

# INTERNATIONAL INVESTMENT PATTERNS

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*Abstract*—We provide a systematic analysis of the bilateral factors driving portfolio equity holdings across countries. We find that bilateral equity holdings are strongly correlated with bilateral trade in goods and services. Larger bilateral positions are also associated with proxies for informational proximity.

## I. Introduction

THIS paper 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 in product or asset markets, benchmark economic theory suggests that investors should 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, how do frictions in product markets affect the structure of international financial trade? Are cultural/informational factors important in explaining the bilateral structure of international portfolios? What is the connection between domestic and international financial development? Answers to these questions are of interest for several fields in economics, including international macroeconomics and international finance, portfolio analysis, and behavioral finance.

In this exploratory work, we focus on international portfolio equity investment, and seek to explain the wide variation in bilateral portfolio allocations observed in the data. The determinants of bilateral holdings also combine to affect aggregate positions: a financially remote country will receive less inward investment and faces a higher cost of equity capital. Further, the geography of international investment can also influence 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 toward country C. In related fashion, the geography of investment positions also heavily shapes international risk-sharing patterns.

Although previous research has studied 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 United States). In this paper, we make use of a new data set on international portfolio positions that provides a geographical breakdown of international portfolio holdings for 67 source countries, which include virtually all major international investors, vis-à-vis over 200 destination countries. We highlight the connections between the geography of product trade and the geography of equity portfolios, and also explore the roles played by financial and informational frictions. In highlighting the role of bilateral factors in explaining the geography of countries' equity holdings, we control for country characteristics that explain aggregate foreign equity asset and liability positions.

The rapidly increasing literature trying to explain bilateral international investment patterns has used empirical methods borrowed from traditional gravity models of international trade, and has focused on foreign direct investment (FDI) and bank lending, for which data are more readily available. Studies on the geography of FDI include Wei (2000) and Stein and Daude (2007), among many others, while studies on bank lending include Buch (2002) and Rose and Spiegel (2004). The latter paper highlights the positive association between bilateral trade and bilateral bank lending, where the mechanism is that closer trade links raise the cost of default and so raise the volume of lending.<sup>1</sup> Ghosh and Wolf (2000) and Sarisoy Guerin (2006) conduct a comparative analysis of the impact of spatial factors on different international investment categories.

A number of papers have also focused more specifically on the pattern of bilateral equity investment. For example, Portes and Rey (2005) 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 international equity flows. Other studies on the geography of portfolio equity investment have focused primarily on a single source country, with most attention paid to the United States (Ahearne, Grier, & Warnock, 2004; Mann & Meade, 2002; Dahlquist et al. 2003). An exception is Yildirim (2003) that examines the role of various corporate governance indicators in determining investment patterns, employing a subset of the CPIS data (23 source countries, 49 host countries) for which such data are available.<sup>2</sup> Several of these studies are

<sup>1</sup> Rose (2005) provides evidence that sovereign default is followed by a decline in bilateral trade with creditor countries.

<sup>2</sup> Subsequent to the initial circulation of our paper, there have been two new studies in this area. Vlachos (2004) examines how similarities in the financial regulatory environment affect bilateral portfolio holdings. Aviat and Coeurdacier (2007) examine trade and portfolio investment patterns in a simultaneous-equations framework. They argue that asset holdings may endogenously affect goods trade but find the strength of this channel to be weak.

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related to the voluminous literature on home bias. This literature is relevant; however, our approach is substantially different in focus, in that we seek to explain the structure of the international component of portfolios rather than the split between domestic and foreign allocations.

Relative to the existing literature, this paper innovates by developing a “double fixed effects” empirical specification that provides a coherent framework for analyzing bilateral equity holdings. Its most striking empirical finding is the strongly positive association between bilateral trade and portfolio allocations, even controlling for a host of gravity-type variables. In addition, bilateral portfolio holdings are found to be significantly correlated with informational/cultural linkages, such as common language and legal origins.

The structure of the rest of the paper is as follows. Section II reviews the theoretical issues that are relevant in thinking about bilateral holdings and section III the empirical strategy. Section IV describes the data and discusses some relevant interpretation issues. Econometric results are reported in section V. Some preliminary conclusions and directions for future research are outlined in section VI.

## II. Theoretical Issues

We can identify three main theoretical approaches to modeling bilateral equity investment. First, a recent literature has reawakened interest in the connection between frictions in goods markets and portfolio choices. Most prominently, Obstfeld and Rogoff (2001) show that the existence of frictions in product markets can generate a home bias in equity positions, even if global financial markets are complete.<sup>3</sup> The intuition for this result is that consumption risk derives from shocks to a country’s domestic production and output of its trading partners—a resident in country A is fully insulated from shocks to production in country B if it imports nothing from country B. In contrast, a potential hedge against output shocks in country C (from which it imports) is to hold equity in that country: the increase in domestic demand for imports from country C in the event a reduction in the relative price of good C can be financed by compensating dividend yields through holding equity in country C.

Coeurdacier (2006) shows that this result is sensitive to parameter choices: in particular, a higher (and more realistic) degree of risk aversion than assumed by Obstfeld and Rogoff can deliver a different pattern, with higher trade costs associated with a smaller home bias in equity portfolios. However, he also shows that if financial frictions produce portfolio home bias, then a reduction in trade costs increases the optimal foreign share in portfolios. Since lower trade costs imply that domestic firms face greater

foreign competition, hedging is obtained by holding the equity of the foreign firms that compete with domestic firms. This implies that bilateral equity holdings should positively covary with bilateral imports.

A second line of research, developed by Martin and Rey (2004), focuses on transactional frictions in asset markets.<sup>4</sup> 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 international asset trade. This approach implies that equity positions are a function of the cost of bilateral financial trade and the endogenously determined market capitalization levels. These authors broadly interpret financial frictions to include informational asymmetries.

Davis, Nalewaik, and Willen (2001) also focus on financial market incompleteness. In their setup, a domestic agent faces a risky labor income stream, and 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 labor income and the return on the risky 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 differences in labor income streams mean 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 develop a general empirical specification that highlights the potential for bilateral goods trade to explain bilateral asset holdings but also allows for a host of proxies for informational and financial frictions to also influence portfolio allocations.

## III. Empirical Strategy

We focus on bilateral portfolio equity holdings for the year 2001 (as discussed in more detail in section IV). Our empirical strategy is to isolate the relative contributions of (i) bilateral factors; (ii) source country factors; and (iii) host country factors. Source country factors relate to cross-country differences in the propensity to invest overseas, while host country factors relate to variation in the attractiveness of different overseas investment destinations. Controlling for these aggregate characteristics, bilateral factors may explain the heterogeneity in the geographical composition of the

<sup>3</sup> In Lane and Milesi-Ferretti (2004), we generalize this model to  $N$  countries and draw out its implications for bilateral equity holdings. The model’s parameterization delivers the strong prediction of perfect covariation between bilateral imports and portfolio allocations.

<sup>4</sup> See also the application in Martin and Rey (2000). The working-paper version of Ahearne et al. (2004) generates a similar reduced form, employing the portfolio model with country-specific proportional investment costs originally developed by Cooper and Kaplanis (1986).

asset portfolios of source countries and the investor bases of host countries.

#### A. Specification

We adopt a “double fixed effects” specification in guiding the empirical work:

$$\log(x_{ij}) = \phi_i + \phi_j + \beta Z_{ij} + \varepsilon_{ij}, \quad (1)$$

where  $x_{ij}$  is the level of equity investment in host country  $i$  by source country  $j$ ;  $\phi_i$ ,  $\phi_j$  are dummy variables for each host and source country;  $Z_{ij}$  is a vector of explanatory variables; and  $\varepsilon_{ij}$  is a residual term. The host fixed effect controls for national characteristics that explain why some countries are more attractive than others to all investors; conversely, the source fixed effect controls for features that explain why some countries generally hold larger outward investment positions than others. We include in  $Z_{ij}$  factors that vary across country pairs and hence can help explain why the same destination attracts different levels of investment from different sources. Most existing empirical work on the geographical allocation of equity holdings, such as Ahearne et al. (2004) and Dahlquist et al. (2003), considers a single source country and cannot control for host country fixed effects. Our broader data set allows us to adopt this more general approach.

#### B. Bilateral Factors

Our theoretical review suggests that bilateral portfolio positions are related to bilateral trade, as well as to various informational and financial frictions. While a strict interpretation of the “optimal portfolio” factors discussed earlier would call for the inclusion of imports in the regression, the volume of total bilateral international trade is a more general proxy for information-type variables (for example, about returns in partner countries) as well as for transaction costs. Accordingly, we include the sum of bilateral exports and imports of goods as an explanatory variable.

We also include an array of gravity-type variables to proxy for information costs. Since trade is directly included in the regression, these variables should exert an independent influence on portfolio positions only to the extent that they proxy for additional informational or other financial frictions. Including these variables ensures that the estimated import effect is not driven by omitted variable bias, since these variables are highly correlated with trade but may yet exert an independent influence on equity holdings. The variables are distance; the time zone difference; common language; colonial relationship; a currency union dummy; a dummy for the existence of an investment tax treaty; and, as a general proxy for institutional similarity, a dummy for common origins to the legal system.

In some specifications (albeit at the cost of a major reduction in sample size), we also include some bilateral financial correlations that may influence asset holdings in an

incomplete-markets environment. These include the correlation in stock market returns and the correlation in GDP growth rates. In addition, following Davis et al. (2001), we also include the correlation between host country stock market returns and source country GDP growth, to take into account the role of the host country stock market in potentially hedging against source country output fluctuations. In all cases, correlations are calculated using historical data. Since most foreign equity investment took place since the mid-1990s, we are confident that the endogeneity of financial correlations to the size of bilateral financial holdings is not a major concern. However, as a robustness check, we also report instrumental variables estimates that allow for the potential endogeneity of a number of regressors.

### IV. Data: Description and Issues

The data set combines data on aggregate and bilateral international portfolio equity holdings (readers interested in only the regression analysis can skip to section V). For bilateral data, we rely on the Coordinated Portfolio Investment Survey (CPIS) that is released by the International Monetary Fund. 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 first CPIS reported data for end-1997 for 29 source countries (IMF, 2000), but some major investing nations (such as Germany) did not participate. We rely on data from the second CPIS, reporting holdings at end-2001.<sup>5</sup> This survey, much broader than the earlier one, covers 67 source countries, including several offshore and financial centers. For each source, the survey reports holdings in up to 218 destination countries/territories. The survey is now annual, with data now also available for 2002–2006. However, in contrast to the 2001 survey, subsequent data are not derived from benchmark surveys in all countries—for instance, the United States did not conduct a comprehensive survey in all of those years. In any event, in light of the very high correlation of bilateral investment patterns across 2001–2006, we opted to focus on the cross-section dimension.<sup>6</sup>

Problems with the CPIS data can arise for several reasons:

- *Incomplete country coverage.* Among the countries/territories that did not participate in the CPIS, the likely largest holders of portfolio equity assets are the British Virgin Islands, China, Kuwait, Saudi Arabia, Taiwan, and the United Arab Emirates.
- *Underreporting of assets.* Underreporting can be due to incomplete institutional coverage of the survey. For example, the Cayman Islands reported only the holdings of its banking sector (but not those of its sizable mutual fund industry); the Bahamas also reported

<sup>5</sup> The data are available at <http://www.imf.org/external/np/sta/pi/datars1.htm>.

<sup>6</sup> For instance, a log-log regression of 2005 equity positions on 2001 equity positions gives an elasticity of 0.87 and an overall  $R^2$  of 0.84.

exclusively bank holdings, and the German survey did not cover holdings by households.<sup>7</sup> Underreporting is also likely to occur for countries that experienced 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.

- *Third-party holdings.* Third-party holdings refer to securities issued by country B and held by a resident of country A in an institution residing in country C. Such 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.<sup>8</sup>
- *Problems in collection methods.* For many countries this is the first participation in the CPIS, and therefore collection methods may still be inadequate.

These shortfalls notwithstanding, 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 2001 CPIS was over \$5 trillion. As shown in table 1, the largest foreign investors were the main OECD economies plus Luxembourg, a very small economy with a large financial center. According to the CPIS, “external” equity holdings of the euro area amounted to \$893 billion, while intra-euro area holdings were over \$800 billion. CPIS equity holdings for Germany (and hence for the euro area) are below those reported in the International Investment Position (IIP) because—as noted above—they exclude household holdings. When scaling equity holdings by GDP, financial and offshore centers dominate the picture, with total assets amounting to multiples of their domestic output. Reported portfolio equity holdings by offshore centers and small economies with financial centers (including in the latter category Ireland, Luxembourg, Hong Kong, and Singapore, but excluding Switzerland) were over \$700 billion, notwithstanding the incomplete coverage of the survey.

Table 2 lists the ten largest recipients of portfolio equity investment, derived from the asset claims of the countries that participated in the CPIS. For reference, the first column also reports (in parentheses) total portfolio equity liabilities

<sup>7</sup> For the Cayman Islands, its derived liabilities (themselves likely to be underestimated) exceed its reported assets by close to \$350 billion. For Germany, the portfolio assets reported in the CPIS survey (\$800 billion) are over \$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).

<sup>8</sup> Grier, Lee, and Warnock (2001) discuss the methodology of U.S. surveys and Warnock and Cleaver (2002) highlight the measurement problems posed by third-party holdings. The CPIS Web site provides details on the data collection methods used by each participating country (<http://www.imf.org/external/np/sta/pi/MdQnPr.htm>).

TABLE 1.—LARGEST HOLDERS OF PORTFOLIO EQUITY ASSETS\*

Largest Asset Holdings (\$ billion)		Largest Asset Holdings (ratio of GDP)	
United States	1,613	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 \$893 billion.

TABLE 2.—LARGEST HOLDERS OF PORTFOLIO EQUITY LIABILITIES\*

Largest Derived Liabilities (\$ billion) (reported IIP equity liabilities in parentheses)		Largest Derived Liabilities (ratio of GDP)	
United States	1,000 (1,533)	Cayman Islands	78.5
United Kingdom	711 (768)	Bermuda	43.7
France	387 (416)	Virgin Islands, British	28.7
Luxembourg†	376 (718)	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 parentheses 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 \$1,411 billion.

†Total portfolio equity liabilities for Luxembourg for 2001 are estimated from the joint IIP of Belgium and Luxembourg, the IIP of Belgium, and cross-holdings between Belgium and Luxembourg reported in the 2001 CPIS.

reported in the countries' IIP. The overall pattern is similar to the one for assets—the largest OECD economies were the main destination countries for equity holdings. 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 derived equity liabilities of offshore centers and small economies with financial centers were \$870 billion—larger than reported offshore center assets, even though holdings in offshore centers by foreign residents are clearly underreported. There are two reasons for this finding. 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

Table 3 provides a brief summary of the size of economies, their stock markets, and the share of domestic stocks owned by nonresidents. A couple of interesting stylized facts emerge from this table. First, at end-2001 exchange

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

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.—FOREIGN PORTFOLIO EQUITY INVESTMENT: ACTUAL AND PREDICTED SHARES\*

Host Country	Source Country			
	Euro Area	Japan	United Kingdom	United States
Euro area				
Theor. share		17.5	17.5	31.1
Actual share		16.8	43.7	28.6
Japan				
Theor. share	11.0		10.2	18.1
Actual share	7.3		9.9	10.6
United Kingdom				
Theor. share	10.6	9.8		17.4
Actual share	22.2	13.0		21.7
United States				
Theor. share	58.1	53.8	53.6	
Actual share	45.2	54.3	24.3	
Rest of the world				
Theor. share	20.3	18.8	18.7	33.4
Actual share	25.4	15.9	22.0	39.1

\*Predicted share: ratio of host country's stock market capitalization to the stock market capitalization of the world minus the source country.

Actual share: ratio of source country's equity investment in host country to total source country foreign equity investment.

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 nonresident 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%, respectively).<sup>9</sup>

Table 4 summarizes bilateral portfolio equity investment among the main economies by comparing the share of foreign equity investment in the host country with the share of the host's stock market capitalization in the rest of the world's stock market capitalization—a simple predictive benchmark for portfolio allocation.<sup>10</sup> Japanese foreign equity holdings are closely aligned with the benchmark, but

the United Kingdom invests much more in the euro area than in the United States. The euro area has higher than predicted investment in the rest of the world and especially in the United Kingdom, and lower than predicted investment in Japan and the United States. Finally, the United States is "overweight" in the United Kingdom and the rest of the world, and underweight in the euro area and especially in Japan.

## V. Empirical Analysis

We focus on explaining portfolio equity positions at end-2001. In this paper we report results for bilateral positions; in Lane and Milesi-Ferretti (2004) we also study aggregate asset and liability positions. We consider a wide range of explanatory variables—the data appendix describes data sources and construction methods.

### A. Determinants of Bilateral Equity Holdings: Specification and Estimation

In Tables 5–7, we present results of panel regressions of equity holdings for three samples: all countries; OECD

our empirical work, since we include a full set of source and host country dummies.

<sup>9</sup> Note that table 3 reports only domestic shares owned by portfolio equity investors (who by definition hold participations below 10%). Adding the shares held by direct investors would increase the measured size of nonresident ownership of domestic shares.

<sup>10</sup> A simple CAPM would identify the key predictor to be the share of the host's market capitalization in global market capitalization. However, data on domestic equity holdings by domestic residents are not readily available for many countries. Accordingly, our assumption is based on the conditional conjecture that the allocation of the foreign component of the equity portfolio is in line with the capitalization shares of each destination in the "rest of the world" capitalization. This is just a proportional transformation of the simple CAPM hypothesis, with the same prediction that the ratio of holdings in destinations A and B should equal the ratio of the market capitalizations of A and B. This distinction does not matter for

TABLE 5.—BILATERAL PORTFOLIO EQUITY HOLDINGS, ALL COUNTRIES: PANEL REGRESSIONS WITH FIXED SOURCE AND HOST EFFECTS

Dep. var. (in logs) →	(1)	(2)	(3)	(4)	(5)	(6)
	Equity Panel FE	Equity Panel FE	Equity Panel FE	Equity IV	Equity + $\epsilon$ Panel FE	Equity + $\epsilon$ Tobit
Log bilateral trade	0.91 (21.33)***	0.68 (9.83)***	0.42 (4.49)***	0.63 (5.67)***	0.16 (3.77)***	0.70 (7.87)***
Log distance		-0.31 (2.52)*	-0.02 (0.18)		-1.36 (11.03)**	-0.97 (4.74)**
Time difference		0.01 (0.40)	-0.09 (3.52)**		0.10 (3.69)**	0.00 (0.06)
Common language		0.50 (3.01)**	0.46 (3.01)**	0.34 (2.19)*	0.45 (2.64)**	0.91 (3.17)**
Colony dummy		0.38 (1.47)	0.34 (1.35)	0.25 (0.99)	0.62 (2.09)*	1.06 (2.31)*
Tax treaty		0.17 (1.20)	-0.03 (0.22)	-0.08 (0.54)	0.64 (4.44)**	0.87 (3.61)**
Currency union dummy		0.02 (0.07)	0.05 (0.26)	0.22 (0.85)	1.31 (4.00)**	-0.44 (0.95)
Correl. in growth rates		0.60 (3.07)**	0.42 (2.10)*	0.62 (1.87)	-0.08 (0.42)	0.39 (1.19)
Correl. in stock returns			2.09 (3.71)**	2.47 (2.39)*		
Correl. growth-stock ret.			0.17 (0.82)	0.51 (0.74)		
Common legal origin			0.20 (1.79)	0.01 (0.11)		
Observations	1,637	1,596	1,011	854	3,380	3,380
No. of source countries	50	50	37	37	50	50
No. of host countries	132	122	42	37	157	157
Adjusted $R^2$	0.80	0.81	0.87		0.79	
Bilateral $R^2$	0.24	0.27	0.33		0.13	
Pseudo $R^2$				0.89		0.34

Equity holdings of source country  $i$  in host country  $j$  are measured in millions of U.S. dollars. The dependent variable in regressions (5)–(6) is  $\log(\text{equity holdings} + \epsilon)$  where  $\epsilon = 0.001$ . Regressions include fixed source and host country effects.  $t$ -statistics reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% confidence level, respectively. Bilateral  $R^2$  is the marginal explanatory power of the bilateral regressors, over and above the explanatory power of the host and source country fixed effects and is measured as one minus the squared residual standard error divided by the squared residual standard error of a regression on the fixed effects alone.

source countries; and emerging-market source countries. The same set of destination countries (as determined by data availability) is used in each case, subject to the restrictions discussed below.<sup>11</sup>

In our baseline specification, the dependent variable is specified as  $\log(\text{equity})$ , thereby omitting the large number of observations equal to 0. While the large majority of total observations in the sample are 0, as documented in table C1, our interest is in explaining “significant” cross-border holdings. For comparison, we also report a set of results including the zero observations, by specifying the dependent variable as  $\log(\text{equity} + \epsilon)$ , where  $\epsilon$  is a small number (equal to \$1,000). This gives more leverage to variables explaining the differences between zero and nonzero holdings, rather than explaining the magnitude of holdings. When a comprehensive set of controls is added, most zero observations are dropped from the sample because of lack of data availability, thus making results using the two alternative specifications quite similar.

All regressions control for both fixed source and host country effects—hence the only controls included in the regression are those that vary along both sample dimen-

sions.<sup>12</sup> 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 areas, populations, and GDPs are soaked up by the fixed host and source effects.

All regressions exclude source and host offshore and small financial centers.<sup>13</sup> These act as pure intermediaries, and are neither true sources nor final destinations of investment. Ideally, we would wish to “reallocate” the funds invested by source economies in offshore centers to their ultimate destination, but this exercise is hindered by the limited available information on the pattern of investment of certain offshore centers. Nevertheless, to the extent that every dollar invested by a source country in an offshore

<sup>12</sup> The tables report both the overall adjusted  $R^2$  (which includes the explanatory power of the source and host country dummies) and the bilateral  $R^2$  (which measures the marginal explanatory power of the bilateral variables). While the host and source country dummies are very important, the bilateral variables also contribute considerable explanatory power. In the broadest specification (column 3 in tables 5–7), the bilateral  $R^2$  is in the range (0.23–0.35).

<sup>13</sup> Among the source countries, these are Aruba, the Bahamas, Bahrain, Bermuda, Cayman Islands, Cyprus, Guernsey, Isle of Man, Jersey, Lebanon, Luxembourg, Macao SAR, Malta, Mauritius, the Netherlands Antilles, Panama, and Vanuatu. A complete data appendix with a list of countries and territories for each sample is available from the authors upon request.

<sup>11</sup> Results for restricted sets of destination countries (such as only OECD destinations; only emerging market-destinations) are available from the authors upon request.

TABLE 6.—BILATERAL PORTFOLIO EQUITY HOLDINGS, OECD SOURCE COUNTRIES: PANEL REGRESSIONS WITH FIXED SOURCE AND HOST EFFECTS

Dep. var. (in logs) →	(1)	(2)	(3)	(4)	(5)	(6)
	Equity Panel FE	Equity Panel FE	Equity Panel FE	Equity IV	Equity + $\epsilon$ Panel FE	Equity + $\epsilon$ Tobit
Log bilateral trade	0.64 (13.45)***	0.59 (8.12)***	0.50 (6.07)***	0.36 (3.63)***	0.12 (2.47)**	0.52 (5.25)***
Log distance		-0.14 (1.06)	0.12 (0.98)		-0.94 (6.63)***	-0.69 (2.82)***
Time difference		0.06 (2.23)**	-0.01 (0.58)		0.08 (2.67)***	0.05 (1.03)
Common language		0.40 (2.53)**	0.38 (2.82)***	0.28 (2.00)**	0.38 (2.31)**	0.80 (2.64)***
Colony dummy		0.24 (1.01)	0.20 (0.95)	0.38 (1.73)*	0.87 (3.35)***	1.21 (2.66)***
Tax treaty		0.13 (0.91)	-0.22 (1.81)*	-0.20 (1.49)	0.21 (1.48)	0.42 (1.65)
Currency union dummy		0.20 (0.91)	0.38 (2.20)**	0.41 (1.77)*	0.15 (0.51)	0.12 (0.25)
Correl. in growth rates		0.25 (1.24)	0.06 (0.33)	0.24 (0.83)	-0.03 (0.14)	-0.19 (0.51)
Correl. in stock returns			0.59 (1.12)	1.30 (1.17)		
Correl. growth-stock ret.			-0.25 (1.33)	-0.22 (0.37)		
Common legal origin			0.08 (0.80)	0.15 (1.36)		
Observations	1,146	1,130	763	681	2,320	2,320
No. of source countries	23	23	22	22	23	23
No. of host countries	129	120	42	37	57	57
Adjusted $R^2$	0.86	0.86	0.91		0.88	
Bilateral $R^2$	0.15	0.17	0.23		0.07	
Pseudo $R^2$				0.92		0.39

Equity holdings of source country  $i$  in host country  $j$  are measured in millions of U.S. dollars. The dependent variable in regressions (5)–(6) is  $\log(\text{equity holdings} + \epsilon)$  where  $\epsilon = 0.001$ . Regressions include fixed source and host country effects.  $t$ -statistics reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% confidence level, respectively. Bilateral  $R^2$  is the marginal explanatory power of the bilateral regressors, over and above the explanatory power of the host and source country fixed effects and is measured as one minus the squared residual standard error divided by the squared residual standard error of a regression on the fixed effects alone.

center is reinvested by the center in the same way as the average dollar invested abroad by the source country, the exclusion of offshore centers is of no consequence to the empirical analysis. This is the case since reallocating holdings in offshore centers to their ultimate destinations would affect bilateral holdings only up to a common factor of proportionality, which in the log regressions would be soaked up by the fixed source country effects.

In each table, columns 1–3 report panel OLS regressions with fixed source and host effects with an increasing number of controls, and column 4 reports IV estimates for the specification of column 3. While we are generally skeptical that reverse causation from equity holdings to the regressors is an important problem—the bulk of equity holdings were accumulated since the mid-1990s and remain comparatively small, whereas trade patterns (for instance) are quite persistent—IV estimates are included to guard against possible reverse causation running from financial holdings to a number of regressors. Columns 5 and 6 report panel OLS and tobit results respectively, with the inclusion of zero observations, using the same specification as column 2. The tobit estimates are included to allow for the possibility that the observed distribution of equity holdings is censored at 0.<sup>14</sup> Such censoring is plausible, given the restrictions on

shorting equity holdings in many countries. In light of the small number of observations where equity holdings are 0 using the most comprehensive set of controls (column 3), we do not report the corresponding results including such observations—they are very similar to column 3.

Column 1 presents results using only bilateral trade, measured as  $\log(\text{imports plus exports})$ , as explanatory variable. This bivariate specification allows the use of the widest possible sample: fifty sources and 132 hosts. Columns 2, 5, and 6 add to the regressors a number of proxies for information barriers and “cultural” distance that have been widely used in gravity models of trade and capital flows.<sup>15</sup> These include geographical distance (in logs); time difference (to proxy for communication difficulties when the overlap between office hours is limited, as suggested by Portes & Rey, 2005 and Stein & Daude, 2007); dummy variables for country pairs that have been in a colonial relation; for country pairs in a strict currency union; for a common language; and for country pairs with a tax treaty

However, Greene (2003) shows that tobit estimates in practice are more reliable than least squares estimates if censoring is a significant data problem. We do not attempt to estimate an IV-tobit specification, in view of the stringent assumptions required to implement such a procedure (Honore & Hu, 2004).

<sup>15</sup> See, for example, Frankel and Rose (2002). On the application of gravity models to capital flows see, among others, Portes and Rey (2005) and Rose and Spiegel (2004).

<sup>14</sup> Tobit panel estimation with fixed effects can give rise to biased and inconsistent estimates, because of the incidental parameters problem.

TABLE 7.—BILATERAL PORTFOLIO EQUITY HOLDINGS, EMERGING-MARKET SOURCE COUNTRIES: PANEL REGRESSIONS WITH FIXED SOURCE AND HOST EFFECTS

Dep. var. (in logs) →	(1)	(2)	(3)	(4)	(5)	(6)
	Equity Panel FE	Equity Panel FE	Equity Panel FE	Equity IV	Equity + $\epsilon$ Panel FE	Equity + $\epsilon$ Tobit
Log bilateral trade	1.03 (11.11)***	0.56 (3.80)***	0.09 (0.31)	1.35 (6.24)***	0.10 (1.65)	0.42 (2.82)***
Log distance		-0.33 (1.18)	-1.17 (2.46)**		-1.12 (5.82)***	-1.98 (5.53)***
Time difference		-0.16 (3.14)***	-0.13 (1.85)*		-0.10 (2.26)**	-0.04 (0.50)
Common language		0.18 (0.49)	0.45 (1.02)	-0.05 (0.11)	0.28 (0.88)	0.57 (1.07)
Colony dummy		2.04 (3.18)***	1.29 (1.65)	1.49 (2.01)**	2.25 (3.22)***	2.21 (2.12)**
Tax treaty		-0.19 (0.58)	0.05 (0.12)	-0.27 (0.75)	0.42 (1.74)	1.12 (2.53)**
Correl. in growth rates		0.19 (0.46)	-0.32 (0.46)	0.32 (0.26)	0.45 (1.49)	1.25 (2.14)**
Correl. in stock returns			1.99 (1.06)			
Correl. growth-stock ret.			0.24 (0.34)			
Common legal origin			0.61 (1.89)*			
Observations	491	466	248	396	1,060	1,060
No. of source countries	27	27	15	27	27	27
No. of host countries	81	71	39	37	157	157
Adjusted $R^2$	0.70	0.73	0.72			0.72
Bilateral $R^2$	0.24	0.31	0.35		0.25	
Pseudo $R^2$				0.77		0.33

Equity holdings of source country  $i$  in host country  $j$  are measured in millions of U.S. dollars. The dependent variable in regressions (5)–(6) is  $\log(\text{equity holdings} + \epsilon)$  where  $\epsilon = 0.001$ . Regressions include fixed source and host country effects.  $t$ -statistics reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% confidence level, respectively. Bilateral  $R^2$  is the marginal explanatory power of the bilateral regressors, over and above the explanatory power of the host and source country fixed effects and is measured as one minus the squared residual standard error divided by the squared residual standard error of a regression on the fixed effects alone.

established prior to 1999. They also include the correlation in GDP growth rates between the source and host country, as a proxy for the gains from bilateral diversification, along the lines of Davis et al. (2001). As shown in table C1, adding these variables reduces the full sample size by about 20%, but the large majority of the dropped observations reflect equity holdings equal to 0, so usable observations for the baseline specification are virtually unchanged.

Finally, regression (3) also adds the correlation between stock market returns in the source and host country (measured in U.S. dollars); the correlation between source country GDP and host country equity returns (following Davis et al., 2001); and a dummy for common legal origin. The first two variables are further proxies for the gains to bilateral diversification, while the latter variable is a general proxy for similarity in institutions. Adding these variables reduces the number of observations substantially—data for the whole sample now cover 37 sources and 48 hosts, and two-thirds of the observations are dropped with respect to the specification of columns 5–6. However, once again the majority of the dropped observations reflect equity holdings equal to 0, and the size of total equity assets included in the regressions drops by a trivial amount (less than 1%).

For the full sample and the OECD subsample (tables 5 and 6), in the IV estimation in column 4, we treat the following as potentially endogenous variables: the level of trade; the correlation of GDP growth rates; the correlation of

stock returns; and the correlation between domestic GDP growth and the foreign stock return. Our instrument list consists of distance; the time difference; a border dummy; the lagged correlation in GDP growth rates; the lagged correlation in stock returns; and the lagged correlation between domestic GDP growth and the foreign stock return.<sup>16</sup> For the emerging-market subsample (table 7), including lagged stock returns would lead to a sharp drop in data availability. For this reason, we treat only the level of trade and the correlation of GDP growth rates as potentially endogenous variables and report the IV regression only for the specification of column 2.

Note that, in the IV specification, we drop distance and the time difference from the list of independent variables in the main regression and allow these variables to influence bilateral equity holdings through their effect on the endogenous regressors. The excludability of distance from the main regression is based on the OLS results for the comparable specification in column 3: distance is not significant at the 5% level in the full sample and the OECD subsample.

<sup>16</sup> We assume that the correlations between growth rates prior to 1990 and between stock returns prior to 1995 are exogenous with respect to 2001 equity holdings, which reflect to a substantial degree the large flows of the period 1995–2001. We therefore use as instruments lagged correlations, which have an “exogenous” overlap with the instrumented variables. Since we analyze cross-sectional data, we do not face the typical IV problem in using lags posed by serially correlated errors.

While the time difference variable is significant at the 1% level for the full sample, it is not significant for the OECD subsample and significant only at the 10% level for the emerging-market sample.

### *B. Determinants of Bilateral Equity Holdings: Empirical Results*

Across tables 5–7, the most striking result is the strong link between bilateral trade and bilateral equity holdings, which is particularly evident for emerging-market source countries.

That the volume of trade matters is consistent with its potential value as an information variable, in addition to the risk-sharing mechanism outlined in the theoretical discussion.<sup>17</sup> It is noteworthy that trade remains very significant (albeit with a smaller point estimate), once gravity-related regressors are included in the specification.

The importance of trade here stands in contrast to the evidence of Ahearne et al. (2004) for the U.S. pattern of overseas investment: using 1997 data, they find no role for bilateral trade in explaining bilateral equity holdings of U.S. investors.<sup>18</sup> The coefficient on the trade variable drops significantly when the regressions also include observations where equity holdings are 0 (column 5)—this is not surprising, in light of the fact that trade is positive for several of the zero equity observations, thereby weakening the bilateral correlation.<sup>19</sup>

The results also highlight the role of informational linkages in explaining bilateral asset holdings: several cultural and physical proximity variables are statistically and economically significant. Speaking a common language raises equity holdings by about 50%.<sup>20</sup> A common colonial history also contributes to raising bilateral holdings, and particularly so for the emerging-market subsample. Distance is generally significant, and its coefficient is higher in regres-

<sup>17</sup> In Lane and Milesi-Ferretti (2004) we used imports rather than aggregate trade, since imports are the key variable in the basic risk-sharing hypothesis. With the regression specifications adopted in this paper, both imports and exports are typically significant in explaining holdings, such that aggregate trade may be the more appropriate empirical indicator. If imports and exports are allowed to have different coefficients, exports have a larger coefficient and are more significant in some specifications for the full sample but imports are more significant in the emerging-markets sample. However, such a specification is difficult to interpret since the bilateral trade balance may itself be a potential determinant of holdings. Accordingly, we opt to report results for aggregate trade.

<sup>18</sup> Their dependent variable is U.S. equity holdings in a country scaled by that country's market capitalization. If a country trades a lot with the United States but even more with other countries, U.S. equity holdings may be relatively low because of the competing claims of other trading partners. With a single source country, it is impossible to control for this "multilateral resistance" effect by including the required set of country dummies.

<sup>19</sup> Trade loses significance only for the emerging-market subsample when financial correlations are included (column 3 in table 7), a specification with few observations.

<sup>20</sup> 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, whose effects in our specification are soaked up by the source and host dummies.

sions that include the zero observations—not surprisingly, in light of the fact that these observations typically include countries that are geographically remote.

For OECD source countries, the currency union dummy is large and significant in the most comprehensive specifications that exclude zero observations, but not generally in the other samples. In the broad sample, the tax treaty variable is significantly positive only when zero observations are included—the variable is hence more helpful in determining whether equity holdings are zero or positive, rather than in explaining their magnitude.<sup>21</sup>

For the full sample, the correlation between GDP growth rates and between stock market returns are significantly positive when zero observations are excluded. Hence there is little evidence that bilateral cross-country holdings are primarily dictated by the gains from diversification—rather, the evidence suggests that investors hold equity in “similar” destinations (in terms of business cycles and stock market behavior).

When stock market-related variables and the common legal origin dummy are added to the regressions (columns 3 and 4 in tables 5–6 and column 3 in table 7), there are notable changes in some of the results, related primarily to the change in sample size. For this narrower sample, the most remarkable change is in the coefficient on distance, which is dramatically reduced in size and loses statistical significance in the full sample and the OECD subsample. As noted above, this suggests that—once we control for trade—distance helps predict whether a given advanced source country is going to invest in a given host country, rather than the size of the investment. The results on the distance variable differ from those in Portes and Rey (2005): one interpretation is that the information frictions captured by distance may matter more for turnover than for equity holdings.<sup>22</sup> Finally, there is some evidence for the full sample and emerging-market source countries that institutional similarity is important for bilateral equity investment.

In sum, the geography of bilateral portfolio equity holdings is strongly related to bilateral trade, but also to proxies for informational asymmetries and cultural-institutional proximity, such as a common language. The impact of distance variables is weakened once the sample is restricted to the major equity sources and destinations. Among OECD countries, a common currency, which captures primarily the

<sup>21</sup> As emphasized by Blonigen and Davies (2005) in the context of foreign direct investment, the expected sign of the tax treaty variable is a priori ambiguous: while on the one side a tax treaty reduces the likelihood of double taxation, thus encouraging foreign equity investment, on the other it makes it more difficult to evade taxes on equity returns and hence may discourage investment.

<sup>22</sup> The correlation between bilateral equity holdings and equity flows (measured as net purchases) is significantly positive at 0.55 for the fourteen country sample studied by Portes and Rey (2005) (we thank the authors and Capital Data for providing us with their data). Following Portes and Rey (2005), we also included bilateral telephone traffic in the regressions, but found it to be insignificant once trade is included as a regressor. The share of immigrants from the host country in the source country's population was also insignificant.

effects of EMU, is associated with higher equity investment. Importantly, bilateral equity investment takes place primarily between countries with similar characteristics, including coordinated business cycles and correlated stock returns, against the predictions of standard diversification models.

Finally, as illustrated by the gap between the adjusted and bilateral  $R^2$  values in tables 5–7, aggregate factors play a large role in determining overall portfolio position—these are held fixed in our empirical work through the inclusion of dummies for each source and destination country. As is shown in Lane and Milesi-Ferretti (2004), the most important sources and destinations of international equity investment are those countries with the highest GDP per capita and largest domestic stock market capitalizations, with financial centers intermediating high levels of equity investment.

## VI. Concluding Remarks

This paper makes use of a new data set on bilateral portfolio equity investment, which covers a very significant number of the largest portfolio equity investor countries, including offshore centers. We develop an empirical framework that identifies the key correlates of bilateral equity investment patterns, as well as of aggregate portfolio equity assets and liabilities. The most striking result is that bilateral equity investment is strongly correlated with the underlying patterns of trade in goods. Informational linkages, such as a common language, are also important.

There are several directions for future research. One important issue is the role of offshore centers. Table C2 offers a geographical perspective on the size of investment in offshore and financial centers: it lists, for the main international investors, equity asset holdings in offshore and financial centers, and derived liabilities to these centers. For example, assets held in offshore and financial centers are over 40% of total portfolio equity assets for Belgium and Italy, and over 25% in Germany (almost entirely reflecting holdings in Luxembourg). Devising methods to allocate equity investment in offshore centers to their ultimate destination is an important, if difficult, research objective.

Another avenue for research consists in developing the economic implications of the asymmetries in the geographical portfolio allocations that this paper has highlighted. 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 United States stock market: those countries with greater exposures to the United States clearly suffer a greater loss. Asymmetries in investment positions also have implications for exchange rate behavior: the bilateral exchange rate response to a given shock should be affected by the degree of bilateral financial integration. More broadly, these data can help examine whether bilateral financial integration affects other bilateral economic relations (see Imbs 2004, 2006). Of course, es-

tablishing lines of causality between financial and other linkages is a challenging task.

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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.

#### APPENDIX 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.

###### **Bilateral trade:**

Sum of imports plus exports between source and host countries (average 1997–2001). Source: International Monetary Fund, Direction of Trade Statistics.

###### **Log distance:**

logarithm of Great Circle distance in miles between the capital cities of source and host country. Source: Rose and Spiegel (2004).

###### **Time difference:**

Absolute value of time difference between source and host country (ranging from 1 to 12). Source: <http://www.timeanddate.com>.

###### **Common language:**

Dummy taking the value of 1 if source and host country share a common language. Source: Rose and Spiegel (2004).

###### **Colony dummy:**

Dummy taking the value of 1 if source and host country ever had a colonial relationship. Source: Rose and Spiegel (2004).

###### **Strict currency union:**

Dummy taking the value of 1 if source and host country are in a currency union. Source: Rose and Spiegel (2004).

###### **Tax treaty:**

Dummy variable taking the value of 1 if the source and host country have a tax treaty enacted prior to 1999. Source: authors' elaborations based on treaty data taken from <http://www.unctad.org>.

###### **Common legal origin:**

Dummy variable taking the value of 1 if source and host countries have a legal system with a common origin (common law, French, German, or Scandinavian). Source: authors' elaborations based on La Porta, Lopez-de-Silanes, and Shleifer (2005).

###### **Correlation of stock returns:**

Correlation between the monthly stock market returns of the host and source country, expressed in U.S. dollars, over the period January: 1990–December 2000 (January 1990–December 1994 in the IV estimation). Source: authors' calculations based on returns data from Datastream and Morgan Stanley Capital International.

###### **Correlation in growth rates:**

Correlation between the annual GDP growth rates in the source and host country over the period 1980–2000 (1980–1989 in the IV estimation). Source: authors' calculations based on World Bank, World Development Indicators.

###### **Correlation growth-stock return:**

Correlation between annual GDP growth in the source country and real stock returns in the host country, 1980–2000 (1980–1989 in the IV estimation). Source: authors' calculations based on Datastream, Morgan Stanley Capital International, and World Development Indicators.

## APPENDIX C

TABLE C1.—SAMPLE SIZE, NUMBER OF OBSERVATIONS = 0, AND TOTAL EQUITY HOLDINGS

All Countries						
Sample	Source	Host	Observations		Total Source Equity Holdings	
			Total	= 0	\$ Billion	% of No Offshore with Trade
Full	67	223	7,069	4,350	5,163	
No offshore, with trade	50	172	4,486	2,849	3,995	100
Add macro variables	50	157	3,384	1,788	3,993	99.9
Add stock mkt. variables and CLO	42	48	1,131	120	3,959	99.8
OECD						
Sample	Source	Host	Observations		Total Source Equity Holdings	
			Total	= 0	\$ Billion	% of No Offshore with Trade
Full	24	223	3,779	2,317	4,921	
No offshore, with trade	23	172	2,530	1,384	3,879	100.0
Add macro variables	23	157	2,324	1,194	3,877	99.9
Add stock mkt. variables and CLO	23	48	792	29	3,850	99.8
Emerging-Market Sample						
Sample	Source	Host	Observations		Total Source Equity Holdings	
			Total	= 0	\$ Billion	% of No Offshore with Trade
Full	43	223	3,290	2,317	224	
No offshore, with trade	27	172	1,956	1,465	117	100.0
Add macro variables	27	157	1,060	594	116	99.5
Add stock mkt. variables and CLO	19	48	339	89	108	98.6

Total equity holdings: sum of portfolio equity holdings of source countries included in the sample.

% of no offshore with trade: total equity holdings divided by equity holdings for the sample excluding offshore centers, with trade. For the purpose of calculating total observations, the Isle of Man, Guernsey, and Jersey are classified as belonging to the OECD group.

TABLE C2.—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		
	\$ Billion	Percent of Total Portf. Equity Assets		\$ Billion	Percent 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