Are daily cross-border equity flows pushed or pulled?

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Abstract

We investigate the conditions under which an equilibrium intertemporal model based on portfolio decisions of rational investors can explain the dynamics of high frequency equity flows. Our model shows that, when all investors have logarithmic utility, foreign investors are less well informed than domestic investors and there are barriers to international investment, unexpectedly high worldwide or local stock returns lead to net equity inflows in small countries. We investigate these predictions using daily data on net equity flows for nine emerging market countries and find that equity flows are positively related to host country stock returns as well as market performance abroad. Both our theoretical model and our empirical analysis show that global stock return performance is an important factor in understanding equity flows.

Within the neo-classical paradigm, capital flows where its marginal product is higher. As a result, the allocation of capital is more efficient and welfare is higher if capital can flow freely across borders. The emerging market crises of the 1990s have led many to challenge that view. Since 1997, economists, policymakers, and journalists have talked about shocks being propagated across countries with little regard for fundamentals through the actions of an "electronic herd" (Friedman (1999), p. 142) of investors. This has led Bhagwati (1998) to state that "Capital flows are characterized, as the economic historian Charles Kindleberger of the Massachusetts Institute of Technology has famously noted, by panics and manias." If markets work this way, it is not surprising that Stiglitz (1998), calling for greater regulation of capital flows, argues that "…developing countries are more vulnerable to vacillations in international flows than ever before."

There are two well-established empirical facts about holdings of foreign equity by domestic investors.[1] First, the home bias evidence shows that domestic investors hold less foreign equity than if they held the world market portfolio. Second, domestic investors buy foreign stocks following unexpectedly high returns on these stocks, a behavior often defined as trend-chasing or momentum investing. In this paper, we build an intertemporal model of equity flows based on the portfolio decisions of rational investors consistent with these empirical facts. Our main theoretical results are that (1) a model with perfect financial markets and investors who know the true distribution of returns cannot explain the existing evidence on flows, (2) extrapolative expectations are required to explain the evidence that unexpectedly high stock returns in a small country, say Thailand, attract equity flows towards that country, and (3) in a model where there is a home bias and extrapolative expectations, net equity flows towards small

[1] See Karolyi and Stulz (2003) for a review of this literature.

countries such as Thailand increase with unexpectedly high worldwide stock returns. This last prediction implies that capital can flow out of Thailand for reasons that have nothing to do with Thailand's economic fundamentals. Consequently, observing flows to and from Thailand that cannot be explained by that country's fundamentals is consistent with equilibrium behavior in well-functioning markets.

In the empirical section of this paper, we examine the implications of our model by using a unique data set of aggregate equity flows in nine emerging markets.[2] In particular, we investigate whether flows into a country increase in the performance of other markets. The dynamic relation between flows and the performance of other markets has not been explored with daily data. We find that lagged returns in bigger markets such as the US are helpful to understand flows into smaller countries such as Thailand. Adding lagged returns of other markets in a Vector Autoregression (VAR) of flows and returns improves the R-square of the flow equation by roughly 25% on average. A positive return shock to the U.S. stock market is associated with an increase in equity flows in all countries but one and in a significant increase in five out of nine countries. While local market returns have an economically economic significant impact on flows, our impulse response analysis shows that capital flows are generally more responsive to past U.S. market performance than to local returns. Capital is pulled towards a country following positive local market performance but capital is also strongly pushed abroad by U.S. market performance.

Some papers have explored the relation between equity flows towards foreign countries and U.S. returns using monthly or quarterly data. The evidence is mixed. This may be because of a lack of power or because analyses using monthly or quarterly data may be misspecified over

[2] In a study developed independently, Richards (2002) relies on similar flow data from a subset of the countries considered here and for the period 1999-2001. He examines several of the relationships analyzed in the present paper.

longer periods of time that encompass economic regime changes. Bohn and Tesar (1996) investigate the contemporaneous impact of U.S. returns and host country returns on monthly equity flows from the U.S. They use a portfolio demand equation for individuals rather than an equilibrium model as we do to predict a portfolio rebalancing effect and a return-chasing effect. With the rebalancing effect, investors sell equities from countries that are the best performers in their portfolio since they have become overweighted in these securities. They argue that the portfolio rebalancing effect implies that a high U.S. return is accompanied by flows toward foreign countries. Most of the correlations between contemporaneous flows and the U.S. return in excess of the host country return are insignificant in their dataset and no correlation is significantly positive.

Brennan and Cao (1997) present a model in which foreign investors are less informed than host country investors about host country stocks. Because of their information disadvantage, foreign investors learn more from public news. Good news announcements lead them to buy stocks from host country investors. They argue that stock purchases by foreign investors in the host country could be associated with high returns in the country of origin of the foreign investors because of wealth effects. Since their investors have exponential utility functions, they cannot model such wealth effects, but they allow for them in their regressions. Using quarterly data, they find that equity purchases from U.S. investors of foreign market securities are contemporaneously related to foreign market performance but not related to U.S. equity returns.

Froot, O'Connell and Seasholes (2001) use daily flow data to examine whether foreign capital precedes, moves with, or follows short-term local market return performance. They find that flows increase following unexpectedly high returns in the host market, but also that flows forecast returns. They interpret their evidence to be consistent with the view that foreign

investors are better informed than domestic investors. Seasholes (2000) and Froot and Ramadorai (2002) provide further evidence supportive of this assessment of the information of flows. We find a similar forecasting power of foreign flows on returns in our dataset. In our data, the relation between flows and returns is driven by a strong positive daily contemporaneous relation between flows and stock prices. Such a result can be consistent with foreign investors being less informed than local investors if there is a price pressure effect of flows.

A related literature has focused on the relation between capital flows and U.S. interest rates and industrial production. Calvo, Leiderman, and Reinhart (1993), Chuhan, Classens, and Mamingi (1998), and Fernandez-Arias (1996) all examine data from 1988 to 1992 and find some evidence that low interest rates in the U.S. lead to higher outflows from the U.S. As pointed out by Bekaert, Harvey, and Lumsdaine (2002), a liberalization event constitutes a regime change that makes estimation hazardous when the sample includes both a pre-liberalization and a post-liberalization period. In their work that takes into account regime changes, they fail to find a statistically significant relation between interest rates and flows. Edison and Warnock (2001) also account for liberalization dates in a sample from 1989 through 1999 and find that an increase in U.S. interest rates reduces monthly net flows to some emerging countries. However, this effect does not exist for a majority of the countries in their sample that overlap with our sample.

This paper proceeds as follows. In Section I, we present our model of how stock returns affect equity flows and the testable hypotheses we derive from the model. In Section II, we describe the composition of the foreign flow data and examine their basic features. Section III examines the extent of foreign investor positive feedback trading within a country and whether foreign investors' trading behavior foreshadows future price movements. The impact of regional

returns on flows is examined in Section IV and compared to the impact of local returns. Section V examines the additional impact of exchanges rates and foreign flows on local flows. Section VI examines the robustness of our results to the currency of denomination, time periods, structural breaks, and returns asymmetries. Section VII concludes.

I. A Simple Model of Equity Flows

We develop an intertemporal continuous-time model. Investors are infinitely-lived. However, to make the model tractable, we assume that investors have logarithmic utility, so that investors are myopic, and that all investors are the same within a country. At any point in time, asset demands depend on the state of the world only through wealth. We can therefore use comparative statics on asset demands to examine the determinants of flows.

For simplicity, we consider a world with two countries, the domestic country D and the foreign country F. We assume that each country has one stock (the market portfolio of that country) and that the returns of the two stocks are uncorrelated. The zero correlation assumption is not unreasonable when considering the U.S. and an emerging market. Let $\mu_D(t)$ and $\sigma_D(t)$ be, respectively, the instantaneous drift minus the risk-free rate and the volatility of the diffusion process at date t followed by the value of the domestic stock. We assume that trading is continuous and that $\mu_D(t)$ and $\sigma_D(t)$ evolve randomly over time. We assume that the outstanding supply of shares of the domestic stock consists of N_D^S shares and a share has price P_D. We use the subscript F to denote foreign values. We follow Brennan and Cao (1997) in ignoring currencies, so that foreign nominal quantities are in the same currency as domestic nominal quantities. The number of shares of stock in each country is kept fixed.

A. Perfect Capital Markets

Though portfolio choice models generally focus on portfolio shares, the data on equity flows is available in terms of net purchases and not portfolio shares. We therefore derive results in terms of net purchases. Define $N_D^D(t)$ to be the number of domestic shares demanded by domestic investors and $N_F^D(t)$ the number of foreign shares demanded by the same investors. The aggregate wealth of domestic investors is $W^D(t)$. With our assumptions, the demand for domestic and foreign shares by domestic investors is given by:

$$N_D^D(t) = \frac{\mu_D(t)}{\sigma_D^2(t)} \frac{W^D(t)}{P_D(t)} \tag{1}$$

$$N_F^D = \frac{\mu_F(t)}{\sigma_F^2(t)} \frac{W^D(t)}{P_F(t)} \tag{2}$$

From now on, we omit the time index to simplify the notation. All variables should always be considered to have such a time index since they obviously change continuously. Many studies of portfolio flows use equation (2) to model portfolio flows towards the foreign country. With that equation, domestic investors buy more shares abroad if the expected return of these shares increases, if their wealth increases, or if the price of these shares falls. Further, domestic investors sell foreign shares if their volatility increases. If domestic investors buy more foreign shares, then foreign investors must sell foreign shares to domestic investors. Taking into account equilibrium conditions can invalidate the conclusions drawn from a comparative static analysis of equation (2).

We now investigate equilibrium equity flows. In discussing our result, we show how they differ from results obtained using a comparative static analysis of equation (2). We start from the case of perfect financial markets. It is well known that, in such markets, investors hold the world

market portfolio. It immediately follows that if w_F^W is the share of the foreign stock in the world market portfolio, then the equilibrium demand for the foreign stock by domestic investors is:

$$N_F^D = w_F^W \left(\frac{W^D}{P_F} \right) \tag{3}$$

A similar equation applies for the number of shares of country F held by investors from country F. The number of shares of country F held by domestic investors relative to the outstanding supply of foreign shares is:

$$\frac{N_F^D}{N_F^S} = \frac{w_F^W \left(\frac{W^D}{P_F} \right)}{w_F^W \left(\frac{W^D}{P_F} \right) + w_F^W \left(\frac{W^F}{P_F} \right)} = \frac{W^D}{W^W} \tag{4}$$

where N_F^S is the number of foreign shares outstanding. Since all investors hold the same portfolio of stocks, the ratio of domestic wealth to world wealth, which we denote by Ω, is constant. Therefore, changes in expected returns do not lead domestic investors to buy or sell foreign shares. The portfolio flow implications of the asset demand equation (2) do not hold in equilibrium because expected returns adjust so that neither domestic nor foreign investors buy or sell foreign shares.

Domestic investors put a fraction $N_F^D P_F / W^D$, or w_F^W, of their wealth in the foreign stock. An increase in the price of the foreign stock, ceteris paribus, increases w_F^W. Consequently, even though an increase in the price of the foreign stock does not lead domestic investors to purchase foreign shares, it has the effect of increasing the fraction of their wealth invested in the foreign stock. This is because the value of their foreign stock holdings increases as the price of the foreign stock increases.

An increase in the price of the foreign stock increases the portfolio weight of the foreign stock in the world market portfolio. With our assumptions, the capital asset pricing model holds, so that the expected return on the foreign stock increases with the covariance of its return with the world market portfolio. Since stock returns are uncorrelated, the covariance of the return of the foreign stock with the return of the world market portfolio is equal to the portfolio weight of the foreign stock in the world market portfolio times the variance of the return of the foreign stock. Consequently, a high return on the foreign stock is associated with a higher expected return for that stock. Since domestic investors increase their allocation to the foreign stock as its price increases, it follows that an increase in the foreign stock allocation of domestic investors predicts a higher expected return on that stock in our simple perfect financial markets model.

B. The Effect of Barriers

The simple model with perfect financial markets is inconsistent with the existence of a home bias and with the result that non-resident investors buy stock in the host country following higher returns on that stock. We now introduce a market imperfection so that there is a home bias. We assume, as in Stulz (1981), that the return of domestic investors is lower than the return of foreign investors by a constant δ^D on a long position in the foreign stock. The barrier could represent any proportional costs to investing abroad that lowers the net expected return relative to a resident investor. To simplify the analysis, we consider only the case where the equilibrium outcome is such that no investors hold short positions. With this modification, equation (2) becomes:

$$N_F^D = \frac{\mu_F - \delta^D}{\sigma_F^2} \frac{W^D}{P_F} \tag{5}$$

Now, investors no longer hold the world market portfolio. Domestic investors exhibit a home bias as they have a lower allocation to foreign shares than foreign investors. The home bias

implies that a positive return on foreign shares enriches foreign investors relatively more than it enriches domestic investors. Everything else equal, foreign investors would like to take some of the gain from the increase in the value of the stock of their country and invest it outside their country. However, if domestic investors earn a dollar on foreign shares, they do not want to keep all of their gain abroad. Because of the home bias, they want to take some of that dollar and bring it back home. Obviously, it is not possible for domestic and foreign investors to sell foreign shares at the same time, so that expected returns have to adjust.

To determine the impact of an increase in the price of foreign shares, we therefore have to turn to an investigation of the equilibrium holdings of foreign shares by domestic investors. The equilibrium holdings of foreign shares by domestic investors and foreign investors are respectively:

$$N_F^D = N_F^S \Omega + \frac{\delta^D}{\sigma_F^2}\left[\Omega - 1\right]\Omega \frac{W^W}{P_F} \tag{6}$$

$$N_F^F = N_F^S [1-\Omega] + \frac{\delta^D}{\sigma_F^2}\Omega[1-\Omega]\frac{W^W}{P_F} \tag{7}$$

Since $\Omega < 1$, domestic investors have a lower equilibrium allocation to foreign stocks in the presence of barriers to international investment than if δ^D is equal to zero, and foreign investors have a higher allocation. The derivative of the holdings of the foreign stock by domestic investors with respect to the price of the foreign stock (shown in Section A of the Appendix) cannot be signed unambiguously. However, an increase in the price of the foreign stock decreases the holdings of that stock by domestic investors for the symmetric case where both countries have initially the same supplies of shares, share prices, wealth, and barriers to international investment. To understand why domestic investors may sell the foreign stock when it has done well, notice that an increase in the price of the foreign stock increases the wealth of

foreign investors proportionately more than it increases the wealth of domestic investors. As the wealth of domestic investors increases, they re-balance their portfolio by selling the foreign stock because they overweight the domestic stock. Foreign investors want also to re-balance by selling the foreign stock and buying the domestic stock, but with less intensity because they earn more on the foreign stock and less on the domestic stock than domestic investors, which explains why, on net, domestic investors sell the foreign stock.

It is useful to examine the properties of equations (6) and (7) numerically. We explore extensively a numerical example where the volatility of the return of the foreign stock is 30%. The base case is $P_F = P_D = 1$, $W^D = W^F = 10$, $N_F^S = N_D^S = 10$, $\delta^D = 3\%$. In this base case, domestic investors hold 3.33 shares of foreign stock and foreign investors hold 6.67 shares. If the price of the foreign stock doubles, domestic holdings of the foreign stock fall from 3.33 to 3.17. If we double δ^D, the holdings of the foreign stock fall by roughly half and the number of foreign shares held by domestic investors falls from 1.67 to 1.52 if the price of the foreign stock doubles. Though the domestic holdings of foreign stock generally fall when the price of the foreign stock increases, this is not the case when the domestic country is small. For instance, when $\Omega = 0.05$, so that the wealth of domestic investors is 1, they hold 0.18 shares of foreign stock when the price of that stock is 1. Following a doubling in the price of the foreign stock, their holdings go to 0.21.

Figure 1A shows the impact of a doubling of the foreign stock price on equilibrium stock holdings after taking into account its effect on the wealth of investors. It shows that such a doubling decreases the equilibrium holdings of the foreign stock by domestic investors except when the domestic country is much smaller than the foreign country.

C. The Effect of Extrapolative Expectations

Suppose now that an unexpectedly high return on foreign stocks leads domestic, but not foreign, investors to expect a higher return on these stocks. This could arise for one of two reasons. First, if investors do not know the true expected returns but are trying to estimate them with past data, past returns are useful in forming expectations. As long as resident investors are better informed than non-resident investors, our assumption could be derived from the optimizing behavior of investors.[3] It could also be the result of stronger extrapolative expectations for a country's stock returns of non-resident investors than of resident investors based on behavioral considerations.[4] We do not model the formation of expectations. Rather, we use a shortcut by letting δ^D depend negatively on the past foreign stock return. Since δ^D is a barrier to international investment that decreases the return on the foreign stock for domestic investors, the expected return on foreign stocks earned by foreign residents exceeds the expected return earned by domestic investors by δ^D.

C.1. The impact of foreign stock price changes

With δ^D negatively related to the past return, foreign stocks become more attractive to domestic investors if these stocks have performed well. A decrease in δ^D increases the demand for foreign stocks by domestic investors and decreases the demand for these stocks by foreign investors. As shown in Section B of the Appendix, as long as δ^D falls sharply enough following a positive return, the equilibrium holdings of the foreign stock by domestic investors increase following a positive return on the foreign stock.

We can use our numerical example to investigate the impact of an increase in the price of the foreign stock when domestic investors expect a higher return on the foreign stock following

[3] Though not formulated in an international context, the model of Williams (1977) leads to such a result directly.
[4] For instance, Hong and Stein (1999) have a group of investors who estimate expected returns by estimating a univariate regression on a short time-series of returns. These investors have extrapolative expectations.

an unexpectedly high return on that stock. For simplicity, we set $\delta^D/\sigma_F^2 = 0.33 - k \times \Delta P_F/P_F$ so that δ^D is equal to 3%. Choosing k = 0.1, the equilibrium holdings of the foreign stock by domestic investors increase from 3.33 shares to 3.55 shares with a doubling of the price of the foreign stock. Hence, in this case, foreign investors drop their holdings of foreign shares from 6.67 to 6.45 shares. Figure 1B shows that a doubling of the foreign stock price leads to net positive foreign equity purchases by domestic investors. With weaker extrapolative expectations, however, it becomes possible for the holdings of the foreign stock by domestic investors to fall when the foreign stock earns an unexpectedly high return. For instance, if we set $\delta^D/\sigma_F^2 = 0.33 - 0.01 \times \Delta P_F/P_F$, equilibrium holdings of the foreign stock by domestic investors fall to 3.22 following a doubling of the foreign stock price.

In the absence of the home bias and extrapolative expectations for non-resident investors, high past returns in a country predict high expected returns. However, with extrapolative expectations, a high return on the foreign stock leads domestic investors to expect higher returns in the future and therefore increases their demand for that stock. This effect, when strong enough, could lead to a decrease in the expected return of the foreign stock. Hence, an increase in equity flows could be associated with a decrease in expected returns as perceived by foreign investors and hence an increase in the foreign stock price because the discount rate on the expected cash flows for that stock has decreased. In Figure 1C, the expected return on the foreign stock falls following high returns on the foreign stock as long as the impact of the price increase of the foreign stock on domestic investors' expected return for these stocks is large enough. However, when the expectations are extrapolative to such an extent, they have to be justified using behavioral considerations since domestic investors would otherwise understand that their behavior leads to a decrease in the expected return on foreign stocks.

C.2. The impact of domestic stock price changes

Consider now the impact of an unexpectedly high increase in the domestic stock price on net flows to the foreign country. The foreign residents investing in the domestic country earn δ^F less than domestic investors on domestic stocks. In this case, the demand for the domestic asset by foreign investors is:

$$N_D^F = N_D^S[1-\Omega] - \frac{\delta^F}{\sigma_D^2}\Omega[1-\Omega]\frac{W^W}{P_D} \qquad (8)$$

We set δ^F/σ_D^2 = 0.33 – 0.1 x $\Delta P_D/P_D$. Starting from the base case, an increase in the domestic stock price increases the expected return on domestic stocks for foreign investors relative to the expected return on the same stocks for domestic investors. A doubling of the domestic stock price reduces the equilibrium holdings of both domestic and foreign stocks for domestic investors. The reason for this is that the extrapolative expectations of foreign investors make stocks more attractive for them, so that they borrow from domestic investors to invest in stocks. However, this result does not hold when the domestic country is sufficiently richer than the foreign country. Figure 1D shows this. When the wealth of the domestic country is large enough relative to the foreign country, a doubling of the domestic stock price results in positive net equity flows toward the foreign country. The intuition for this result can be obtained by looking at equation (6). When the wealth of the domestic country is large relative to the wealth of the foreign country, Ω is large. Consequently, the second term in equation (6) is small. As Ω becomes large enough, we can neglect the second term in equation (6). In this case, an increase in the price of the domestic stock increases the first term of equation (6) simply because domestic investors become richer. However, it is still the case that domestic investors sell domestic shares for proceeds that exceed their purchase of foreign stocks, so that an increase in

the domestic stock prices leads both to foreign stock purchases and to lending to the foreign country.

D. Summary of Model Implications

It follows from this analysis that if non-resident investors in a market have extrapolative expectations for the expected returns of that market, equilibrium holdings of foreign stocks by non-resident investors relate as follows to past returns:

Result 1: Unexpectedly high returns on foreign stocks are accompanied by net equity inflows in the foreign country as long as domestic wealth is not too small compared to foreign wealth and expectations are sufficiently extrapolative.

Result 2: Unexpectedly high returns on domestic stocks are accompanied by net equity flows into the foreign country as long as expectations are sufficiently extrapolative and the wealth of the domestic country is large relative to the wealth of the foreign country.

The model of this section is admittedly very simple. It is also incomplete in the sense that we do not derive how expectations are formed. However, this model is consistent with the two previous findings noted at the beginning of the paper: there is a home bias and flows into a host country increase with past returns in that host country. A model with internationally perfect capital markets where risk-aversion does not differ across countries and where investors consume the same consumption basket cannot be made consistent with these results. The attributes of our model that make it consistent with existing evidence also lead to a new empirical prediction (result 2) that we can test.

II. Data Description

In testing predictions such as result 1 and 2 above, it is particularly useful to use relatively high frequency data. Daily data allows for a better examination of lead-lag dynamics between flows and returns which, with lower frequency data (namely, monthly or quarterly), would likely appear as contemporaneous relationships. The only existing published study that uses daily data on equity flows for multiple countries is the study of Froot, O'Connell, and Seasholes (2001). Their study estimates flows from the sales and purchases of investors who use State Street Bank as a custodian. These investors represent about 12 percent of the world's securities over the period of their study. Because State Street is such a large custodian, the flow data is fairly representative, but the data is proprietary. To construct a dataset of daily equity flows, we contacted about 60 stock exchanges and 12 regulatory agencies with websites on the Internet.[5] Most stock exchanges or regulatory agencies indicated that they did not keep track of the trading activity of foreign investors, at least at the daily level. However, we were able to obtain data from seven countries with this approach. In addition, private data vendors were helpful in obtaining data from two other countries. In all, we obtained data on foreign flows from nine markets.[6] As a general feature, Asian countries seem to keep much more extensive data records of foreign investors' activities and thus our sample contains seven Asian countries. This is fortunate for our sake since much of the concerns about the potentially destabilizing influence of foreign investment flows center around the Asian equity markets.

Our final sample consists of data from five countries in East Asia (Indonesia, Korea, the Philippines, Taiwan, and Thailand), two in South Asia (India and Sri Lanka), one country from

[5] Some of the websites we used for finding stock exchanges and regulating agencies are www.gsionline.com/exchange.htm, www.fibv.com, and www.iosco.org.

[6] We were not able to obtain flow data for two countries for which studies using daily data have been published: Sweden and Finland.

East Europe (Slovenia), and one country from Africa (South Africa). Since this data is recorded by the exchange, it has the advantage of containing all the recorded trades of foreign investors on the stock exchange. The flows we consider contain trading by both foreign institutions and foreign individual investors. In Korea and Taiwan, this data is separately classified, but most foreign equity flows in these two countries are due to institutional investors.[7] A legitimate issue is whether we should report results for Slovenia, South Africa, and Sri Lanka. Slovenia and Sri Lanka represent each less than one hundredth of a percent of the world market capitalization in 1997. South Africa represents a substantially larger market but, as we will discuss below, there are questions about the nature of the flow data. We choose to report results for all countries for the sake of completeness, but pay special attention to the East Asian countries.

The capital flow measure we use is the value of all equity purchases by foreigners minus all equity sales by foreigners scaled by the previous day's market capitalization [$f_t = 100*(f_{\text{buy, t}} - f_{sell,t}) / mktcap_{t-1}$]. We use net flows relative to market capitalization because this measure tells us how important the net demand is relative to the total supply of available shares.[8]

Data for market indices and exchanges rates are collected from Datastream with the exceptions of Sri Lanka and Slovenia where market capitalization and return data is supplied by the exchange (Datastream does not have coverage of these two countries). We primarily focus on local currency returns so that exchange rate effects will not confound our inferences, but subsequently we examine separately the role of exchange rates as well as the implications of using dollar returns. Since flows are scaled by the country's market capitalization, they are invariant to the currency of denomination.

[7] Japan has weekly data classified this way. This data is studied in Karolyi (2001) for a sample period that partly overlaps with ours. Using a VAR framework, he finds strong evidence of positive feedback trading.

[8] Without scaling, it is problematic to compare flows across countries or even across time within a country. Though Bekaert, Harvey, and Lumsdaine (2002) and Froot, O'Connell, and Seasholes (2001) scale flows as we do, a number of papers, including Edison and Warnock (2001) do not scale flows.

Figure 2 shows time-series plots of the market indices as well as the cumulative foreign flows. The net flows divided by the previous day's market capitalization are cumulated across the entire period. We also cumulate flows divided by the beginning of the period market capitalization and obtain similar figures. Because many countries started keeping track of the flow data only recently, the starting dates of the countries vary by country. The data begins in January 1996 for Korea, Indonesia, and South Africa, 1997 for Taiwan and Thailand, 1998 for India, Sri Lanka, and Slovenia, and 1999 for the Philippines. The ending date is February 23, 2001 for all countries except Slovenia, which ends on January 31, 2001.

The first interesting feature of the plots is that flows seem to exhibit a weak positive relationship with the movement in the market indices. There do not appear, though, to be massive capital flights during large market down moves. For example, for the Russian crisis in the summer of 1998, there are five countries with available data, but only in Korea does there appear to be a noticeable sell-off by foreign investors. Second, the sample period is one of cumulative net foreign inflows. However, for Thailand, Sri Lanka, and the Philippines net foreign investment over 1999 is negative. A third noticeable feature of the data is that the volatility of the foreign equity net flows appears to fluctuate widely across countries with Korea and Indonesia showing substantial movements in net flows, but Slovenia has almost no variation in foreign flows.

To gain additional insights about the time-series properties of the data, Figure 3 reports the daily return movements on the right axis and scaled daily net foreign flows on the left axis. There appears to be a relationship between the volatilities of returns and flows. For instance, this can be seen clearly in Korea where both returns and flows became more volatile in mid to late 1997. Another evident feature of the data is that for many of the countries there are large positive

spikes in net foreign inflows. For Korea, we are able to obtain liberalization dates and notice that most of these days of large inflows coincide with market liberalization dates. Another possible explanation for some of the large inflows is that they coincide with days when a stock from the country lists in the U.S. Edison and Warnock (2001) find that ADR listings can lead to sharp spikes in U.S. monthly flows to emerging markets. To control for capital inflows due to abnormal reasons, we set observations above the 99th percentile of the daily net flow distribution equal to the 99th percentile point.[9]

We examine the mean, median, and standard deviation of foreign net flows in Table I. The standard deviation of net flows varies across countries between one one-hundredth of a percent (0.01) for Slovenia to 5.5 times as much (0.055) for Korea. This means that in all markets most daily foreign net activity is less than one-tenth of one percent of market capitalization.

Table I also examines the autocorrelation structure of both flows and returns out to five lags. Flows generally have much greater autocorrelations than returns, with the autocorrelations in flows varying widely across countries. The autocorrelation in flows slowly declines and is generally still significant out to lag five, indicating substantial persistence in the foreign investment activity.

Table I also documents some substantial contemporaneous correlations between flows and returns within each country. All of the Asian countries have substantial positive correlations between flows and returns (ranging between 0.070 and 0.44). Quite different is the case of Slovenia and South Africa. The negative correlations in these two countries are inconsistent with what has been observed elsewhere [e.g. Froot, O'Connell and Seasholes (2001)] and more

[9] All tables and the remaining figure consider the characteristics of foreign flows after trimming the top one percent of foreign flow activity. We also re-examine our main findings by using flows including these tail-end observations and obtain similar findings.

consistent with the contrarian behavior observed by domestic individual investors [Odean (1999) and Grinblatt and Keloharju (2000)].

This brings up a potential problem that plagues most analysis of capital flows. While the flow data is marked as trading activity by foreign investors, there are no guarantees that domestic investors do not disguise themselves as foreigners through offshore accounts. One might expect such activity to be particularly prevalent in a situation where there is large political risk. Through various news sources, we ascertained that capital flight in South Africa has been occurring rapidly since the removal of Apartheid laws and the relaxation of exchange rate controls in 1997.[10] In addition, laws introduced since 1997 allow South Africans to legally invest some capital in offshore accounts. Given that South African investors hold large amounts of capital in offshore accounts, it certainly seems possible that one explanation for the negative contemporaneous relation between flows and returns in South Africa is that the 'foreign flows' in South Africa represent mostly trading by local investors. Thus, we are careful in making inferences from South African data and given the negative correlation between flows and returns, potentially from Slovenia as well.

III. Flows and Own Country Returns

This section examines the within country joint dynamics of local market returns and net equity flows. As previously illustrated, our model generally predicts that in the presence of extrapolative expectations, high stock returns in the local market increase the demand for local stocks from non-resident investors and hence lead to net flows. Though our model does not

[10] The following articles contained some information on the presence of offshore activity by South African investors: www.moneymax.co.za/learning_centre/begin_global.asp, www.tradeport.org/ts/countries/safrica/mrr/mark0241.html, www.computingsa.co.za/1999/06/14/Topnews/top03.html.

include price pressure effects, such effects could lead to a contemporaneous correlation between net flows and returns. The existence of such effects would mean that high cap ital flows today lead to high flows and returns tomorrow through the impact of net flows on prices through price pressure. The end result is that foreign trading activity is predictive of future returns even when foreigners are informationally disadvantaged. To examine these implications, we ask two main questions of the flow data. Is there any reliable evidence of foreign investors chasing local market returns? Do foreign investment flows predict future price movements and, if so, is this predictability more consistent with information or price pressure explanations?

To investigate these issues, within each country, we use a vector autoregression (VAR) framework. To facilitate comparison between movements in returns and flows we standardize both net flows (buy-sell imbalances/ total market cap) and returns relative to their respective time series standard deviation. We estimate the following bivariate unrestricted VAR:

$$\begin{bmatrix} r_{i,t} \\ f_{i,t} \end{bmatrix} = \begin{bmatrix} \alpha_{i,r} \\ \alpha_{i,f} \end{bmatrix} + \begin{bmatrix} b_{11}(L) & b_{12}(L) \\ b_{21}(L) & b_{22}(L) \end{bmatrix} \begin{bmatrix} r_{i,t-1} \\ f_{i,t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon^{r}{}_{i,t} \\ \varepsilon^{f}{}_{i,t} \end{bmatrix} \tag{9}$$

where $r_{i,t}$ is the time t return on country i's equity index and $f_{i,t}$ is the standardized net foreign flow to country i at time t. The alphas are intercept terms, the $b(L)$s are polynomials in the lag operator L and contain the autoregressive coefficients, and $\varepsilon^{r}_{i,t}$ and $\varepsilon^{f}_{i,t}$ are zero mean disturbance terms that are assumed to be contemporaneously as well as serially uncorrelated.[11]

Table II displays the VAR regression results with five lags for both flows (*f*) and returns (*r*). The examination of the flow regressions in panel A shows several interesting findings. First,

[11] For most countries the Schwartz Information Criterion (SIC) selects the optimal lag length at two lags. However, for Korea and Thailand the optimal lag length is four and five, respectively. We choose to model the system with five lags in each variable for all countries as this choice makes the analysis homogeneous across countries. The fairly large sample sizes at our disposal allow us to be less concerned about the losses of degrees of freedom induced by more highly parameterized models. We also reexamine all our VAR results with systems only containing two lags and find that our results are, essentially, unchanged.

flows are strongly related to past flows even after controlling for the effect of returns. For example, a one standard deviation positive movement in yesterday's foreign flows in Indonesia leads to a 0.208 standard deviation increase in today's flows. The impact of past flows decreases quickly at lag two (coefficients ranging from 0.015 to 0.139) but persists even out to lag five in most of the countries.

The second interesting finding, which is consistent with our model, is that foreign flows are highly affected by the previous day's return. For instance, a one standard deviation increase in yesterday's Indonesian market return leads to a 0.16 standard deviation increase in today's foreign inflows. Foreign flows in all five East Asian countries are highly responsive to past returns with coefficients ranging between 0.16 for Indonesia and 0.287 for Thailand. While the response in flows to a change in yesterday's return is large for the East Asian countries, these effects are always smaller than that of past flows. For the two South Asian countries, there is only a weak and insignificant relationship with past returns, and for Slovenia and South Africa the relationship is negative. Interestingly, while the relationship between flows and previous day's returns in East Asian countries is large, this effect dies out quickly with the impact of lag two returns being small and actually negative in six of the nine countries. To assess the joint significance of lagged returns on flows, Granger causality tests are reported at the bottom of Panel A. For Indonesia, Korea, the Philippines, Taiwan, Thailand, and Slovenia, we can reject (at the 1% level) the null that past index returns do not Granger-cause flows, after controlling for the predictive power of lagged flows. These results suggest that foreigners buy following high previous-day stock returns but respond little or actually are net sellers following high returns earlier in the week.

Moving to the return equation of the VAR in equation (9), Panel B of Table II examines the relationship between current market returns and past foreign trading activity as well as lagged returns. Foreign flows are significant predictors of returns at lag one for Korea, Taiwan, Thailand, and India, indicating that foreign investors are buying before market index increases. We also test the joint significance of flows for predicting future returns and find (as reported at the bottom of Panel B) that we can reject the null (at the five percent level) that flows do not Granger-cause returns in Korea, Taiwan, Thailand, India, and Slovenia.

It is important to notice that, relative to the explained variation in flows, the variation in returns that is explained by past returns and flows is small. The adjusted R^2s in the return equations are less than 0.04 in all the East Asian countries. Comparatively, the adjusted R^2s in the flow equations for East Asian countries range up to 0.40.

Nevertheless, we wish to further understand the cause of this relationship between foreign activity and next-day stock returns. These findings could be due to foreign investors anticipating future market movements better than domestic investors. If this were the case, the extrapolative component of the expectations of domestic investors in our model would have to be driven purely by behavioral considerations, since it would not be possible to argue that somehow foreign investors are at an informational disadvantage and simultaneously anticipate future market movements better than domestic investors. Froot and Ramadorai (2002) use closed-end country fund flows to investigate these alternative explanations and conclude that U.S. investors do have information about future fundamentals of foreign stock funds. Alternatively, past flows could forecast flows and flows could contemporaneously increase prices through price pressure.

To investigate these competing explanations for our countries, in Panel C we report estimates from a structural VAR model identical to the one above except that contemporaneous

flows are included in the return equation. If flows have predictive power for market returns beyond their forecasting power for future foreign flows, we would expect lagged flows to be significant predictors even after including the contemporaneous flows. However, if lagged foreign flows merely forecast future foreign flows, which then lead to a contemporaneous price impact, we would expect to see the contemporaneous flow/return relationship subsuming the lead-lag dynamics.

The tests for this specification reveal that contemporaneous flows are positive and highly significant in India and all five East Asian countries. However, lagged flows in these countries are positive and significant in two countries only and negative and significant in two other countries. Thus, these results seem to suggest that the importance of foreign flows (in the VAR without contemporaneous flows) is mainly due to past flows signaling future foreign investment which leads to contemporaneous price movements. Conversely, we find only mixed support for the hypothesis that foreign investors consistently anticipate local market movements. Although admittedly limited, this evidence does not support the view that foreigners have better information than locals about future market movements.

For the flow equations, a similar question can be asked -- how do foreign flows respond to past price changes if one controls for the contemporaneous relationship between flows and returns? Panel D of Table II reports results for a separate structural VAR model where the contemporaneous market index return is included in the flow equation (and no contemporaneous flows are included in the return equation).[12] The return equation is not reported for this specification as the results are the same as those estimated in Panel B.

[12] Allowing returns to contemporaneously impact flows does not assume causality but rather allows for a separate assessment of the importance of past returns on current flows, after controlling for their contemporaneous relationship.

The regressions reported in Panel D show that the inferences obtained in Panel A still hold. Namely, foreign flows are strongly related to past flows and the previous day's return. The contemporaneous relationship between returns and flows is positive and highly significant in India and the five East Asian countries. The coefficient on the contemporaneous return for these markets range between 0.178 and 0.353 indicating that a movement on the local index return is generally associated with a relatively large net flow of the same sign.

In our model, high returns lead to equity flows. Consequently, there will be a correlation between flows and returns. However, the contemporaneous relationship could also be due to foreign investors buying ahead of intraday market moves, price pressure by foreigners, or by intradaily trend chasing. Our empirical work does not make it possible to discriminate among these possible explanations. The previous day's coefficient on returns could be attributed to trades executed after price movements or to trend chasing. It is also interesting to note that the magnitude of these lagged effects is relatively large, although somewhat smaller than the contemporaneous relationship. We also estimate VARs with two lags and obtain similar findings.

Although the individual VAR coefficients are informative in their own rights, they only measure the static lead-lag relationships between foreign flows and returns. It is, perhaps, even more important to look at the joint impact of past shocks and at the dynamic behavior of the system under consideration. While the Granger causality tests reported above are a first step in this direction, through the use of impulse response functions we can trace out the overall impact of an innovation in both flows and returns on subsequent flows over time. Using the VAR regressions in equation (9), in unreported results we examine the cumulative impact (or dynamic multipliers) of both lagged flows and market returns on flows for up to twenty days. For the five East Asian markets, the impulse response graphs show that both flows and returns generally have

a significant and lasting impact on flows. However, the cumulative impact of shocks to flows is generally substantially higher and more persistent than the impact of returns.

IV. Flows and Non-host Country Returns

As discussed in Section I, our model predicts a positive relationship between net flows and non-host country (or, regional) equity returns when non-host countries are substantially richer than the host country. In this section we investigate the relationship between regional equity returns and foreign investment flows.

A. Cross-country Correlations between Flows and Returns

We first examine simple correlations between flows and returns across countries. All returns are denominated in local currency, as are the regional Datastream indices. Table III presents correlations between flows and returns in the nine markets and with regional indices. The correlations between foreign flows vary widely across countries. Foreign investment flows in Thailand and Korea generally exhibit the highest correlation with other countries, particularly within the Asian region. While flows between India and the five East Asian countries are always positive, the flow correlations with Sri Lanka, Slovenia, and South Africa are close to zero. The pattern of much higher correlations of flows within regions is also consistent with findings by Froot, O'Connell, and Seasholes (2001).

Second, and more importantly, we examine the relationship between flows and contemporaneous and lagged equity returns in Europe, North America, the Pacific region, and emerging markets. The three regional indices considered here represent coverage from the major trading regions and the emerging market index is selected to examine the potential presence of a common impact within developing markets. Flows in Indonesia, Korea, Taiwan, Thailand, and

India are for the most part significantly correlated with the regional and emerging market indices. Interestingly, both flows and returns in the East Asian countries are correlated with the lagged North American return but not the contemporaneous return. Since the trading day starts in Asia, this indicates that Asian equity returns are much more highly correlated with the previous-days' North American returns than with same-day North American returns which follow Asian equity trading. Perhaps this is due to more information about prices being generated during North American trading hours.

B. Cross-country VAR Models

To investigate the importance of regional indices in explaining flow dynamics, we estimate a structural VAR system where net foreign flows and country index returns depend on their lagged values as well as those of the Pacific, European, North American, and emerging market indices. If the predictions of our model hold up, we would expect the relationship between flows and regional returns to be positive and larger for those indices with larger market cap, especially the North American and, then, the European index. In this structural VAR, the regional index returns are assumed to be exogenous variables. To make the presentation of our results more space effective, even though we estimate the system with five lags for each variable (exogenous and endogenous), only two lags are reported in the tables and the additional lags are discussed when relevant. Panel A of Table IV displays the results for the flow regressions. The results for the return equations are not shown here, as they are not central to the focus on the determinants of foreign investment behavior.

It is first interesting to note that the inclusion of the regional indices does not alter the main conclusions reached previously with only the own-country indices and the flows--namely, that net foreign flows are highly persistent and that foreign investment strongly follows own-

country index returns. Secondly, in looking across regional indices, consistent with the prediction of our model that flows are positively related to home market returns for large markets, the most noticeable effect is related to the previous-day North American return. North American returns exhibit a positive and significant relationship with subsequent foreign inflows in Indonesia, Korea, Taiwan, Thailand, and India. The economic magnitude of this effect is not trivial as a one unit (standard deviation) shock to the North American return index is followed the next day by between a 0.095 and 0.247 unit (standard deviation) increase in foreign flows in these five countries. Looking back further in time shows that lagged two-period North American returns are sometimes negatively related to current foreign flows although only significantly so in Korea. However, in Korea lagged three-period returns from North America are positive and significant and lagged four- and five-period coefficients are smaller but positive. The Pacific market index exhibits a positive although not statistically significant relationship to flows and the lagged emerging market index is significantly related to foreign flows in Taiwan only. Consistent with the European index being second behind the U.S. in market cap, the previous-day European index is positively and significantly related to equity flows in two countries, Korea and Thailand. We also assess the joint significance of the lag one to five returns and similarly find that own-country lagged returns are important in six markets, North American lagged returns are important in four markets and European returns are important in only in two markets.

It is interesting to examine the amount of variation in flows that can be explained by the different (local vs. regional) equity indices. To address this issue we first estimate the basic system with flows as a function of past flows only. We add local index returns (as in Table II), gauge the incremental increases in adjusted R^2s, and then add both local and regional index returns. We find that the average adjusted R^2s for East Asian markets with only lagged flows is

0.242, but the explanatory power increases 16.8 percent to 0.285 with the inclusion of lagged local index returns and increases an additional 12.7 percent to 0.320 with the inclusion of both local and regional index returns. For the other countries the increases in adjusted R^2s are much smaller. Regional index returns appear, thus, to be economically important in determining the variation in foreign flows in East Asian countries.

To assess joint economic importance, Figure 4 displays impulse response graphs for flows from the VAR without contemporaneous effects (shown previously in Panel A of Table IV). The shocks to North American returns lead to larger increases to capital flows than those from local returns in seven of the nine countries (exceptions are the Philippines and Sri Lanka). North American market returns lead to economically and statistically significant increases in flows in Indonesia, Korea, Taiwan, and Thailand, respectively. In Korea, Taiwan, and Thailand a one standard deviation increase in the North American market returns leads to an economically large response of more than a 0.50 standard deviation increase in net flows.

One potential explanation for the positive relation between North American returns and foreign flows to Asian countries is that positive returns in North America propagate into higher Asian equity returns. Since flows and local market returns are contemporaneously correlated, the positive relationship between flows and lagged North American index returns could simply be an artifact of the correlation between North American returns and the next-day East Asian equity returns. To examine this possibility, we estimate a structural VAR where contemporaneous returns are included in the flow equation. Panel B of Table IV demonstrates that while this effect weakens the significance of the North American return somewhat, North American returns still significantly impact flows in Korea, Taiwan, and Thailand.

One other question is whether these regional index effects are jointly (across countries, that is) important. One problem with a joint system is that it is restricted to the time-period of the country with the shortest coverage. For this reason we first estimate a system for the four East Asian countries with the longest coverage, Indonesia, Korea, Taiwan, and Thailand, with the sample beginning in December of 1997. In unreported results, with a specification similar to the one estimated in Panel B of Table IV, a joint test across markets finds that both lagged North American and European returns are statistically significant determinants of flows.[13]

The findings are consistent with the predictions of our model. Our model predicts that when the foreign market is sufficiently large relative to the domestic market, equity flows are positively related to foreign returns and an increasing function of the size of the foreign market. Empirically we find that equity flows into Asian countries are positive and significantly related to North American market returns and, to a lesser extent, to European returns.

V. The Impact of Exchange Rates and Cross-Country Flows

The model of Section I ignores the impact of exchange rate changes on equity flows. In this section, we examine whether exchange rate changes affect equity flows and whether they can explain the impact on flows of non-host country returns.

A. Exchange Rates

To the extent that exchange rate changes are contemporaneously correlated with equity market increases, a positive relationship between non-host country returns and equity flows could simply be proxying for an exchange rate effect. In Table V, we add foreign exchange rate

[13] In addition we estimate a seven-country system (Indonesia, Korea, Taiwan, Thailand, India, Slovenia, and Sri Lanka) with coverage beginning in January 1999 and find a jointly significant North American index return but none of the other regional indices are jointly significant. We also repeat both the four and seven-country tests with non-trimmed data and with several regional emerging market indices and find similar results.

changes as exogenous variables in our structural VAR. The exchange rate coefficients are positive in eight of the nine countries, indicating that a depreciation of the local currency leads to more foreign equity inflows. However, the relationship is statistically significant only in Indonesia and the Philippines. As with returns, the two-period lags of the exchange rate generally have coefficients closer to zero, indicating that investors react quickly to changes in the exchange rate. More importantly, coefficient estimates are generally quite close to the specification excluding exchange rates (as in Panel B of Table IV). As before, lagged one-period North American returns exhibit a positive relationship to foreign flows in Korea, Taiwan, and Thailand, and the European equity index is significant in Thailand. A joint significance test of lag one through five returns indicates that North American returns are significantly related to flows in Indonesia as well as Korea, Taiwan, and Thailand and European returns are jointly significant in Korea and Thailand. In Asian markets, increased foreign investment follows exchange rate depreciations, positive local market equity returns, and increases in regional index returns.

B. Foreign Flows

Our previous investigation has largely drawn inferences for each country in isolation. However, as shown in Table III, flows are correlated across countries, particularly within East Asia. One would expect that cross-country flow correlations are due to common information shocks across countries as well as the influence of the North American equity movements on small market flows. However, one could also argue that these cross-country flow relations are primarily driven by non-fundamental contagion. In a world where non-fundamental contagion is important, one might expect flow herding behavior to be the only major determinant of flow activity and this would drive out the other inferences observed in our model.

To assess the impact of foreign herding behavior across markets, we estimate structural VARs similar to those previously examined in Table V with the addition of cross-country flows as an additional exogenous variable. Because of the strong regional component in flows, we examine East Asian flows for the four countries with the longest coverage: Indonesia, Korea, Taiwan, and Thailand. We construct a foreign flow index as a simple equally-weighted average of the flows in the three other East Asian countries.

Table VI presents the results from both the flow and return equations. Foreign flows are an important determinant of Korean flows and the magnitude of this effect is economically large.[14] This result is consistent with the evidence of a regional common factor in flows presented in Froot, O'Connell, and Seasholes (2001). Interestingly, the inclusion of the foreign flow index does sharpen some of the inferences obtained from other variables in the system. European equity returns have positive coefficients in Korean and Thailand and the emerging market index is now significantly positive in both Korea and Thailand but significantly negative in Taiwan. The coefficients on the North American returns are highly significant in three countries and have a p-value of 0.07 in Indonesia.

We also examine the return equations in the structural VAR. In particular we examine whether foreign flows precede local market equity returns. Foreign flows are a significant determinant of equity returns in Korea but in neither of the other markets. Both cross-country and local flows only explain a small fraction of the variation in returns. The main inference we obtain here is that exchange rates and foreign flows affect local flows but their roles are generally not as important, both economically and statistically, as those of regional index returns.

[14] In unreported results, we decomposed the average flow measure into three separate foreign flows (one for each other country) and find that it is flows from Thailand that are leading the Korean flows.

VI. Other Issues

In this section we briefly investigate the role that currency, time periods, and return asymmetries play in understanding flow dynamics.

A. Currency of Denomination

All of the previously discussed findings are obtained with local currency denominated returns and, thus, are taken from the perspective of an investor who is completely hedged against exchange rate movements. An alternative method of conducting (and checking the robustness of the) inferences is to take the perspective of an investor who is unhedged against foreign currency movements and uses a common currency such as the U.S. dollar. To this end, we compute dollar returns on local and regional indices. Net flows are scaled by market cap and hence invariant to the currency of denomination. In unreported results, we estimate a country-by-country structural VAR model identical to the ones previously analyzed in Table V.

Past flows, contemporaneous and lagged own-country market returns are again important determinants of foreign equity flows. The lagged Pacific index is important only in Korea and the European index is positive and significant in Korea and Thailand. Previous-day North American returns are highly significant in Korea, Taiwan, and Thailand and have p-values of 0.07 and 0.06 in Indonesia and India. Emerging market indices play a much smaller economic, but yet statistically significant role in Korea and Thailand. Impulse response functions also reveal an aggregate significant effect of the North American market on subsequent flows in all five East Asian countries. In summary, the dollar return results confirm that positive equity returns in other parts of the world, particularly the US, lead to an increase in foreign investments into Asian markets.

B.Sub-period analysis

An important question is whether our inferences change through time. Most of our strongest inferences come from Asian countries where we have a time-series extending through the Asian crisis. We first examine the importance of possible structural breaks using both the univariate and multivariate tests of Bai Lumsdaine and Stock (1998) which have been implemented in flows analysis by Bekaert, Harvey, and Lumsdaine (2002). At the ten percent level only three of the nine countries have significant structural break dates. Multivariate break dates are June 18, 1998 for Thailand, October 8, 1998 for Taiwan and February 4, 1997 for South Africa.[15] We, thus, examine regression results in Thailand, Taiwan, and South Africa before and after each country's structural break date and find that own-country returns and the North American returns for Thailand, and Taiwan are still significant.

Even though the tests indicate no structural break for most markets, one may think that the Asian or Russian Crises may alter fundamental flow relations. We first estimate VAR regressions similarly to Table V for the three countries with the longest coverage, Indonesia, Korea, and Taiwan, during the pre-crisis period (prior to July 2, 1997), during the crisis (July 2, 1997 to December 31, 1997) and post-crisis (January 2, 1998 to February 23 2001). In unreported results, we find that in the short pre-crisis period, only Korea has a significant lag one coefficient on the local market return, although the other two local market return coefficients are both positive. The lack of significance for Taiwan is not surprising as only about three months of data are available to us prior to the crisis. Pre-crisis, the North American coefficients at lag one are not significant. During the crisis, the coefficient on local market returns at lag one is positive and significant in Korea and Taiwan and the North American market return is significant only in Taiwan. Post-crisis, the local market return at lag one is positive and significant in all three

[15] The univariate tests yields dates that are the same for South Africa and within four to six days for Thailand and Taiwan. We also conduct the Bai and Perron (1998) Univariate test and find similar break dates.

countries and the North American market return is economically large and significant in Korea and Taiwan. In addition, we examine the post Russian crisis period (August 17, 1998 to February 23, 2001) and find similar magnitude of coefficients and significance. Our findings of Asian capital flows following large local and North American market moves are, thus, not driven by the Asian or Russian crisis periods.

C. Return Asymmetries

Another interesting issue is whether net flows are affected differently by up and down market movements. Bekaert, Harvey, and Lumsdaine (2002) find that flows leave faster than they come using monthly data and a longer but mostly earlier sample period. In particular, if foreign investors are more sensitive to negative news, local negative returns may be followed by capital outflows to a greater extent than a positive return of the same absolute value would affect foreign inflows. Similarly, stock price declines in North American markets may play a stronger influence than North American stock price increases on capital flows in Asia. Our model gives no predictions regarding flow asymmetry and it is not clear whether positive or negative returns should have more impact on flows.

We investigate this issue by estimating VAR regressions of flows on local and U.S. market returns with dummy variables for flow asymmetries. Unreported results show that net flows react differently to positive and negative own lagged returns only in Slovenia and South Africa although the asymmetries are of opposite sign. As for lagged U.S. returns, there is no evidence that positive shocks affect subsequent flows differently than negative shocks with the exception of Slovenia. In sum, our analysis of asymmetries like those for dollar returns and different sub-periods indicates that the findings of a strong positive relation between capital

flows into Asian countries and both local and North American market returns are remarkably robust.

VII. Conclusion

We present a simple model of equilibrium equity flows with barriers to international investment and foreign investors who find past stock prices more informative about future domestic returns than domestic investors. The model predicts that equity flows toward a country increase with the return of that country's stock market. Further, when a country is small, the model predicts that equity flows toward the country increase with stock returns in bigger markets. Using daily flow data from nine markets, we find strong support for both of these predictions.

We find that foreign investors invest more following high returns in a market and that they react quickly, often within one calendar day. Using a bivariate structural VAR where flows are allowed to depend on returns to regional indices as well as past flows and local returns, we examine the importance of regional returns. Equity flows increase following strong regional equity returns. North American returns are particularly important in determining equity flows toward Asia and have an economically and statistically significant effect on flows toward Indonesia, Korea, Taiwan, Thailand, and India. These findings are robust when taking into account exchange rate effects, cross-country flow dynamics, the Asian and Russian crisis, and potential asymmetric effects of positive and negative returns.

Our model and supporting empirical results provide evidence of a world where foreign investors from large markets buy shares from local investors following positive international stock market performance and foreign investors move out of smaller markets following negative

stock market performance both locally and globally. A stock market's past performance is positively related to foreign investment but inflows also increase more rapidly when the U.S. market performs well irrespective of the local market's performance. The result that inflows into small countries are positively related to U.S. stock market returns has important implications for our understanding of equity flows. Some have argued that capital flows cannot be explained by innovations about fundamentals and must be due to some contagious activity. However, both our model and our empirical results indicate that, to understand capital flows into a country over a sample period that includes the Asian and the Russian crises, it is not enough to focus on fundamentals of the host country or even markets with similar fundamentals. Capital can be pushed towards a country as well as pulled towards it.

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Appendix

A. Impact of an increase in P_F on N_F^D when there are barriers to international investment.

Take the derivative of N_F^D with respect to P^F in equation (6):

$$\frac{dN_F^D}{dP_F} = N_F^S \frac{\partial \Omega}{\partial P_F} + \frac{\delta^D}{\sigma_F^2}[2\Omega - 1]\frac{\partial \Omega}{\partial P_F}\frac{W^W}{P_F} + \frac{\delta^D}{\sigma_F^2}[\Omega - 1]\Omega\frac{\partial\left(\frac{W^W}{P_F}\right)}{\partial P_F}$$

The first term is always negative. The second term is negative if Ω is greater than 0.5. The third term is always positive. When the domestic country is small enough and the ratio δ^d / σ_F^2 is large, the second term is positive and more than offsets the first one, so that the derivative is positive. In the symmetric case, the derivative is negative provided that δ^d / σ_F^2 is not greater than one.

B. Proof that N_F^D increases as P_F increases if the expected return for domestic investors increases sufficiently strongly with P_F.

Let $\delta^D = \delta^D(P_F)$. Substitute $\delta^D(P_F)$ in the equation in Section A of this Appendix and take the derivative of N_F^D with respect to P_F:

$$\frac{dN_F^D}{dP_F} = N_F^S \frac{\partial\left(\frac{W^D}{W^W}\right)}{\partial P_F} + \frac{\frac{\partial \delta^D}{\partial P_F}}{\sigma_F^2}\left[\frac{W^D}{W^W} - 1\right]\frac{W^D}{P_F} + \frac{\delta^D}{\sigma_F^2}\frac{\partial\left(\frac{W^D}{W^W}\right)}{\partial P_F} + \frac{\delta^D}{\sigma_F^2}\left[\frac{W^D}{W^W} - 1\right]\frac{\partial\left(\frac{W^D}{W^W}\right)}{\partial P_F}$$

In this expression, the second and fourth terms are positive and the other terms are negative. Hence, as long as the second and fourth terms are large enough, it is possible for a positive return on the foreign stock to lead domestic investors to purchase foreign shares. The second positive term is the term that differentiates this expression from the expression of Section A of this Appendix. If this term is large enough, it makes the derivative positive in the symmetric case.

Table I
Summary Statistics of Net Capital Flows and Market Return by Country

This table reports descriptive statistics for daily net capital flows and market return in each country. Net Flows are defined as (buy value - sell value) by foreign investors scaled by previous day market capitalization. To control for abnormal capital inflows, observations above the 99th percentile of the daily net flow distribution are set equal to the 99th percentile point. Returns and scaled net flows are both expressed in local currency and in percentage terms. Returns are continuously compounded returns on the country stock market index. For each country the table shows the starting date of the sample, the mean, median and standard deviation of net flows and returns, the contemporaneous correlation between net flows and returns and the first five autocorrelation estimates for each series. The end date for all countries is 2/23/01 except Slovenia, which has an ending date of 1/31/01.

	Start Date		***Mean***	***Median***	***Stdev.***	*lag 1*	*lag2*	*lag3*	*lag4*	*lag5*	*Corr.*
					East Asia						
Indonesia	Jan. 2, 1996	Flow	0.008	0.003	0.030	0.33*	0.24*	0.18*	0.12*	0.13*	0.375*
		Ret.	-0.021	-0.051	2.361	0.13*	0.01*	-0.02*	-0.07*	0.01*	
Korea	Jan. 4, 1996	Flow	0.013	0.006	0.055	0.49*	0.32*	0.29*	0.24*	0.25*	0.270*
		Ret.	0.000	-0.068	2.739	0.08*	-0.03*	-0.05*	-0.04*	-0.06*	
Philippines	Jun. 1, 1999	Flow	-0.003	-0.004	0.022	0.42*	0.22*	0.15*	0.12*	0.13*	0.325*
		Ret.	-0.081	-0.040	1.533	0.11*	-0.05*	-0.07*	0.03	-0.01	
Taiwan	Apr. 1, 1997	Flow	0.007	0.006	0.027	0.47*	0.34*	0.23*	0.21*	0.18*	0.282*
		Ret.	-0.006	-0.066	2.031	0.01	0.05	0.03	-0.13*	0.02*	
Thailand	Dec. 1, 1997	Flow	0.002	-0.004	0.041	0.48*	0.34*	0.28*	0.27*	0.27*	0.441*
		Ret.	-0.007	-0.240	2.686	0.10*	0.05*	-0.01*	-0.04*	-0.01*	
					South Asia						
India	Dec. 31, 1998	Flow	0.007	0.006	0.024	0.23*	0.20*	0.18*	0.12*	0.13*	0.218*
		Ret.	0.050	0.142	1.886	-0.01	0.08	0.00	0.02	-0.03	
Sri Lanka	Aug. 17, 1998	Flow	-0.007	-0.003	0.024	0.17*	0.17*	0.16*	0.09*	0.10*	0.070
		Ret.	-0.013	0.000	1.107	0.27*	0.10*	0.12*	0.02*	0.09*	
					Other						
Slovenia	Mar. 2, 1998	Flow	0.000	0.000	0.010	0.58*	0.47*	0.46*	0.38*	0.40*	-0.096*
		Ret.	0.031	-0.001	0.825	0.25*	0.14*	-0.04*	-0.04*	-0.05*	
S. Africa	Jan. 2, 1996	Flow	0.015	0.012	0.024	0.24*	0.20*	0.22*	0.16*	0.19*	-0.086*
		Ret.	0.052	0.089	1.394	0.13*	0.08*	0.00*	-0.02*	-0.01*	

*significant at the five-percent level

Table II

Vector Autoregression of Returns and Standardized Net Flow by Country

This table presents results from the bivariate vector autoregression (VAR) specified below with five lags for each endogenous variable. $r_{i,t}$ is the daily percentage continuously compounded returns on the country stock market index. $f_{i,t}$ is the daily net capital flow (buy value – sell value) originated by foreign investors scaled by the previous day market capitalization, the α's are constant intercept terms, b(L) denotes a polynomial in the lag operator L, $\varepsilon^{r}_{i,t}$ and $\varepsilon^{f}_{i,t}$ are zero mean disturbance terms that are assumed to be intertemporally uncorrelated. The scaled net flow is also expressed in percentage terms. Returns, flows, and market caps are all expressed in local currency. The VAR is estimated separately for each country by OLS. Panel A and B report coefficient estimates, their p-values, and adjusted R-squared for the flow and return equations, respectively, from a standard VAR with no contemporaneous variables in either equation. Panel C reports the return equation results for a structural VAR with contemporaneous flows in the return equation. For a separate VAR with contemporaneous returns in the flow equation, the flow equation results are reported in Panel D. For each country the p-values of two Granger causality tests are reported. Granger 1: Returns do not Granger cause flows. Granger 2: Flows do not Granger cause returns. The VAR equations are as follows:

$$\begin{bmatrix} r_{i,t} \\ f_{i,t} \end{bmatrix} = \begin{bmatrix} \alpha_{i,r} \\ \alpha_{i,f} \end{bmatrix} + \begin{bmatrix} b_{11}(L) & b_{12}(L) \\ b_{21}(L) & b_{22}(L) \end{bmatrix} \begin{bmatrix} r_{i,t-1} \\ f_{i,t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon^{r}{}_{i,t} \\ \varepsilon^{f}{}_{i,t} \end{bmatrix}$$

Panel A: Flow Equations

		East Asia					South Asia		Others	
		Indo.	**Korea**	**Phil.**	**Taiwan**	**Thai.**	**India**	**Sri Lanka**	**Slovenia**	**S. Africa**
Intercept		0.006	0.004	0.008	0.004	-0.004	0.013	-0.001	0.018	0.008
	(*p*-val)	(0.81)	(0.88)	(0.85)	(0.88)	(0.88)	(0.75)	(0.98)	(0.53)	(0.77)
Net Flows	***Lag 1***	0.208	0.391	0.354	0.342	0.307	0.152	0.126	0.370	0.154
	(*p*-val)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	Lag 2	0.115	0.042	0.015	0.117	0.054	0.139	0.114	0.053	0.138
	(*p*-val)	(0.00)	(0.18)	(0.79)	(0.00)	(0.18)	(0.00)	(0.01)	(0.18)	(0.00)
	Lag 3	0.049	0.088	0.094	0.027	0.130	0.108	0.118	0.182	0.080
	(*p*-val)	(0.11)	(0.00)	(0.09)	(0.45)	(0.00)	(0.02)	(0.00)	(0.00)	(0.00)
	Lag 4	0.047	0.052	-0.005	0.098	0.144	0.079	0.020	-0.028	0.100
	(*p*-val)	(0.13)	(0.09)	(0.93)	(0.01)	(0.00)	(0.08)	(0.62)	(0.48)	(0.00)
	Lag 5	0.085	0.102	0.060	0.047	0.100	0.055	0.078	0.149	0.083
	(*p*-val)	(0.00)	(0.00)	(0.24)	(0.15)	(0.01)	(0.22)	(0.06)	(0.00)	(0.00)
Returns	***Lag 1***	0.160	0.237	0.178	0.204	0.287	0.059	0.028	-0.108	-0.034
	(*p*-val)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.18)	(0.51)	(0.00)	(0.21)
	Lag 2	0.031	-0.079	-0.002	0.010	-0.038	-0.075	0.019	-0.045	-0.006
	(*p*-val)	(0.28)	(0.00)	(0.97)	(0.75)	(0.26)	(0.09)	(0.66)	(0.14)	(0.84)
	Lag 3	-0.002	0.010	0.005	-0.027	-0.063	-0.052	0.040	0.031	0.035
	(*p*-val)	(0.95)	(0.68)	(0.92)	(0.36)	(0.06)	(0.24)	(0.35)	(0.31)	(0.19)
	Lag 4	-0.032	-0.037	-0.004	-0.038	-0.119	-0.060	0.033	-0.060	0.051
	(*p*-val)	(0.25)	(0.14)	(0.94)	(0.19)	(0.00)	(0.17)	(0.44)	(0.04)	(0.06)
	Lag 5	-0.034	-0.041	-0.014	-0.016	-0.087	-0.013	-0.010	-0.018	-0.009
	(*p*-val)	(0.23)	(0.10)	(0.77)	(0.59)	(0.01)	(0.76)	(0.80)	(0.53)	(0.74)
Adj. R^2		0.162	0.346	0.219	0.307	0.391	0.093	0.068	0.399	0.117
Granger 1		0.000	0.000	0.011	0.000	0.000	0.147	0.613	0.000	0.198

Panel B: Return Equations

		East Asia					South Asia		Others	
		Indo.	**Korea**	**Phil.**	**Taiwan**	**Thai.**	**India**	**Sri Lanka**	**Slovenia**	**S. Africa**
Intercept		-0.022	-0.001	-0.079	-0.011	-0.009	0.048	-0.001	0.024	0.042
	(*p*-val)	(0.43)	(0.96)	(0.10)	(0.74)	(0.79)	(0.27)	(0.99)	(0.50)	(0.13)
Net Flows	***Lag 1***	0.004	0.107	-0.020	0.196	0.157	0.167	-0.063	-0.132	0.017
	(*p*-val)	(0.91)	(0.00)	(0.73)	(0.00)	(0.00)	(0.00)	(0.12)	(0.01)	(0.57)
	Lag 2	0.054	0.100	-0.096	0.012	0.013	0.018	-0.027	0.080	-0.006
	(*p*-val)	(0.11)	(0.01)	(0.12)	(0.77)	(0.81)	(0.70)	(0.50)	(0.11)	(0.83)
	Lag 3	0.006	-0.017	0.034	-0.125	-0.005	0.056	-0.031	0.071	0.007
	(*p*-val)	(0.85)	(0.66)	(0.59)	(0.00)	(0.93)	(0.24)	(0.45)	(0.15)	(0.81)
	Lag 4	-0.014	-0.039	0.089	0.058	0.054	0.021	0.082	-0.069	-0.028
	(*p*-val)	(0.67)	(0.30)	(0.15)	(0.17)	(0.30)	(0.66)	(0.05)	(0.16)	(0.35)
	Lag 5	0.004	0.002	0.086	-0.009	-0.051	-0.037	0.010	-0.048	0.005
	(*p*-val)	(0.90)	(0.96)	(0.13)	(0.82)	(0.26)	(0.42)	(0.81)	(0.29)	(0.86)
Returns	***Lag 1***	0.139	0.069	0.126	-0.031	0.051	-0.020	0.268	0.208	0.136
	(*p*-val)	(0.00)	(0.02)	(0.02)	(0.36)	(0.20)	(0.66)	(0.00)	(0.00)	(0.00)
	Lag 2	-0.022	-0.135	-0.027	0.005	-0.043	0.000	0.019	0.114	0.061
	(*p*-val)	(0.49)	(0.00)	(0.61)	(0.89)	(0.31)	(1.00)	(0.66)	(0.00)	(0.03)
	Lag 3	-0.049	-0.076	-0.039	0.007	-0.057	-0.014	0.075	-0.065	-0.012
	(*p*-val)	(0.11)	(0.01)	(0.46)	(0.85)	(0.17)	(0.76)	(0.08)	(0.09)	(0.68)
	Lag 4	-0.033	-0.043	0.029	-0.085	-0.043	0.005	-0.035	-0.037	-0.046
	(*p*-val)	(0.28)	(0.16)	(0.58)	(0.01)	(0.30)	(0.90)	(0.41)	(0.33)	(0.10)
	Lag 5	-0.016	-0.072	-0.080	-0.001	0.006	-0.016	0.090	-0.038	-0.002
	(*p*-val)	(0.59)	(0.02)	(0.12)	(0.97)	(0.88)	(0.71)	(0.03)	(0.31)	(0.96)
Adj. R^2		0.018	0.039	0.026	0.036	0.021	0.018	0.085	0.078	0.019
Granger 2		0.667	0.000	0.073	0.000	0.012	0.002	0.227	0.007	0.943

Panel C: Return Equations with Contemporaneous Flows included

		East Asia					South Asia		Others	
		Indo.	**Korea**	**Phil.**	**Taiwan**	**Thai.**	**India**	**Sri Lanka**	**Slovenia**	**S. Africa**
Intercept		-0.024	-0.002	-0.082	-0.012	-0.007	0.046	0.000	0.024	0.042
	(*p*-val)	(0.35)	(0.93)	(0.07)	(0.70)	(0.83)	(0.29)	(0.99)	(0.50)	(0.13)
Net Flows	***Lag 0***	0.402	0.303	0.389	0.313	0.567	0.192	0.072	-0.006	-0.085
	(*p*-val)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.07)	(0.90)	(0.00)
	Lag 1	-0.080	-0.011	-0.158	0.089	-0.018	0.138	-0.072	-0.130	0.030
	(*p*-val)	(0.01)	(0.75)	(0.01)	(0.03)	(0.71)	(0.00)	(0.08)	(0.01)	(0.31)
	Lag 2	0.007	0.087	-0.102	-0.024	-0.018	-0.008	-0.036	0.080	0.005
	(*p*-val)	(0.81)	(0.02)	(0.08)	(0.55)	(0.69)	(0.86)	(0.39)	(0.11)	(0.86)
	Lag 3	-0.013	-0.043	-0.003	-0.133	-0.078	0.035	-0.040	0.072	0.014
	(*p*-val)	(0.67)	(0.24)	(0.96)	(0.00)	(0.09)	(0.45)	(0.33)	(0.15)	(0.64)
	Lag 4	-0.033	-0.055	0.091	0.027	-0.028	0.005	0.081	-0.069	-0.020
	(*p*-val)	(0.29)	(0.13)	(0.12)	(0.50)	(0.55)	(0.91)	(0.05)	(0.16)	(0.51)
	Lag 5	-0.030	-0.029	0.063	-0.023	-0.107	-0.048	0.004	-0.048	0.012
	(*p*-val)	(0.31)	(0.37)	(0.24)	(0.53)	(0.01)	(0.30)	(0.92)	(0.31)	(0.68)
Returns	***Lag 1***	0.075	-0.003	0.056	-0.095	-0.111	-0.031	0.266	0.208	0.133
	(*p*-val)	(0.01)	(0.93)	(0.25)	(0.00)	(0.00)	(0.48)	(0.00)	(0.00)	(0.00)
	Lag 2	-0.034	-0.111	-0.026	0.002	-0.021	0.014	0.017	0.114	0.061
	(*p*-val)	(0.24)	(0.00)	(0.59)	(0.96)	(0.58)	(0.75)	(0.68)	(0.00)	(0.03)
	Lag 3	-0.048	-0.079	-0.041	0.015	-0.022	-0.004	0.072	-0.065	-0.009
	(*p*-val)	(0.09)	(0.01)	(0.41)	(0.65)	(0.57)	(0.93)	(0.09)	(0.09)	(0.76)
	Lag 4	-0.020	-0.032	0.030	-0.073	0.024	0.017	-0.037	-0.037	-0.042
	(*p*-val)	(0.49)	(0.28)	(0.54)	(0.03)	(0.52)	(0.70)	(0.38)	(0.33)	(0.14)
	Lag 5	-0.003	-0.059	-0.074	0.004	0.056	-0.014	0.091	-0.038	-0.002
	(*p*-val)	(0.92)	(0.04)	(0.12)	(0.91)	(0.14)	(0.75)	(0.03)	(0.31)	(0.93)
Adj. R^2		0.153	0.098	0.143	0.102	0.216	0.050	0.089	0.077	0.024
Granger 2		0.032	0.044	0.001	0.005	0.002	0.054	0.148	0.015	0.837

Panel D: Flow Equations with Contemporaneous Returns included

		East Asia					South Asia		Others	
		Indo.	**Korea**	**Phil.**	**Taiwan**	**Thai.**	**India**	**Sri Lanka**	**Slovenia**	**S. Africa**
Intercept		0.014	0.004	0.033	0.006	-0.001	0.005	-0.001	0.018	0.011
	(*p*-val)	(0.57)	(0.86)	(0.42)	(0.81)	(0.97)	(0.91)	(0.98)	(0.53)	(0.68)
Net Flows	***Lag 1***	0.207	0.369	0.360	0.298	0.252	0.123	0.130	0.370	0.156
	(*p*-val)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
	Lag 2	0.097	0.022	0.045	0.114	0.050	0.135	0.116	0.053	0.137
	(*p*-val)	(0.00)	(0.47)	(0.39)	(0.00)	(0.17)	(0.00)	(0.01)	(0.18)	(0.00)
	Lag 3	0.047	0.092	0.084	0.055	0.132	0.098	0.120	0.183	0.081
	(*p*-val)	(0.10)	(0.00)	(0.11)	(0.11)	(0.00)	(0.03)	(0.00)	(0.00)	(0.00)
	Lag 4	0.052	0.060	-0.033	0.085	0.125	0.075	0.014	-0.028	0.098
	(*p*-val)	(0.07)	(0.04)	(0.53)	(0.01)	(0.00)	(0.09)	(0.73)	(0.47)	(0.00)
	Lag 5	0.084	0.102	0.033	0.049	0.118	0.062	0.078	0.148	0.083
	(*p*-val)	(0.00)	(0.00)	(0.49)	(0.12)	(0.00)	(0.16)	(0.06)	(0.00)	(0.00)
Returns	***Lag 0***	0.343	0.206	0.313	0.225	0.353	0.178	0.075	-0.004	-0.076
	(*p*-val)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.07)	(0.90)	(0.00)
	Lag 1	0.112	0.223	0.139	0.212	0.268	0.062	0.008	-0.108	-0.023
	(*p*-val)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.14)	(0.86)	(0.00)	(0.39)
	Lag 2	0.038	-0.051	0.007	0.008	-0.023	-0.075	0.018	-0.045	-0.001
	(*p*-val)	(0.15)	(0.03)	(0.88)	(0.77)	(0.44)	(0.08)	(0.68)	(0.14)	(0.97)
	Lag 3	0.015	0.026	0.017	-0.028	-0.043	-0.049	0.034	0.030	0.034
	(*p*-val)	(0.57)	(0.29)	(0.70)	(0.32)	(0.15)	(0.25)	(0.42)	(0.32)	(0.20)
	Lag 4	-0.021	-0.028	-0.012	-0.019	-0.103	-0.061	0.035	-0.061	0.047
	(*p*-val)	(0.42)	(0.25)	(0.78)	(0.50)	(0.00)	(0.16)	(0.41)	(0.04)	(0.08)
	Lag 5	-0.028	-0.027	0.011	-0.015	-0.089	-0.010	-0.017	-0.018	-0.009
	(*p*-val)	(0.28)	(0.27)	(0.79)	(0.59)	(0.00)	(0.81)	(0.68)	(0.53)	(0.73)
Adj. R^2		0.277	0.386	0.313	0.355	0.512	0.122	0.072	0.398	0.122
Granger 1		0.000	0.000	0.062	0.000	0.000	0.126	0.783	0.000	0.311

Table III: Correlation Matrix of Flows and Returns

This table reports correlations between net flows and returns from nine capital markets along with correlations with four regional indices. Net Flows are defined as (buy value - sell value) by foreign investors scaled by the previous day market capitalization. Flows above the 99th percentile of the daily net flow distribution are set equal to the 99th percentile point. Returns and scaled net flows are all expressed in local currency and in percentage terms. A '*' indicates a correlation that is significant at the five percent level.

		Indonesia		**Korea**		**Philippines**		**Taiwan**		**Thailand**		**India**		**Sri Lanka**		**Slovenia**		**S. Africa**		**Pac.**	**Eur.**	**N.Am.**
		flow	*ret*	*flow*	*ret*	*flow*	*ret*	*flow*	*ret*	*flow*	*ret*	*flow*	*ret*	*flow*	*ret*	*flow*	*ret*	*flow*	*ret*	*ret*	*ret*	*ret*
Indonesia	*Ret*	0.39 *																				
Korea	*Flow*	0.19 *	0.13 *																			
	Ret	0.06 *	0.16 *	0.20 *																		
Philippines	*Flow*	0.16 *	0.12 *	0.07	0.04																	
	Ret	0.12 *	0.17 *	0.17 *	0.21 *	0.34 *																
Taiwan	*Flow*	0.19 *	0.14 *	0.19 *	0.23 *	0.17 *	0.19 *															
	Ret	0.12 *	0.14 *	0.10 *	0.20 *	-0.01	0.13 *	0.28 *														
Thailand	*Flow*	0.21 *	0.31 *	0.52 *	0.25 *	0.30 *	0.31 *	0.21 *	0.20 *													
	Ret	0.18 *	0.37 *	0.20 *	0.35 *	0.13 *	0.26 *	0.26 *	0.21 *	0.44 *												
India	*Flow*	0.18 *	0.04	0.19 *	0.05	0.04	0.15 *	0.25 *	0.14 *	0.16 *	0.11 *											
	Ret	0.08	0.08	0.15 *	0.17 *	0.08	0.11 *	0.17 *	0.13 *	0.16 *	0.14 *	0.23 *										
Sri Lanka	*Flow*	0.03	-0.05	-0.01	0.05	0.08	0.02	0.05	0.02	0.06	0.05	0.10 *	-0.03									
	Ret	0.06	0.02	-0.01	0.02	-0.01	0.05	0.02	0.04	0.10 *	0.11 *	0.06	-0.02	0.07								
Slovenia	*Flow*	-0.11 *	-0.07 *	0.01	0.04	-0.02	0.02	0.01	0.00	0.07	0.09 *	0.05	0.03	0.03	0.04							
	Ret	0.07	0.10 *	0.11 *	0.07	0.02	0.10 *	0.04	0.06	0.06	0.04	0.04	0.01	0.02	0.01	-0.10 *						
S. Africa	*Flow*	0.03	0.03	0.02	-0.02	-0.05	0.02	-0.04	-0.01	0.03	0.00	0.05	-0.09 *	0.05	0.05	-0.09 *	-0.01					
	Ret	0.11 *	0.23 *	0.09 *	0.25 *	0.07	0.17 *	0.20 *	0.20 *	0.23 *	0.34 *	0.11 *	0.23 *	-0.05	0.04	-0.06	0.11 *	-0.08 *				
Pacific	*Ret*	0.13 *	0.28 *	0.12 *	0.32 *	0.05	0.25 *	0.24 *	0.25 *	0.24 *	0.38 *	0.11 *	0.17 *	0.04	0.06	0.02	0.07	-0.04	0.44 *			
lag 1		0.09 *	0.07 *	0.13 *	0.08 *	0.03	0.06	0.23 *	0.14 *	0.20 *	0.09 *	0.13 *	0.03	-0.02	0.05	0.01	0.07	-0.01	-0.05	0.04		
Europe	*Ret*	0.06 *	0.17 *	0.08 *	0.23 *	-0.02	0.12 *	0.10 *	0.12 *	0.13 *	0.25 *	0.06	0.11 *	0.01	0.00	-0.05	0.10 *	-0.06 *	0.58 *	0.38 *		
lag 1		0.10 *	0.18 *	0.15 *	0.22 *	0.07	0.23 *	0.25 *	0.19 *	0.24 *	0.20 *	0.09 *	0.17 *	0.02	0.04	-0.05	0.13 *	-0.05	0.15 *	0.29 *	0.07 *	
N. America	*Ret*	0.00	0.00	0.04	0.09 *	-0.05	0.04	-0.02	0.03	0.04	0.06	0.03	0.00	-0.07	0.02	-0.05	-0.05	-0.02	0.20 *	0.10 *	0.43 *	
lag 1		0.11 *	0.22 *	0.13 *	0.28 *	0.01	0.23 *	0.27 *	0.23 *	0.19 *	0.22 *	0.12 *	0.17 *	0.03	0.07	0.00	0.18 *	-0.06 *	0.43 *	0.43 *	0.40 *	0.01
Emerging	*Ret*	0.23 *	0.46 *	0.19 *	0.33 *	0.07	0.27 *	0.31 *	0.26 *	0.33 *	0.54 *	0.19 *	0.34 *	0.03	0.08 *	0.00	0.22 *	-0.03	0.50 *	0.49 *	0.41 *	0.08 *
lag 1		0.16 *	0.13 *	0.22 *	0.07 *	0.15 *	0.14 *	0.31 *	0.14 *	0.27 *	0.13 *	0.12 *	0.04	0.07	0.11 *	0.01	0.08 *	0.00	0.04	0.07 *	-0.06 *	0.03

Table IV
VAR: Flows with Regional Index Returns

This table presents estimation results from the structural bivariate VAR below. $r_{i,t}$ denotes the daily percentage continuously compounded market return for country i. $f_{i,t}$ denotes the daily net flow (buy value – sell value) originated by foreign investors scaled by previous day market capitalization for country i, the α's are constant intercept terms, b(L) denotes a polynomial in the lag operator L, $\varepsilon^{r}_{i,t}$ and $\varepsilon^{f}_{i,t}$ are zero mean disturbance terms that are assumed to be intertemporally uncorrelated. Scaled net flows are expressed in percentage terms. x_t is a vector of daily returns on regional market indices, which are considered to be exogenously determined. Five lags are used for all endogenous variables as well as exogenous variables but only the first two are reported. All variables are expressed in local currency and the system is estimated separately for each country as Seemingly Unrelated Regressions (SUR). Panel A presents the flow equation results for the basic VAR. Panel B displays similar results for a structural VAR with contemporaneous local market returns included in the flow equation. Wald tests of joint significance of lag 1 through 5 for each regressor are also reported. The equation for the VAR with the contemporaneous local market return included is as follows:

$$\begin{bmatrix} r_{i,t} \\ f_{i,t} \end{bmatrix} = \begin{bmatrix} \alpha_{i,r} \\ \alpha_{i,f} \end{bmatrix} + \begin{bmatrix} b_{11}(L) & b_{12}(L) \\ b_{21}(L) & b_{22}(L) \end{bmatrix} \begin{bmatrix} r_{i,t-1} \\ f_{i,t-1} \end{bmatrix} + \begin{bmatrix} 0 \\ b_c r_{i,t} \end{bmatrix} + A_i(L) x_{t-1} + \begin{bmatrix} \varepsilon^{r}_{i,t} \\ \varepsilon^{f}_{i,t} \end{bmatrix}$$

Panel A: Flow Equations, no contemporaneous local returns

		East Asia					South Asia		Others	
		Indo.	**Korea**	**Phil.**	**Taiwan**	**Thai.**	**India**	**Sri Lanka**	**Slovenia**	**S. Africa**
Intercept		-0.004	-0.007	0.009	-0.004	-0.015	0.008	-0.004	0.023	0.010
	(*p*-val)	(0.87)	(0.77)	(0.83)	(0.87)	(0.59)	(0.84)	(0.92)	(0.42)	(0.72)
Net Flows	***Lag 1***	0.212	0.384	0.354	0.301	0.318	0.134	0.125	0.370	0.155
	(*p*-val)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	Lag 2	0.115	0.028	0.013	0.150	0.057	0.132	0.110	0.057	0.140
	(*p*-val)	(0.00)	(0.36)	(0.81)	(0.00)	(0.17)	(0.00)	(0.01)	(0.15)	(0.00)
Returns	***Lag 1***	0.148	0.206	0.164	0.168	0.270	0.047	0.028	-0.104	-0.047
	(*p*-val)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.31)	(0.51)	(0.00)	(0.20)
	Lag 2	0.035	-0.097	-0.006	0.016	-0.036	-0.066	0.019	-0.052	-0.002
	(*p*-val)	(0.27)	(0.00)	(0.90)	(0.57)	(0.33)	(0.16)	(0.67)	(0.10)	(0.96)
Pacific	***Lag 1***	0.009	0.039	-0.040	0.009	-0.013	0.079	0.027	-0.009	0.004
	(*p*-val)	(0.78)	(0.15)	(0.47)	(0.79)	(0.70)	(0.12)	(0.60)	(0.81)	(0.92)
	Lag 2	0.022	0.048	-0.064	0.005	-0.021	0.024	0.017	0.033	0.044
	(*p*-val)	(0.49)	(0.08)	(0.25)	(0.87)	(0.53)	(0.63)	(0.74)	(0.35)	(0.19)
Europe	***Lag 1***	0.029	0.073	0.067	0.059	0.122	0.005	-0.023	-0.039	0.001
	(*p*-val)	(0.40)	(0.01)	(0.26)	(0.09)	(0.00)	(0.92)	(0.67)	(0.31)	(0.99)
	Lag 2	0.014	-0.028	0.070	-0.045	-0.011	-0.026	-0.010	-0.053	-0.024
	(*p*-val)	(0.68)	(0.35)	(0.27)	(0.21)	(0.76)	(0.65)	(0.86)	(0.18)	(0.54)
North	***Lag 1***	0.095	0.148	0.033	0.247	0.123	0.095	0.020	0.031	-0.062
America	(*p*-val)	(0.00)	(0.00)	(0.51)	(0.00)	(0.00)	(0.05)	(0.67)	(0.34)	(0.04)
	Lag 2	-0.024	-0.076	-0.045	0.034	-0.052	0.028	-0.077	0.009	0.035
	(*p*-val)	(0.48)	(0.01)	(0.46)	(0.33)	(0.14)	(0.62)	(0.16)	(0.82)	(0.32)

All	***Lag 1***	0.014	0.045	0.061	0.092	-0.013	-0.020	0.071	0.038	0.029
Emerging	(*p*-val)	(0.69)	(0.12)	(0.26)	(0.01)	(0.73)	(0.71)	(0.17)	(0.31)	(0.41)
	Lag 2	-0.022	0.013	0.048	0.027	0.005	-0.021	-0.017	0.027	-0.016
	(*p*-val)	(0.54)	(0.66)	(0.38)	(0.42)	(0.90)	(0.70)	(0.75)	(0.48)	(0.66)
Adj. R^2		0.170	0.391	0.216	0.394	0.427	0.100	0.050	0.399	0.119

Panel B: Flow Equations with contemporaneous local returns

		East Asia					**South Asia**		**Others**	
		Indo.	**Korea**	**Phil.**	**Taiwan**	**Thai.**	**India**	**Sri Lanka**	**Slovenia**	**S. Africa**
Intercept		0.010	-0.004	0.038	-0.002	-0.007	0.002	-0.003	0.023	0.011
	(*p*-val)	(0.67)	(0.87)	(0.36)	(0.94)	(0.77)	(0.97)	(0.94)	(0.42)	(0.69)
Net	***Lag 1***	0.207	0.368	0.345	0.274	0.263	0.107	0.130	0.369	0.155
Flows	(*p*-val)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.02)	(0.00)	(0.00)	(0.00)
	Lag 2	0.100	0.011	0.038	0.149	0.053	0.131	0.112	0.058	0.140
	(*p*-val)	(0.00)	(0.71)	(0.48)	(0.00)	(0.15)	(0.00)	(0.01)	(0.15)	(0.00)
Returns	***Lag 0***	0.339	0.158	0.331	0.151	0.330	0.164	0.085	-0.007	-0.052
	(*p*-val)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.05)	(0.82)	(0.08)
	Lag 1	0.112	0.200	0.148	0.175	0.269	0.046	0.007	-0.103	-0.038
	(*p*-val)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.31)	(0.88)	(0.00)	(0.30)
	Lag 2	0.043	-0.079	0.019	0.017	-0.012	-0.060	0.016	-0.051	0.001
	(*p*-val)	(0.15)	(0.00)	(0.69)	(0.55)	(0.73)	(0.19)	(0.71)	(0.11)	(0.97)
Pacific	***Lag 1***	0.014	0.037	-0.030	-0.002	0.006	0.077	0.029	-0.008	-0.004
	(*p*-val)	(0.63)	(0.17)	(0.56)	(0.96)	(0.84)	(0.13)	(0.56)	(0.81)	(0.91)
	Lag 2	0.019	0.047	-0.089	0.004	-0.015	0.027	0.018	0.033	0.043
	(*p*-val)	(0.53)	(0.08)	(0.09)	(0.90)	(0.64)	(0.59)	(0.73)	(0.35)	(0.20)
Europe	***Lag 1***	-0.009	0.054	0.023	0.050	0.097	-0.003	-0.020	-0.039	-0.006
	(*p*-val)	(0.78)	(0.07)	(0.69)	(0.15)	(0.00)	(0.95)	(0.71)	(0.31)	(0.88)
	Lag 2	-0.007	-0.033	0.089	-0.028	-0.028	-0.028	-0.016	-0.052	-0.024
	(*p*-val)	(0.83)	(0.27)	(0.13)	(0.43)	(0.40)	(0.61)	(0.78)	(0.19)	(0.53)
North	***Lag 1***	0.035	0.115	-0.038	0.217	0.057	0.073	0.013	0.032	-0.039
America	(*p*-val)	(0.21)	(0.00)	(0.44)	(0.00)	(0.05)	(0.12)	(0.79)	(0.33)	(0.24)
	Lag 2	0.010	-0.061	-0.077	0.038	-0.059	0.027	-0.082	0.008	0.035
	(*p*-val)	(0.76)	(0.04)	(0.18)	(0.27)	(0.07)	(0.62)	(0.13)	(0.83)	(0.32)
All	***Lag 1***	-0.003	0.045	0.063	0.081	-0.021	-0.012	0.063	0.038	0.030
Emerging	(*p*-val)	(0.92)	(0.12)	(0.21)	(0.01)	(0.55)	(0.82)	(0.23)	(0.31)	(0.39)
	Lag 2	-0.003	0.021	0.059	0.024	0.004	-0.031	-0.018	0.027	-0.015
	(*p*-val)	(0.93)	(0.46)	(0.25)	(0.47)	(0.91)	(0.56)	(0.73)	(0.47)	(0.67)
Adj. R^2		0.275	0.413	0.311	0.414	0.524	0.124	0.055	0.398	0.120
P-values for Joint Significance Test (Lag 1 – 5):										
Own Ret		0.000	0.000	0.038	0.000	0.000	0.318	0.663	0.000	0.270
Pacific		0.777	0.010	0.881	0.738	0.598	0.204	0.833	0.456	0.460
Europe		0.755	0.054	0.311	0.077	0.006	0.779	1.000	0.198	0.532
N. America		0.001	0.000	0.704	0.000	0.000	0.382	0.849	0.286	0.121
All Emerging		0.231	0.321	0.758	0.054	0.325	0.568	0.859	0.567	0.364

Table V
VAR: Flows with Regional Index Returns and FX Rates

This table presents estimation results from the structural bivariate VAR below. $r_{i,t}$ denotes the daily percentage continuously compounded market return for country i. $f_{i,t}$ denotes the daily net flow (buy value – sell value) originated by foreign investors scaled by previous day market capitalization for country i, the α's are constant intercept terms, b(L) denotes a polynomial in the lag operator L, $\varepsilon^{r}_{i,t}$ and $\varepsilon^{f}_{i,t}$ are zero mean disturbance terms that are assumed to be intertemporally uncorrelated Scaled net flows are expressed in percentage terms. x_t is a vector of daily returns on regional market indices, which are considered to be exogenously determined. FXt is the percentage change in the local currency exchange rate with the US dollar. Contemporaneous local market returns are included in the flow equation. All variables are expressed in local currency and the system is estimated separately for each country as Seemingly Unrelated Regressions (SUR). Five lags are used for all endogenous variables as well as exogenous variables but only the first two are reported. The table presents results for the flow equations only. Wald tests of joint significance of lag 1 through 5 for each regressor are also reported. The structural VAR

$$\begin{bmatrix} r_{i,t} \\ f_{i,t} \end{bmatrix} = \begin{bmatrix} \alpha_{i,r} \\ \alpha_{i,f} \end{bmatrix} + \begin{bmatrix} b_{11}(L) & b_{12}(L) \\ b_{21}(L) & b_{22}(L) \end{bmatrix} \begin{bmatrix} r_{i,t-1} \\ f_{i,t-1} \end{bmatrix} + \begin{bmatrix} 0 \\ b_{c} r_{i,t} \end{bmatrix} + A_i(L) x_{t-1} + \begin{bmatrix} c_1(L) FX_{t-1} \\ c_2(L) FX_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon^{r} i,t \\ \varepsilon^{f} i,t \end{bmatrix}$$

equation is as follows:

		East Asia					South Asia		Others	
		Indo.	**Korea**	**Phil.**	**Taiwan**	**Thai.**	**India**	**Sri Lanka**	**Slovenia**	**S. Africa**
Intercept		-0.006	-0.009	0.035	-0.001	-0.008	0.001	-0.008	0.027	0.012
	(*p*-val)	(0.82)	(0.67)	(0.40)	(0.98)	(0.75)	(0.99)	(0.84)	(0.34)	(0.65)
Net Flows	***Lag 1***	0.220	0.361	0.345	0.266	0.261	0.117	0.127	0.401	0.156
	(*p*-val)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
	Lag 2	0.089	0.007	0.049	0.150	0.054	0.124	0.125	0.072	0.140
	(*p*-val)	(0.00)	(0.82)	(0.36)	(0.00)	(0.14)	(0.01)	(0.00)	(0.09)	(0.00)
Returns	***Lag 0***	0.338	0.151	0.390	0.146	0.328	0.159	0.087	0.002	-0.051
	(*p*-val)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.05)	(0.94)	(0.09)
	Lag 1	0.109	0.197	0.186	0.168	0.269	0.058	0.005	-0.084	-0.032
	(*p*-val)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.21)	(0.90)	(0.01)	(0.40)
	Lag 2	0.044	-0.074	-0.008	0.018	-0.013	-0.067	0.018	-0.084	0.001
	(*p*-val)	(0.14)	(0.00)	(0.88)	(0.52)	(0.71)	(0.15)	(0.69)	(0.01)	(0.98)
Pacific	***Lag 1***	0.015	0.039	-0.040	-0.007	0.008	0.073	0.031	-0.017	-0.005
	(*p*-val)	(0.62)	(0.15)	(0.44)	(0.83)	(0.81)	(0.15)	(0.54)	(0.63)	(0.88)
	Lag 2	0.020	0.052	-0.079	0.005	-0.014	0.029	0.020	0.027	0.043
	(*p*-val)	(0.50)	(0.06)	(0.13)	(0.87)	(0.65)	(0.56)	(0.69)	(0.43)	(0.19)
Europe	***Lag 1***	-0.015	0.053	0.004	0.054	0.100	-0.002	-0.020	-0.012	-0.003
	(*p*-val)	(0.65)	(0.07)	(0.94)	(0.12)	(0.00)	(0.97)	(0.72)	(0.75)	(0.93)
	Lag 2	-0.009	-0.036	0.087	-0.025	-0.030	-0.029	-0.017	-0.051	-0.027
	(*p*-val)	(0.78)	(0.23)	(0.14)	(0.48)	(0.38)	(0.61)	(0.76)	(0.20)	(0.50)
North America	***Lag 1***	0.038	0.120	-0.051	0.220	0.058	0.078	0.014	0.018	-0.038
	(*p*-val)	(0.18)	(0.00)	(0.29)	(0.00)	(0.04)	(0.10)	(0.77)	(0.58)	(0.25)
	Lag 2	0.006	-0.059	-0.060	0.035	-0.058	0.026	-0.085	0.021	0.034
	(*p*-val)	(0.85)	(0.04)	(0.29)	(0.31)	(0.07)	(0.64)	(0.12)	(0.58)	(0.33)

All	***Lag 1***	0.014	0.052	0.072	0.077	-0.011	-0.012	0.060	-0.003	0.030
Emerging	(*p*-val)	(0.67)	(0.07)	(0.15)	(0.02)	(0.76)	(0.82)	(0.25)	(0.94)	(0.40)
	Lag 2	-0.001	0.029	0.058	0.033	0.014	-0.031	-0.019	0.022	-0.016
	(*p*-val)	(0.98)	(0.31)	(0.26)	(0.32)	(0.71)	(0.56)	(0.71)	(0.55)	(0.66)
FX (US$)	***Lag 1***	0.084	0.026	0.153	-0.052	0.011	0.070	0.055	0.018	0.030
	(*p*-val)	(0.00)	(0.27)	(0.00)	(0.06)	(0.69)	(0.11)	(0.19)	(0.55)	(0.27)
	Lag 2	-0.023	0.054	0.027	0.020	0.019	-0.048	0.021	0.006	-0.013
	(*p*-val)	(0.37)	(0.02)	(0.58)	(0.48)	(0.48)	(0.27)	(0.62)	(0.85)	(0.65)
Adj. R^2		0.282	0.415	0.323	0.414	0.525	0.124	0.051	0.467	0.119
P-values for Joint Significance Test (Lag 1 – 5):										
Foreign Flows		0.288	0.186	0.217	0.037		0.078	0.073	0.284	0.330
Own Ret		0.000	0.000	0.000	0.000		0.093	0.097	0.005	0.001
Pacific		0.925	0.027	0.983	0.807		0.352	0.860	0.589	0.113
Europe		0.781	0.077	0.128	0.005		0.008	0.048	0.030	0.038
N. Amer		0.001	0.000	0.000	0.000		0.000	0.000	0.000	0.002
All Emerging		0.797	0.675	0.036	0.316		0.034	0.756	0.263	0.558
FX Rate (US$)		0.009	0.024	0.195	0.141		0.400	0.007	0.055	0.972

Table VI

VAR: Flows with Regional Index Returns, FX Rates and Foreign Flows

This table presents parameter estimates, standard errors and adjusted R^2s from the structural VAR below. $r_{i,t}$ denotes the daily percentage continuously compounded market return for country i. $f_{i,t}$ denotes the daily net flow (buy value – sell value) originated by foreign investors scaled by previous day market capitalization for country i. $f_{i,t}$ is a vector of scaled net flows in all countries other than country i, the α's are constant intercept terms, b(L) denotes a polynomial in the lag operator L, $\varepsilon^r_{i,t}$ and $\varepsilon^f_{i,t}$ are zero mean disturbance terms that are assumed to be intertemporally uncorrelated. Scaled net flows are expressed in percentage terms. x_t is a vector of daily returns on regional market indices, which are considered to be exogenously determined. Contemporaneous market returns are included. FX_t is the percentage change in the local currency exchange rate with the US dollar. FF_t is the aggregate net flow to all countries other than country i: this aggregate is computed as sum of standardized net flows in other countries. All

$$\begin{bmatrix} r_{i,t} \\ f_{i,t} \end{bmatrix} = \begin{bmatrix} \alpha_{i,r} \\ \alpha_{i,f} \end{bmatrix} + \begin{bmatrix} b_{11}(L) & b_{12}(L) \\ b_{21}(L) & b_{22}(L) \end{bmatrix} \begin{bmatrix} r_{i,t-1} \\ f_{i,t-1} \end{bmatrix} + \begin{bmatrix} 0 \\ b_c r_{i,t} \end{bmatrix} + A_i(L) x_{t-1} + \begin{bmatrix} c_{i,1}(L) FX_{t-1} \\ c_{i,2}(L) FX_{t-1} \end{bmatrix} + \begin{bmatrix} d_{i,1}(L) FF_{t-1} \\ d_{i,2}(L) FF_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon^r i,t \\ \varepsilon^f i,t \end{bmatrix}$$

variables are expressed in local currency and the system is estimated separately for each country as Seemingly Unrelated Regressions (SUR).Five lags are used for all endogenous variables as well as exogenous variables but only two are reported. The table presents results for the East Asian countries only. Wald tests of joint significance of lag 1 through 5 for each regressor are also reported. The equation for the structural VAR is as follows:

		Flow Equations				**Return Equations**			
		Indo.	**Korea**	**Taiwan**	**Thai.**	**Indo.**	**Korea**	**Taiwan**	**Thai.**
Intercept		0.007	-0.015	0.016	-0.032	-0.160	-0.053	0.054	-0.078
	(*p*-val)	(0.81)	(0.55)	(0.60)	(0.32)	(0.00)	(0.07)	(0.15)	(0.08)
Net	***Lag 1***	0.234	0.358	0.322	0.263	0.076	0.074	0.006	0.123
Flows	(*p*-val)	(0.00)	(0.00)	(0.00)	(0.00)	(0.02)	(0.03)	(0.88)	(0.02)
	Lag 2	0.081	0.004	0.165	0.034	0.019	0.108	-0.045	0.005
	(*p*-val)	(0.01)	(0.91)	(0.00)	(0.37)	(0.55)	(0.00)	(0.32)	(0.92)
Returns	***Lag 0***	0.284	0.109	-0.012	0.307				
	(*p*-val)	(0.00)	(0.00)	(0.66)	(0.00)				
	Lag 1	0.084	0.179	0.005	0.293	-0.018	0.062	0.050	0.009
	(*p*-val)	(0.03)	(0.00)	(0.84)	(0.00)	(0.67)	(0.04)	(0.13)	(0.86)
	Lag 2	0.088	-0.065	-0.016	-0.035	-0.039	-0.127	0.051	-0.068
	(*p*-val)	(0.02)	(0.02)	(0.55)	(0.36)	(0.36)	(0.00)	(0.13)	(0.20)
Pacific	***Lag 1***	0.019	0.048	0.014	-0.008	0.041	0.090	0.003	0.026
	(*p*-val)	(0.50)	(0.06)	(0.66)	(0.80)	(0.20)	(0.00)	(0.94)	(0.54)
	Lag 2	0.029	0.031	-0.031	0.011	-0.011	0.009	-0.001	-0.041
	(*p*-val)	(0.32)	(0.24)	(0.33)	(0.71)	(0.74)	(0.78)	(0.98)	(0.33)
Europe	***Lag 1***	0.007	0.065	0.052	0.085	0.070	0.147	0.050	0.105
	(*p*-val)	(0.83)	(0.02)	(0.12)	(0.01)	(0.04)	(0.00)	(0.24)	(0.01)
	Lag 2	0.028	-0.031	-0.033	-0.025	0.060	0.045	0.007	0.025
	(*p*-val)	(0.37)	(0.26)	(0.32)	(0.44)	(0.08)	(0.17)	(0.88)	(0.57)
North	***Lag 1***	0.050	0.137	0.263	0.082	0.138	0.172	-0.046	0.168
America	(*p*-val)	(0.07)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.21)	(0.00)
	Lag 2	-0.013	-0.056	0.053	-0.041	-0.083	-0.116	-0.022	-0.004
	(*p*-val)	(0.67)	(0.04)	(0.12)	(0.18)	(0.01)	(0.00)	(0.61)	(0.93)

All	***Lag 1***	0.174	0.040	-0.075	0.094	-0.064	0.040	-0.026	-0.047
Emerging	(*p*-val)	(0.00)	(0.11)	(0.01)	(0.00)	(0.08)	(0.18)	(0.48)	(0.25)
	Lag 2	0.031	0.050	0.023	0.038	-0.091	0.022	0.023	-0.030
	(*p*-val)	(0.35)	(0.05)	(0.43)	(0.20)	(0.01)	(0.47)	(0.55)	(0.47)
FX (US$)	***Lag 1***	0.030	0.047	0.114	-0.022	0.099	-0.009	-0.003	0.011
	(*p*-val)	(0.40)	(0.11)	(0.00)	(0.56)	(0.01)	(0.80)	(0.94)	(0.84)
	Lag 2	-0.027	0.039	0.080	0.020	-0.014	-0.055	0.063	0.006
	(*p*-val)	(0.46)	(0.19)	(0.02)	(0.60)	(0.71)	(0.11)	(0.15)	(0.91)
Foreign	***Lag 1***	0.138	0.799	-0.235	0.415	-0.585	0.775	0.086	0.141
Flows	(*p*-val)	(0.67)	(0.02)	(0.40)	(0.18)	(0.10)	(0.06)	(0.81)	(0.74)
	Lag 2	0.220	-0.300	-0.514	0.738	-0.061	-0.045	0.281	-0.162
	(*p*-val)	(0.51)	(0.39)	(0.08)	(0.02)	(0.87)	(0.91)	(0.44)	(0.71)
Adj. R^2		0.249	0.405	0.377	0.523	0.103	0.183	-0.004	0.091
P-values for Joint Significance Test (Lag 1 – 5):									
Own Ret.		0.000	0.000	0.000	0.000	0.093	0.097	0.005	0.001
Pacific		0.925	0.027	0.983	0.807	0.352	0.860	0.589	0.113
Europe		0.781	0.077	0.128	0.005	0.008	0.048	0.030	0.038
N. America		0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.002
All Emerging		0.797	0.675	0.036	0.316	0.034	0.756	0.263	0.558
FX Rate (US$)		0.009	0.024	0.195	0.141	0.400	0.007	0.055	0.972
Foreign Flows		0.288	0.186	0.217	0.037	0.078	0.073	0.284	0.330

Figure 1
Model Comparative Statics

The base case is the symmetric case where the return volatility of each stock is 30%, wealth is 10 in each country, the price of each stock is 1, each stock has 10 shares, and δ^D and δ^F are equal to 3%.

Figure 1A

This Figure shows the net equity flow corresponding to a doubling of the foreign stock price without extrapolative expectations. The net expected return of domestic investors exceeds the net expected return of foreign investors by δ for the foreign stock. The net expected return of foreign investors exceeds the net expected return of domestic investors by δ for the domestic stock.

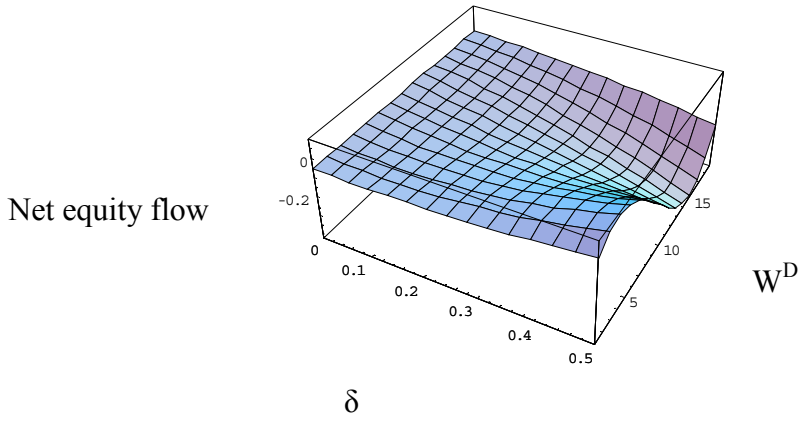

Figure 1B

This Figure differs from Figure 1A in that it takes into account extrapolative expectations. The net expected return of domestic investors exceeds the net expected return of foreign investors by $\delta - 0.1 \times \Delta P_F/P_F$ for the foreign stock. The net expected return of foreign investors exceeds the net expected return of domestic investors by $\delta - 0.1 \times \Delta P_D/P_D$ for the domestic stock.

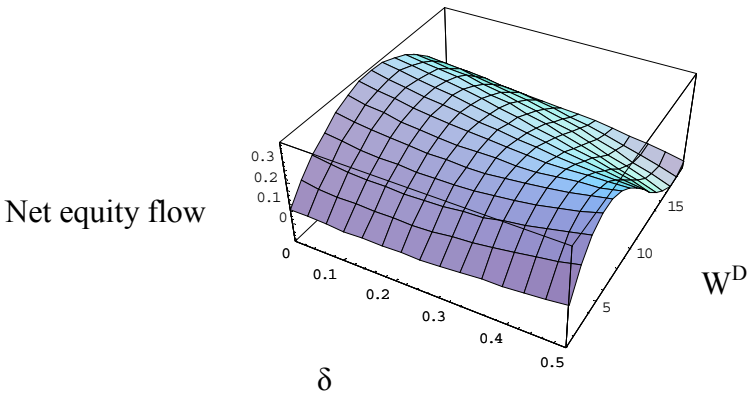

Figure 1C
This Figure shows the change in the equilibrium expected return of the foreign stock when domestic investors have extrapolative expectations and the price of the stock doubles. The net expected return of domestic investors exceeds the net expected return of foreign investors by $\delta - 0.1 \times \Delta P_F/P_F$ for the foreign stock. The net expected return of foreign investors exceeds the net expected return of domestic investors by $\delta - 0.1 \times \Delta P_D/P_D$ for the domestic stock.

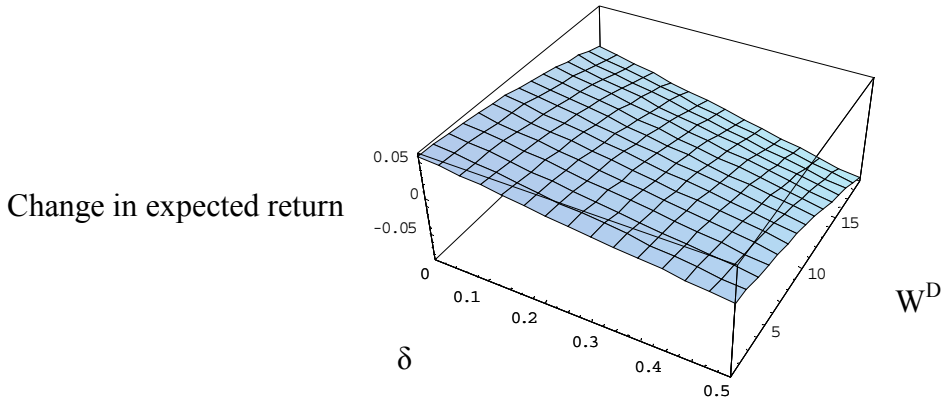

Figure 1D
This Figure shows the net equity flow corresponding to a doubling of the domestic stock price with extrapolative expectations. The net expected return of domestic investors exceeds the net expected return of foreign investors by $\delta - 0.1 \times \Delta P_F/P_F$ for the foreign stock. The net expected return of foreign investors exceeds the net expected return of domestic investors by $\delta - 0.1 \times \Delta P_D/P_D$ for the domestic stock.

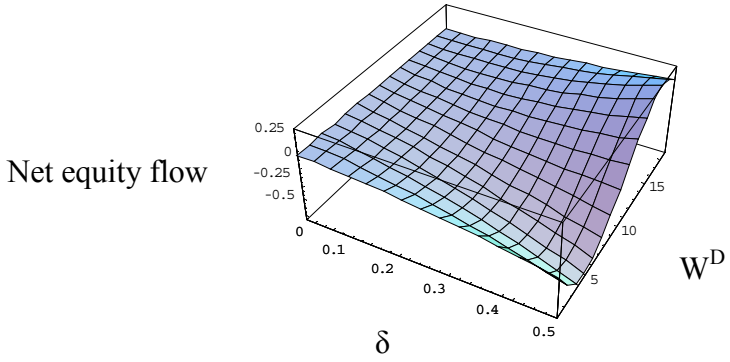

Figure 2
Market Index and Cumulative Standardized Net Flows by country

The plots show accumulated daily net foreign capital flows on right axis, darker line and stock market index levels on the left axis, lighter or dotted line for nine countries. Net capital flows are computed as aggregate (buy value – sell value) expressed in percentage of the previous day market cap. Flows and market indices are denominated in local currency.

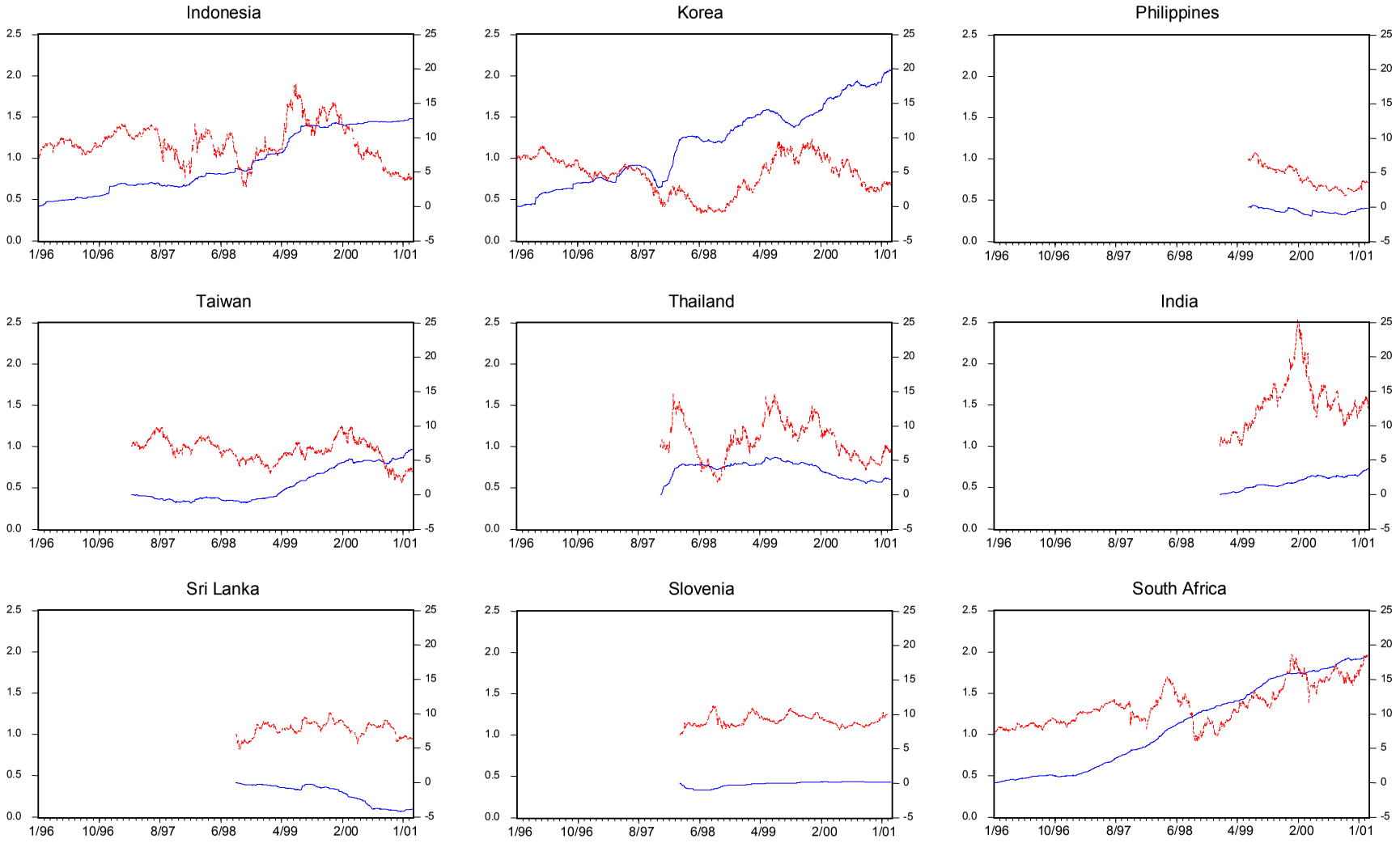

Figure 3
Standardized Net Flows and Market Returns by country

The plots show daily net foreign capital flows on the left axis, lower series and stock market returns on the right axis, upper series for nine countries. Net capital flows are computed as aggregate (buy value – sell value) expressed in percentage of the previous day market cap. Market returns are computed as the continuously compounded change in the Total Market Index. Flows and returns are denominated in local currency.

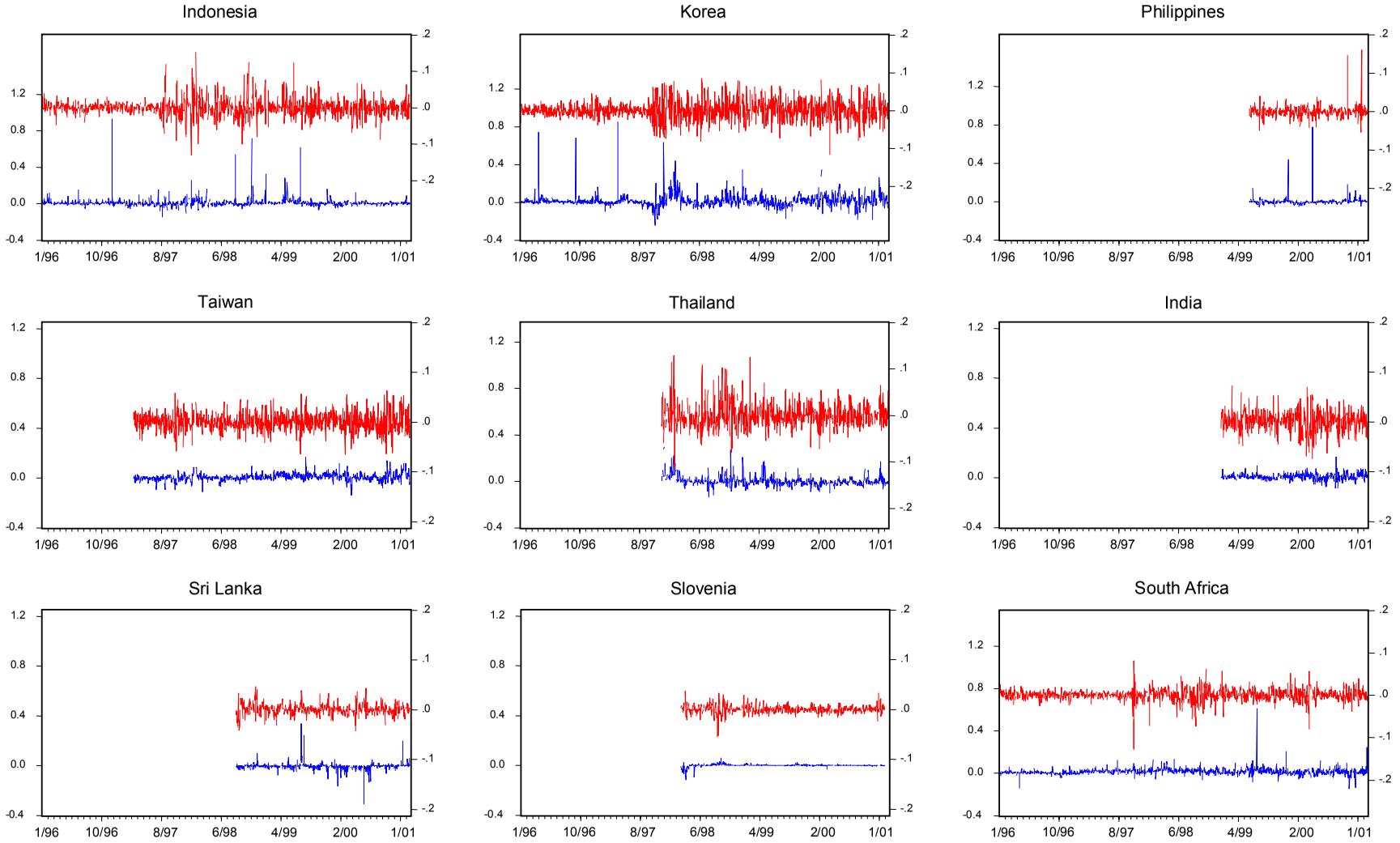

Figure 4
Responses of Flows to Local and North American Returns

This table shows Impulse Response functions describing the response of scaled net flows to a one standard deviation shock in local market returns and in North America index returns. Responses are, also, expressed in standard deviation units. The time scale on the horizontal axis is expressed in days. Results are based on the vector auto regression (VAR) specified in Panel A of Table IV. The VAR is estimated separately for each country with five lags for each endogenous variable and for each exogenous variable. All returns are expressed in local currency. Shocks are orthogonalized through a Cholesky factorization in order to account for contemporaneous correlations across equations. For each impulse response functions we also report the 95% confidence intervals (dotted lines), which are computed by Monte Carlo simulation.