation between the stock market returns of the host and source country, expressed in US dollars. Source; authors' calculations based on returns data from Datastream and Morgan Stanley Capital International.

Correlation in growth rates: correlation between the GDP growth rate in the source and host country. Source: authors' calculations based on World Bank, World Development Indicators.

Correlation growth-stock return:

Real exchange rate volatility Volatility of the bilateral real exchange rate index between the source and the host country for the period . Source: authors' calculations based on International monetary Fund, Information Notice System.

Log GDP: Log of 2001 GDP level in current US dollars. Source: World Bank, World Development Indicators.

Log GDP per capita: Log of 2001 GDP per capita level in current US dollars. Source: World Bank, World Development Indicators.

Log domestic stock market capitalization: log of the domestic stock market capitalization in US dollars as of end-2001. Sources: Datastream, xxxx and national sources.

Capital controls (equity assets): Index of restrictions on transactions in capital market securities, 1996-2001. Source: Johnston and Tamirisa (1998) and Johnston and others (1999).

Capital controls (equity liabilities): Index of restrictions on capital inflows, 1996-2001. Source: Johnston and Tamirisa (1998) and Johnston and others (1999).

Offshore dummy: Dummy variable taking the value of 1 if the country or territory is an offshore center or an international financial center.

Table 1. Largest holders of portfolio equity assets*

Largest asset holdings (US\$ billion)		Largest asset holdings (ratio of GDP)	
United States	1613	Luxembourg	16.6
United Kingdom	558	Jersey	14.8
Germany	381	Guernsey	13.5
Luxembourg	319	Isle of Man	9.6
Switzerland	247	Bermuda	8.6
Italy	239	Netherlands Antilles	2.2
Netherlands	235	Ireland	1.3
Japan	227	Bahamas	1.1
France	202	Switzerland	1.0
Canada	199	Netherlands	0.61

* The euro area's portfolio equity assets (calculated from the CPIS survey) amount to US\$893 billion.

Table 2. Largest holders of portfolio equity liabilities*

Largest derived liabilities US\$ billion (reported IIP equity liabilities in brackets)		Largest derived liabilities (ratio of GDP)	
United States	1000 (1533)	Cayman Islands	78.5
United Kingdom	711 (768)	Bermuda	43.7
France	387 (416)	Virgin Islands, British	28.7
Luxembourg	376 (N.A.)	Luxembourg	19.5
Japan	330 (376)	Netherlands Antilles	8.3
Netherlands	287 (284)	Guernsey	4.3
Germany	273 (296)	Jersey	2.2
Switzerland	201 (322)	Dominica	1.7
Bermuda	157 (N.A.)	Bahamas	1.1
Italy	119 (35)	Gibraltar	1.0

* The numbers in brackets in the first column are the total portfolio equity liabilities as reported by countries in their International Investment Position (IIP). The 2001 equity liabilities of the euro area reported in their IIP amounted to US\$1411 billion.

Table 3. Summary statistics on stock market size and foreign ownership (2001)

Country \ Variable	Domestic stock market cap. in percent of world stock market cap.	Percent of domestic stock market cap. owned by foreign portfolio investors	Domestic GDP in percent of world GDP
Euro area	15.9	36.5	19.6
Japan	9.3	16.7	13.4
United Kingdom	8.9	35.6	4.6
United States	48.9	12.9	32.3
Other	17.0	N.A.	30.1

Note: world stock market capitalization is calculated as the sum of stock market capitalization of 71 countries in the sample. In this calculation, holdings of shares by residents of one euro area country in another are considered domestic holdings.

Table 4. Summary geographical distribution of portfolio equity investment, 2001

Source \ Destination	Euro area	Japan	United Kingdom	United States
Euro area	48.2	16.8	41.5	28.8
Outside euro area	51.8	83.2	58.5	71.2
Japan	7.6		9.4	10.7
United Kingdom	21.8	13.0		21.9
United States	45.0	54.3	23.1	
Other	25.6	15.9	26.0	38.6

Note: Percentage of total portfolio equity investment of source country in destination country. Percentage for investment from the euro area into the euro area refer to the share of intra-euro area investment in total gross euro area equity investment, and the same for investment from the euro area outside the area. The shares of investment in Japan, United Kingdom, United States, and other are shares of total investment outside the euro area. For Japan, United Kingdom, and United States the shares of investment in Japan, United Kingdom, United States, and other are instead shares of total investment.

Table 5. Bilateral portfolio equity holdings at end-2001:
panel regressions with fixed source and host effects (excluding trade)

	(1) Full sample	(2) Excluding offshore & fin. ctr. source countries	(3) “Large” source investors (no fin. ctrs)	(4) OECD source countries (no fin. ctrs)	(5) EU source countries (no fin. ctrs)
Log distance	-0.60 (5.59)**	-0.69 (5.96)**	-0.60 (5.10)**	-0.59 (4.97)**	-0.89 (5.27)**
Time difference	-0.08 (3.58)**	-0.07 (2.98)**	-0.08 (3.23)**	-0.00 (0.02)	0.11 (0.81)
Common language	0.60 (4.05)**	0.51 (3.15)**	0.47 (2.96)**	0.28 (1.78)	0.10 (0.41)
Colony dummy	0.59 (2.38)*	0.71 (2.71)**	0.71 (2.75)**	0.65 (2.76)**	0.84 (2.88)**
Strict currency union	0.16 (0.62)	0.26 (0.94)	0.42 (1.56)	0.54 (2.30)*	0.52 (1.77)
EU pair dummy	-0.75 (2.99)**	-0.75 (2.86)**	-0.77 (2.91)**	-0.47 (2.00)*	3.74 (4.90)**
Correlation stock returns	2.25 (4.44)**	1.99 (3.57)**	1.66 (2.84)**	0.02 (0.03)	0.89 (1.11)
Correlation in growth rates	0.64 (3.47)**	0.65 (3.35)**	0.66 (3.22)**	0.39 (1.93)	0.49 (1.55)
Correlation growth- stock return	0.04 (0.23)	0.07 (0.37)	0.13 (0.64)	-0.07 (0.33)	-0.34 (1.15)
RER volatility	0.30 (0.03)	1.85 (0.15)	-8.91 (0.67)	-9.73 (0.70)	5.11 (0.20)
Observations	1252	1144	1031	782	494
Number of source co.	44	41	32	21	13
Adjusted R ²	0.20	0.20	0.32	0.43	0.57

Note: the dependent variable is the log of portfolio equity holdings of the source country in the host country. Regressions include fixed source and host country effects. t-statistics reported in parenthesis. * (**) indicates statistical significance at the 5 percent (1 percent) confidence level. Offshore source countries excluded from sample in columns (2)-(5) are Bahrain, Ireland, and Luxembourg.

Table 6. Bilateral portfolio equity holdings at end-2001:
panel regressions with fixed source and host effects (including trade)

	(1) Full sample	(2) Full sample	(3) Excluding offshore & fin. ctr. source count.	(4) “Large” source investors (no fin. ctrs)	(5) OECD source countries (no fin. ctrs)	(6) EU source countries (no fin. ctrs)
Log source country imports	0.65 (18.53)**	0.38 (6.51)**	0.43 (6.78)**	0.43 (6.54)**	0.44 (7.26)**	0.64 (6.77)**
Log distance		-0.26 (2.15)*	-0.30 (2.39)*	-0.23 (1.82)	-0.21 (1.63)	-0.33 (1.85)
Time difference		-0.06 (2.78)**	-0.05 (2.02)*	-0.05 (2.21)*	0.02 (0.87)	0.10 (0.78)
Common language		0.50 (3.38)**	0.41 (2.57)*	0.38 (2.44)*	0.18 (1.21)	0.02 (0.11)
Colony dummy		0.36 (1.46)	0.43 (1.66)	0.44 (1.73)	0.37 (1.63)	0.37 (1.28)
Strict currency union		0.18 (0.71)	0.29 (1.06)	0.42 (1.59)	0.53 (2.34)*	0.60 (2.13)*
EU pair dummy		-0.76 (3.09)**	-0.77 (2.99)**	-0.77 (2.96)**	-0.45 (1.97)*	3.96 (4.63)**
Correlation stock returns		2.23 (4.48)**	1.93 (3.54)**	1.60 (2.79)**	-0.07 (0.12)	1.13 (1.48)
Correlation in growth rates		0.67 (3.69)**	0.69 (3.59)**	0.70 (3.51)**	0.41 (2.10)*	0.44 (1.46)
Correlation growth-stock return		0.01 (0.06)	0.07 (0.34)	0.10 (0.52)	-0.12 (0.62)	-0.27 (0.97)
RER volatility		1.56 (0.13)	2.12 (0.17)	-7.62 (0.58)	-8.33 (0.62)	-9.75 (0.40)
Observations	2331	1250	1142	1030	782	494
Number of source co.	63	44	41	32	21	13
Adjusted R ²	0.35	0.27	0.32	0.43	0.57	0.71

Note: the dependent variable is the log of portfolio equity holdings of the source country in the host country. Regressions include fixed source and host country effects. t-statistics reported in parenthesis. * (**) indicates statistical significance at the 5 percent (1 percent) confidence level. Offshore and financial center source countries excluded from sample in columns (2)-(5) are Bahrain, Ireland, and Luxembourg.

Table 7. Determinants of aggregate portfolio equity assets
(2001 end-of-period stock)

	(1) CPIS (fixed effect)	(2) CPIS (fixed effect)	(3) CPIS (fixed effect)	(4) Max CPIS, IIP)	(5) Max CPIS, IIP)	(6) Max CPIS, IIP)
Log GDP	-0.42 (1.48)	-0.45 (1.63)	-0.50 (2.03)	0.31 (1.06)	0.08 (0.29)	0.16 (0.68)
Log GDP per capita	0.85 (3.19)**	0.71 (2.44)*	0.57 (2.05)*	1.27 (4.57)**	1.02 (3.58)**	0.70 (2.58)*
Log domestic Stock mkt cap	0.83 (3.54)**	0.77 (3.35)**	0.64 (3.02)**	0.58 (2.35)*	0.74 (3.31)**	0.46 (2.21)*
Log exports	-0.01 (0.09)	0.14 (1.10)	0.08 (0.63)	0.06 (0.46)	0.13 (1.00)	0.00 (0.01)
Capital controls	-2.01 (2.57)*	-1.94 (2.19)*	-0.86 (1.16)	-1.44 (1.76)	-1.71 (1.99)	-0.75 (1.02)
Offshore dummy	1.36 (1.80)	2.28 (2.61)*	1.30 (1.27)	1.45 (1.84)	1.64 (1.92)	0.66 (0.65)
Beta (1995-2001)		-0.93 (2.17)*	-0.23 (0.28)		-0.87 (2.08)*	0.80 (0.97)
Domestic stockmkt Returns 1995-2001			0.05 (0.31)			0.11 (0.62)
SD domestic stock Returns 1995-2001			-0.22 (1.97)			-0.35 (3.28)**
Constant	-12.19 (4.20)**	-10.48 (3.47)**	-5.40 (1.72)	-13.17 (4.35)**	-9.52 (3.23)**	-2.12 (0.68)
Observations	53	44	40	53	44	40
Adjusted R ²	0.78	0.80	0.86	0.84	0.86	0.91

Note: Dependent variable in columns (1)-(3) is the fixed source country effect obtained from a panel regression of log bilateral equity holdings on log source country imports from host countries (see Table 6). Dependent variable in columns (4)-(6) is the log of the maximum stock of portfolio equity assets between the one reported in the CPIS and the one reported in the country's International Investment Position. t-statistics in parenthesis. * (**) indicates statistical significance at the 5 percent (1 percent) confidence level. CPIS indicates the stock derived from the 2001 Portfolio Survey; IIP indicates the stock reported in the International Investment Position.

Table 8. Determinants of aggregate portfolio equity liabilities
(2001 end-of-period stock)

	(1) CPIS (fixed effect)	(2) CPIS (fixed effect)	(3) CPIS (fixed effect)	(4) Max (CPIS, IIP)	(5) Max (CPIS, IIP)	(6) Max (CPIS, IIP)
Log GDP	-0.10 (0.55)	-0.10 (0.55)	-0.07 (0.53)	-0.10 (0.40)	0.01 (0.02)	0.02 (0.12)
Log GDP per capita	0.12 (0.96)	0.12 (0.85)	0.02 (0.13)	0.18 (1.12)	0.22 (1.12)	0.28 (1.93)
Log domestic stock mkt cap	0.64 (5.02)**	0.71 (5.37)**	0.62 (5.52)**	0.71 (4.45)**	0.75 (4.21)**	0.82 (6.42)**
Log imports	-0.18 (0.81)	-0.28 (1.32)	-0.19 (1.14)	0.66 (2.39)*	0.25 (0.87)	0.13 (0.72)
Capital controls	-1.71 (3.01)**	-1.41 (1.99)	-1.12 (2.08)*	-1.07 (1.50)	-1.09 (1.13)	-0.46 (0.76)
Offshore dummy	1.76 (4.42)**	2.72 (6.08)**	1.94 (4.04)**	0.84 (1.69)	1.53 (2.52)*	2.48 (4.57)**
mid east	-0.92 (2.82)**	-1.08 (3.03)**	-0.87 (2.23)*	-2.02 (4.94)**	-2.41 (4.99)**	-1.98 (4.47)**
Beta (1995-2001)		0.29 (1.51)	0.38 (1.36)		0.44 (1.68)	0.09 (0.28)
Domestic stockmkt Returns 1995-2001			0.15 (1.81)			0.01 (0.12)
SD domestic stock Returns 1995-2001			-0.03 (0.78)			0.03 (0.66)
Constant	-7.68 (5.66)**	-7.85 (4.89)**	-7.26 (5.34)**	-5.59 (3.28)**	-3.53 (1.62)	-3.73 (2.43)*
Observations	70	52	46	70	52	46
Adjusted R ²	0.78	0.82	0.88	0.89	0.87	0.94
R ² when dep. var. is log (equity/mkt cap)				0.45	0.53	0.66

* Dependent variable in columns (1)-(3) is the fixed host country effect obtained from a panel regression of log bilateral equity holdings on log source country imports from host countries (see Table 6). Dependent variable in columns (4)-(6) is the log of the maximum stock of portfolio equity liabilities between the one reported in the CPIS and the one reported in the country's International Investment Position. t-statistics in parenthesis. CPIS indicates the stock derived from the 2001 Portfolio Survey; IIP indicates the stock reported in the International Investment Position.

Table 9. Portfolio equity investment: the role of financial and offshore centers

Largest portfolio equity asset holdings in offshore and financial centers			Largest derived equity liabilities to offshore and financial centers		
	US\$ billion	Share of total portf. equity assets		US\$ billion	Share of derived portfolio equity liabs.
United States	197.0	12.3%	United States	167.3	16.8%
Germany	104.4	27.4%	United Kingdom	77.0	10.9%
Italy	103.7	43.3%	Germany	41.4	15.3%
Switzerland	73.0	29.5%	France	38.2	9.8%
Belgium	49.8	46.9%	Japan	29.0	8.7%
Hong Kong	42.9	45.3%	Netherlands	22.4	7.8%
France	26.6	14.4%	Switzerland	18.9	9.4%
United Kingdom	19.3	3.5%	Italy	17.7	14.8%
Japan	18.3	8.1%	Cayman Islands	15.2	16.6%
Luxembourg	13.2	4.1%	Luxembourg	12.5	3.4%

Figure A1. Scatter of 2001 Equity Holdings versus 1997 Equity Holdings

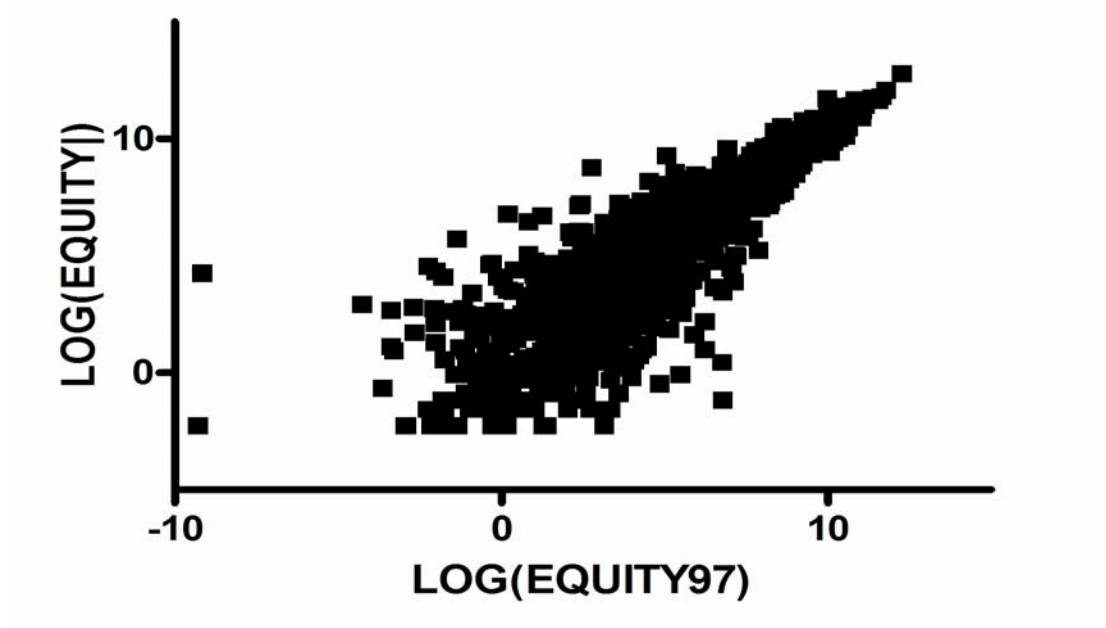


Figure A2. Scatter of 2001 Equity Holdings versus 2001 Imports

