The Determinants of Cross-Border Equity Flows: The Geography of Information

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First draft: September 1998
This draft: January 2000

We have received outstanding research assistance from Gino Cateau, Yonghyup Oh and Chris Walters, and additional help from HaYan Lee, Daniel Halmer, and Elisabetta Falcetti. Angela Cozzini of Cross Border Capital very kindly provided the data on equity investment flows, and Tim Kelly of the International Telecommunications Union was equally helpful in providing the data on telephone call traffic. Zvi Eckstein, Thomas Gehrig, Pierre-Olivier Gourinchas, Stéphane Grégoir, Vassilis Hajivassiliou, Bronwyn Hall, Jean Imbs, Boyan Jovanovic, Paul Krugman, Philip Lane, Jacques Mairesse, Philippe Martin, Andy Rose, Allan Timmermann, Frank Warnock, Shan Jin Wei, Alan Winters and Holger Wolf gave helpful comments, and we have benefited from seminars at MIT, Berkeley, the Centre for Financial Studies (Frankfurt), DELTA (Paris), the CEPR European Summer Symposium in Macroeconomics, the European Economic Association meetings, the Wharton School, the IMF, and the University of California at San Diego. Portes thanks the Haas School of Business and its Clausen Center (University of California at Berkeley) for resources and a stimulating research environment during 1999-2000, and Rey is similarly grateful to NBER and Harvard University, as well as the Centre for Economic Performance (LSE).

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We apply a new approach to a new panel data set on bilateral gross cross-border equity flows between 14 countries, 1989-96. The model integrates elements of the finance literature on portfolio composition and the international macroeconomics and asset trade literature. Gross asset flows depend on market size in both source and destination country as well as trading costs, in which both information and the transaction technology play a role. Distance proxies some information costs, and other variables explicitly represent information transmission, an information asymmetry between domestic and foreign investors, and the efficiency of transactions. The remarkably good results have strong implications for theories of asset trade. We find that the geography of information is the main determinant of the pattern of international transactions, while there is little support in our data for diversification and 'return-chasing' motives for transactions.

Keywords: equity flows; cross-border portfolio investment; information asymmetries; gravity model

JEL classification numbers: F36, F21, F12, G11.

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1. Introduction

There are very few well-established results on the determinants of trade in assets, especially securities. Such work has been impeded by data problems, and there is little theory behind it. The literature on portfolio investment focuses on portfolio choice and the determinants of returns.

We now have a set of data on cross-border equity transaction flows. These are exceptional insofar as they give a panel of observations of cross-border purchases and sales of equities. They include all major equity markets (Europe, United States, Asia). They are annual bilateral (source and destination) gross portfolio equity flows, 1989-96.

We provide new, clear-cut evidence on the determinants of these flows: we explain almost 70% of their variance with a parsimonious set of variables. Initially, we find that market size, efficiency of transactions, and distance are the most important determinants of transaction flows. The very significant negative impact of distance on transactions is at first sight quite puzzling: unlike goods, assets are 'weightless', and distance cannot proxy transportation costs. Moreover, if investors seek to diversify their portfolios, they may want to buy many equities in distant countries whose business cycles have a low or negative correlation with

their own country's cycle. If that were so, distance could have a positive effect on asset trade because of the diversification motive.[1]

We show that distance is largely a proxy for information asymmetries: we use in particular telephone call traffic and multinational bank branches to account for information transmission, and an index of the degree of insider trading to represent directly the information asymmetries between domestic and foreign investors. Telephone calls and bank branches, both of which are time-varying, are highly significant; insider trading, for which we have data for only a single year, has a negative but less well-determined effect on portfolio investment flows.[2] These results are robust to a wide range of specification tests and experiments with dummy variables, none of which is very helpful. In our sample, the diversification and return-chasing motives are completely dominated by the information effect. The geography of information appears central for the distribution of asset flows.

International capital markets thus appear to be not so frictionless as is often assumed in discussions of capital mobility and 'globalisation'.[3] Our empirical results help to understand the character and impact of frictions in international capital markets. The market segmentation

[1] We investigate the diversification motive in Section 4. Note, however, that our data are for transactions, not asset holdings, so this argument is valid only if there is a positive relationship between flows and stocks. Frankel and Rose (1998) show that trade between country pairs is positively related to the correlation of their business cycles; since trade decreases with distance, business cycle correlation does as well. Imbs (1999) provides direct evidence that correlations of business cycles decrease with distance.

[2] It is also remarkable that our information variables perform very well for a comparable panel of goods trade (Section 5). This suggests to us that the empirical goods trade literature overestimates the importance of transportation costs (proxied by distance) and considerably underestimates the importance of information asymmetries (also proxied by distance).

[3] This conclusion is consistent with some of the recent literature along the lines of Feldstein and Horioka (1980), as suggested by Gordon and Bovenberg (1996).

appears to be attributable mainly to informational asymmetries, only to a lesser extent due to transactions costs. All this argues for the same type of radical change in theoretical modelling of asset trade that we have seen in the literature on goods trade: it should shift away partly from models based on factor endowments, comparative advantage and autarky prices[4] towards models including differentiated assets, transaction costs and information asymmetries.

The finance literature has emphasized information asymmetries much more than the asset trade literature, but it has largely focused on portfolio choice and asset pricing, rather than transaction volumes for trade in equities. Yet there are very interesting, important issues here. First, understanding flows may tell us something about stocks, i.e. about the determinants of portfolio composition. On this issue, the effort to relate theory to the data has led to an impasse represented by the 'home bias puzzle' (Tesar and Werner, 1995; Lewis, 1999; Lane, 1999). We use 'home bias' in a very general sense, referring to the evidence that residents of a given country invest much less abroad than portfolio allocation models would appear to suggest as optimal diversification. There is continuing controversy over whether this home bias is due to transaction costs, including informational asymmetries. Our analysis and results may throw some light on these questions.

Second, the equity portfolio flows that we study are a substantial component of the huge international capital flows that feature in 'globalisation'. These are at the centre of current

[4] See Helpman and Razin (1978), Svensson (1988).

macroeconomic policy concerns. A better understanding of their determinants may help us, for example, to interpret herding behavior and contagion effects.

Third, financial market integration (e.g., in the euro area, as discussed in Portes and Rey 1998a, Martin and Rey 1999b) will have a wide range of consequences for asset trade. Improvements in our knowledge about a major dimension of this trade could help us to analyze how the various aspects of integration will affect international transactions in securities.

Fourth, policy-makers may wish to promote involvement by foreign investors in their domestic markets. Our results suggest that one means of doing so would be to improve the information flows to the international investment community.

Section 2 discusses the existing theoretical and empirical literature and draws some conclusions about how to model equity flows. We take a new direction that brings insights from the finance literature to a perspective based on international macroeconomics and trade. We sketch a simple model which leads to our basic estimating equation. In Section 3, we describe our data. Section 4 examines the determinants of portfolio equity investment flows. Section 5 shows that our informational variables enter significantly in a standard gravity equation for goods trade, with a consequent reduction of the effect of distance. Section 6 concludes.

2. The explanation of gross cross-border equity portfolio flows

2.1. Two perspectives: finance and international economics

There are two perspectives from which one can view the determinants of cross-border equity flows. The first comes out of the finance literature on portfolio composition, while the second arises from international macroeconomics and trade.

The finance viewpoint focuses on portfolio composition and adjustment, information, and the relationship of flows to returns. It features the home bias puzzle and offers several insights but no clear conclusions, even regarding the appropriate theoretical framework for modelling flows.

The literature starts from theories and observations on portfolio stocks. In discussing home bias, Tesar and Werner (1995) focus on 'language, institutional and regulatory differences and the cost of obtaining information about foreign markets' (p. 479) and suggest that 'geographic proximity seems to be an important ingredient in the international portfolio allocation decision' (p. 485).

Gehrig (1993) and Kang and Stulz (1994) derive home bias from asymmetric information between domestic and foreign investors: the former are better informed about payoffs on their own market. Brennan and Cao (1997) move from stocks to flows, accepting this foreign-local asymmetry. They construct a model in which purchases of foreign equities are an increasing function of the return on the foreign equity market index. A public signal moves investors to revise their priors and hence change their portfolios; the less well informed foreign investors

revise the means of their distributions more than do the better informed locals, so price moves simultaneously in the same direction as foreign purchases. The story is appealing, but their empirical support for it is weak: 'our model is able to explain only a small proportion of the variance of international equity portfolio flows' (p. 1876).[5] Froot *et al.* (1998) also find a contemporaneous correlation between flows and returns, as well as effects that they interpret as arising from private information (on emerging but not developed country markets).

Gehrig (1998) treats information in a specifically geographical context. He notes that 'pure equity…constitutes a security with high (maximal) informational complexity'. He then focuses on the role of financial centers in processing information and suggests that the intensity of that activity is related to the concentration of branches of multinational banks in such centers. The role of bank branches as informational links has been suggested by Choi *et al.* (1986, 1996) and Jeger *et al.* (1992). Gehrig concludes that 'face-to-face communication within a financial centre and telecommunication are complements (p. 35).' He does not, however, relate this to transactions flows.

[5] Brennan and Aranda (1999), however, obtain stronger results on the returns variable in a study of international flows of debt and equity capital during the Asian crisis. This work further supports the hypothesis that foreign investors are less well informed than domestic investors. Tesar (1999) finds that an 'expected returns' variable performs well in explaining monthly data for US investors' net purchases of equities in 22 foreign countries. Bohn and Tesar (1996) had also found a similar result and suggest that foreign investors are at an informational disadvantage: '[Foreign] investors may be chasing returns, but apparently not in the right markets at the right time (p. 81).' Kim and Wei (1999) study equity investors' trading behaviour before and during the Korean crisis of 1997-98. Their results on both positive feedback trading and herd behaviour are consistent with an informational asymmetry between non-resident and domestic investors. So are the results of Frankel and Schmukler (1996), who find that local residents 'led' non-residents in exit behaviour during the Mexican crisis of 1994-95. Timmerman and Blake (1999) using a sample of 247 UK pension funds (1991-97) find that 'explanations based on relatively poorly informed foreign investors appear to be important in explaining the short-run dynamics of portfolio adjustments'.

Hau (1999) explores informational asymmetries across the trader population. He finds 'an important role for asymmetric information for the geographic distribution of market-making activity and possibly international portfolio management'. He does not study trading volumes.

Gordon and Bovenberg (1996) also focus on asymmetries of information between foreign and domestic investors but develop their model at a macro level, so it yields a relationship across countries between current account deficits and domestic real interest rates. Again, net flows are related to a returns variable; here the empirical results give reasonably strong but indirect support for the informational asymmetry hypothesis.[6]

A very different viewpoint from the international economics literature starts from trade in goods and arrives at a gravity model. Here trade depends on economic 'mass' (GDP) and distance, which gives a specification that has proved to be a reliable and robust tool for explaining trade (see the surveys by Leamer and Levinsohn, 1995; Evenett and Keller, 1998). An argument for a gravity model of equity trade is the observed complementarity between trade and FDI flows. The latter are in turn related to portfolio equity flows. There is no theory here[7], but the argument is suggestive. Ghosh and Wolf (1999) make a case along these lines and also appeal to informational asymmetries that increase with distance, and they find some empirical support for the hypothesis. De Ménil (1999) finds that a gravity model accounts well for FDI flows among European countries.

[6] Razin *et al.* (1998) accept the Bovenberg-Gordon model for foreign portfolio equity investment and the justification in terms of informational asymmetry between foreign and domestic investors. They too, however, argue in terms of *net* flows.

[7] Baldwin and Ottaviano (1999) propose a model in which FDI induces complementary trade flows.

An alternative route begins with Helpman's (1998) argument that product differentiation is the best rationale for the gravity model. By analogy, one could regard equities as highly differentiated products.

2.2. An empirical model of asset trade

Martin and Rey (1999a) propose a theory of asset trade from which a gravity equation emerges naturally. The two key elements that are required to generate such an equation are: 1) that assets are imperfect substitutes because they insure against different risks; 2) that cross-border asset trade entails some transaction or information costs. In their model, risk-averse agents develop different projects that correspond to different assets, which are traded on markets. Hence the number of assets is proportional to the number of agents in the country. Like Arrow-Debreu assets, each project/asset pays off in only one state of nature so that they are imperfect substitutes. The aggregate demand for country A assets from country B is then:

$T_{AB} = n_A n_B s_B^A p_A$

where n_A is the number of agents in country A and is therefore a measure of the number of different projects/assets developed and traded in this country. n_B is the number of agents of country B who demand assets of country A. s_B^A is the representative demand of an asset of A by an agent in B and p_A is the price of such an asset[8]. The demand of an asset of A by an agent of B (s_B^A) depends itself negatively on the transaction and information cost between A and B (τ_{AB}). For a given supply of the asset, higher transaction costs generate (through lower demand) a lower price of the asset. Higher aggregate demand from B (higher n_B) also implies

[8] In their model, all assets of a given country have the same price, because each state of nature is equiprobable, and the dividend is identical across assets.

(for a given supply of the asset) a higher asset price. Hence, the log of the asset flows from A to B can be written as:

$\log T_{AB} = \text{constant} + \log (n_A n_B) + \log (\tau_{AB})$

This equation is very similar to the standard gravity equations derived in the literature of international goods trade: the first term on the right is a product of a measure of the sizes of countries A and B, the second is the trading cost term (usually proxied by distance) [9].

When going to the data, we interpret the trading cost as a function of both information cost and the efficiency of the transaction technology. We would expect information costs to be positively correlated with distance: the cost of travelling is higher for long distance, cultural differences are likely to be stronger, business links weaker. Hence we capture the informational dimension first by using distance, second by using explicit variables for information transmission (telephone calls, number of bank branch subsidiaries) and variables measuring directly the degree of asymmetry between domestic and foreign investors (an index of insider trading). As far as the transaction technology is concerned, we have an index of sophistication of financial markets.

The model of Martin and Rey (1999a) suggests GDP as the size variable. GDP does perform acceptably in this role. In our specification for asset trade, however, we use a measure of size which is more directly related to financial markets: market capitalisation. After estimating our basic specification, we experiment with various normalisations, dummies and other variables

[9] Boyan Jovanovic suggested to us a way in which the q-theory of investment could lead to the use of destination market capitalisation to explain capital inflows.

common in the goods trade literature (trading blocs, language, main financial centres, time and country-specific dummies, population as a proxy for openness, etc…). None enters significantly (except the language dummy in some specifications), and our preferred specification is very parsimonious.

To summarize, the estimating equation arising out of this analysis takes the following form:

$$\log(T_{ij,t}) = \text{constant} + \equiv_1 \log(mcap_{i,t}) + \equiv_2 \log(mcap_{j,t}) + \equiv_3 \log(distance_{ij,t})$$
$$+ \equiv_4 \text{information variables} + \equiv_5 \text{transaction technology variables} + \equiv_6 \text{cyclical variables} + \varepsilon_{ij,t}$$

A generalization of Martin and Rey (1999a) suggests the introduction of several additional variables. If capital markets were frictionless, we would expect portfolio diversification motives to dominate, so transactions flows would arise from rebalancing portfolios in response to shocks. We supplement the above specification with variables representing the correlations of returns on the country equity markets (we also experiment with correlations between GDP growth rates). This allows for a more general asset payoff structure than in Martin and Rey (1999a), where all returns are perfectly negatively correlated. We also allow for a 'return-chasing' motive with a variable measuring the return on equity investment in the destination country (in Martin and Rey, these are equal across countries). The total number of transactions performed in a year may be affected by the volatility of returns: if returns are volatile, possibly because of more shocks, agents may adjust their portfolios more frequently. We will therefore include several variables describing the variance of equity market returns.

3. Portfolio equity investment flows

Our equity transactions flow data come from Cross-Border Capital (London).[10] There are eight years of the panel, 1989-96. These are annual data, whereas Brennan-Cao use quarterly data, while Froot *et al.* have daily data. The former, however, are restricted to US bilateral transactions with four developed and 16 emerging market countries. The latter use a subset of aggregate (not bilateral) flows into and out of 46 countries. Our data are bilateral flows, so the set of 14 source (country *i*) and destination (country *j*) countries is identical, and we have a total of 1456 observations (8 x 13 x 14). The cross-sectional dimension is the most important in our panel. These are transactions data: they record purchases (*purij*) and sales (*salij*) by residents of country *i* (source) in the portfolio equity markets of country *j* (destination). The gross flow variable we use in most of our specifications is the sum of purchases and sales, *equityij*. The countries are:

Western Hemisphere: United States, Canada (dummy variable: *wh*)

East Asia: Japan, Hong Kong, Singapore (dummy variable: *easia*)

EU Europe: UK, Germany, France, Netherlands, Spain, Italy, Scandinavia (dummy variable: *eu*)

Non-EU Europe: Switzerland

Australia

[10] Summary statistics from this data base (which was initiated by Michael Howell and Angela Cozzini a decade ago at Baring Securities) appear in Lewis (1999) and Tesar and Werner (1995).

Summary statistics for the transaction flow data are given in Table 1. Evidently there is considerable variance in the gross flows over time – it is not surprising that portfolio equity investment grew rapidly (though not monotonically) over our period. The mean of the net flows is positive for all countries in the sample, consistent with a trend erosion of home bias. And in these annual data, the net flows are typically very small by comparison with gross purchases and sales – perhaps of the same order of magnitude as the measurement error in the data. This picture would change with higher frequency data. Indeed, if there were only one stock to purchase in each country, or if the representative foreigner transacted only in a single index fund, then as the period length decreased, we would expect to see a rising number of observations with only one of purchases or sales positive, with the other zero. At any instant, the investor would be only buying or only selling, not both simultaneously. Thus we would expect the ratio of gross to net flows to increase with the length of the period. Razin *et al*. (1998) stress that net portfolio equity flows are small, but their data are net annual flows. And as we shall see, although a returns variable has some explanatory power for net flows in daily and quarterly data, it does not in our annual data.

The share of our 14 countries in global equity market capitalisation in 1996 was 86.6 per cent (Tesar, 1998). We denote the market capitalisation of country *i* (at the beginning of the year) by *mcapi*.

We use several variables representing information flows and transactions costs, as well as equity market returns, their variances and covariances:

telij = volume of telephone call traffic in minutes from country *i* to country *j* in each year (available annually), normalized to give *telnorij* (see below)

banksij = number of branches in country *j* of banks headquartered in country *i* (*Bankers Almanac*, available annually)

insidersj = *absence* of insider trading in the stock market of the destination country (*World Competitiveness Report*, 1996) – so the coefficient is expected to be positive

sophi = sophistication of financial markets of the source country (*World Competitiveness Report*, 1996*)*

varij = variance of the difference of stock market indices (in logs) between country *i* and country *j* (we also try variance of first differences of stock indices (in logs))

corrij = correlation of stock market returns, calculated using monthly data for each country, correlation taken over each year in the sample

Note that *insidersj* and *sophi* are each available only for a single year in our sample and are therefore time-invariant in our regressions.

We also have a data set for trade flows of manufactures between the same countries (*tradeij*) that is strictly comparable to our equity flow data.

The equity investment and trade data exhibit a few striking features, which we discuss in more detail in a previous paper (Portes and Rey, 1998b):

- There is a sharp increase in international portfolio equity flows after 1992 for the US and EU15 but not for Asia.
- International equity transactions are very asymmetric across blocs.
- Trade in goods and in equities shows different patterns both over time and on a cross-sectional basis.

Thus trade in goods and trade in equities differ both in geographical structure and in their evolution over time. Nevertheless, as we shall see, some factors may play similar roles in explaining both.

4. The determinants of portfolio equity investment flows

4.1. The basic specification and estimates

We now proceed to model equity flows empirically. We begin with a specification that is a 'stripped' form of the estimating equation at the end of Section 2. All equations include a constant term, whose estimates are not reported. The dependent variable *equityij* is the gross purchases plus sales of portfolio equity by residents of country *i* (source investor) in country *j* (destination market). The estimates for the full panel are given in the first column of Table 2. We use beginning-of-period market capitalization (*mcapi, mcapj*) to represent financial size. The overall OECD GDP growth rate represents cyclical conditions, as is customary in modelling goods trade. All variables (except *growth*) are in logs, throughout, so all the corresponding coefficients are elasticities. There is no evidence of non-linearities in the data. The estimation procedure (here and below) gives 'White-corrected' (heteroskedasticity-consistent) standard errors, which are shown in parentheses below the coefficient estimates.

Both financial size variables enter with the expected signs and with well-determined coefficients. Distance is also appropriately negatively signed and precisely estimated. The cyclical variable performs well. With four independent variables, this straightforward, simple 'gravity' regression captures 57% of the variance in our 1456 observations.

We now proceed to add a variable representing transactions costs in the financial markets of the source country (*sophi*). The estimates in column (2) of Table 2 show it as clearly significant, with very little effect on the other coefficients.

Distance, we conjecture, is in good part a proxy (inversely) for information. The first direct measure of information we introduce is telephone call traffic, normalised for country economic size (i.e., the volume of telephone calls from country *i* to country *j* is divided by the square root of the product of their real GDPs): *telnorij*. Initially, we use it to replace distance, and that gives the estimates in column (3) of Table 2. It performs equally well, and the coefficients on the other variables (and their standard errors) are virtually unaffected. Again, adding *sophi* is successful (column (4) of Table 2), although its coefficient is now smaller than in column (2).

We have two further informational variables: the number of branches in country *j* of banks headquartered in country *i* (*banksij*), which does vary over time; and an index of the perceived absence of insider trading in the destination country's financial markets, *insidersj* (constructed from questionnaire data by the *World Competitiveness Report*, 1996 - it is time-invariant in our data[11]). Including these as regressors, we have columns (5) and (6) of Table 2. Whether with distance or with telephone calls, the other information variables and the transactions cost variable appear with correctly signed, well determined coefficients, with the exception of the

[11] This index is fairly closely related in our sample to the (quite separate) 'corruption' index developed by Transparency International (www.transparency.de); the rank correlation across the 14 countries is 0.47, rejecting independence at the 8% level.

insider trading variable in column (5). Column (7) shows a final specification that includes both distance and telephone calls as well as the other variables. Telephone call traffic indeed appears to be representing some of the information transmission that is inversely related to distance. When both are included, the coefficient of each is significantly less than what we obtain in estimates with either alone. The other coefficients are not overly sensitive to whether we use distance, telephone calls, or both. One might be concerned about multicollinearity between distance and telephone calls - indeed, a causal relation between them - but the (robust) standard errors on their coefficient estimates are low, and the correlation between the two variables is also not disturbingly high (-0.32). In order to avoid potential endogeneity problems with the bank variable, we use its beginning-of-period value. In any case, we believe that bank branches are not set up primarily to deal with portfolio equity trade, but for a wide range of reasons.

With a total, then, of seven explanatory variables, we capture 67% of the variance of bilateral cross-border equity flows for fourteen countries over eight years. This is the basic specification that we shall subject to various robustness tests below. First, however, we give in column (8) a 'between' regression on the group means (i.e., the mean over time of observation *ij*). The cyclical variable is excluded by this procedure. The only 'casualty' is the bank branches variable, which becomes insignificant. The other coefficients are similar to those in the pooled estimates, and the R^2 for this cross-section regression is a remarkable 0.83.

We do not introduce country-pair fixed effects, because we have a strong prior that the distance variable should be a major determinant of the flows. By construction, the distance

variable (which is constant over all observations for a given country pair) will pick up some of the fixed effects. Conversely, with fixed-effects panel data estimation, we cannot use any time-invariant variable (thus including regional bloc dummies and some of our information variables, as well as distance), because any such variable is spanned by the individual dummies representing the fixed effects. Moreover, the interesting variation in our panel is virtually all cross-sectional; a 'between' estimator on the time-series means for the country pairs demonstrates this clearly (see Tables 2,3, and 6), as do the random effects estimates (Tables 5 and 10). The fixed effects estimator transforms the observed variables by subtracting out the appropriate time-series means. That clearly rules it out in our context. Thus most of our estimation simply pools the time-series and cross-section data[12]. Random effects panel estimation is not theoretically appropriate for our data, which are not drawn randomly from a larger population (see Baltagi, 1995). We can, however, get some information from a random effects estimation (Table 5), which we discuss below.

First, however, we go back to the estimates in Table 2 and note that the elasticities on each market capitalization are close to unity in all our specifications. That suggests that we could normalize the flows for market size and use a new dependent variable, the gross bilateral cross-border equity flow divided by the product of the equity market capitalizations of each country. We call this *eqnorij*, and Table 3 gives estimates for it that are analogous to columns

[12] It is, however, appropriate to ask whether the data are 'poolable'. Unfortunately, it is not possible to test poolability across years formally for a number of technical reasons. A Wald test for equality of parameters over years fails because of the Behrens-Fisher problem, that is, a failure to satisfy the assumption of independent annual subsamples. A standard Chow F-test of parameter stability fails because variances of the subsamples are not equal over years. And it is not possible to perform the Generalised Chow test because a consistent estimate of the country- and time-specific variance components with which to weight the data can only be obtained from the within-groups (fixed effects) estimator - an estimator which is not able to estimate the effect of time-invariant variables like distance. Inspection and comparison of the results by years does, however, suggest considerable stability of the key coefficients (except insofar as we report otherwise – see below).

(2), (4), (7), and (8) of Table 2. These results are very encouraging. The market capitalizations were indeed contributing substantially to the explanation of the transaction flows, but removing their influence leaves the other variables at least as strong (with bank branches estimated better), with coefficient estimates very close to those for the non-normalized equation. Moreover, even without market capitalizations, we capture a substantial part of the variance in the data. [13]

The distance, telephone traffic and banks variables may all represent information, but in somewhat different dimensions. For example, one interpretation might be that different classes of agents have different information sets. Thus telephone calls might represent the information gathering of the broad population and the cross-country networks associated with migration, cultural ties, past colonial relationships, etc. Traders might be more influenced by their information about fundamentals which are more closely correlated, the closer is a pair of countries geographically (which appears to be an empirical regularity, partly mediated through trade flows). Foreign bank branches might transmit information about specific companies directly to investment managers in the home country. The argument is highly conjectural, but the heterogeneity of information sets might leave room for several distinct 'information variables'.

4.2. Robustness

[13] It might be thought that market capitalization would be particularly likely to be endogenous in our specification: high transactions flows could themselves push prices up. To minimise this problem, we use beginning-of-period market capitalization. But we also tried instrumenting for market capitalization using GDP and financial market sophistication as instruments; the estimates did not change significantly.

Studies of goods trade often use a range of dummy variables that might plausibly be related to economic exchange between two countries. We therefore tried introducing such variables into the basic specification of Table 2, column (7). Thus we experimented with geographical adjacency and common language (both used by Ghosh and Wolf, 1998). In our sample, adjacency is strongly collinear with the regional bloc dummies and brings no improvement. The common language dummy, which applies to the US, Canada, the UK and Australia in our sample, is significant with the expected sign for some specifications. But it was satisfying that the coefficients on the initial explanatory variables were very stable in all specifications.

We then sought to allow for a regional bloc effect, for (alternatively) a currency bloc effect, and for what we call a 'major financial centre' effect. First, we used dummy variables for the three regions: Western Hemisphere, Europe, and East Asia. For the non-normalized flows, two of the three regional dummy variables entered with negative signs; the other was a positive but insignificant influence. For the normalized flows, all three coefficients were negative. This does not suggest that regional groupings tend to have closer financial market ties.

Frankel and Wei (1998) used a continuous variable for currency volatility within blocs. We proceeded differently, constructing a 'currency stability' dummy variable for each bilateral relationship in our sample (e.g., this variable is unity for US-Hong Kong, unity for intra-ERM [EMS Exchange Rate Mechanism] currencies, zero for all Australian, Canadian, Singaporean, Swiss, and Japanese bilateral relations, etc.). When introduced into our basic specification,

this variable took on a negative coefficient - again, currency stability does not seem to have a positive influence on cross-border equity transactions.

New York, London and Tokyo are the world's major financial centers, and even after allowing for their market sizes and sophistication, we might expect them to enter disproportionately in the data. We sought to represent any such effect by constructing (for the US, UK, and Japan) variables like *usin*, which takes the value unity when the flow is transactions in US equities by residents of any other country, zero otherwise, and *usout*, which takes the value unity for transactions by US investors in any other country, and zero otherwise. These dummy variables also did not improve the specification.

We tried two different variables representing the effectiveness of the legal system. In our sample, however, the 'judicial efficiency' variable of La Porta *et al*. (1997) is negatively correlated with the 'effectiveness of the legal system in enforcing commercial contracts' index in the *World Competitiveness Report* (1996). Perhaps it is not surprising, therefore, that when both are present, the former is insignificant and the latter takes a negative sign. When we include them individually, their coefficients are unstable and often wrongly signed in annual cross-sections. Most of the countries in our sample rank so highly on this criterion that there is relatively little variation in either of the indices.

It is reasonable to ask whether our results are dominated by any particular year(s) or countries and whether the relationship between the transaction flows and our explanatory variables behaves in a consistent way over time. We therefore ran our basic specification as a cross-

section for each year of the sample. The results are shown in Table 4. The coefficients appear fairly stable; distance is always negatively signed, while telephone calls and financial market sophistication always exercize a positive influence on transaction flows. But the performance of the bank branches and insider trading variables is unsatisfactory. Still, they are consistently strong in Table 2 and in most of our other robustness exercises.[14]

We also estimated our basic specification for each country individually, treated as the source country of the transaction flows (so, for example, the US regression has as dependent variable gross transactions by US residents in each of the destination countries for each of the years of the sample, giving 104 observations for the regression). Again, the estimates (not reported) show country-by-country behavior consistent with the overall regression and relatively little difference across countries. A related robustness check is reported in Tables 7 and 8, discussed below. Non-parametric estimation (kernel) did not suggest any non-linearity in the data.

We can get some information from using a random effects panel estimator, the results from which are reported in Table 5. These estimates show that the main component of the variance which our specification is capturing is that in cross-section (the 'between' R^2 is high, while that for 'within' - the time-series dimension - is very low). It is also reassuring that the coefficients and their standard errors in these GLS estimates are fairly similar to those of Table 2, column (7), and Table (3), column (3).

[14] We note also that when we ran maximum-likelihood estimation (along with the random effects estimation reported below), likelihood-ratio tests showed consistently that bank branches and insider trading should not be dropped from the specification.

The regional integration in Europe, with the European Union and EFTA, has certainly affected the operation of capital markets. We might ask whether our results stand up if we take flows within Europe alone. The estimates are reported in Table 6. Note that we have less than one-third of our full set of observations. Nevertheless, the basic specification works, as shown in columns (2) and (4), in particular for distance, telephone call traffic, and financial market sophistication. Insider trading and bank branches appear with negative but insignificant coefficients. The elasticity on distance is substantially greater than in the full sample.

If we in turn exclude intra-European flows from the full sample (leaving the set of observations complementary to those covered in Table 6), we obtain the excellent results reported in Table 7. These estimates for the reduced sample are at least as good as those for the full sample (compare Table 2, column (7), and Table 3, column (3)).

Why is our basic specification not as good for intra-European exchanges as for others? Why should the elasticity on distance be so much higher in the intra-European subsample, while the banks and insider trading variables are incorrectly signed? It is reasonable to believe that as part of the European Union's Single Market program ('1992') and the European Economic Area, financial market and institutional integration has gone substantially further than for financial transactions involving countries outside Europe. That might have made the financial institutions variables less important and distance, representing the 'fundamentals', relatively

more important – but this interpretation is even more conjectural than that at the end of Section 4.1 above.

Even within Europe, it does seem that the information sets of the various countries are quite different. To document this effect further, we studied the geographical coverage of some of the main European newspapers. We compared *Le Monde*, *The Guardian*, *La Stampa* and the *Frankfurter Allgemeine Zeitung* (main 'general interest' newspapers); and we looked separately at the *Financial Times*, *Les Echos* and *Il Sole 24 Ore* (main financial newspapers).[15] We used FT Profile to search for keywords like France, French, etc… in the headlines of all these newspapers. Table 8 shows for each newspaper the fraction of its headlines devoted to a given country. The results are suggestive: there is a much broader coverage of Spain and Italy by French newspapers compared to that of the British and to a lesser extent the German press. On the other hand, Switzerland is followed much more closely by Germany than by the UK (or France). France and Germany are likely to be more informed about each other than about the UK. Italian newspapers tend to write more about France than about Germany and the UK (in that order), and they do not say much about the Netherlands.[16] We note that the correlation between the number of articles written in country *i* about country *j* and the distance between the countries is indeed negative: –0.23 for the general interest newspapers and –0.33 for the financial newspapers.

[15] The choice of countries considered and periods has been dictated by data availability.

[16] These results are illustrative rather than claiming to be general.

It has been argued that the most general form of a gravity model should include country dummy variables (for both source and destination) and time dummies (Matyas, 1997). Running our two basic specifications with all such dummies gives the estimates in Table 9 (where we have omitted the coefficients on the dummies themselves). The country dummies eliminate the (time-invariant) *sophi* and *insidersj*, and the time dummies eliminate *growth*. The elasticity on distance rises somewhat, that on telephone calls falls somewhat, the banks variable performs well, and the standard errors are satisfactory. Again, our results are robust to this experiment.

Table 10 shows the results when our basic specification is applied to bilateral purchases and sales, taken separately (without and with the normalization by market size). It is very reassuring that we find very similar estimates. Not surprisingly, the coefficients are somewhat less well determined than for the aggregate of purchases and sales, and the R^2s are down somewhat. These results strongly suggest that our hypothesis is indeed a reasonable story about transactions flows.

4.3. Portfolio diversification and 'return chasing'

When we attempt to allow for diversification motives, the results are quite weak. We proxy risk diversification opportunities by incorporating various correlation variables in our basic specifications (correlation of the stock market returns, *corrij*, or the correlation between the GDP growth rates of countries *i* and *j*, calculated at various time horizons). These correlations are computed with monthly (stock market returns) or annual (GDP) data – see Appendix for details. In column (2) of Table 11, we present estimates with the correlation variables but

without the information variables, and in column (3) all are included. None of the correlation variables is significant in our specifications without the information variables. One of them, however, becomes significant (with the expected negative sign) once we control for information asymmetries. This provides weak evidence for diversification motives in transactions, once we account for information asymmetries. Conditional on being sufficiently informed, investors prefer to buy equities whose returns are not highly correlated with their home country assets. As we see below, however, this result is not very robust.

We also allow for 'return-chasing' by introducing the return on the stock market of the destination country in our equations explaining gross purchases (and gross sales). This variable is never significant. This is not surprising for annual gross flows – but the returns variable also does not explain net flows at the annual frequency of our data. The lack of success with the returns variable, in contrast to Brennan and Cao (1997), Brennan and Aranda (1999), and Froot *et al.* (1998), may simply be a consequence of using data of different frequency – the effect may show up in quarterly or daily data, but not in the annual data we use, as explained in Section 3.

We would expect that high volatility of the stock returns of countries *i* and *j* should increase asset flows, as investors have to readjust their portfolios more often. This is indeed the case: when we introduce in our preferred specification alternative variables representing the variances of the stock market indices (*varij* in Table 11), they enter with positive and significant coefficients (columns (5) and (6)). They do not affect any other variables in our

basic specification. But the risk diversification variables are no longer significant once these variances are introduced.

The significance of the volatility variables can be interpreted in alternative ways: if agents do pursue a return-chasing strategy, they will shift their portfolios frequently if returns are highly volatile. But high volatility in returns could also reflect high volatility of the information to which our agents would react by adjusting their portfolios.

5. Information and the gravity model for manufactures trade flows

Trade in goods is very different from trade in equities[17] - there are physical transport costs, and most goods purchased from abroad are consumed or used as intermediate inputs, so purchases normally repeat in subsequent periods. But there may be some common influences. We therefore estimate gravity equations for trade flows (manufactures) over the same period covered by our portfolio equity flows. The specification is standard (see, e.g., Hamilton and Winters, 1992). We use as dependent variable the average of exports reported by country *i* to country *j* and imports reported by country *j* from country *i* (this is not an average of *i*'s imports and exports to *j*, but rather averages the *same* flow as recorded by the source and destination country, in order to deal with the well-known 'mirror statistics' discrepancies). Explanatory variables are GDP for both source and destination country (market size), per capita GDP, distance, the OECD GDP growth rate, and dummy variables for Western

Hemisphere, European Union, and East Asia. Again, the specification is log-linear, and the estimation procedure gives 'White-corrected' (heteroskedasticity-consistent) standard errors.

The results for the full panel are shown in column (1) of Table 12. We see that the market size (*gdpi, gdpj*) variables perform as expected. Trade varies positively with the cycle (*growth*), as expected, and also with the regional dummies (*wh, eu, easia*), although the EU dummy is insignificant. The effects of EU membership may be picked up partly by the distance variable, since in our sample of countries, the EU members form a geographically contiguous bloc.

The elasticity of trade with respect to distance is regarded as one of the most securely established empirical results in the literature. Leamer and Levinsohn (1995) cite a 'consensus elasticity' of –0.6; our point estimate of –0.54 in column (1) is one standard deviation away from this.

The picture changes dramatically, however, when we include explicit information variables alongside distance in the trade flows equation. Among the variables we used to explain equity flows, both telephone call traffic and bank branches are *a priori* plausible candidates to represent direct information flows between trading partners. Including them gives the results reported in column (2) of Table 12. The information variables do indeed enter with sizeable, very well-determined coefficients; and they improve the regression considerably. The EU dummy becomes significant, the proportion of the variance explained rises substantially, and

[17] Although in a simple model with utility separable in traded and non-traded goods, the only claims traded in equilibrium are claims on firms producing traded goods, so that asset trade mirrors goods trade (see Obstfeld and

most importantly, the coefficient on distance falls sharply. The elasticity is now only –0.24! Thus here too, in the workhorse gravity model of goods trade, distance appears to be proxying for information flows. The trade literature does not in fact justify convincingly the role of distance in the gravity equation, except by general reference to transport costs. It seems that information flows may be at least as important. These results suggest obvious directions for developing and refining the gravity model.[18] [19]

6. Conclusion

We apply a new approach to a new panel data set on bilateral gross cross-border equity flows between 14 countries, 1989-96. The results are remarkably good and have strong implications for theories of asset trade and the nature of frictions in international capital markets.

We integrate elements from the finance literature on portfolio composition and the international macroeconomics and asset trade literature. Theory suggests that gross asset flows should depend on market size in both source and destination country as well as trading costs, in which both information and the transaction technology play a role. The resulting estimating equation, with equity market capitalization representing market size and distance

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Rogoff, 1996, Ch. 5).

[18] There has been some movement in this direction. For example, Anderson and Marcouiller (1999) find that 'corruption and imperfect contract enforcement dramatically reduce trade'. Rauch and Trindade (1999) find that where ethnic Chinese communities in trading partner countries are large, they transmit information that helps to match buyers and sellers (Rauch 1999 also deals with the effects of networks on trade flows).

[19] If in turn we use trade flows as one of the explanatory variables for equity flows, it enters significantly and positively. Not surprisingly, it reduces the coefficients on distance, telephone calls, and banks, but they all remain significant. Thus trade flows may incorporate (or be influenced by) some of the information flows that appear to explain equity flows, but there may still be common determinants of both that we have not yet succeeded in modelling explicitly.

proxying some informational asymmetries, performs well. But we also include variables that explicitly represent information transmission (telephone call traffic and multinational bank branches), an information asymmetry between domestic and foreign investors (degree of insider trading in the stock market), and the efficiency of transactions (an index of financial market sophistication).

The full specification accounts for almost 70% of the variance of the transaction flows, much more than in any previous work. Various dummy variables (adjacency, language, currency or trade bloc, effectiveness of the legal system, and a 'major financial centre' effect) do not improve the results. The basic specification is valid for purchases and sales taken separately, for individual years, and country-by-country, as well as for intra-European transactions alone and when we exclude intra-European transactions. We find no evidence of return chasing and only weak effects of any portfolio diversification motives, although transaction flows are higher when equity market returns are more volatile. With almost 1500 observations on bilateral cross-border equity flows, we conjecture that these results are likely to be qualitatively robust.

A key role for informational asymmetries emerges strongly from the portfolio transactions data. We also find that our information transmission variables substantially improve standard gravity equations for trade in goods: the importance of information asymmetries has been considerably underestimated in the empirical trade literature.

Our empirical work is rather strong evidence that there is a very important geographical component in international asset flows. International capital markets are not frictionless: they are segmented by informational asymmetries. These results may have implications for the 'home bias' literature surveyed by Lewis (1999). Countries have different information sets, which heavily influence their international transactions.

The integration of international macroeconomic, trade and finance perspectives here, and the empirical support for this approach, suggest new directions for studying financial market integration and international capital flows. The results may also have policy implications. Whether in advanced countries or in emerging market countries, if policy-makers wish to raise foreign investors' activity levels in their domestic markets – and thereby enhance liquidity and the development of these markets – they should consider measures to improve transparency, reduce insider trading, and communicate to the foreign press information relevant to the financial markets.

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Data Sources and definitions

Bilateral portfolio equity flows: Cross Border Capital, London 1998

Bilateral trade in manufactures: OECD Bilateral Trade Data Base

Distance, adjacency, language: www.ksg.harvard.edu/people/sjwei/ Distance is the physical distance between capital cities.

GDP, population: *International Financial Statistics* (IMF) and OECD

Equity price indices and equity market capitalization: Datastream, MSCI

Telephone call traffic (total volume of calls in minutes): *Direction of traffic – Trends in International Telephone Tariffs 1996*, International Telecommunications Union

Bank branches: *Bankers Almanac*, various issues

Index of insider trading, index of sophistication of financial markets: *World Competitiveness Report*, 1996

Gross bilateral portfolio equity flows

Foreign equity investment has three main conduits: (1) The purchase of a substantial share of the equity of a company, or the outright purchase of physical assets, such as plant, equipment, land or buildings. These transactions are deemed to be direct investments. They are differentiated from indirect, or portfolio, transactions. (2) The purchase or sale of an equity security on a stock exchange local to the issuing company for the benefit of a non-resident investor. In this instance, a UK fund manager's purchase of IBM stock in New York would be defined as a cross-border transaction. (3) The purchase or sale of a foreign equity on a stock exchange local to the investor. A UK fund manager's sale of IBM stock via SEAQ International in London would be recorded as a cross-exchange transaction.

· Gross equity flows are the sum of all purchases and all sales of foreign equity.
· Net equity investment is the difference between the purchases and the sales of foreign equity.

The data used in this paper are gross cross-border portfolio equity flows. They are principally derived from three sources: national balance of payments statistics; official national stock exchange transactions; published evidence of international asset switches by major fund management groups. While these data sources complement one another and allow for cross-checks, there are limitations.

The threshold percentage distinguishing portfolio from direct varies from country to country but is around 20%-30% in the data set. The data record transactions between domestic and foreign residents. It is the residence of the transactor that is recorded, rather than that of the final holder; thus if a British financial institution transacts with the US on behalf of a Hong Kong resident (say), the transaction is recorded as a US-UK flow. Moreover, once a UK

security (say) is in the foreign domain and is being transferred between foreign investors, it no longer shows up in the UK balance of payments data.

(Source: Cross-Border Capital, direct communication from Angela Cozzini)

Correlations of GDP growth rates: We calculate these using quarterly data. We try two measures, over different periods: 1960-92, 1976-92. We also try correlations between the first differences of growth rates 1979-95.

Stock market returns, variances: Variance of the difference of indices (in logs) between country *i* and country *j* (*varij*). We also try variance of first differences of stock indices (in logs), for both source and destination country.

Stock market returns, correlations: Calculated using monthly data for each country, correlation taken over each year in the sample (*corrij*). We also try correlation over the entire period 1989-96 (so the variable is time-invariant for each country pair) and the correlation of returns for the five years preceding date *t*.

TABLE 1 – SOURCE COUNTRY TOTAL PURCHASES, SALES, GROSS FLOWS, NET FLOWS, 1989-96 ($ BN.)

	Purchases	Sales	Gross flows			Net flows
	mean	mean	mean	min	max	mean
US	21.235	17.995	39.230	2.180	419.006	3.240
J	3.473	3.212	6.681	0	71.603	0.265
UK	19.001	18.260	37.258	0	319.84	0.743
BD	2.541	2.305	4.846	0	27.515	0.236
F	2.223	2.140	4.363	0	21.833	0.083
SW	6.142	5.962	12.101	0	84.536	0.183
NL	2.023	1.754	3.776	0	33.502	0.268
SP	0.159	0.137	0.296	0	2.937	0.022
IT	0.974	0.925	1.895	0	22.329	0.050
SC	0.684	0.534	1.214	0	14.000	0.153
C	3.146	2.866	6.010	0	103.081	0.282
A	0.560	0.512	1.071	0	7.917	0.049
HK	1.884	1.730	3.614	0	26.040	0.155
S	1.324	1.078	2.401	0	23.972	0.247

Gross flows mean$_i$ = $\frac{1}{8} \sum_t \sum_j equity_{ij,t}$ (similarly for purchases and sales)

Min$_i$ = $\min_{ij,t} equity_{ij,t}$

Max$_i$ = $\max_{ij,t} equity_{ij,t}$

i and *j* are country indices, *t* time

TABLE 2 – BILATERAL EQUITY FLOWS 1989-96

equityij	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)[a]
mcapi	1.032	1.010	0.954	0.951	0.815	0.885	0.904	1.026
	(.036)	(.031)	(.030)	(.030)	(.035)	(.035)	(.034)	(.074)
mcapj	1.027	1.031	1.006	1.006	0.908	0.901	0.946	1.075
	(.034)	(.032)	(.032)	(.031)	(.035)	(.036)	(.035)	(.070)
distij	-0.689	-0.741	-	-	-	-0.695	-0.572	-0.573
	(.034)	(.032)				(.035)	(.039)	(.076)
telnorij	-	-	0.416	0.373	0.318	-	0.186	0.226
			(.020)	(.021)	(.024)		(.027)	(.046)
sophi	-	3.675	-	1.349	2.043	4.114	2.943	2.581
		(.254)		(.281)	(.312)	(.257)	(.295)	(.525)
banksij	-	-	-	-	0.384	0.341	0.229	0.125
					(.055)	(.051)	(.052)	(.106)
insidersj	-	-	-	-	-0.797	1.668	0.799	0.568
					(.328)	(.302)	(.320)	(.588)
growth	0.341	0.341	0.366	0.363	0.416	0.390	0.385	-
	(.062)	(.058)	(.059)	(.058)	(.058)	(.057)	(.056)	
N	1456	1456	1456	1456	1456	1456	1456	182
F (K, N-K-l)	545.64	638.88	682.75	559.73	402.34	505.34	454.51	123.94[b]
R^2	0.572	0.631	0.600	0.607	0.622	0.653	0.666	0.833[c]

a 'Between' regression on group means b F(7,174) c 'Between'

TABLE 3 – NORMALISED BILATERAL EQUITY FLOWS

eqnorij	(1)	(2)	(3)	(4)[a]
distij	-0.740 (.032)	-	-0.593 (.038)	-0.565 (.075)
telnorij	-	0.372 (.021)	0.194 (.027)	0.215 (.045)
sophi	3.676 (.254)	1.341 (.281)	2.792 (.284)	2.703 (.505)
banksij	-	-	0.142 (.040)	0.182 (.079)
insidersj	-	-	0.815 (.313)	0.650 (.579)
growth	0.340 (.058)	0.364 (.058)	0.375 (.056)	-
N	1456	1456	1456	182
F (K, N-K-1)	262.08	160.86	161.42	49.58[b]
R^2	0.303	0.257	0.365	0.585[c]

a 'Between' regression on group means b F(5,176) c 'Between'

TABLE 4 – BILATERAL EQUITY FLOWS, BY YEAR

equityij	1989	1990	1991	1992	1993	1994	1995	1996
mcapi	0.720	0.994	1.092	1.063	1.307	1.096	0.980	1.099
	(.071)	(.090)	(.092)	(.096)	(.137)	(.103)	(.104)	(.097)
mcapj	0.755	0.853	1.239	1.146	1.194	1.142	1.154	1.238
	(.087)	(.113)	(.099)	(.088)	(.111)	(.099)	(.083)	(.090)
distij	-0.332	-0.450	-0.687	-0.701	-0.524	-0.642	-0.642	-0.690
	(.101)	(.114)	(.121)	(.100)	(.111)	(.099)	(.090)	(.099)
telnorij	0.310	0.347	0.278	0.153	0.258	0.129	0.143	0.165
	(.071)	(.085)	(.095)	(.067)	(.087)	(.051)	(.046)	(.055)
sophi	2.250	2.699	2.354	3.718	3.240	1.978	2.122	1.695
	(.642)	(1.068)	(.870)	(.763)	(1.019)	(.674)	(.671)	(.750)
banksij	0.149	0.158	-0.161	0.272	0.144	0.138	0.102	-0.077
	(.120)	(.154)	(.168)	(.137)	(.173)	(.130)	(.130)	(.134)
insidersj	0.135	0.670	1.720	1.847	-0.278	0.024	-0.677	0.955
	(.800)	(.918)	(1.086)	(.899)	(.908)	(.789)	(.601)	(.802)
N	182	182	182	182	182	182	182	182
F(7,174)	51.24	68.63	79.39	115.38	88.30	58.96	79.42	72.52
R^2	0.621	0.665	0.686	0.763	0.695	0.702	0.748	0.708

TABLE 5 – RANDOM EFFECTS (GLS) ESTIMATES

	(1) equityij	(2) eqnorij
mcapi	0.714 (.055)	-
mcapj	0.718 (.054)	-
distij	-0.610 (.078)	-0.698 (.077)
telnorij	0.112 (.044)	0.104 (.044)
sophi	3.476 (.515)	3.220 (.516)
banksij	0.278 (.074)	0.029 (.067)
insidersj	1.406 (.602)	1.441 (.599)
growth	0.381 (.043)	0.351 (.044)
N	1456	1456
R^2 within	0.103	0.038
R^2 between	0.812	0.554
R^2 overall	0.658	0.353

TABLE 6 – BILATERAL EQUITY FLOWS IN EUROPE

	(1) equityij	(2) equityij	(3) eqnorij	(4) eqnorij	(5)[a] eqnorij
mcapi	1.207 (.093)	1.112 (.095)	-	-	-
mcapj	0.446 (.093)	0.471 (.090)	-	-	-
distj	-1.476 (.117)	-1.155 (.144)	-1.069 (.117)	-0.977 (.152)	-0.934 (.307)
telnorij	-	0.174 (.051)	-	0.158 (.051)	0.175 (.097)
sophi	-	1.357 (.442)	2.473 (.411)	1.701 (.426)	1.665 (.911)
banksij	-	-0.045 (.070)	-	-0.139 (.069)	-0.113 (.162)
insidersj	-	-0.415 (.472)	-	-0.520 (.481)	-0.580 (1.043)
growth	0.321 (.101)	0.319 (.098)	0.323 (.102)	0.306 (.102)	-
N	448	448	448	448	56
F(K, N-K-1)	135.00	83.27	66.39	35.13	8.38[b]
R^2	0.591	0.629	0.274	0.295	0.456[c]

a ‘Between’ regression on group means b F(5,50) c ‘Between’

TABLE 7 – BILATERAL EQUITY FLOWS EXCLUDING INTRA-EUROPEAN FLOWS

	(1) equityij	(2) eqnorij
mcapi	0.825 (.040)	-
mcapj	0.976 (.040)	-
distij	-0.555 (.100)	-0.554 (.103)
telnorij	0.172 (.033)	0.186 (.032)
sophi	3.591 (.405)	3.423 (.393)
banksij	0.385 (.071)	0.241 (.051)
insidersj	1.255 (.418)	1.520 (.404)
growth	0.417 (.065)	0.400 (.065)
N	1008	1008
F(K, N-K-1)	407.31	83.02
R^2	0.698	0.322

Table 8 – NATIONAL INFORMATION SETS

Geographical coverage of *Le Monde*, *The Guardian*, *Frankfurter Allgemeine Zeitung*, *La Stampa* (1996-1998)

Le Monde	UK	France	Germany	Nether.	Switz.	Spain	Italy	Scand.
%	17		27	8	7	15	17	9
The Guardian	UK	France	Germany	Nether.	Switz.	Spain	Italy	Scand.
%		46	15	6	5	9	13	6
Frankfurter	UK	France	Germany	Nether.	Switz.	Spain	Italy	Scand.
%	17	29		5	12	13	15	9
La Stampa	UK	France	Germany	Nether.	Switz.	Spain	Italy	Scand.
%	22	30	22	4	6	11		5

Geographical coverage of the *Financial Times*, *Les Echos* and *Il Sole 24 Ore* (1993-1998)

Fin. Times	UK	France	Germany	Nether.	Switz.	Spain	Italy	Scand.
%		30	25	7	6	9	12	11
Les Echos	UK	France	Germany	Nether.	Switz.	Spain	Italy	Scand.
%	29		29	5	6	10	13	7
Il Sole 24 Ore	UK	France	Germany	Nether.	Switz.	Spain	Italy	Scand.
%	22	31	27	3	6	7		4

TABLE 9 – ESTIMATES WITH YEAR AND COUNTRY DUMMY VARIABLES

	(1) equityij	(2) eqnorij
mcapi	0.438 (.189)	-
mcapj	0.211 (.189)	-
distij	-0.649 (.056)	-0.648 (.056)
telnorij	0.082 (.032)	0.078 (.033)
sophi	-	-
banksij	0.213 (.059)	0.230 (.059)
N	1456	1456
F (K, N-K-l)	176.23[a]	69.53[b]

[a] K=38 [b] K = 36

There is a full set of dummy variables for both source and recipient countries and one dummy for each year.

TABLE 10 – BILATERAL PURCHASES AND SALES

	(1) purij	(2) purnorij	(3) salij	(4) salnorij
mcapi	0.977 (.046)	-	0.939 (.086)	-
mcapj	0.989 (.055)	-	1.077 (.072)	-
distij	-0.621 (.049)	-0.626 (.047)	-0.735 (.076)	-0.743 (.072)
telnorij	0.210 (.037)	0.212 (.036)	0.189 (.052)	0.182 (.053)
sophi	3.455 (.517)	3.421 (.500)	3.458 (.554)	3.483 (.529)
banksij	0.161 (.075)	0.141 (.051)	0.331 (.120)	0.331 (.080)
insidersj	0.653 (.371)	0.660 (.372)	0.309 (.625)	0.465 (.608)
growth	0.320 (.065)	0.318 (.063)	0.258 (.117)	0.257 (.114)
N	1456	1456	1456	1456
F(K, N-K-1)	255.79	101.69	146.47	64.95
R^2	0.564	0.288	0.404	0.179

TABLE 11– ESTIMATES WITH RISK DIVERSIFICATION AND RETURNS VOLATILITY

	(1) equityij	(2) equityij	(3) equityij	(4) eqnorij	(5) eqnorij	(6) eqnorij[a]
mcapi	0.904	0.990	0.901	-	-	-
	(.034)	(.034)	(.034)			
mcapj	0.946	1.008	0.943	-	-	-
	(.035)	(.034)	(.035)			
distij	-0.572	-	-0.588	-0.593	-0.619	-0.711
	(.039)		(.039)	(.038)	(.039)	(.076)
telnorij	0.186	-	0.193	0.194	0.202	0.112
	(.027)		(.027)	(.027)	(.027)	(.044)
sophi	2.943	3.146	2.986	2.792	2.831	3.223
	(.295)	(.342)	(.295)	(.284)	(.285)	(.510)
banksij	0.229	-	0.220	0.142	0.130	0.028
	(.052)		(.052)	(.040)	(.040)	(.067)
insidersj	0.799	-	0.828	0.815	0.875	1.439
	(.320)		(.320)	(.313)	(.315)	(.592)
corrij	-	0.210	-0.248	-	-0.023	0.022
		(.101)	(.091)		(.106)	(.093)
varij	-	-	-	-	2.803	2.307
					(.799)	(.692)
growth	0.385	0.342	0.382	0.375	0.394	0.368
	(.056)	(.064)	(.055)	(.056)	(.056)	(.044)
N	1456	1456	1456	1456	1448	1448
F (K,N-K-1)	454.51	406.51	403.01	161.42	124.03	-
R^2	0.666	0.527	0.667	0.365	0.369	b

a Random effects GLS

b 'within' $R^2 = 0.045$; 'between' $R^2 = 0.557$; overall $R^2 = 0.358$.

TABLE 12 – BILATERAL MANUFACTURES TRADE FLOWS, 1989-96

tradeij	(1)	(2)
gdpi	0.537	0.431
	(.019)	(.019)
gdpj	0.487	0.483
	(.020)	(.017)
pci	0.502	0.528
	(.079)	(.070)
pcj	-0.159	-0.154
	(.084)	(.079)
distij	-0.544	-0.235
	(.047)	(.049)
telnorij	-	0.095
		(.009)
banksij	-	0.300
		(.023)
growth	0.052	0.102
	(.027)	(.025)
wh	1.470	1.560
	(.124)	(.113)
eu	0.029	0.562
	(.113)	(.112)
easia	1.486	1.321
	(.113)	(.093)
N	1456	1456
F(K, N-K-1)	549.94	585.71
R^2	0.711	0.772