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Publication Date
2003-04-11

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July 17, 2003

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Abstract

This paper uses a noisy rational expectations model to derive predictions about the dynamic behaviour of the proportion of institutional money managers in a given country who are bullish about the equity market in different countries. The predictions are tested using monthly data for four countries for the period October 1995 to October 2000. The empirical findings are consistent with the hypothesis of informational asymmetries between capital market participants in different countries.

1 Introduction

The theory of international finance is based on differences between the residents of different countries in opportunity sets, tastes, and information. Such differences may lead to systematic differences between the portfolios held by investors in different countries,as well as to different trading behavior. Differences in opportunity sets may arise because of cross-border frictions and barriers such as taxes and capital controls (Black (1974), Stulz (1981)). Although these impediments to the flow of capital have become progressively less important among developed countries over the last 25 years, there continue to exist pronounced differences in the portfolios of residents of different countries, which are characterized most simply in terms of *home bias*.[1] French and Poterba (1991) and Cooper and Kaplanis (1994) argue that the remaining barriers are insufficient to explain the observed degree of home bias.

Adler and Dumas (1983) point out that differences in tastes between residents of different countries may create deviations from purchasing power parity that lead investors in different countries to hold different portfolios in order to hedge against domestic purchasing power risk.[2] But, while domestic inflation risk could in principle account for the home bias phenomenon, Cooper and Kaplanis (1994) show that the empirical evidence is consistent with this explanation only if investors have implausible low risk aversion (and equity returns are negatively correlated with domestic inflation.)

This paper is concerned with the implications of differences of information between investors resident in different locations. The differential information hypothesis has typically been specified in terms of an informational disadvantage for foreign investors. Gehrig (1993) uses this hypothesis to explain the home bias phenomenon, and Portes *et al.* (2000, 2001) show that distance and other variables that capture informational asymmetries have significant explanatory power for the volume of inter-country portfolio flows. Kang and Stulz (1997) argue that information asymmetry can account for foreigner preferences for large

[1] Tesar and Werner (1998).

[2] Grauer *et al.* (1976) show that in the absence of deviations from purchasing power parity the standard results apply.

firms in Japan. Brennan and Cao (1997) argue that a foreign investor informational disadvantage will cause foreign investors to be rational trend followers, buying when the market rises and selling when it falls. They use this framework to explain international flows of equity capital and provide some supportive evidence, while Brennan and Aranda (1999) use the same framework to explain the relative volatility of flows of debt and equity capital. Similar trend following behavior has been reported by Warther (1994) for mutual fund investors, by Karolyi (2001) for foreign investors in Japan, by Froot *et al.* (2001) for foreign investors who use a particular U.S. custodian, by Choe *et al.* (1999, 2001) and Kim and Wei (2002) for foreign investors in Korea, by Grinblatt and Keloharju (2000) for foreign investors in Finland, and by Dahlquist and Robertsson (2001) for foreign investors in Sweden. On the other hand, Hamao and Mei (2001) argue that foreign investors in Japan tend to be long term contrarians, and Grinblatt and Keloharju (2000) argue that foreign institutional investors are the most sophisticated class of investors in Finland, despite the fact that they pursue momentum strategies. Seasholes (2000) presents evidence that foreigners have an informational advantage in emerging markets.

Interpretation of this body of evidence for the differential information hypothesisi is complicated by the fact that different studies use data at different frequencies, ranging from transactions data to quarterly flow data. Moreover, while the theoretical model of information asymmetry predicts a contemporaneous relation between flows and returns, realistic information lags suggest that flows from less well-informed foreign investors might well lag returns, at least at high frequencies. Many of the empirical studies report only the results of regressing flows on lagged returns and interpret their findings in terms of 'trend-chasing' behavior or 'momentum investing' without asking why it is *foreign* investors who are prone to such behavior. Even a finding of a contemporaneous relation between flows and returns may be difficult to interpret in terms of information asymmetry: first, exogenous foreign demand shocks tend to increase or decrease both flows and prices, creating a positive association between them, even in the absence of information asymmetries; secondly, dynamic portfolio strategies such as portfolio insurance that are not information based will also lead to a positive association between flows and price changes.[3] Therefore evidence on the relation between flows and returns cannot be conclusive about information asymmetry. In this paper, instead of examining the relation between flows and returns, we examine the relation between reports of investor expectations and returns. This avoids the problem of inferring information endowments from trading behavior.

The allocation of information across investors is likely to be more complex in reality than is suggested by simply positing that foreign investors are at an informational disadvantage relative to domestic investors. Informational advantages are likely to depend on the type of information—short lived or long lived, market wide or security specific, as well as on the countries involved. Although some have questioned how there can exist informational asymmetries in the modern world between institutional investors in different countries, recent work by Coval and Moskowitz (1999) and by Huberman (2001) shows that physical propinquity is important even for institutional investors and the same authors have shown that the home bias phenomenon exists even within national boundaries.[4] Hau (2001) shows that the profits of professional traders in German stocks are higher for those located in Germany or in German speaking countries.

Consistent with the suggestion that informational advantage is likely to resist a simple characterization, evidence on the relative investment performance of foreign investors is mixed. Kang and Stulz (1997) using annual data for 10 years find no evidence that foreign investors outperform domestic investors in Japan. Choe, Kho and Stulz (1999, 2001) find that in Korea foreign institutions are at a disadvantage relative to both domestic institutions and domestic individuals and that foreigners are net buyers before large negative abnormal stock returns while domestic individuals are net sellers. Shukla and Inwegen (1995) show that UK funds managers investing in the US underperform local managers, and Timmermann and Blake (1999) show that UK pension funds lose from timing decisions in foreign markets.

[3]Brennan and Cao (1996) point out that less well informed investors will tend to pursue strategies that look like portfolio insurance strategies so the distinction between information driven trading and portfolio insurance is not always clear.

[4]See also Grinblatt and Keloharju (2000).

On the other hand, Grinblatt and Keloharju (2000) find that foreign investors appear to make the most profitable individual stock trades in Finland during the period 1995–96. In this paper we compare the expectations of institutional investment managers in different countries about different national market returns.

Our theoretical framework is a dynamic version of the multi-asset noisy rational expectations model of Admati (1985) which we use to analyze the determinants of the proportion of investors in country m who are bulls and bears about the equity market in country k. The basic assumption underlying the model is that domestic investors are better informed about the payoffs on the domestic asset than are foreign investors. In order to focus attention on the role of information asymmetry, exchange risk and interest rate differentials are ignored, and the analysis is conducted in a model with many trading periods but only a single terminal consumption period. This model which was developed by Brennan and Cao (1997) is summarized in Section 2. Its implications for the behavior of the fraction of investors in a given country who are bullish about the stock market of another country are developed in Section 3. Section 4 describes the data and Section 5 reports the empirical findings, which imply that foreign institutional investors in a given country's equity market are at an informational disadvantage relative to the average investor in that market. The evidence is particularly strong for the Japanese market and for Japanese institutions in foreign markets.

2 A General Model

We first extend the results of Brennan and Cao (1997) to an economy in which the number of trading sessions becomes large.[5] Thus, consider a multi-asset noisy rational expectations model in the spirit of Admati (1985). The payoff on the M risky assets is realized at time 1, and is represented by the $M \times 1$ normally distributed random vector $\tilde{U}$ with mean $\bar{U}$ and precision matrix H. Without loss of generality, the riskless interest rate is taken as zero. Each investor $i, i \in [0, 1]$ is endowed at time 0 with risky assets denoted by the vector $\tilde{X}_0^i$;

[5]See also Brennan and Cao (1996).

investors are characterized by exponential utility functions defined over time 1 consumption with common coefficient of absolute risk aversion $1/r$. The vector of aggregate per capita supply of the risky assets at time 0, $\tilde{X}_0$, is normally and independently distributed with mean $\bar{X}_0$ and precision matrix Φ_0. We consider a sequence of economies, denoted T, $T = 1, \ldots,$ in which there are T trading sessions that take place at times $t = \tau h, \tau = 0, \ldots, T-1$, where $h = 1/T$. The asset payoffs are realized and consumption takes place at time 1: there is no intermediate consumption in the model.

Immediately prior to trading session τ, each investor i obtains a *private* signal about the asset payoff, $\tilde{Z}^i_\tau$, where

$$\tilde{Z}^i_\tau = \tilde{U} + \tilde{\epsilon}^i_\tau,$$

and $\tilde{\epsilon}^i_\tau$ is distributed normally and independently of $\tilde{U}$, has mean zero, and is independent of $\tilde{\epsilon}^k_j$, if $k \neq i$ or $j \neq \tau$. In order to preserve the information structure as the number of trading sessions increases, the precision matrix of the private (and public) signals received by investors is scaled to reflect the length of time between trading sessions, so that the precision matrix of the private signals received by investor i in session τ is denoted by $S^i_\tau(h) \equiv hS^i_\tau$. In addition to the private signals, a vector of *public* signals is released immediately before each trading session $\tau = 0, \ldots, T-1$. The public signals are represented by the $M \times 1$ vector $\tilde{Y}_\tau$, where

$$\tilde{Y}_\tau = \tilde{U} + \tilde{\eta}_\tau,$$

and $\tilde{\eta}_\tau$ is normally distributed with mean zero and precision matrix $N_\tau(h) \equiv hN_\tau$.[6] New liquidity traders are assumed to enter the market in each trading session after the initial trading session, $\tau = 1, \ldots, T-1$; the incremental net supply of these traders is represented by the normally distributed random vectors $\tilde{X}_\tau$ which have mean zero and precision matrices $\Phi_\tau(h) \equiv \Phi_\tau/h$. For simplicity, we impose $\bar{X}_t = 0$ for $t > 0$. We assume that the volume of trading is not observable by investors.

The elements of the precision matrices S^i_τ are assumed to be uniformly bounded, and

[6] We assume that $N_0^{-1} = N_T^{-1} = O$ where O is a zero matrix to reflect the assumption that there is no public information at time 0 and that the returns on all risky assets are realized at time 1.

S_τ, the population average of the (unscaled) precision matrices at trading session τ is given by:

$$S_\tau \equiv \int_0^1 S_\tau^i \, di.$$

We follow the convention used by Admati (1985) in defining the integral of random variables in the continuum economy with multiple risky assets. If $(\tilde{V}_i)_{i\in[0,1]}$ is a process of independent random variables with zero mean and bounded variance, and $(\tilde{W}_i)_{i\in[0,1]}$ is almost surely integrable, then $\int_0^1 (\tilde{V}_i + \tilde{W}_i)\, di = \int_0^1 \tilde{W}_i \, di$. For example, this convention implies that $\int_0^1 \tilde{Z}^i = \tilde{U}$, a.s. and $\int_0^1 S_t^i \tilde{Z}^i = S_t \tilde{U}$, a.s.

Let $\tilde{P}_t$ denote the vector of equilibrium risky asset prices, and $\tilde{D}_t^i$ the vector of risky asset demands of investor i at time $t \equiv \tau h$ in trading session τ, and let $\tilde{I}_t$ be the public information set at time t including the prices at trading session τ, and $\tilde{I}_t^i$ be the information set of investor i at time t. Then the following theorem describes the risky asset prices and investor asset demands at the date of each market session in a noisy rational expectations equilibrium:

Theorem 1 *(Brennan and Cao (1997)) There exists a partially revealing rational expectations equilibrium in the T trading session economy in which the vectors of risky asset prices, $\tilde{P}_t$, and individual asset demands, $\tilde{D}_t^i$, at time $t \equiv \tau h$ in trading session τ are given by,*

$$\tilde{P}_t = K_t^{-1}[(K_t - \sum_{j=0}^{\tau} hS_j)\tilde{\mu}_t + \sum_{j=0}^{\tau}\{hS_j\tilde{U} - \tilde{X}_j/r\}], \tag{1}$$

$$\tilde{D}_t^i = rK_t^i[\tilde{\mu}_t^i - \tilde{P}_t] = rh[\sum_{j=0}^{\tau}\{S_j^i\tilde{Z}_j^i - S_j\tilde{U} + \tilde{X}_j/rh - (S_j^i - S_j)\tilde{P}_t\}] \tag{2}$$

where

$$\tilde{\mu}_t^i \equiv E(\tilde{U}|\tilde{I}_t^i) = (K_t^i)^{-1}(H\bar{U} + h\sum_{j=0}^{\tau}[N_j\tilde{Y}_j + S_j^i\tilde{Z}_j^i + r^2 S_j\Phi_j S_j\tilde{Q}_j])$$

$$\tilde{\mu}_t \equiv E(\tilde{U}|\tilde{I}_t) = (K_t - \sum_{j=0}^{\tau} hS_j)^{-1}(H\bar{U} + h\sum_{j=0}^{\tau}[N_j\tilde{Y}_j + r^2 S_j\Phi_j S_j\tilde{Q}_j])$$

$$\tilde{Q}_j = \tilde{U} - r^{-1}h^{-1}S_j^{-1}(\tilde{X}_j - \bar{X}_j)$$

$$K_t^i \equiv \mathrm{Var}^{-1}[\tilde{U}|\tilde{I}_t^i] = H + h\sum_{j=0}^{\tau}[S_j^i + N_j + r^2 S_j\Phi_j S_j]$$

$$K_t \equiv \int_0^1 K_t^i \, di = H + h \sum_{j=0}^{\tau} [N_j + S_j + r^2 S_j \Phi_j S_j].$$

The change in the optimal holdings of the M securities of investor i between trading sessions τ and $\tau - 1$ is denoted by ΔD_t^i, and is given by,

$$\Delta \tilde{D}_t^i \equiv \tilde{D}_t^i - \tilde{D}_{t-h}^i = r \left[h S_\tau^i (\tilde{Z}_\tau^i - \tilde{P}_\tau) - h S_\tau (\tilde{U} - \tilde{P}_\tau) + \frac{\tilde{X}_\tau}{r} - h \sum_{j=0}^{\tau} (S_j^i - S_j) \Delta \tilde{P}_\tau \right], \quad (3)$$

where $\Delta \tilde{P}_t \equiv \tilde{P}_t - \tilde{P}_{t-h}$. From equation (1), we get

$$\Delta \tilde{P}_t = K_t^{-1} [h \{ N_\tau (\tilde{Y}_\tau - \tilde{P}_{t-h}) + r^2 S_\tau \Phi_\tau S_\tau (\tilde{Q}_\tau - \tilde{P}_{t-h}) + S_\tau (\tilde{U} - P_{t-h}) \} - \tilde{X}_\tau / r]. \quad (4)$$

It then follows that the expected change in the individual's holdings conditional on the realized vector of price changes, ΔP_t, can be written as,

$$E[\Delta \tilde{D}_t^i | \Delta \tilde{P}_t] = r \left[\omega_t^i(h) A_t \Delta \tilde{P}_t + E[\tilde{X}_t / r | \Delta \tilde{P}_t] - \Omega_t^i \Delta \tilde{P}_t \right], \quad (5)$$

where $\omega_t^i(h) \equiv h(S_t^i - S_t)$, $A_t \equiv \mathrm{Cov}[\tilde{U} - \tilde{P}_{t-h}, \Delta \tilde{P}_t] \mathrm{Var}^{-1}[\Delta \tilde{P}_t]$, and $\Omega_t^i \equiv h \sum_{j=0}^{\tau} (S_j^i - S_j)$.

The variable $\omega_t^i(h)$ represents the *marginal* information advantage of investor i arising from private signals received in the interval $(t, t-h)$, while Ω_t^i represents the *cumulative* information advantage of the investor from all private signals received up to time t. As the time between trading sessions, $h \to 0$, $\omega_t^i(h) \to 0$, while Ω_t^i is unaffected. Hence as $h \to 0$, the expected change in the individuals holdings, conditional on the realized vector of price changes, becomes:

$$E[\Delta \tilde{D}_t^i | \Delta \tilde{P}_t] = r[B_t - \Omega_t^i] \Delta \tilde{P}_t, \quad (6)$$

where

$$\begin{aligned} B_t &= \frac{\mathrm{Cov}[\tilde{X}_t, \Delta \tilde{P}_t] \mathrm{Var}^{-1}[\Delta \tilde{P}_t]}{r} \\ &= -\left(\frac{\Phi_\tau^{-1}}{r^2} + S_\tau \right) \left(N_\tau + 2S_\tau + r^2 S_\tau \Phi_\tau S_\tau + \frac{\Phi_\tau^{-1}}{r^2} \right)^{-1} K_t, \end{aligned}$$

is an $M \times M$ matrix. In what follows we shall assume that h is small so that $\omega_t^i(h)$ can be neglected and we can use equation (6) to describe the conditional expected change in asset holdings.

For the average investor, we have

$$E[\Delta\tilde{D}_t^i|\Delta\tilde{P}_t] = rB_t\Delta\tilde{P}_t\,. \tag{7}$$

Without further specification, expression (6) places little restriction on the behavior of asset demands conditional on price changes. Therefore, in order to obtain sharp results we make the following assumption:

Assumption A: The average investor's demand curve is downward sloping

A downward sloping demand curve for the average investor implies that the diagonal elements of matrix B_t are negative, so that an increase in the supply of asset k leads to a decrease in its price. A sufficient condition for B_t to have negative diagonal elements is that the supply noise precision matrices, $\Phi_\tau(h)$, the public information precision matrix N_τ, and the average private information precision matrix are diagonal. Alternatively, B_t will be negative definite if K_{t-h} and K_t are proportional to each other.

3 International Investment and Investment Sentiment

In order to use the above framework to analyze the investment sentiment of institutional investors in an international context we shall assume that each of the risky assets corresponds to the market index of a different country, $m = 1, \ldots, M$. We consider a continuum of "institutional" investors, each of which is domiciled in a given country but may invest in all of the M countries. We shall be exploring the implications of different informational endowments for investors domiciled in different countries; in particular, we shall be interested in differences of information about market m between investors who are domiciled in country m and those who are domiciled abroad but invest in country m. We use $\mu^m \equiv \int_{i\in m} di$ to denote the measure of domestic institutional investors in country m. We assume that there is no currency risk, and that all institutional investors domiciled in a given country have the same private signal precision matrix so that $S_\tau^i \equiv S_\tau^m$, $\forall\tau$ and $i \in m$. Define $\bar{D}_t^m \equiv (\mu^m)^{-1}\int_{i\in m} D_t^i\,di$ as the vector of average investment allocations at time t for institutional investors domiciled in country m. Then, using equation (2), the average institutional investment vector for country m can be written as:

$$\bar{D}_t^m = r \sum_{j=0}^{\tau} \left((S_j^m - S_j)(\tilde{U} - P_t) + \tilde{X}_j / r \right), \tag{8}$$

where $S_j^m \equiv (\mu^m)^{-1} \int_{i \in m} S_j^i \, di$ is the private information precision matrix of institutional investors in country m at time $t_j \equiv jh$.

Let $\Delta \bar{D}_t^m \equiv \bar{D}_t^m - \bar{D}_{t-h}^m$ denote the change in the average investment allocation vector from the previous trading session for institutions domiciled in country m. Then it follows from equation (6) that

$$E[\Delta \bar{D}_t^m | \Delta \tilde{P}_t] = (\mu^m)^{-1} \int_{i \in m} E[\Delta \tilde{D}_t^i | \Delta \tilde{P}_t] \, di = r \left[B_t - \Omega_t^m \right] \Delta \tilde{P}_t, \tag{9}$$

where $\Omega_t^m = (\mu^m)^{-1} \int_{i \in m} \Omega_t^i \, di = \Omega_t^i \;\; \forall i \in m$.

Let $\Delta \bar{d}_{k,t}^m$, the k^{th} element of the vector $\Delta \bar{D}_t^m$, denote the change in the average holding by institutional investors domiciled in country m of securities in country k. Then

$$\Delta \bar{d}_{k,t}^m = \sum_{l=1}^{M} \Theta_{kl}^m \Delta P_{lt} + \nu_{kt}^m \tag{10}$$

where, dropping the time subscripts, $\Theta_{kl}^m = r[B_{kl} - \Omega_{kl}^m]$, and ν_k^m is an orthogonal, mean zero, error term. Equation (10) is essentially equivalent to equation (8) of Brennan and Cao (1997) where it is used to describe flows of investment capital. In this paper we are concerned with the behavior of expectations; in particular, with the fraction of (institutional) investors in each country who describe themselves as bullish or bearish about the stock market in their own and the other countries. For this reason we must be concerned with the *differences* between institutional investors domiciled in the *same* country. Theorem 1 and equation (8) imply that the investment vector of institutional investor i in country m, $\tilde{D}_t^i$, is related to the average institutional investment vector for country m, $\bar{D}_t^m$, by,

$$\tilde{D}_t^i = \bar{D}_t^m + r \sum_{j=0}^{\tau} S_j^m \epsilon_j^i. \tag{11}$$

Then, Ξ_t^m, the conditional variance–covariance matrix of the investment vectors of institutional investors in country m, is given by

$$\Xi_t^m \equiv \mathrm{Var}[\tilde{D}_t^i | i \in m, \bar{D}_t^m] = r^2 \sum_{j=0}^{\tau} \left(h S_j^m(h)\right)^2 \mathrm{Var}(\epsilon_j^i) = r^2 h \sum_{j=0}^{\tau} S_j^m. \tag{12}$$

Let $d_{k,t}^i$ and $\bar{d}_{k,t}^m$ denote the k^{th} elements of the vectors $\tilde{D}_t^i$ and $\bar{D}_t^m$. Then $d_{k,t}^i$, the demand at time t by institutional investor i in country m, for the equity of country k, is distributed normally with mean $\bar{d}_{k,t}^m$, and variance $\xi_{k,t}^m$, where $\xi_{k,t}^m$ is the k^{th} diagonal element of Ξ_t^m.

We are concerned with the fraction of institutional investors domiciled in each country who describe themselves as "bullish" or "bearish" about a given market. In order to operationalize this concept, we define an investor $i \in m$ as "bullish" about country k if and only if his demand for holdings in market k is positive so that $d_{k,t}^i > 0$. Then the probability that a particular institutional investor in country m is bullish, which is equal to the fraction of institutional investors who are bullish, is denoted by $F_{k,t}^m$ where,

$$F_{k,t}^m = \aleph\left(\frac{\bar{d}_{k,t}^m}{\sqrt{\xi_{k,t}^m}}\right), \tag{13}$$

and $\aleph()$ denotes the cumulative normal distribution.

Denote the change in the fraction of institutional investors in country m who are bullish about market k by $\Delta F_{k,t}^m \equiv F_{k,t}^m - F_{k,t-h}^m$, and denote the vector of price changes by $\Delta P_t \equiv P_t - P_{t-h}$. Using a Taylor expansion, the change in the fraction of institutional investors in country m who are bullish about market k can be written in terms of the change in $\bar{d}_t^{mk}$, the average institutional demand:

$$\Delta F_{k,t}^m = n(z_{k,t}^m) \frac{1}{\sqrt{\xi_{k,t}^m}} \Delta \bar{d}_{k,t}^m, \tag{14}$$

where $z_{k,t}^m = \bar{d}_{k,t}^m / \sqrt{\xi_{k,t}^m}$ and n denotes the normal probability density. Then, using equation (10) and dropping the time subscript, the change in the fraction of investors in country m who are bullish about the returns on market k can be written as:

$$\Delta F_k^m = \sum_{l=1}^{M} \Lambda_{kl}^m \Delta P_l + \eta_k^m, \tag{15}$$

where $\Lambda_{kl}^m = rn(z_k^m)(\xi_k^m)^{-1/2}[B_{kl} - \Omega_{kl}^m]$ and η_k^m is a mean zero error term.

Following Brennan and Cao (1997), the coefficients in equation (15) depend on the information endowments of investors in different countries. We hypothesize that:

- *domestic* institutional investors have an information *advantage* relative to the average investor: this implies that $\Omega_{mm}^m > 0$; since $B_{mm} < 0$, this in turn implies that $\Lambda_{mm}^m \leq 0$.

- *foreign* institutional investors have an information *disadvantage* relative to the average investor: this implies that $\Omega_{kk}^m \leq 0, m \neq k$ and, since $B_{kk} < 0$, it is consistent with $\Lambda_{kk}^m \leq 0$ or $\Lambda_{kk}^m \geq 0$. However, if $\Lambda_{kk}^m > 0$ then it must be the case that $\Omega_{kk}^m \leq 0$ so that foreign institutional investors have an informational disadvantage relative to the average investor.

  We note also that if there exist substitution effects in the stock market for the average investor so that the off-diagonal elements of B are positive, then the off-diagonal elements of Λ^m will be positive when there is no informational asymmetry so that Ω^m is zero. Therefore, the finding of significant negative values in the off-diagonal elements of Λ will imply that there are significant differences in informational endowments between institutional investors and the average investor.

In the following section we shall report estimates of the parameters Λ_{kl}^m and compare the signs of $\Lambda_{kk}^m, m \neq k$ and Λ_{mm}^m to detect evidence of informational asymmetries between domestic investors in their home market and investors in foreign markets.

A Restricted Model

The behavior of expectations is greatly simplified if we assume that the coefficient matrix Λ^m, which is proportional to $(B - \Omega^m)$, is diagonal. Ω^m will be diagonal if investors only receive private information about their domestic market, and the elements of B will be small if the variance of supply noise is low. These conditions are sufficient for:

Assumption B: Approximately diagonal coefficient matrix

$$\Lambda_{kl}^m \approx 0, \forall\, k \neq l.$$

Under Assumption B the change in the fraction of institutional investors in country m who are bullish about market k can be written as:

$$\Delta F_k^m = \Lambda_{kk}^m \Delta P_k + \eta_k^m, \tag{16}$$

where $\Lambda_{kk}^m = rn(z_k^m)(\xi_k^m)^{-1/2}[B_{kk} - \Omega_{kk}^m]$.

Under the Restricted Model,

- if domestic institutional investors have an information advantage relative to the average investor then $\Omega_{mm}^m > 0$, $\Lambda_{mm}^m \leq 0$;
- a finding that $\Lambda_{kk}^m \geq 0$ implies that $\Omega_{kk}^m < 0$, since $B_{kk} < 0$. Thus $\Lambda_{kk}^m > 0$ implies that foreign institutional investors are uninformed relative to the average investor.

4 Data

The primary data come from the Merrill Lynch monthly *Fund Manager Survey* which is completed by around 250 large institutional managers around the world. The breakdown of participants for October 2000 was: pension fund, 8%; insurance company, 9%; hedge fund, 2%; investment manager, 61%; investment advisor, 15%; other, 5%. The breakdown of the positions held by the participants was: Chief Investment Office, 14%; Strategist/Economist, 21%; Portfolio Manager, 39%; Research Analyst 8%, Trader, 2%; other 17%. Although the survey currently covers fund managers from the US, Continental Europe, the UK, Japan, the Asia-Pacific Basin, and South Africa, we follow Strong and Xu (2003) in restricting our analysis to Continental Europe, UK, Japan and the US in order to obtain a reasonable time series of data. In December 1998 participants and their funds under management were 44 and $2,204 billion for the US; 68 and $1,018 billion for Continental Europe; 71 and $1,552 billion for the UK; and 33 and \$603 billion for Japan. We analyze the survey question: "Please indicate whether you are bullish, bearish or neutral on the following ASSET classes on a 12 month view." The survey reports the balance of bullish and bearish managers for each equity market over the next 12 months as a percentage. For example, forecasting in early December 1998 for the US market in 1999, bulls outnumbered bears among US fund managers, the balance of bulls minus bears being 9% of the US fund managers surveyed. Although the survey does not give the detailed breakdown behind this figure, a 9% balance of bulls minus bears would result if, for example, 52% of fund managers were bullish, 5% were neutral, and 43% were bearish. In this paper we calculate the *change* in the bull *minus* bear balance. Ignoring those who are neutral, this will be equal to *twice* the change in the proportion who rate themselves as bullish. As a timing convention, we calculate the change in the fraction bull–bear balance for October as the difference between the balance reported in the September survey and the balance reported in the October survey.[7] Our change in proportion bullish series runs from November 1995 to March 2001 so that we have 64 monthly observations. We use the Morgan Stanley Capital International return series for the monthly returns on the corresponding four stock markets.[8] The returns are for the calendar month so that, if we were to relate changes in bullishness to the 'contemporaneous' returns on the stock markets we would be relating the return for October to the change in the survey results from September to October. It is possible then that an increase in bullishness in the first week of October for example would *cause* an increase in stock prices during the month, so that the causation would run from bullishness to returns. Since we are interested in the reaction of investors to public information including that contained in stock prices rather than the effects of investor sentiment on stock prices we shall for the most part relate changes in bullishness to *lagged* stock price changes. Thus we shall relate the change in bullishness between September and October to the returns realized in the month of September. Since the bullishness recorded in the October survey is bullishness relative

[7]The surveys are normally conducted over a period of up to 10 days during the first two weeks of each month.

[8]These returns exclude dividends but, since dividend payments are small, this should have little effect on our results.

to the prices in October it cannot have caused the returns during September. We take it instead that the September returns will have (Granger) caused the change in bullishness between September and October or that in fact both will have been caused by information that became public during September.[9] In addition to tests that use lagged returns we also run tests that use the difference between the changes in bullishness of foreign and domestic investors as the dependent variable. It is unlikely that an increase in the *relative* bullishness of foreign investors would cause an increase in stock prices since in most markets the holdings of foreign investors are small relative to those of domestic investors.

5 Results

To compare the time series behavior of the fraction of bullish investors across country pairs it is convenient to express them in terms of $z^m_{k,t} \equiv \aleph^{-1}(F^m_{k,t})$ where $F^m_{k,t}$ is the fraction of investors in country m who are bullish about market k at time t and $\aleph()$ denotes the cumulative normal distribution. $z^m_{k,t}$ is the normalized mean demand of individual institutions in country m where the normalization is by the standard deviation of institutional demand, and the normalized demand is computed from the fraction of institutions that report themselves as bullish about a given market, using equation (13). Table 1 reports summary statistics for the normalized demands for the four countries. Panel A reports the time series mean normalized demand by institutions in each country for equity in the other countries. Two facts stand out. First, the normalized mean demand for the equity of the home market exceeds the corresponding figure for all markets, except for the case of the institutions domiciled in the US whose normalized mean demand for foreign markets exceeds that for the US market.[10] In fact the US is anomalous in that it is the only country for which the normalized demand

[9] Regressions that relate changes in bullishness to unlagged returns in fact yield much fewer significant coefficients: changes in EU and UK bullishness about Japan are positively related to the Japanese market return. In addition changes in UK bullishness about Japan are (negatively) related to US returns; changes in Japanese bullishness about the EU and UK markets are positively related to the Japan market return; and changes in Japanese bullishness about the US market are negatively related to the EU market return.

[10] This corresponds to the finding of Strong and Xu (2003, Table 1) that US fund managers were on average more bullish about foreign equities than about US equities during this period.

from institutions domiciled in all countries except the US itself is *negative* during this period and, as we have just mentioned, US institutions have higher demands for foreign than for US equities. Second, for each market the normalized demand from institutions domiciled abroad is lower than the normalized demand from domestic institutions. In other words, institutions have higher domestic than foreign demands (with the exception of the US institutions), and markets attract higher normalized average demands from their domestic institutions than from foreign institutions. These results are simply another manifestation of the home bias that has been documented by French and Poterba (1991), Cooper and Kaplanis (1994) and Tesar and Werner (1995). Panel B reports the corresponding time series standard deviations of the normalized mean demands: the most striking observation here is the much higher variability of demands for equities in Japan relative to other countries. Moreover, the standard deviation of domestic investors' normalized demand in domestic markets is lower than the average standard deviation of foreign investors' normalized demand with the exception of the Japanese market. Similarly, the standard deviation of domestic investors' normalized demand in domestic markets is lower than the average standard deviation of their normalized demand in foreign markets with the exception of UK investors. These results indicate that domestic investors update less intensively, consistent with the idea that they are more informed and put less weight on public information.

Table 2 reports correlations between normalized demands from institutions in one country for the equity of all countries. Each table in panel A shows, for institutions domiciled in a given country, the correlations of their normalized mean demand for investments in the four countries. The correlation patterns are quite different across institutions in the four countries which is consistent with them having access to different information. Particularly striking is the negative correlation between demands for Japanese and UK equity which is in the range -0.4 to -0.6, except for Japanese institutions for which the correlation is 0.22. Similarly, the correlation between demands for Japanese and US equity is in the range -0.4 to -0.6, again except for Japanese institutions for which the correlation is 0.01. Each table in panel B reports the correlations between demands for a given country's equity coming from institutions domiciled in each of the four countries. Now all of the correlations are positive indicating that institutions tend to agree about the attractiveness of a given market. For the EU market, the highest correlations are between Japanese, EU and UK demands; the correlations between US demands and UK and Japanese demands are only about half as high. For the UK and US markets in contrast, Japanese demands have the lowest correlations with those of institutions in other countries; the overall level of correlations is higher for the US market than for the EU and UK markets. Finally, the demand correlations are highest for the Japanese market for which the lowest correlation is 0.70. Table 3 reports the covariance and precision matrix of the monthly returns for the four countries. All returns are positively correlated, suggesting that there could exist substitution effects for stock demands.

Table 4 reports regressions of the changes in the fraction of bullish investors on the four lagged market returns, corresponding to equation (15):

$$\Delta F_{k,t}^m = a_k^m + \sum_{l=1}^{4} b_{kl}^m R_{l,t-1} + e_{k,t}^m$$

where $R_{l,t-1}$ is the one month lagged return on market k. Panel A relates only to changes in bullishness about *foreign* equity markets ($m \neq k$) while panel B concerns the *domestic* equity market. We have argued that when the change in the fraction of institutional investors who are bullish about a *foreign* market k is regressed on all market returns, the coefficient on the return on market k will be positive *only if* the institutional investors are less well informed about market k than the average investor. The relevant coefficients are shown in bold type in panel A. 10 out of the 12 coefficients are positive implying that the foreign institutions tend to be at an informational disadvantage, except possibly in the US market where both the negative coefficients arise (they are both insignificant). When the coefficients for the EU return in the regressions for the EU market are constrained to be equal across institutions domiciled in foreign countries, the constrained estimate of the coefficient is 129.69 ($t = 3.12$); the constrained estimate of the coefficient for the UK return in the UK market regressions is 176.31 ($t = 3.82$); for Japan the corresponding figure is 105.17 ($t = 4.79$); and for the US it is -25.81 ($t = -0.85$). Thus only the US market regressions are consistent with the null hypothesis that foreign investors do not suffer from an informational disadvantage. This is consistent with claims that US capital markets are more "transparent" than those in other countries.

Turning next to the characteristics of the institutions domiciled in the different countries, we see that EU institutions have a significant positive coefficient on the "own"-market return[11] in the regressions for the UK and Japanese markets, implying an informational disadvantage in those markets; UK instititutions have a significant positive coefficient on the "own"-market return only in the Japanese market regression. Japanese institutions have significant positive coefficients on the "own"-market returns for the EU and UK market regressions, while for US institutions none of the "own"-market return coefficients is significant.[12] When the coefficients on the"own"-market return are constrained to be the same across all foreign markets for a given institutional domicile, estimates of the constrained coefficient are as follows: for EU institutions 86.84 (t = 3.02); for UK institutions 87.37 (t = 3.08); for Japanese institutions 59.81 (t = 1.58)—the high coefficients for Japanese institutions in the EU and UK markets being offset by a negative but insignificant coefficient in the US market; and for US institutions 50.54 (t = 1.91). These results suggest that US institutions especially may be at less of an informational disadvantage in foreign markets than institutions domiciled in the other countries. However, even for the US the "own"-market return coefficient is positive, though insignificant for all three foreign markets.

Panel B reports similar regression results when the change in the bullishness of the institutions is about the market of their home country. If institutional investors possess an informational advantage in their home markets we should expect these coefficients (shown in bold) to be negative as discussed in Section 3. In fact, only the coefficients for Japan and the US are negative, and neither coefficient is significant. When the own-market return coefficient is constrained to be equal across the four countries the estimate is -5.18 ($t = -0.20$). The large positive (but insignificant) coefficient for the EU provides the least evidence of a home

[11]That is, on the Japanese market return when the dependent variable is the change in the fraction bullish about Japan etc.

[12]For US institutions the "own"-market return for the UK is significant at 10%.

market informational advantage for EU investors; it is possible that this is due to the different markets, languages and accounting systems used by different countries in Continental Europe and suggests that EU fund managers may to some extent be foreigners at home. We conclude that there is no evidence from this unrestricted model that institutional investors possess an informational advantage in their domestic market.

Suppose that substitution effects exist for the average investor, i.e., the off-diagonal elements of the matrix B_t are positive. From Table 3, the fact that asset returns are positively correlated lends support to the claim that substitution effects are likely to be positive. Then our model predicts that the regression coefficients on the returns of other markets should be positive for all investors if their informational endowments are the same as that of the average investor ($\Omega^m = 0$) Thus any significant negative coefficients would imply the importance of the difference between the informational endowments of institutional investors and the average investor. Out of the 20 off-diagonal coefficients that have t-statistics larger than one, 15 are negative. Out of the 9 off-diagonal coefficients (shown in italic font) that have t-statistics larger than 1.63 (10% significance level), 8 are negative. These results support the hypothesis that informational differences between institutional investors and average investors are significant. For example, European investors become less bullish in the UK when the markets of Europe and Japan move up.

As a robustness check on the results shown in Table 4, the regressions were repeated using as the dependent variable for each country k the *difference between* the change in the proportion of bulls about market k among institutions domiciled in country m and the corresponding change among institutions domiciled in country k itself:

$$\Delta F_{k,t}^m - \Delta F_{k,t}^k = a_k^m + \sum_{l=1}^{4} b_{lk}^m R_{l,t-1} + e_{k,t}^m$$

If foreign institutional investors are at an informational disadvantage and domestic institutional investors are at an informational advantage, we should expect the coefficients on the market k return (shown in bold in Table 5) to be positive, since the coefficient for foreign institutions would be positive and for domestic institutions negative. The advantage of using the difference between the changes in the fraction of foreign and domestic bulls is that it reduces the possibility of spurious results caused by a global increase in bullishness being associated with positive market returns.[13] The results shown in Table 5 are broadly consistent with the results reported in panel A of Table 4: 10 out of the 12 coefficients are positive. Consistent with the earlier results, the most significant coefficients are for Japanese institutions in the EU market, EU institutions in the UK market, and UK institutions in the Japanese market.

Panel A of Table 6 reports the results of tests of the restricted model in which only the return on the market the demands for which are being analyzed is included as an independent variable. The results are broadly consistent with those for the general model. There is now reliable evidence that Japanese institutional investors suffer from an informational disadvantage in all three foreign markets. US institutions are at a disadvantage in the EU and Japan, but the coefficient for the UK market regression while positive, is not significant;[14] UK institutions are at a disadvantage in Japan but not in the EU or the US. Thus, institutions in all four countries of domicile are at a disadvantage in at least one foreign market. Panel B reports the results obtained when the change in the bullish proportion of domestic institutional investors is subtracted from the corresponding change for foreign investors in a given market. While the evidence for the foreigner information disadvantage hypothesis is now less strong, the results are broadly consistent with those in Panel A and 11 out of 12 of the coefficients are positive as the foreign investor disadvantage/domestic investor advantage hypothesis predicts. When the coefficient of the foreign market is constrained to be the same across all investor domiciles and foreign markets the estimated coefficient is 66.79 ($t = 4.51$).

Panel C reports the results of regressing the change in the proportion of bullish *domestic* institutions on the local market return. The negative coefficients for the UK and the US

[13]This might be possible for example if a global increase in bullishness in the second half of September led to an increase in September returns, *and* portfolio managers reported an increase in bullishness in October *even after the stock price increase.*

[14]Brennan and Cao (1997, Table I) find stronger evidence that (all) US residents are at an informational disadvantage in Japan and Germany than in Canada or UK.

are consistent with the hypothesis that institutions in these countries enjoy an informational advantage in their domestic markets, and the coefficient for the US is statistically significant. When the coefficient is constrained to be the same across markets its estimated value is -28.73 ($t = -1.80$), providing modest support for the hypothesis that domestic institutions in general enjoy an informational advantage.

6 Summary and Conclusions

In this paper we have developed new implications of the hypotheses that domestic institutional investors enjoy an informational advantage and foreign institutional investors an informational disadvantage in a country's equity market relative to the average investor in that market. In particular, it was shown first that, under certain auxiliary assumptions, the domestic institutional investor informational advantage hypothesis implies that when the change in the fraction of domestic institutional investors who are bullish about the domestic market is regressed on foreign and domestic market returns the coefficient on the domestic market return will be negative. Under a restricted model that makes the stronger assumption of symmetric information endowments the hypothesis is that the same sign restriction holds in a simple regression in which the given market return is the only independent variable. The foreign institutional investor informational disadvantage hypothesis implies that when the dependent variable is the change in the fraction of institutional investors in a given foreign country who are bullish about a particular market the coefficient on that market return will be positive.

These hypotheses were tested using survey data on institutional investor views on four different national equity markets. There was strong evidence that the fraction of bullish foreign investors tended to increase following a rise in the domestic equity market. On the other hand, there is no evidence that the proportion of domestic institutional investors shows a corresponding rise. These findings are consistent with the foreign informational disadvantage hypothesis. This evidence was particularly strong for the Japanese market and for Japanese institutional investors in foreign markets. On the other hand there was little evidence for the domestic institutional investor information advantage hypothesis: only for the US, and to a lesser degree the UK, was there any evidence for the hypothesis.

The evidence of a foreign institutional investor disadvantage is consistent with the arguments made by Brennan and Cao (1997) that international portfolio flows of equity capital may be driven, at least in part, by informational considerations.

Table 1
Inter-country normalized security demands: 1995:10–2001:03

This table reports statistics for the normalized demand variable $z^m_{k,t} \equiv \aleph^{-1}(F^m_{k,t})$, where $F^m_{k,t}$ is the fraction of investors in country m who are bullish about market k in month t and $\aleph()$ denotes the cumulative normal distribution. Panel A reports means of normalized demands; Panel B reports standard deviations of normalized demands.

	A: Mean Normalized Demand for Equity in:					
Domicile of Institution	EU	UK	Japan	US	Mean All Markets	Mean Home Market
EU	**0.86**	0.23	0.49	−0.06	0.38	0.86
UK	0.66	**0.45**	0.50	−0.31	0.33	0.45
Japan	0.31	0.00	**0.71**	−0.07	0.23	0.71
US	0.53	0.21	0.34	**0.07**	0.29	0.07
Mean: All Domiciles	0.59	0.22	0.51	−0.10		
Mean: Domestic Domicile	0.86	0.45	0.71	0.07		

	B: Standard Deviation of Normalized Demand for Equity in:					
Domicile of Institution	EU	UK	Japan	US	Mean All Markets	Mean Home Market
EU	0.15	0.23	0.41	0.22	0.25	0.15
UK	0.20	0.22	0.44	0.23	0.27	0.22
Japan	0.24	0.19	0.32	0.21	0.24	0.32
US	0.20	0.21	0.36	0.18	0.24	0.18
Mean: All Sources	0.20	0.21	0.38	0.21		
Mean: Domestic Source	0.15	0.22	0.31	0.18		

Table 2
Correlations between inter-country normalized security demands: 1995:11–2001:02

This table reports correlations between the normalized demands for one country's securities by institutions in another country; the normalized demand is $z^m_{k,t} \equiv \aleph^{-1}(F^m_{k,t})$, where $F^m_{k,t}$ is the fraction of investors in country m who are bullish about market k in month t and $\aleph()$ denotes the cumulative normal distribution.

A. Correlations between normalized demands from institutions in a given country for investments in four different countries

Demands from EU Institutions for Investment in:

	EU	UK	Japan	US
EU	1.00			
UK	−0.23	1.00		
Japan	0.05	−0.46	1.00	
US	−0.05	0.52	−0.55	1.00

Demands from UK Institutions for Investment in:

	EU	UK	Japan	US
EU	1.00			
UK	−0.06	1.00		
Japan	0.10	−0.62	1.00	
US	−0.24	0.64	−0.60	1.00

Demands from Japanese Institutions for Investment in:

	EU	UK	Japan	US
EU	1.00			
UK	0.35	1.00		
Japan	0.32	0.22	1.00	
US	0.31	0.60	0.01	1.00

Demands from US Institutions for Investment in:

	EU	UK	Japan	US
EU	1.00			
UK	0.16	1.00		
Japan	0.18	−0.38	1.00	
US	0.13	0.26	−0.42	1.00

B. Correlations between normalized demands for investments in a given country from institutions in four different countries

Demands for EU Investment from Institutions in:

	EU	UK	Japan	US
EU	1.00			
UK	0.38	1.00		
Japan	0.54	0.44	1.00	
US	0.42	0.26	0.21	1.00

Demands for UK Investment from Institutions in:

	EU	UK	Japan	US
EU	1.00			
UK	0.55	1.00		
Japan	0.30	0.19	1.00	
US	0.59	0.63	0.18	1.00

Demands for Japanese Investment from Institutions in:

	EU	UK	Japan	US
EU	1.00			
UK	0.80	1.00		
Japan	0.70	0.75	1.00	
US	0.86	0.84	0.73	1.00

Demands for US Investment from Institutions in:

	EU	UK	Japan	US
EU	1.00			
UK	0.82	1.00		
Japan	0.33	0.32	1.00	
US	0.66	0.74	0.28	1.00

Table 3
Covariance and precision matrices of annualized returns: 1995:11–2001:03

This table reports the covariance matrix and the corresponding precision matrix for the annualized monthly returns for the four markets.

	A. Covariance Matrix			
	EU	UK	Japan	US
EU	0.025	0.018	0.013	0.020
UK	0.018	0.045	0.008	0.015
Japan	0.013	0.008	0.035	0.013
US	0.019	0.015	0.013	0.027
	B. Precision Matrix			
	EU	UK	Japan	US
EU	102.44	−18.34	−12.36	−56.38
UK	−18.34	30.71	1.60	−5.06
Japan	−12.36	1.60	36.78	−10.11
US	−56.38	−5.06	−10.11	84.53

Table 4
Regressions of changes in the fraction of institutional investors domiciled in each country who are bullish about a given market on lagged market returns: 1995:12–2001:03

This table reports the results of the regressions: $\Delta F^m_{k,t} = a^m_k + \sum_{l=1}^{4} b^m_{lk} R_{l,t-1} + e^m_{k,t}$, where $R_{l,t-1}$ is the one month lagged return on market l, and $\Delta F^m_{k,t}$ is the change in the fraction of investors in country m who are bullish about market k. Absolute values of t-statistics are reported in parenthesis.

A: Regressions of Change in Bullishness about a Foreign Market on Market Returns

Market	Investor Domicile	Constant	EU	UK	Japan	US	R^2
EU	UK	0.57	**21.14**	−81.39	−4.79	9.09	−0.02
		(0.42)	**(0.38)**	(1.30)	(0.16)	(0.22)	
	Japan	−2.47	**254.91**	−83.55	−29.18	−50.58	0.16
		(1.31)	**(3.27)**	(0.95)	(0.71)	(0.88)	
	US	−2.45	**113.04**	−9.36	−44.03	14.56	0.04
		(1.32)	**(1.48)**	(0.11)	(1.09)	(0.26)	
UK	EU	1.02	*−143.28*	**198.65**	*−95.02*	−9.34	0.31
		(0.81)	*(2.77)*	**(3.42)**	*(3.47)*	(0.25)	
	Japan	−1.55	48.05	**162.97**	−52.37	−48.93	0.14
		(0.90)	(0.68)	**(2.04)**	(1.39)	(0.94)	
	US	−0.07	−109.31	**163.31**	−16.41	46.66	0.03
		(−0.04)	(1.41)	**(1.87)**	(0.40)	(0.82)	
Japan	EU	−0.70	*−162.62*	143.25	**89.93**	44.90	0.06
		(0.35)	*(2.00)*	(1.56)	**(2.08)**	(0.75)	
	UK	0.61	−71.22	−8.42	**162.35**	1.17	0.19
		(0.36)	(1.01)	(0.11)	**(4.37)**	(0.02)	
	US	−1.53	−49.36	16.25	**63.23**	71.47	0.05
		(0.66)	(0.19)	(1.59)	**(1.30)**	(0.15)	
US	EU	1.13	*−129.87*	95.90	−33.72	**33.26**	0.04
		(0.71)	*(1.98)*	(1.30)	(0.97)	**(0.69)**	
	UK	0.77	−20.65	15.81	−21.80	**−21.25**	−0.02
		(0.55)	(0.36)	(0.24)	(0.72)	**(0.51)**	
	Japan	−3.36	*258.46*	4.24	*−123.81*	**−89.43**	0.20
		(1.64)	*(3.06)*	(0.04)	*(2.77)*	**(1.44)**	

Panel B: Regressions of Change in Institutional Bullishness about a Domestic Market on Market Returns

Domestic Market	Constant	EU	UK	Japan	US	R^2
EU	−0.93	**71.43**	−49.40	*−41.83*	0.65	−0.00
	(0.83)	**(1.54)**	(0.95)	*(1.70)*	(0.02)	
UK	0.87	−22.36	**6.73**	−45.92	−34.31	0.06
	(0.58)	(0.36)	**(0.10)**	(1.40)	(0.75)	
Japan	−1.10	47.55	82.15	**−5.37**	*−94.89*	0.02
	(0.67)	(0.71)	(1.09)	**(0.15)**	*(1.92)*	
US	0.24	30.41	13.85	*−86.92*	**−53.84**	0.09
	(0.15)	(0.45)	(0.18)	*(2.42)*	**(1.08)**	

Table 5
Regressions of the difference between changes in the fraction of foreign investors who are bullish about a given market and changes in the fraction of domestic investors who are bullish about that market on lagged market returns: 1995:12–2001:03

This table reports the results of the regressions:

$$\Delta F^m_{k,t} - \Delta F^k_{k,t} = a^m_k + \sum_{l=1}^{4} b^m_{lk} R_{l,t-1} + e^m_{k,t}$$

where $R_{l,t-1}$ is the one month lagged return on market l, and $\Delta F^m_{k,t}$ is the change in the fraction of investors in country m who are bullish about market k. Absolute values of t-statistics are reported in parenthesis.

		$\Delta F^m_{k,t} - \Delta F^k_{k,t} = a^m_k + \sum_{l=1}^{4} b^m_{lk} R_{k,t-1} + e^m_{k,t}$					
Market	Investor Domicile	Constant	EU	UK	Japan	US	R^2
EU	UK	1.50	**−50.29**	−31.99	37.03	8.44	−0.00
		(0.99)	**(0.81)**	(0.46)	(1.12)	(0.18)	
	Japan	−1.54	**183.48**	−34.15	12.65	−51.23	0.10
		(0.81)	**(2.33)**	(0.38)	(0.30)	(0.88)	
	US	−1.52	**41.62**	40.05	−2.20	13.91	−0.01
		(0.73)	**(0.49)**	(0.42)	(0.05)	(0.22)	
UK	EU	0.15	*−120.93*	**191.92**	−49.10	24.97	0.08
		(0.09)	*(1.81)*	**(2.55)**	(1.39)	(0.51)	
	Japan	−2.42	70.41	**156.24**	−6.44	−14.62	0.13
		(1.05)	(0.74)	**(1.45)**	(0.13)	(0.21)	
	US	−0.94	−86.95	**156.58**	29.51	80.97	0.14
		(0.51)	(1.15)	**(1.85)**	(0.74)	(1.46)	
Japan	EU	0.40	*−210.17*	61.10	**95.30**	*139.79*	0.10
		(0.18)	*(2.27)*	(0.59)	**(1.95)**	*(2.06)*	
	UK	1.71	−118.77	−90.56	**167.72**	96.06	0.21
		(0.84)	(1.42)	(0.96)	**(3.79)**	(1.56)	
	US	−0.44	−96.91	−65.90	**68.60**	*166.36*	0.08
		(0.19)	(1.02)	(0.62)	**(1.37)**	*(2.39)*	
US	EU	0.89	*−160.29*	82.05	53.20	**87.10**	0.01
		(0.41)	*(1.80)*	(0.82)	(1.13)	**(1.33)**	
	UK	0.53	−51.06	1.96	65.11	**32.59**	−0.02
		(0.27)	(0.62)	(0.02)	(1.50)	**(0.54)**	
	Japan	−3.60	*228.05*	−9.60	−36.89	**−35.59**	0.11
		(1.45)	*(2.23)*	(0.08)	(0.68)	**(0.47)**	

Table 6

Simple regressions of the difference between changes in the fraction of foreign investors who are bullish about a given market and changes in the fraction of domestic investors who are bullish about that market on lagged market returns: 1995:12–2001:03

Panel A reports the results for each market of simple regressions of the change in the fraction of bullish institutional investors for each country of domicile on lagged market returns. In Panel B the dependent variable is the difference between the change in the fraction of bullish institutional investors from a given domicile and the change in the fraction of bullish domestic investors. Panel C repeats Panel A when the country of institutional domicile is the same as the market. Figures in parenthesis are absolute values of t-statistics.

		A. $\Delta F^m_{k,t} = a + bR_{k,t-1}$			B. $\Delta F^m_{k,t} - \Delta F^k_{k,t} = a + bR_{k,t-1}$		
Market	Investor Domicile	a	b	R^2	a	b	R^2
EU	UK	0.83	−31.31	0.00	1.36	*−50.90*	0.02
		(0.62)	(1.12)		(0.92)	*(1.75)*	
	Japan	−2.05	*142.42*	0.16	−1.27	*107.45*	0.13
		(1.08)	*(3.60)*		(0.69)	*(3.12)*	
	US	−2.05	*93.41*	0.07	−1.19	53.51	0.03
		(1.11)	*(2.45)*		(0.60)	(1.41)	
UK	EU	0.25	−2.07	−0.02	−0.49	*73.65*	0.02
		(0.17)	(0.05)		(0.30)	*(1.88)*	
	Japan	−1.28	*142.49*	0.13	−1.77	*188.92*	0.17
		(0.76)	*(3.26)*		(0.82)	*(3.85)*	
	US	−0.56	*85.40*	0.03	−1.16	145.56	0.14
		(0.31)	*(1.81)*		(0.60)	(1.40)	
Japan	EU	−1.50	*78.09*	0.05	−0.61	51.30	0.03
		(0.80)	*(2.06)*		(0.28)	(1.30)	
	UK	−0.57	*128.31*	0.19	0.32	*100.91*	0.13
		(0.35)	*(3.95)*		(0.16)	*(2.82)*	
	US	−1.26	*78.87*	0.06	−0.36	37.51	0.02
		(0.74)	*(2.30)*		(0.17)	(0.98)	
US	EU	0.57	−22.28	−0.01	−0.76	72.42	−0.00
		(0.36)	(0.68)		(0.36)	(1.79)	
	UK	0.78	−38.45	0.01	−0.42	46.63	−0.01
		(0.58)	(1.39)		(0.22)	(1.27)	
	Japan	−0.80	*30.21*	−0.01	−2.22	*131.27*	0.04
		(0.74)	*(2.30)*		(0.89)	*(2.85)*	

		C. $\Delta F^m_{m,t} = a + bR_{m,t-1}$		
Market	Investor Domicile	a	b	R^2
EU	EU	−0.45	14.58	−0.01
		(0.40)	(0.61)	
UK	UK	0.68	*−68.94*	0.03
		(0.46)	*(1.80)*	
Japan	Japan	−0.87	−4.76	−0.02
		(0.55)	(0.15)	
US	US	1.01	*−70.42*	0.05
		(0.61)	*(2.08)*	

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