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STRUCTURAL BREAKS IN EMERGING MARKET CAPITAL FLOWS

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ABSTRACT

We study the interrelationship between capital flows, returns, dividend yields and world interest rates in 20 emerging markets. We use a vector autoregression on these variables to measure the degree to which lower interest rates contribute to increased capital flows and the degree to which shocks in flows impact the cost of capital among other dynamic relations. We precede the VAR analysis by a detailed examination of endogenous break points in capital flows and the other variables. These structural breaks are traced to the liberalization of emerging equity markets which would invalidate the VAR results over the full sample. We also attempt to characterize the transition dynamics of capital flows, returns and dividend yields in various countries across the break points.

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1. Introduction

With a number of recent crises in emerging markets, the role of foreign capital in developing countries is under intense scrutiny once again. One country, Malaysia, imposed capital controls on October 1, 1998, in an effort to thwart the perceived destabilizing actions of foreign speculators. After a decade of capital market liberalizations and increased portfolio flows into developing countries, this process may now be stalled or even reversed. The goal of this paper is to explore the dynamics, causes and consequences of capital flows in 20 emerging markets over the last 20 years. Importantly, we explicitly investigate the role of the recent financial liberalization process in these dynamics.

Our work is related to two literatures. First, there is a growing body of research that studies the joint dynamics of capital flows and equity returns [see for example, Warther (1995), Choe, Kho and Stulz (1998), Froot, O'Connell and Seasholes (1998), Clark and Berko (1997), Edelen and Warner (1999) and Stulz (1999)]. The first hypothesis of interest is whether foreign investors are "return chasers," in the terms of Bohn and Tesar (1996), that is, are flows caused by changes in expected returns? A related hypothesis is that international investors are momentum investors, leading to a positive relation between past returns and flows. The second set of hypotheses focuses on the effect of flows on returns. Both Froot et al. (focusing on 28 emerging markets) and Clark and Berko (focusing on Mexico) find that increases in capital flows raise stock market prices, but the studies disagree on whether the effect is temporary or permanent. If the increase in prices is temporary, it may be just a reflection of "price pressure," which has also been documented for mutual fund flows and stock indices [Warther (1995) and Shleifer (1986)]. If the price increase is permanent, it may reflect a long-lasting decrease in the cost of equity capital associated with the risk sharing benefits of capital market openings in emerging markets.

Our work is also related to a second literature on capital market liberalizations and the integration process in emerging markets [see Bartolini and Drazen (1997), Bekaert and Harvey (1995, 1998a,b), Henry (1999a,b) and Kim and Singal (1999)]. During the sample period, many emerging markets removed capital controls, which often went hand in hand with other reforms in the domestic financial system, trade liberalization, macro-economic stabilization programs (especially in Latin-America) and large scale privatizations [see Bekaert and Harvey (1998b) for detailed time lines on important structural changes in emerging countries]. These structural changes complicate any empirical analysis of emerging markets during this period, since they could cause permanent or at least long-lasting

changes in the data- generating processes. In Bekaert, Harvey and Lumsdaine (1998), we use the structural break methodology of Bai, Lumsdaine, and Stock (hereafter BLS) (1998) to "date" when market integration occurred and document structural changes in a number of financial and economic time-series.[1]

The main tool of analysis in this paper is a vector-autoregressive (VAR) framework as in Froot et al. (1998), but with a number of differences. First, we add two variables to the bivariate set-up of returns and equity flows in Froot et al.: the world interest rate and dividend yields. The low level of U.S. interest rates has often been cited as one of the major reasons for increased capital flows to emerging markets in 1993 [see World Bank (1997) as well as Calvo, Leiderman and Reinhart (1993, 1994) and Fernandez-Arias, (1996)] and our framework will allow us to trace out the effects of an unexpected reduction in world interest rates on capital flows to emerging markets. We are ultimately interested in the effects of structural reforms in emerging markets on local returns and particularly, on the local cost of capital. The inclusion of the world interest rate helps in that endeavor in that it removes the effect of exogenous global determinants of capital flows. We add dividend yields to the VAR as our cost of capital measure, since they capture potential permanent price effects induced by increased foreign capital after liberalizations better than average returns [see Bekaert and Harvey (1998a)].

Second, we precede our VAR analysis with a detailed endogenous break point analysis of our three main time series (net equity flows as a proportion of local market capitalization, log returns and the log dividend yield) using the novel techniques in BLS (1998) and Bai and Perron (1998a,b). This analysis helps pin down a relevant time-period over which to conduct the VAR analysis but is also interesting in its own right. For example, we study the transition dynamics of some of our variables around the break points. Such analysis is particularly important given that recent events in South-East Asia indicate that the integration process may now be halted and reversed. Studying capital flow dynamics and their impact on the local market may therefore yield predictions for the likely effects of the recent re-imposition of capital controls in some countries. Also, if capital market liberalizations induce one-time portfolio rebalancing on the part of global investors, one may expect net flows to increase substantially after a liberalization and then to decrease again [see Bachetta and van Wincoop (1998) for a formal model generating such dynamics]. The Bai-Perron statistics look for multiple breaks in a time series and may uncover such

[1] Kawakatsu and Morey (1998) also use endogenous break point techniques to date stock market openings and examine stock market efficiency before and after the opening.

dynamics. We also test this prediction directly.

Third, although equity flows are our main focus, we also investigate how they relate to bond flows. For example, increased equity flows may substitute for decreased bond flows or both may increase simultaneously as a result of a general financial liberalization package.

We find that equity capital flows increase after liberalization but level out three years after their liberalization. This provides evidence that foreign investors rebalance their portfolios towards the newly available emerging market assets. Our analysis of the transition dynamics suggests that the movement of equity capital is much faster when it leaves than when it enters. In general, we find sharply different results if our models are estimated over the entire sample – which ignores a fundamental nonstationarity in the data – versus a post-break (liberalization) sample. One of our main findings is that unexpected equity flows are indeed associated with strong short-lived increases in returns. However, we also find that they lead to permanent reductions in dividend yields, suggesting that additional flows reduce the cost of capital and that the actual return effect is not a pure price pressure effect.

The paper is organized as follows. The second section presents the vector autoregressive empirical model that we use to interpret the relation between expected returns, dividend yields and capital flows. The third section explores the methods that we use to establish structural breaks in the time-series of interest. The fourth section describes the data. The results are presented in the fifth and sixth sections. The final section offers some concluding remarks.

2. The econometric framework

2.1 The basic VAR flows model

2.1.1 Variables and hypotheses

Both our analyses of breaks in the data and our empirical hypotheses tests are mostly conducted in the context of vector autoregressions (VARs). The reason for using the VAR framework is that there is currently no well-accepted model of transition dynamics. Whereas in the break analysis these VARs are reduced-form representations of an unspecified structural model, some of the empirical hypotheses we want to test require a structural interpretation of the VARs. In our primary empirical system, we generalize the set-up of Froot et al. (1998), who run a bivariate VAR on the ratio of net capital flows to

market capitalization and market returns. Their main identifying structural restriction is that the shock to flows may affect returns but not vice versa. In addition, past returns only affect current returns through their effects on flows. Two interesting hypotheses can be tested in this framework:

1. *What is the effect of an unexpected shock to capital flows on current returns and what are its dynamics (that is, does it die out or is it permanent)?* The dynamic effects of the shock serve to distinguish the price pressure hypothesis from the permanent change in the cost of capital hypothesis.

2. *Do past returns affect current capital flows?* In particular, Bohn and Tesar (1996) argue that capital flows are motivated by capital "chasing" high expected returns - rather than portfolio rebalancing motives. One issue here is that high past returns need not signal high future returns, unless momentum is an important determinant of expected return (see Bohn and Tesar 1997). In our framework, we will be able to distinguish the expected return-updating hypothesis from the momentum hypothesis.

In contrast to previous work, our primary VAR will contain four variables. Let $\mathbf{Y}_t = [i_t, nf_t, dy_t, r_t]'$, where i_t is the world interest rate, nf_t is the net equity capital flow divided by market capitalization, dy_t is the log-dividend yield and r_t is the logged equity return.

The presence of the world interest rate allows a more subtle testing of the hypotheses in (1). It has often been argued that the emerging markets received a lot of U.S. capital in 1993 because investors were chasing higher yielding assets with interest rates in the U.S. reaching historical lows. It should be mentioned that there may be good reasons for an inverse link between U.S. interest rates and capital flows to emerging markets. For example, the low U.S. interest rates may have increased the Americans' wealth and therefore increased their risk tolerance, leading them to rebalance towards riskier emerging market securities. Whatever the reason, our framework will allow a direct test of the magnitude and dynamics of a decrease in the world interest rate on capital flows to emerging markets.

With the world interest rate in the system, we can now divide the effect of higher capital flows on returns into two components. Capital flow increases induced by lower world interest rates may, for example, be less likely to lead to permanent price increases than capital flow increases that are not caused by world factors, but also may reflect portfolio rebalancing after a capital market liberalization.

The addition of the log-dividend yield is motivated by the work of Bekaert and Harvey (1998a). They argue that the extreme volatility in emerging market returns implies that changes in the cost of capital can be better assessed by investigating changes in dividend yields. In particular, they document that liberalizations tend to lead to small drops in

dividend yields, and hence the cost of capital, as would be expected. One problem is that a lower dividend yield may also reflect an improvement in growth opportunities. Nevertheless, our set-up will allow us to test the effect of a change in the world interest rate, and/or capital flows on the dividend yield in emerging markets and contrast that with the effect on returns. In addition, given that the dividend yield is a good proxy for expected returns, which is also borne out in the predictability tests for emerging markets by Harvey (1995), its inclusion allows for a proper test of the Bohn-Tesar hypotheses mentioned above.

2.1.2 VAR analysis

We will document the information in the VARs regarding the dynamic relations between our four variables using three different statistics.

Dynamic regression coefficients

First, we investigate dynamic regression coefficients between the various variables, for example, what is the correlation between world interest rates today and capital flows or returns in the future? Formally, we investigate:

$$\beta_{i,j,k} = \frac{\text{Cov}[\mathbf{e}_i' \mathbf{Y}_{t+k}, \mathbf{e}_j' \mathbf{Y}_t]}{\text{Var}[\mathbf{e}_j' \mathbf{Y}_t]}. \tag{1}$$

where $\mathbf{e}_i$ are indicator vectors, e.g. $\mathbf{e}_1 = [1, 0, 0, 0]$. To compute these coefficients, consider, for simplicity, a first-order VAR, suppressing the constant:

$$\mathbf{Y}_t = \mathbf{A}\mathbf{Y}_{t-1} + \boldsymbol{\epsilon}_t \tag{2}$$

with all eigenvalues of $\mathbf{A}$ having moduli less than one so that the VAR is stationary. Hence, $\text{Var}[\mathbf{Y}_t] = \mathbf{C}(0)$ can be computed as

$$Vec[\mathbf{C}(0)] = [\mathbf{I} - \mathbf{A} \otimes \mathbf{A}]^{-1} vec(\boldsymbol{\Sigma}) \tag{3}$$

where $\boldsymbol{\Sigma} = E[\boldsymbol{\epsilon}_t \boldsymbol{\epsilon}_t']$ and $\mathbf{I}$ is the identity matrix. The VAR fully summarizes the short-run and long-run dynamics of $\mathbf{Y}_t$; e.g.

$$E[\mathbf{Y}_t \mathbf{Y}_{t-k}] = \mathbf{C}(k) = \mathbf{A}^k \mathbf{C}(0). \tag{4}$$

With this information, projection coefficients at all horizons can be computed.

In addition to looking at the VAR variables themselves we also introduce two other variables. First, we define $r_{t+k,k} = \frac{1}{k}\sum_{i=0}^{k-1} r_{t+1+i}$ as the per period cumulative long-horizon return. Next, consider the definition of net capital flows to capitalization:

$$nf_t = \frac{f_t}{mcap_t}$$

where f_t is the net capital flow and $mcap_t$ is the equity market capitalization. The cumulative capital flow to market capitalization is:

$$\begin{aligned} cf_{t,t+k} &= \sum_{i=1}^{k} nf_{t+i} \\ &= \frac{f_{t+1}}{mcap_{t+1}} + \cdots + \frac{f_{t+k}}{mcap_{t+k}} \\ &= \frac{1}{mcap_{t+k}}\left[f_{t+1} \times \frac{mcap_{t+k}}{mcap_{t+1}} + \cdots + f_{t+k}\right] \end{aligned}$$

So, $cf_{t,t+k}$ accumulates the flows occuring between t and $t+k$ and allows each flow to change value as a result of the market return.

Now consider the definition of the cumulative holdings in the local market:

$$\begin{aligned} h_t &= \left[\sum_{i=0}^{t} f_i \frac{mcap_t}{mcap_i}\right]\frac{1}{mcap_t} \\ &= \sum_{i=0}^{t} \frac{f_i}{mcap_i} \\ &= \sum_{i=0}^{t} nf_i \end{aligned}$$

So holdings accumulate the flows from the beginning of time (notice the counter begins at $i = 0$) allowing for the market return and express them as a proportion of current market capitalization. From this analysis, it is immediate that

$$cf_{t,t+k} = h_{t+k} - h_t,$$

is the change in holdings.

With these new variables, we can investigate the relation between world interest rates and capital flows on the one hand and long-run future returns on the other hand. For example, we compute:

$$\begin{aligned} \gamma_k &= \frac{\mathrm{Cov}[r_{t+k,k}, nf_t]}{\mathrm{Var}[nf_t]} \\ &= \frac{\frac{1}{k}\mathbf{e}_4'[\mathbf{I} + \mathbf{A} + \ldots + \mathbf{A}^{k-1}]\mathbf{C}(0)\mathbf{e}_2'}{\mathbf{e}_2'\mathbf{C}(0)\mathbf{e}_2}, \end{aligned} \tag{5}$$

where and $\mathbf{e}_2$ ($\mathbf{e}_4$) are indicator variables representing flows (returns). Also, $[\mathbf{I}+\mathbf{A}+\ldots+\mathbf{A}^{k-1}] = [\mathbf{I}-\mathbf{A}^k][\mathbf{I}-\mathbf{A}]^{-1}$. We can also let k go to infinity here. Analogously, we can investigate the long-run beta of changes in holdings with respect to current interest rates, returns and dividend yields.

Granger causality tests

Second, whereas the regression coefficients provide useful summary information, they are univariate relations that may hide intricate dynamic patterns. For example, there may be a positive relation between current capital flows and future returns, but part of this correlation may come indirectly through the effect of world interest rates on capital flows. It would be interesting to see whether there is still a relation between capital flows and future returns, controlling for the world interest rate effect. Similarly, are capital flows mostly predictable by external variables like world interest rates, or by internal variables (returns and dividend yields) that may proxy for expected returns for example? This question has been addressed before [see Calvo, Leiderman and Reinhart (1993, 1994) and Fernandez-Arias (1996)], but in the context of our VAR it is particularly simple to implement. We conduct a series of Granger-causality tests, testing whether world interest rates Granger cause the other variables, and whether returns and dividend yields Granger cause capital flows or vice versa. If liberalization is a gradual process and is pre-announced, dividend yields may decrease and returns temporarily increase before flows pickup. In this case, returns and dividend yields may Granger-cause flows. Hence, it may be hard to distinguish this effect from momentum investing (positive feedback trading), since this would also imply that positive returns predict higher flows.

Impulse responses

Third, both of our statistics so far do not rely on a structural interpretation of the VAR. However, there seems to be a natural ordering of the variables that can lead to a structural interpretation of the VAR shocks and a formal investigation of the hypotheses postulated in 2.1.1. As in Froot et al. (1998), we order flows before returns, but we insert the dividend yield in the middle. Dividend yields and returns are contemporaneously negatively correlated, but a shock to the dividend yield may reflect a near-permanent price change due to the liberalization process or a change in expected returns, and it is therefore natural to order them before returns.

Furthermore, by ordering the interest rate first, the world interest residual is implicitly assumed not to be affected by the other shocks in the system. More precisely, if we

denote the structural shocks by $\epsilon^*_{i,t}$, the VAR residuals, ϵ_t are given by $\epsilon_t = \mathbf{P}'\epsilon^*_t$, where $\mathbf{P}$ is an upper-triangular matrix and ϵ^*_t are uncorrelated structural shocks, such that $\Sigma = E[\epsilon_t \epsilon_t'] = \mathbf{P}'\mathbf{P}$.

We compute impulse responses, $IR(i,j,k) = \partial \mathbf{e}_i' \mathbf{Y}_{t+k} / \partial \epsilon^*_{t,j}$, where $\epsilon^*_{t,j}$ are the "structural" shocks. We look at one standard deviation shocks. We are interested in the: (i) effects of the world interest rate, i_t, on the ratio of net capital flows to market capitalization, returns and dividend yields, (ii) impact of flows on returns and dividend yields and (iii) effect of past returns and dividend yields on flows. For this last response, our setup removes the contemporaneous correlation between returns or dividend yields and flows, ascribed potentially to price pressure effects, because flows are ordered before these two variables. For example, a shock to the dividend yield not contemporaneously correlated with capital flows may reflect a change in growth opportunities or a change in expected returns which may affect future foreign capital inflows.

We also report impulse responses of shocks to the world interest rate, current capital flows, returns, and dividend yields on the two cumulative variables (average return and change in holdings) introduced above. Whereas impulse responses on the VAR variables die out in any stationary VAR, these cumulative effects represent the permanent effect on returns and capital flows when we let k go to infinity.

2.2 The dynamics of capital flows and breaks

It does not make much sense to conduct this analysis over the full sample of data, given that many of the markets that we study may have undergone an integration process somewhere in the middle of the sample. If the market truly went from segmented to integrated, the dynamics of all the variables in our VAR except the world interest rate would be affected. Consider Figure 1 which sketches what a standard model of risk sharing [see the description in Bekaert, Harvey and Lumsdaine (1998)] would predict, namely "a permanent change in prices leading to a new regime of lower expected returns". Interestingly, this process is associated with short-term increases in returns (the return to integration) and long-run decreases in expected returns, plus a permanent decrease in dividend yields. This pattern would more generally result from "investor base broadening," the spreading of risks among more investors (see Stulz (1998) for a summary of the scarce evidence to date on this). If flows drive prices temporarily away from fundamentals, the price effect ought to be temporary ("the price pressure hypothesis.") This behavior can be examined in the context of our VAR by contrasting the effects of capital flows on r_t, $r_{t+k,k}$ and

dy_t. We expect a positive (negative) contemporaneous relation between returns (dividend yields) and unexpected flows that is permanent under the first but transitory under the second hypothesis.

Figure 1 also suggests a potential scenario for capital flows. Flows are of course virtually zero before the liberalization. After the liberalization, which may be gradual, large inflows occur as foreign investors include the emerging market into their portfolios. However, once the rebalancing is accomplished, net flows need no longer be positive. Bachetta and van Wincoop (1998) model the dynamics of capital flows by allowing for a gradual decrease in a tax on investments into an emerging market and show how capital flows can over-shoot. Of course, this is a simple story and there are many competing models for the behavior of emerging market capital flows including models that predict a foreign lending boom followed by the inevitable crash! [see, for example, Calvo and Mendoza (1998).]

To deal with this problem, we use the most recent methodology on break date inference. We first use the methodology developed in BLS which we apply to all of our univariate series, but we also try to determine a break date for the joint system. This break point analysis then determines the post-break period to which we will apply our VAR analysis described above. The break point analysis also reveals a period of transitions and the transition dynamics are of interest in their own right.

A disadvantage of the BLS methodology is that it only allows for one break. There are a number of reasons why there may be more than one break especially in the net flows series. As indicated above, flows may be temporarily high to effect a portfolio rebalancing after capital market integration. There may be a second break at the end of this process. Recently, we have seen a reversal of capital flows with a number of well-publicized crises in Mexico 1994-1995, and in South-East Asia in 1997-98. Even much before this, the Debt crisis may have caused some Latin American markets to become effectively segmented from the rest of the world, although capital flows before then were small. Therefore we also apply the techniques of Bai and Perron (1998a,b) which allow for multiple breaks. Additional details are presented in the econometrics section.

We also investigate the dynamics of capital flows around a potential liberalization break using a very simple regression procedure. If the capital flow story of Figure 1 is accurate, mean equity flows should be higher after the break than before, but decrease again after portfolio re- balancing is completed. In other words, let $D1_t$ be a dummy that

comes on after the break and $D2_t$ the dummy that comes on three years after the break, then in the regression

$$nf_t = a + bD1_t + cD2_t + e_t \tag{6}$$

we would find b to be positive, and c to be negative. We choose three years because of the time it takes from announcement to effective implementation of a market liberalization. Bekaert and Harvey (1998a) provide evidence that liberalizations are often gradual.

Finally, to examine the transition dynamics, we compute a statistic we call the "transition half-life statistic" (THL). The THL statistic is measured as follows. Consider the point in time at which the break occurs and imagine the current realization of the variable is at the unconditional mean *before* the break. Now consider forecasting k periods in the future using the new dynamics. If the VAR is stationary, eventually the forecasts will reach the new unconditional mean. How fast they will get there depends on the persistence of the system and how far away the post-break mean is from the starting point (pre-break mean). Our THL statistic records the time it takes (in months) to reach half the distance between old and new mean. We can also reverse the computation. That is, we compute the THL statistic starting from the new mean going to the old mean using the pre-break dynamics. Comparing the two statistics is informative about the different dynamics before and after the break. We will compute this statistic for capital flows and dividend yields. For capital flows, a bold interpretation of the pre-break THL statistic is that it reveals something about how capital flows will react when the integration process is reversed, as is recently happening in a few countries. We do not compute the THL statistic for returns, because we conjecture that the measurement of mean returns is too noisy to make the computation valuable.

3. Break econometrics

In this section, we summarize the econometric tests used to investigate break dates. Details of these tests are contained in the technical appendix.

3.1 Single structural change in a VAR framework

The techniques in BLS enable us to investigate structural breaks in the relationship between capital flows, returns, and dividends and to construct confidence intervals around an estimated break date. For this part of the analysis, we assume that the data are generated by a stationary vector autoregression and there is at most one structural break. One of the key results in BLS is that the precision with which a potential break date is

estimated (as given by the width of the associated confidence interval) is a function not of the number of observations but of the number of series in a multivariate framework that experience the same break date. In addition, they show that including series that have no break in the VAR, such as the world interest rate in our application, while reducing the power of the tests to detect a common break, will not increase the width of the confidence intervals. In an earlier paper (Bekaert, Harvey, and Lumsdaine 1998, hereafter BHL), we provide empirical examples of how these techniques can be used to draw inference.

3.2. Multiple structural breaks in univariate analysis

The assumption of a single structural change seems less palatable in light of recent events in Asian markets. In addition, as we indicated above, some theoretical models of the dynamics of capital flows [see, e.g. Bachetta and Van Wincoop (1998)] may also lead to multiple breaks in the net flows as a percentage of market capitalization. Therefore, we investigate whether returns, dividend yields, and capital flows experienced multiple structural breaks, using techniques recently developed by Bai and Perron (1998a,b). Because multiple break analogs to the VAR framework of BLS have not yet been developed, we consider each series separately.

Rather than assuming the number of breaks is known *a priori*, Bai and Perron provide econometric tests to determine the number of breaks. The necessary assumptions in Bai and Perron are not particularly restrictive and admit a wide variety of linear specifications to identify the break dates, and construct confidence intervals around the estimated break dates. We use one of their set-ups that has serially uncorrelated errors but allows for lagged dependent variables. As in Lumsdaine and Papell (1996), it is also assumed that the breaks are asymptotically distinct (intuitively, if a large downward spike is followed by a large upward one, this would be considered one break, rather than two). Bai and Perron also show that the estimation of a single break when the underlying series has two breaks in its data-generating process results in consistent estimation of the break fraction for one of the breaks. In fact, the procedure consistently estimates the break of the larger magnitude. Hence, our work assuming single breaks may still detect useful dates.

Following recommendations in Bai and Perron (1998b), we investigate multiple breaks as follows:[2] First, we use their double maximum tests to test the null hypothesis that there

[2] We are grateful to Pierre Perron for supplying us with the Bai-Perron programs.

is no break versus the alternative that there is at least one break. The statistic is given by

$$\max_{1 \leq m \leq M} F_T^*,$$

where F_T^* is a modified F-statistic given by equation (T2) in the technical appendix and M is the upper bound on the number of breaks. Critical values are given in Bai and Perron (1998a,b), for various values of M and k^*, the trimming value.[3] Second, if there is evidence of at least one break, we implement their repartition procedure, which is based on comparing the sum of squared residuals from estimation of the 'best' (in a minimum sum of squared residuals sense) l-break model to the best $l+1$-break model, beginning with $l = 1$. The number of breaks m is the first value of l for which the test fails to reject the null hypothesis of l breaks in favor of the alternative of $l+1$ breaks. Finally, confidence intervals are then computed around the break dates estimated using the m-break model (formulas are given in Bai and Perron 1998b).

One drawback of this approach is that the choice of how many lags to include must now be determined exogenously, rather than by using an information criterion. However, the BP procedures do allow for robust (heteroskedasticity and autocorrelation consistent) covariance estimation and for different variances of the errors in each of the break periods, something the BLS test theory permits but is not allowed in current implementation. There is a cost associated with this flexibility, however; in general the BP tests appear to have less power to detect breaks than the BLS tests. Thus it is important to consider both sets of results together when identifying possible break dates.[4]

4. Data

Our data consists of capital flows, interest rates, dividend yields, and returns. Our source of monthly data on capital flows is the U.S. Treasury International Capital (TIC) reporting system.[5] For the 20 emerging markets we study, we are able to calculate the net U.S. flows for stocks and bonds for 17 countries. The Treasury does not track data on

[3] The trimming value refers to the number of observations at either end of the sample where it is assumed that no break has occurred; in earlier literature this was most often chosen to be $.15T$ or $.01T$ where T is the sample size.

[4] When we restrict the BP test to at most use one break, the number of lags of the BLS tests, and do not allow for robust covariance estimation or different variances, we replicate the break dates, confidence intervals, and significance levels of the BLS tests, except for Indonesia and Portugal, two countries with very short samples, where the break dates differ slightly.

[5] See Tesar and Werner (1994, 1995a,b) for a description and analysis of these data.

Jordan, Nigeria, and Zimbabwe. We use the International Finance Corporation's Emerging Markets Database as a source of the U.S. dollar returns and the dividend yields. The world interest rate is constructed as a GDP weighted average of the short-term government Treasury bills in the G-7 countries.[6] The interest rate and GDP data are from Datastream.

With so many countries and relatively small sample periods, a country by country analysis may both lack power, and prevent us from presenting the results in an intelligible way. Therefore we present most of our results using country groupings. We use three different types of groupings. The first set is aimed primarily at noise reduction. We aggregate results over all countries with three weighting schemes: equally weighted, value weighted (using the market capitalization of the equity market from the IFC) and volatility weighted. The volatility weighting constructs weights using the inverse of the sum of squared residuals of all the regressions in the VAR for a particular country relative to the inverse sum of the squared residuals over all countries. Hence, the "noisiest" VARs are down-weighted. Before applying this procedure, we re-scaled the residuals, so that at a global, all-country level, capital flows accounted for 40% of the total variance, returns and dividend yields each 25%, and interest rates, 10%. If the coefficients (like impulse responses) are independent across countries, this aggregation would lead to a reduction of the typical country - specific standard error with a factor of over four, since there are 17 countries in our sample. Hence, even if the country - specific standard errors are double the size of the coefficients, we would obtain significance.

The second grouping is geographical. We contrast the results for six Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico and Venezuela) and six Asian countries (Indonesia, Korea, Malaysia, Philippines, Taiwan and Thailand). Although these results may be sensitive to country-specific outliers, the contrasts between the development models of Latin-America and South-East Asia and the recent crises in both areas, make this grouping meaningful.

Our last groupings focus on the characteristics of capital flows. Table 1 summarizes some of the characteristics we use in the selection process. First, we investigate the magnitude of equity and bond flows. We calculate the return-adjusted cumulative equity flows divided by market capitalization. This is a measure of U.S. ownership in the country. We present average ownership over the full sample as well as the 1990s. The largest average ownership is found for Mexico (since 1990) followed by Brazil and Argentina. The country

[6] See the data appendix for additional details on the construction of the dividend yields and the world interest rate.

with the largest average ownership in Asia is Thailand in the 1990s. To allow comparison with bond flows, where return adjustments and market capitalizations are not available, we also calculate the cumulative equity flows to GDP without return adjustments. In this analysis, Mexico, Chile and Malaysia have the largest cumulative U.S. equity flows to GDP. Bond flows to GDP are presented in the next column. The highest averages of the cumulative bond flows to GDP are found in Mexico, Venezuela and Argentina. Clearly, cumulative net bond flows are much smaller than equity flows. By adding cumulative equity and bond flows, we obtain a measure of total external financing through portfolio capital. We also report sample averages and averages in the 1990s. There are two countries with net negative external financing, Chile and Taiwan, both, not surprisingly, countries with stringent capital controls. Mexico, Venezuela and Malaysia have the highest external financing to GDP.

We now consider different groups of countries based on this information for the 1990s sample. First, we rank the countries according to the importance of external finance. In addition to the three countries previously mentioned (Mexico, Venezuela and Malaysia), we add Argentina, Brazil and Korea to the top group. The bottom six countries are, in addition to Chile and Taiwan, India, Greece, the Philippines and Pakistan, all with less than 0.35% of GDP in external financing through U.S. bond and equity flows.

Finally, we want to select countries that primarily rely on equity capital and countries that primarily rely on fixed income. This is not trivial to do, since for some countries the absolute flows may be very small and, in particular, for bonds, they may be negative. Our approach was to rank countries based on the difference between the average cumulative post-1989 equity and bond flows to GDP. The bottom six countries are deemed bond-reliant, the top six equity reliant. We exclude countries when they do not place in the top 10 ranked according to cumulative bond flows or cumulative equity flows to GDP, respectively. The countries relying primarily on equity are Chile, Philippines, Malaysia, Portugal, Thailand and Korea. We excluded Taiwan because of its insignificant absolute equity flows. Although Mexico, Brazil and Argentina are top countries in terms of equity flows to GDP, they appear in the fixed income group because of their substantial positive fixed income flows. The other three countries are Venezuela, Pakistan, and Indonesia. Because of the relative non-importance of bond flows in general, it is possible that countries grouped in the "rely on bonds" category receive more equity than bond capital.

At the bottom of the table, we present country groupings. We find that Latin American countries tend to have high U.S. equity ownership. Asian countries have had sharply

negative bond outflows in the 1990s perhaps due in part to the Asian crisis. Latin American countries tend to rely more on equity financing than Asian countries. The countries grouped in "relying on bonds" category are generally countries that heavily rely on external portfolio capital, including equity capital. As a proportion of market capitalization, these countries have higher U.S. holdings than the "stock reliant" countries.

Table 1 also presents some additional information on the relation between bond and stock flows. We present the correlation of the net capital flows which is, in general, small. The highest correlation is found for India and Colombia. The largest negative correlations are found for Turkey and Malaysia. In the majority of the countries, the correlation is positive, and of the five negative correlations, three are in South-East Asian countries.

We also present Granger-causality tests based on a bivariate system of stock flows to market capitalization and bond flows to GDP. We can reject the hypothesis at the 5% level that equity flows do not Granger-cause bond flows in Brazil, Chile, Colombia, India, Korea, Pakistan, Portugal and Thailand. We can reject the hypothesis at the 5% level that bond flows do not Granger-cause equity flows in Colombia, Greece, Indonesia, Korea, Mexico, Portugal and Thailand. Hence, there are five countries for which there are significant predictive relations in both directions, potentially suggesting the effect of a third variable on general capital flows or persistence in capital flows after a capital market liberalization. There is no support for a consistent pattern where bonds always lead equity (or vice versa) or where bonds and equity are clear substitutes.

Figure 2 presents the results from the impulse response analysis based on the bivariate VAR. We examine value and equally-weighted impulse responses as well as the regional groupings. There are two interesting observations. First, positive shocks to stock (bond) flows are followed by positive responses in bond (stock) flows. Again, this is potentially consistent with gradual portfolio rebalancing towards emerging markets in general (both equities and bonds, after a capital market liberalization or induced by changes in world interest rates, for example). Second, notice the distinction between Latin America and Asia. A shock to equity flows in Latin America has a much larger short-term impact on bond flows than it does in Asia. Moreover, there is an initial slightly negative effect of bond flows on stock flows in Latin America whereas the effect in Asia is positive. From the second period onwards, the effects are positive and very similar in magnitude across the two regions. From both graphs, it is clear that the effects die out within six months.

5. Breaks and initial pre and post-break analysis

5.1 Break analysis

Table 2 presents the results of the univariate break analysis for four series: returns, dividend yields, net equity flows and net bond flows. We present the median break date, the 90% confidence interval for the date in months as well as a statistic that provides a test of the null hypothesis that no break occured. In the countries that experienced significant breaks in equities and bond capital flows, the break in bonds preceded the break in equities in four countries (Argentina, Korea, Malaysia and Thailand). The break in equities preceded the break in bonds in five countries (Brazil, Colombia, Greece, India and Philippines). However, with the exception of one country, Philippines, the equity and bond breaks are clustered closely in time for all of these countries. The median break dates for returns and dividend yields often precede the flow break points, but the confidence intervals for the return break dates are quite wide.

The multivariate analysis of breaks is presented in Table 3. We present three panels. In the first, we present a trivariate system with equity capital flows, dividend yields and returns. In the second panel, we present quadravariate results that include an equation for the world interest rate. However, the coefficients in the world interest rate equation are not allowed to break in the estimation but the dependence of the other variables in the system on the world interest rate may break. The third panel adds the bond capital flows to the system of equations. For 13 of the 17 countries, the multivariate breaks fall within the range of the univariate breaks for either bond or equity flows. For four countries, (Greece, Mexico, Portugal and Taiwan), the break dates correspond to the break dates in dividend yields or returns. In addition, the confidence intervals for the breaks are always tighter in the multivariate estimation consistent with what the theory would predict. Finally, the break dates from the three multivariate systems are very close to each other.

The analysis in Tables 2 and 3 only allows for a single break. In Table 4, we present the results of the Bai-Perron tests which allow for multiple breaks. In a number of countries more than one break occurs. For example, in the dividend yield estimation for Mexico there are three significant breaks: January 1983, July 1986 and March 1991. The first date closely follows the onset of the Latin American debt crisis. The second date closely follows the abolition of the official exchange rate and coincides with major debt restructuring. The final date closely follows the privatization of Telmex and the beginning of the NAFTA negotiations. For the flows estimation, we find little evidence in favor of multiple breaks, although this may be due to low power. Argentina shows two breaks in both equity and

bond flows, with the second one being detected in the BLS tests. There are three breaks for equity flows in Korea, partially reflecting the gradual lifting of foreign ownership. Finally, there are two break dates for bond flows in Taiwan, one preceding and one following the liberalization plan of January 1991. Hence, there appears to be a pattern in the multiple break analysis that is linked to important events tied to either deliberalization or liberalization of capital markets.

Given all of this information on breaks, we need to select the appropriate break date for use in our subsequent analysis. Table 5 presents the break point selections and the logic behind them. We heavily rely on the break dates that arise from the quadravariate system as well as the Bai-Perron breaks for dividend yields and equity and bond capital flows. Most importantly, we link the statistical breaks to the economic events detailed in Bekaert and Harvey (1998b). For example, the Bai-Perron break for equity capital flows in Thailand is August 1988. This closely corresponds to the opening of the market to foreigners by the creation of the Alien Board for trading in late 1987. The quadravariate and quintravariate date for Taiwan is April 1988. This closely corresponds to the lifting of exchange controls. Pakistan is particularly interesting. Most consider the official liberalization to be February 1991. The Bai-Perron break in dividend yields is earlier, in December 1990. However, an examination of the chronology shows that the liberalizations were announced in November 1990.[7]

5.2 The impact of breaks on unconditional means

Table 6 presents an analysis of both the means and standard deviations of the four country-specific variables that we study in the VARs: dividend yields, log returns, net bond flows to GDP and net equity flows to equity market capitalization. Individual country results and results for our country groupings are presented for the full sample, as well as the pre and post-break periods using the dates in Table 5.

There are a number of interesting differences between the pre-break and post-break periods. The dividend yields are sharply lower on average (2.5 in post break and 4.7 in pre-break). The yields decrease in 13 of 17 countries. This is consistent with the idea that expected returns decrease after a liberalization. Although returns are much noisier than dividend yields, we also observe that the average return decreases after the breaks. Note

[7] We also closely examined the results of estimations with a smaller trimming factor, that suggested breaks near the end of the sample which are associated with the Asian crisis. Since these dates are very much near the end of our sample, we did not exclude post-break observations.

that return volatility actually declines from 41.6% to 39.3% on an annualized basis.

The capital flows also exhibit differences. The equity capital flows to capitalization ratio increases five-fold after the break. Increases occur in 15 of 17 countries. Similarly, the bond flows to GDP ratio increases from a negative number in the pre-break period to a positive number in the post-break period. Increases occur in 13 of 17 countries. It is also interesting to note that while the volatility of equity returns and dividend yields decreases after our breaks, the volatility of both the equity and bond capital flows increases. Indeed, the volatility of the bond and equity flow ratios doubles from pre to post-break.

5.3 Mean dynamics of capital flows

We estimated the regression specified in equation (6) for each individual country and pooled across all countries or the various country groups introduced in Section 4. The pooled regression allows for fixed effects, and corrects for temporal heteroskedasticity. The results are in Table 7. We report the regressions both for equity flows and bond flows. The equity results are consistent with the liberalization inducing a large portfolio rebalancing that induces large capital flows just after the break, but less after the transition period (which we fixed at three years). On an annualized basis, equity flows increase by 1.4% of local market capitalization, but then drop by 0.55% after three years. Bond flows continue to increase throughout.

One might expect this phenomenon to be artificially driven by the Asian crisis. During late 1997 and 1998, large amounts of foreign capital left Asia and this was not driven by a liberalization-induced portfolio rebalancing. However, the overall phenomenon we find does not occur for Asia, where equity flows on average continue to increase three years after the liberalization. The positive/negative pattern however is very strong in Latin-America. Not surprisingly the result also strongly appears for the 6 countries relying most on foreign capital, whereas it does not show for the least foreign portfolio capital reliant countries. The fact that the result shows up for the countries that rely more heavily on bonds and not for those that rely most heavily on stocks is probably due to the geographical composition of these groups, with Latin-American countries dominating the former, but not the latter.

6. VAR results

6.1 Dynamic regression coefficients

Table 8 reports the results of our analysis of dynamic regression coefficients. We report

the coefficients at three horizons, $k = 12$ (one year), $k = 36$ (three years), and $k = 60$ (five years). We also report the cumulative responses over these horizons, and the infinite cumulative response. To give an idea of the cross-sectional distribution of the coefficients across countries, we order the coefficients from low to high and report the coefficients for the third and 15th country (there are 17 countries). We also report the equally-weighted average over the six Latin American, over the six Asian and over all countries.

The first three panels investigate slope coefficients with the world interest rate as the regressor. These reflect the long-run correlations between capital flows, dividend yields or returns at time $t + k$ and the world interest rate at time t. The relation between future capital flows and current world interest rates varies significantly across countries. The equally weighted response is positive, but the relation is negative for both the Latin American and Asian countries. For example, a 1% decrease in the world interest rate is associated with a cumulative 36-month increase of U.S. holdings of the local equity market equal to 0.24% in Latin America and 0.18% in South-East Asia in the post-break period. The results in the pre-break and the full period are harder to interpret, partially because one of the South-East Asian countries is among the outlier observations.

The relation between the world interest rate and future dividend yields also has no clear sign. For the post-break period, the equally-weighted response is at first positive but the cumulative infinite response is negative. The responses in Latin America and Asia are always negative, indicating that lower interest rates are associated with future increases in dividend yields. This is surprising under the "push" hypothesis where lower interest rates drive developed market capital into emerging markets and drive up prices there, hence lowering dividend yields. Of course, we report long-run effects, and the "push" effect may be very short-lived. The effects we document die out very slowly, which is largely due to the large persistence of the dividend yield in most countries. Also, the result is not robust across time periods. In the pre-break period and the full sample we find positive coefficients. Note that the coefficients seem large primarily because of the log-transformation of dividend yields. To get an approximate regression coefficient for the level of the dividend yield, one should multiply the reported coefficients with the average dividend yield level (0.035).

For the implicit regression of future returns on the world interest rate, we divide the cumulative effects by k, to obtain a per period return effect (except, of course, for $k = \infty$). Not surprisingly, given the noisiness in returns, the coefficients show also a wide range across countries. Nevertheless, they are consistently positive for both Latin-America and

Asia, at least for the full and post-break samples. Hence, decreases in world interest rates are associated with long-run decreases in returns, not increases as we might expect. The same caveats we mentioned above apply. In addition, we should add that a true test of the "push" hypothesis should focus on the effects of an unexpected shock to world interest rates, especially since world interest rates are quite predictable. Such an analysis follows later when we consider impulse responses.

The following panels consider the long-run relation between capital flows and future dividend yields and returns. The relation between capital flows and future dividend yields also shows a lot of cross-sectional dispersion, but for the full sample is clearly predominantly negative. Increased flows are associated with future lower dividend yields, and hence potentially lower costs of capital. For an average dividend yield level of 3.5%, an increase in US flows of 1% of market capitalization is associated with a 0.39% drop in the dividend yield after 12 months in Asia and an 1.32% drop in Latin America. Of course, such large increases in net flows rarely happen. However, for the post-break period, the results are somewhat different, with positive coefficients for Asia and negative ones for Latin America. Substantial differences between post and full period also exist for the correlations between capital flows and returns. In the post-break period, the coefficients are largely positive; higher flows are correlated with higher future returns. For the full sample, the coefficients are negative when equally weighted over all countries, but change sign over different horizons for Latin America and Asia, ending up positive for Asia and negative for Latin-America at infinity.

The next panel considers an implicit regression of future capital flows on current log-dividend yields. The cumulative responses can now be interpreted as the change in total holdings over this period. The coefficients are generally small for the same reason previous coefficients involving dividend yields were large–the log-transformation. For an average dividend yield level of 0.035, one should multiply the coefficients by 28.6. If higher dividend yields proxy for higher expected returns, and the return chasing hypothesis is true, one would expect a positive contemporaneous relation, which may persist because of positive autocorrelation in dividend yields and flows. This is indeed the case for both Latin-America and Asia at the five-year horizon, but the effects are very small. It remains true when the country-by-country results are averaged at the five-year horizon but not when the infinite cumulative response is computed. For the full sample, we find positive coefficients for the equally-weighted average and Asia, but negative coefficients for Latin-America . The coefficients are also much larger, implying changes in holdings that move

more than one to one with changes in dividend yields.

The second to last panel investigates the correlation between current returns and future capital flows. At the horizons that we consider, we would not expect to see much of an effect, even if foreigners are momentum traders. In the post-break period, we find very small effects, that are positive when cumulated for Asia and Latin-America, but negative when averaged over all countries. The pre-break period yields mostly negative coefficients.

In general, the slope coefficients do not lead to strong conclusions about univariate correlation patterns between the various variables. This motivates investigating more complex patterns, either partial regression coefficients as in the Granger-causality analysis that follows, or impulse responses which control for the predictability of causal factors. One very clear conclusion revealed by this analysis, is that the results pre and post break are very different, demonstrating once again that capital liberalizations have caused breaks in the dynamic relations between our variables that cannot be ignored.

6.2 Granger-causality tests

Granger causality tests are reported in Table 9. The first three columns investigate the predictive power of a much discussed external factor (a "push" factor), the world interest rate, on equity flows, dividend yields and returns. The statistical results are weak. This is not surprising before the break if markets were truly segmented preventing free capital flows. The only significant result is that in Korea we can reject that the world interest rate fails to Granger-cause returns. But even in the POST period, significant results are rare. Except for single cases of near or below 5% rejections of the no Granger-causality hypotheses in Korea, the Philippines, and Turkey, the only country where the world interest rate played a significant role predicting capital flows, dividend yields and returns simultaneously is Brazil.

These results may indicate that the world interest rate is not an important predictor of capital flows and returns and that the previous literature (e.g. Froot et al. (1998)) justifiably ignored it, but it may also reflect the short sample periods we have available. When looking at impulse responses in the next sub-section, our various country groupings may yet reveal the interest rates to be an important external determinant of capital flows.

The price pressure hypothesis would suggest that increased capital flows temporarily

induce high returns which are reversed afterwards in which case we would expect capital flows to Granger-cause returns. In the portfolio rebalancing story, on the other hand, even before the full liberalization is implemented, anticipation should have already led to permanent price increases, making it less obvious that we will see significant results in the post period. As Figure 1 indicates, returns show the most interesting dynamics during the transition period. If there is an effect on the dividend yield, the effect may represent a more permanent change in the cost of capital. The statistical evidence on Granger causality is not overwhelming. We reject the hypothesis of no predictability of returns by capital flows at the 5% level for only six countries: Brazil (pre-break), Greece (pre-break), Korea (post-break), Malaysia (full period), Pakistan (post-break), and Thailand (pre-break).

In three of the six countries where capital flows predict returns, they also predict dividend yields significantly. In three other countries (Indonesia, Philippines and Venezuela), we also record a significant relation between capital flows and dividend yields.

Do endogenous factors play a large role in determining capital flows? If that is the case, returns and/or dividend yields ought to have predictive power for capital flows. Interestingly, there is little predictive power of dividend yields (only Colombia, Malaysia, Pakistan, and the Philippines), and returns predict capital flows only in Brazil (pre-break), Korea and Thailand.

The lack of significant predictive relations between our variables, revealed by country-specific Granger-causality tests, stresses again the need to focus on cross-sectionally averaged results. To analyze some of the predictive relations further, we report three partial regression coefficients in Table 10. The first is the coefficient in the flow equation on past flows. Froot, O'Connell and Seasholes (1998) note that the predictive power of flows for future returns may in fact be due to both a strong contemporaneous relation between flows and returns (see next section) and the persistence in flows. Our estimates suggest a monthly persistence coefficient of around 0.135, which is substantially higher than that found by Froot et al. (0.36) in a daily model.

The second coefficient is the coefficient on returns in the flows equation. Positive coefficients suggest feedback trading or may be the result of returns anticipating positive news about future market reforms that will bring in foreign capital. Whereas the country by country results showed little significance (and are not reported), the coefficients are predominantly positive as they are in Froot et al. (1998). One country for which a gradual liberalization story would have much appeal, Korea, records a negative coefficient.

Finally, we report the flow coefficient in the return equation. As in Froot et al. (1998), we find predominantly positive and large coefficients. A 1% increase in foreign holdings leads on average to a 4.74% increase in returns next month (see Table 12). Froot et al. argue that this is not inconsistent with the price pressure hypothesis (which would require a positive contemporaneous effect and negative long-run effect) given that flows are persistent. The response could also reflect a return to integration, as we discussed before, although one would expect much of the increase in foreign holdings to be anticipated and, hence, not induce large ex post price changes. In the impulse response analysis in the next section, we look at the dynamic effects of unexpected shocks, including the contemporaneous relations between variables.

6.3 Impulse Response Analysis

A summary of the impulse response analysis of the quadravariate VAR is presented in Figure 3. For each country, we estimate the VAR on three samples: full sample, pre-break and post-break. We then aggregate the impulse responses across various country groups using equal weights. To help interpret the evidence, in the light of the hypotheses formulated in section 2, we provide two additional tables. Table 11 presents an analysis of impulse responses on changes in equity holdings and long-run returns, whereas Table 12 reports some important contemporaneous betas. When rescaled, these betas constitute the impulse responses at time 0 and they also appear in Figure 3. Both tables focus exclusively on the post-break period.

The effect of world interest rate shocks

The effects of a negative world interest rate shock differ greatly between the pre-break and the post-break periods. Consider the post-break period. The contemporaneous effects of a shock in world interest rates are mixed with positive covariances dominating (see Table 12) but after one period a negative shock generally leads to small increases in net equity flows (Figure 3 panel A). This is definitely the case for Asia but less so for Latin America. The countries that benefit the most are those with the highest degree of external financing. In all cases, the effects die out quickly. From Table 11, we see that a negative interest rate shock is associated with increased holdings at five year horizons for all groupings. The impact is greatest for countries that rely on bonds rather than stocks. While there is a large positive increase in holdings for Asian countries up to one year out compared to Latin American countries, by five years, the impact is very similar across the regions. A 0.3% decrease in world interest rates leads to an 0.04% increase in the proportion of the

market held by U.S. investors.

The analysis of dividend yields in Figure 3 panel B also reveals differences between pre- and post-break samples. Looking at the full sample results, the impulse response function is flat. In the post-break sample, a negative shock in the interest rate is associated with lower dividend yields in Asian and Latin American countries. The only incidence of higher dividend yields is for countries that use little external financing. In terms of magnitude, Table 12 is informative. The contemporaneous beta is over 10.0, meaning that a 1% decrease in the world interest rate leases to a drop in the level of the dividend yield of about 10 times the average dividend yield, that is 35 bp. The effect persists for quite a long time, especially in Asia.

The analysis of returns in Figure 3 panel C suggests a positive effect only contemporaneously in all countries except those that do not rely on external financing. This is consistent with a portfolio effect (higher capital flows to emerging markets) being induced by a low world interest rate. It may reflect a pure short-term price pressure effect or the return to integration (see above) if market liberalizations happen to coincide with periods of lower world interest rates.

Our analysis of long-run returns suggests that negative interest rate shocks increase long-run returns over a one-year horizon but the effect is eliminated by three years. However, both the dividend yield effects and the expected return effects do not show clear enough results to distinguish between long-term beneficial effects (lower cost of capital) or short-term price pressure effects that might reverse themselves. Nevertheless, the majority of the coefficients in Table 11 are negative, suggesting long-run decreases in expected returns. From Figure 3, it is also apparent that there were no clear world interest rate effects before the break.

The effect of equity flow shocks

We examine the impact of positive equity flows shocks on dividend yields and returns in Figure 3 panels D and E. Perhaps the most powerful graph that we present is the impulse response of a positive shock in equity flows on dividend yields. Again, in the pre-break period, it is hard to see any consistent effect. However, in the post break period, there is a sharply lower dividend yield. Contemporaneously (see Table 12), the effect is on the order of about 20 basis points per 1% increase in foreign holdings. In addition, the effect is very persistent. Dividend yields drop the most for Asian countries but also drop for Latin American countries. The drop in dividend yields is very strong for those

countries that rely on external financing. Interestingly, the countries that actively use bond financing have a larger drop in dividend yields than those countries that rely more on equity financing. Following Bekaert and Harvey's (1999) argument that changes in dividend yields closely follow changes in the cost of equity capital, this analysis suggests that increased capital flows decrease the cost of equity capital. It is important to realize that the shock to capital flows is net of the result of world interest rate changes.

The impulse response analysis of capital flows on returns in Figure 3 panel E is consistent with the portfolio rebalancing hypothesis. In the post-break period, returns increase only in the very short term. These results are consistent with the dividend yield results. A shock in equity capital flows increases the price level which leads to higher returns in the short-term and permanently lower dividend yields. The contemporaneous beta is around 6. This is of the same order of magnitude as the estimate for Mexico in Clark and Berko (1997), but much smaller than the estimate in the daily flow/return model in Froot et al. (1998). None of these studies separate the interest rate effect from the capital flows effect. The cumulative effect (see Table 11) remains positive, but becomes significantly smaller at the 60-month horizon suggesting some, but incomplete, reversal of prices. The largest impact is on countries that have a relatively large reliance on external financing.

The effect of return and dividend yield shocks

We now turn to the return chasing hypothesis. Bohn and Tesar (1996) distinguish two hypotheses. The "return updating" hypothesis links expected returns to capital flows. The "momentum" hypotheses predicts positive capital flows after positive returns. We revisit this last hypothesis by looking at realized returns and measuring the impact of a positive shock in returns on the capital flows (see Figure 3 panel F). In our framework, the VAR ordering implies that the return shock omits the contemporaneous correlation with both capital flows and dividend yields and hence reflects an unusual unexpected high return, not contemporaneously correlated with foreign capital shocks or permanent cost of capital changes. While not reported, positive shocks to returns increase capital flows in 14 of 17 countries using the full sample. Examining the post-break estimation, we see that capital flows increase in 11 of 17 countries. From panel F, the positive response of flows is found in all regions but is most dramatic for Latin American countries. We also find little or no impact on capital flows for those countries that have small external financing. The impulse response analysis supports the hypothesis that capital flows are, in part, momentum driven. That this is an entirely short-run effect is confirmed by the

cumulative responses reported in Table 11, Panel C. The positive return shocks lead to higher holdings in the short-term but not in the long term.

Figure 3 Panel G reports the effects of dividend yields on capital flows, where the dividend yield shock is net of a contemporaneous capital flow effect. In the post-break analysis, a positive shock in the dividend yield is associated with higher flows after a few periods for the volatility-weighted, equally-weighted and the value-weighted set of countries after an initial negative response. For the Latin American and the Asian set, the impulse responses basically become zero. The former results may be consistent with the short-run momentum results and a longer term "expected return"-chasing effect. In the very short term, a higher dividend yield may simply reflect a negative unexpected return, which leads to reduced short-term capital flows. However, higher dividend yields may be associated with higher expected returns in the future. Positive effects on capital flows are only visible after two periods and then only for a subset of our groupings. For the pre-break period, the expected return effect is very strong for South-East Asia and the stock reliant countries (which includes four of the South-East Asian countries) even in the short-term, but it gets reversed in the long-term. The countries not relying on external finance display a consistently positive effect. Table 11, Panel B cumulates these effects to measure the total change in holdings. The cumulative effects, for example, show that the positive long-run effects on capital flows in South-East Asia suffice to overturn the initial negative effect. For Latin American and stock reliant countries, the cumulative effect is slightly negative.

6.4 Transition Dynamics

The results of our THL statistic using the quadravariate VAR are summarized in Figure 4 for capital flows and dividend yields. As discussed in section 3, we can interpret these results as indicative of how flows and dividends reacted when the markets integrate and how they might react when the integration process is reversed. The pre-mean/new dynamics plot illustrates that for almost half the countries, capital comes in very fast, so that adjustment happens very quickly, usually within one month. This may provide indirect evidence of portfolio rebalancing. But there are also some notable exceptions. In Chile, Colombia, Greece, India, Korea, Philippines, Portugal, Thailand, and Venezuela the transition lasts at least five months. More striking is that in 15 of the 17 countries, the transition implied by the post-mean/old dynamics is faster (with Brazil moving from 1 to 2 months), suggesting that when capital leaves, it leaves faster than it came! This is an interesting finding in the light of the recent crises which resulted in capital flight from

many emerging markets. Indeed, our empirical findings use data from long before these crises.

In 13 of the 17 countries, a dividend yield decrease followed the liberalization (structural change), indicating a decrease in the cost of capital. In contrast to the evidence on capital flows, this decrease in the cost of capital seems to take some time (more than 1 month in all countries besides Korea, and a median of 4 months), but in the reverse experiment, this process would take even longer (median of 10 months). One interpretation of this finding is that liberalizations have made dividend yields less persistent.

6. Conclusions

The goal of this paper is to develop a better understanding of the relation between capital flows and asset prices. We apply the latest structural break econometrics to identify liberalizations in 20 emerging markets. In contrast to previous work, we examine both bond and equity flows. Furthermore, we examine both ex post returns and a proxy for expected returns, the dividend yield.

Our analysis suggests that after a liberalization equity capital flows increase by 1.4% of market capitalization on an annual basis. However, three years post-liberalization, the equity flows are reduced. This is consistent with a model whereby investors rebalance their portfolios towards emerging markets.

Our structural VAR framework allows us to examine the impact of shocks in net capital flows on asset returns and expected returns. In contrast to previous research, we explicitly take into account a fundamental nonstationarity in the data - structural breaks induced by liberalizations. We estimate our VARs in both the full sample, pre-break and the post-break sample. We find significant differences, in particular, between the pre-break analysis and the post-break analysis.

We revisit a number of important hypotheses within the VAR framework. First, the "push effect" from world interest rates to capital flows appears consistently when we cumulate impulse responses whereas contemporaneously interest rates and capital flows show no consistent correlation pattern. A 0.3% decrease in interest rates eventually increases foreign holdings by about 0.04% of market cap, a small effect. Interest rate decreases do generate strong but very short-lived increases in returns.

Second, unexpected shocks to equity flows have a strongly positive contemporaneous effect on returns, in line with the findings of Clark and Berko (1997), and Froot et al. (1998). The effect immediately dies out but there is only incomplete reversal suggesting some of the effect is permanent. This is consistent with our finding that positive shocks in net equity capital flows lead to lower dividend yields – our proxy for expected returns. Following Bekaert and Harvey's (1998a) argument that dividend yield changes reveal information about the cost of equity capital, the equity capital flow shocks lead to lower cost of capital in many countries. We find that this relation is dramatically strengthened if we estimate our VARs on the post break sample. Although part of the initial effect may be due to "price pressure", our results suggest part of the response is near permanent and beneficial.

Third, we revisit the Bohn and Tesar (1996) argument that capital flows are more likely driven by 'return chasing' than portfolio rebalancing. We find evidence that positive returns shocks are followed by increased short-term equity capital flows.

Finally, we provide interesting new results on the transition from pre-break to post-break systems. In almost all the countries we examine, our transition analysis of equity flows suggests that when capital leaves it leaves faster than it came. These intriguing results may shed light on the recent crises in Latin America and Asia and the role of capital flight.

There are, of course, many caveats to our analysis. Ideally, we need an economic theory that captures the evolution from segmented to integrated financial markets. In the absence of such a theory, we rely on vector autoregressions to characterize the behavior of important financial aggregates. In addition, the break methodology implicitly assumes that every break is permanent and hence theoretically ignores that the next break may be rationally anticipated by market participants. If this is the case, a regime switching model, such as the one presented in Bekaert and Harvey (1995) may be a superior modeling approach. Although we have not studied this issue in detail, we believe that structural break tests can probably be used to detect persistent changes in regime and so are less incompatible with a regime-switching model than theory may lead one to believe.

Technical appendix

BLS (Testing for a single break with multiple time-series that break at the same time)

For this part of the analysis, it is assumed that there is at most one break. It is also assumed that the errors in the VAR have $4+\kappa$ moments for some $\kappa > 0$. The general form of the regression is (equation 2.2 from BLS):

$$Y_t = (G_t' \otimes I_n)\theta + d_t(k)(G_t' \otimes I_n)S'S\delta + \epsilon_t \qquad (T1)$$

where Y_t is $n \times 1$ (defined earlier), G_t' is a row vector containing a constant and p lags of Y_t, I_n is an $n \times n$ identity matrix, $d_t(k) = 0$ for $t < k$ and $d_t(k) = 1$ for $t \geq k$. θ and δ are parameter vectors with dimension $r = n(np+1)$. S is a selection matrix containing zeros and ones and having column dimension r and row dimension equal to the number of coefficients which are allowed to change ($\leq r$; i.e., S is full row rank).

The procedure for determining when a potential break occurred involves estimating (T1) for all possible break dates $k^* + 1 \leq k \leq T - k^*$, where k^* represents a trimming value, often taken to be 15% of the sample size, T. At each possible break date, an F-statistic is computed, testing the significance of $S\delta$, and is denoted $F(k)$. Then the statistic testing for structural change is equal to

$$\max_{k^*+1 \leq k \leq T-k^*} F(k).$$

BLS show that this statistic converges via the functional central limit theorem to $\max F^*$, a (known) function of Brownian motion. More details and critical values are provided in BHL and BLS.

A confidence interval with asymptotic coverage of at least 95% is given by (eq. 2.19 in BLS):

$$I = (\hat{k} - [\Delta k] - 1, \hat{k} + [\Delta k] + 1),$$

where $\hat{k}$ is the estimated break date, $[\cdot]$ denotes the "greatest least integer", and

$$\Delta k = c[(S\hat{\delta})'S(\hat{Q}_1 \otimes \hat{\Sigma}_{\hat{k}}^{-1})S'(S\hat{\delta})]^{-1},$$

where c=7.63, $\hat{\Sigma}_{\hat{k}}$ is the estimator of the variance-covariance matrix of the OLS residuals under the alternative, given $\hat{k}$, and $\hat{Q}_1 = \frac{1}{T}\sum_{t=1}^{T} G_t G_t'$.

BP (Testing for multiple breaks in a single series)

We consider the full structural change model of Bai and Perron (that is, where all coefficients are allowed to change). Using notation analogous to (T1), the model can be written as

$$Y_t = \sum_{i=1}^{m+1} d_t(k_i)G_t'\delta_i + \epsilon_t,$$

where m is the number of breaks and, as in model (T1), G_t consists of a constant and lags of Y_t, and $d_t(k_i)$ is an indicator variable equal to 0 when $t < k_i$ and 1 otherwise.

A maximal F-test is used to test the hypothesis of no structural change versus the alternative of m breaks. The null hypothesis is thus

$$H_0 : \delta_1 = \ldots = \delta_{m+1}$$

and can be expressed as $R\delta = 0$ where

$$R = \begin{pmatrix} 1 & -1 & 0 & \cdots & 0 & 0 & 0 \\ 0 & 1 & -1 & \cdots & 0 & 0 & 0 \\ \vdots & \vdots & \vdots & \ddots & \vdots & \vdots & \vdots \\ 0 & 0 & 0 & \cdots & 1 & -1 & 0 \\ 0 & 0 & 0 & \cdots & 0 & 1 & -1 \end{pmatrix}.$$

Then the F-statistic is (this corresponds to equation (12) in Bai and Perron 1998a)

$$\sup_{(\lambda_1, \ldots, \lambda_m) \in \boldsymbol{\Lambda}} F_T^*(\lambda_1, \ldots, \lambda_m; r) = \frac{1}{T}[\frac{T-(m+1)r}{mr}]\hat{\delta}' R'(R\hat{V}(\hat{\delta})R')^{-1}R\hat{\delta}, \qquad (T2)$$

where $\hat{\delta}$ is an estimate of δ, and $\delta = (\delta_1', \ldots, \delta_{m+1}')'$, $\hat{V}$ is the estimate of its covariance matrix, λ_i is the fraction of the sample at which break i occurs, $\boldsymbol{\Lambda}$ is the space of all possible m-partitions and r is the number of columns in G.

Data appendix

A. Dividend yields

There are a few instances of zeros in the 12-month moving sum of dividends that the IFC reports. We investigated these zeros by looking at each individual firm's dividends. There seems to be an issue of when the IFC recorded dividends. For example, in Korea, there are dividends paid in January 1988 and no dividends appear in the individual company files until March 1989. After that, there is no dividend paid by an individual company until April 1990. It is not surprising that we find zero entries in January and February 1989 and in March 1990. In order to avoid zero entries which appear to be a result of the timing of the recording of dividends, rather than a canceling of dividends, we carried forward some past dividends to replace these holes in the data.

For Korea, we calculate the dividend on the index in December 1988 and use that value as the numerator for the dividend yield calculation for January and February 1989. The values (in percent) for these two months are 0.5511 and 0.5273, respectively. In February 1990, we calculate the dividend on the index and use that value in the numerator for March 1990. The value is 1.0919.

For Indonesia, we calculate the value of the dividend in June 1991. That value, is used in the numerator for July 1991 through February 1992. The dividend yields are: 0.1200, 0.1380, 0.1745, 0.1936, 0.1799, 0.1718, 0.1496 and 0.1311.

For Taiwan, we calculate the value of the dividend in February 1990 and use that in the numerator for March 1990 through April 1991. The dividend yields for this period are: 0.2250,

0.2600, 0.3340, 0.4545, 0.4186, 0.6355, 0.8307, 0.6825, 0.5314, 0.5037, 0.5831, 0.4703, 0.4677 and 0.4048.

B. World interest rates

The nominal interest rate for the G-7 countries is calculated by aggregating individual countries' short-term interest rates weighted by using countries' previous quarter's share in G-7 GDP. The following interest rates are employed: Canada 90-day Treasury bill (IFS 60C), France 90-day bill (IFS 60C), Germany 90-day bill (IFS 60C), Italy 180-day bill (IFS 60B), Japan commercial paper from 1975-1976 (IFS 60B) and the Gensaki rate from 1977-1997 (IFS GBD3M), United Kingdom 90-day bill (IFS 60C), and the United States 90-day bill (IFS 60C).

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Table 1

Summary analysis of net equity flows and net bond flows

	Average of cumulative equity flows/equity capitalization		Average of cumulative equity flows/GDP		Average of cumulative bond flows/GDP		Average of total cumulative external financing to GDP		Equity flow and bond flow	H_0: - Equity flows do not Granger cause bond flows	H_0: - Bond flows do not Granger cause equity flows
Country	Full	Post-1990	Full	Post-1990	Full	Post-1990	Full	Post-1990	correlation	P-value	P-value
Argentina	0.0093	0.0837	0.0035	0.0090	0.0040	0.0104	0.0074	0.0194	0.055	0.558	0.114
Brazil	0.0519	0.1271	0.0037	0.0093	0.0030	0.0077	0.0067	0.0170	0.013	0.000	0.165
Chile	0.0233	0.0578	0.0090	0.0226	-0.0326	-0.0642	-0.0236	-0.0416	-0.049	0.036	0.897
Colombia	0.0137	0.0323	0.0017	0.0044	-0.0001	0.0022	0.0015	0.0065	0.189	0.000	0.000
Greece	0.0012	0.0173	0.0008	0.0023	-0.0009	-0.0009	-0.0001	0.0014	0.046	0.262	0.019
India	0.0048	0.0112	0.0008	0.0019	-0.0010	-0.0009	-0.0002	0.0011	0.195	0.000	0.000
Indonesia	0.0302	0.0764	0.0027	0.0069	0.0023	0.0058	0.0050	0.0127	-0.007	0.834	0.181
Jordan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Korea	0.0417	0.0781	0.0037	0.0088	0.0016	0.0056	0.0053	0.0144	0.071	0.000	0.000
Malaysia	0.0115	0.0263	0.0088	0.0210	-0.0058	0.0004	0.0030	0.0214	-0.135	0.996	0.763
Mexico	0.1186	0.2411	0.0104	0.0253	0.0196	0.0466	0.0300	0.0719	0.103	0.973	0.000
Nigeria	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Pakistan	0.0058	0.0148	0.0007	0.0018	0.0006	0.0014	0.0012	0.0032	0.110	0.000	0.100
Philippines	0.0176	0.0444	0.0046	0.0115	-0.0052	-0.0101	-0.0006	0.0014	0.035	0.832	0.998
Portugal	0.0284	0.0701	0.0028	0.0070	-0.0016	-0.0033	0.0012	0.0037	0.043	0.000	0.002
Taiwan	0.0010	0.0020	0.0001	0.0004	-0.0110	-0.0278	-0.0109	-0.0274	0.022	0.973	0.953
Thailand	0.0320	0.0667	0.0026	0.0059	-0.0005	-0.0001	0.0021	0.0058	-0.063	0.013	0.001
Turkey	0.0188	0.0477	0.0010	0.0028	0.0003	0.0010	0.0014	0.0038	-0.169	0.611	0.441
Venezuela	-0.0049	-0.0091	0.0004	0.0011	0.0139	0.0327	0.0144	0.0338	0.007	0.990	0.892
Zimbabwe	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Full	0.0238	0.0581	0.0034	0.0083	-0.0008	0.0004	0.0026	0.0087	0.027		
Asia	0.0223	0.0490	0.0037	0.0091	-0.0031	-0.0044	0.0006	0.0047	-0.013		
Latin	0.0353	0.0888	0.0048	0.0119	0.0013	0.0059	0.0061	0.0178	0.053		
Rely on Stocks	0.0257	0.0572	0.0052	0.0128	-0.0073	-0.0119	-0.0021	0.0009	-0.016		
Rely on Bonds	0.0352	0.0890	0.0036	0.0089	0.0072	0.0174	0.0108	0.0263	0.047		
Top External	0.0380	0.0912	0.0051	0.0124	0.0060	0.0172	0.0111	0.0296	0.019		
Bottom External	0.0089	0.0246	0.0027	0.0067	-0.0083	-0.0171	-0.0057	-0.0103	0.060		

Full represents an equally weighted average across all countries. Asia is an equally-weigthed average across six Asian countries (Indonesia, Korea, Malaysia, Phillipines, Taiwan and Thailand), and Latin is equally weighted correlation across six Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico and Venezuela). We also report equally-weighted across the six countries that rely most on equity financing (Chile, Philippines, Malaysia, Portugal, Thailand and Korea), equally weighted across the six countries that rely most on bond financing (Venezeula, Mexico, Argentina, Pakistan, Indonesia and Brazil), equally weighted across the six countries that have the highest proportion of external financing, that is, the bond plus equity capital flows to GDP (Mexico, Malaysia, Venezuela, Argentina, Brazil, and Korea) and the six countries with the lowest proportion of external financing to GDP (Chile, Taiwan, Pakistan, the Philippines, Greece and India). The correlations are estimated over the full sample. The break dates for each country are presented in Table 4. The Granger causality tests are from a bivariate VAR of equity returns and bond returns estimated over the full sample.

Table 2
Univariate Break Tests

	Log returns					Log dividend yield				
Country	Statistic	5th Percentile	Median	95th Percentile	# of lags	Statistic	5th Percentile	Median	95th Percentile	# of lags
Argentina	8.00	Jun-84	Jul-89	Aug-94	1	8.84	Oct-90	May-92	Dec-93	1
Brazil	8.17	Sep-82	Apr-87	Nov-91	1	9.25	May-88	Nov-90	May-93	3
Chile	24.75 ***	May-81	Feb-83	Nov-84	2	20.48 ***	Jan-81	Sep-82	May-84	3
Colombia	14.17 **	Apr-90	Feb-92	Dec-93	1	14.98 **	Jun-92	Feb-94	Oct-95	2
Greece	8.38 *	Feb-81	Nov-85	Aug-90	0	15.29 **	Dec-83	Jun-86	Dec-88	1
India	6.23	Oct-86	Apr-92	Oct-97	0	12.67	Jul-89	Jan-92	Jul-94	3
Indonesia	21.75 ***	Dec-96	Apr-97	Aug-97	2	20.68 ***	Apr-92	May-92	Jun-92	2
Jordan	5.94	Feb-79	Apr-82	Jun-85	0	30.18 ***	Nov-91	Apr-92	Sep-92	1
Korea	10.62 **	Sep-92	Nov-94	Jan-97	0	92.49 ***	Dec-90	Feb-91	Apr-91	1
Malaysia	12.53 **	Jun-95	Jul-96	Aug-97	0	10.32 *	May-90	Feb-91	Nov-91	1
Mexico	22.69 ***	Jan-86	Oct-87	Jul-89	3	11.92 **	Oct-84	May-86	Dec-87	1
Nigeria	2.56		Jun-87	Aug-97	3	5.55	Feb-94	Jun-95	Oct-96	1
Pakistan	13.01 *	Jan-92	Dec-93	Nov-95	2	29.77 ***	Jan-96	Mar-96	May-96	2
Philippines	13.10 **	Nov-86	Aug-87	May-88	1	10.49	Aug-90	Oct-91	Dec-92	3
Portugal	17.19 *	Feb-87	May-88	Aug-89	4	19.49 ***	Jan-89	Apr-89	Jul-89	2
Taiwan	7.94 *	Feb-87	Feb-90	Feb-93	0	18.26	Jul-87	Apr-88	Jan-89	4
Thailand	21.38	Oct-93	Nov-94	Dec-95	4	15.33 **	Mar-89	Jan-90	Nov-90	1
Turkey	2.70		Aug-90	Jan-97	0	20.23	Aug-89	Oct-89	Dec-89	1
Venezuela	8.96	Apr-89	Feb-92	Dec-94	1	12.04	Jul-90	Mar-92	Nov-93	2
Zimbabwe	7.17	May-91	Mar-95		3	6.59	Feb-92	Jun-93	Oct-94	1

	Net equity flows to equity capitalization					Net bond flows to GDP				
Country	Statistic	5th Percentile	Median	95th Percentile	# of lags	Statistic	5th Percentile	Median	95th Percentile	# of lags
Argentina	37.50 ***	Jan-95	Jul-95	Jan-96	2	44.00 ***	Jul-92	Apr-93	Jan-94	0
Brazil	30.74 ***	Dec-88	Jan-90	Feb-91	1	9.44	May-89	Nov-92	May-96	0
Chile	11.31 *	Feb-85	Jan-88	Dec-90	1	2.08		May-84		0
Colombia	24.12 ***	Nov-92	Jul-93	Mar-94	0	55.08 ***	Sep-93	Feb-94	Jul-94	3
Greece	18.89 ***	Feb-90	Mar-92	Apr-94	1	15.29 **	Apr-93	Nov-94	Jun-96	0
India	82.20 ***	Feb-93	May-93	Aug-93	0	23.48 ***	Aug-94	May-95	Feb-96	2
Indonesia	5.40	May-93	Dec-95		0	29.62 ***	Jul-94	Jun-95	May-96	2
Jordan										
Korea	34.89 ***	Jun-95	Jan-96	Aug-96	2	24.42 ***	May-89	Dec-90	Jul-92	0
Malaysia	18.68 **	Feb-93	Feb-94	Feb-95	3	15.03 **	Jul-91	Jul-93	Jul-95	0
Mexico	7.77	Nov-87	Jul-90	Mar-93	1	13.59 **	Mar-87	Mar-90	Mar-93	0
Nigeria										
Pakistan	6.10	May-95	Dec-96		1	n.a.				
Philippines	26.62 ***	Sep-87	Jul-90	Mar-93	0	54.72 ***	Sep-95	Nov-95	Jan-96	4
Portugal	4.67	Sep-91	Jun-95		0	31.13 ***	Sep-94	May-95	Jan-96	4
Taiwan	5.31	Feb-92	Jun-95		1	21.93 **	Jun-91	Nov-91	Apr-92	4
Thailand	34.91 ***	Jan-96	Jul-96	Jan-97	4	29.07 ***	Aug-94	May-95	Feb-96	0
Turkey	5.05	Sep-94	Nov-96		0	39.70 ***	May-92	Jul-92	Sep-92	4
Venezuela	3.34	Dec-92	Aug-96		0	1.62		Dec-90		0
Zimbabwe										

Univariate break tests based on the methods of Bai, Lumsdaine, Stock (1998). Test is computed from an autoregression, where the number of lags is chosen by the BIC, and is the maximum over all possible break dates $k^*+1 \leq k \leq T-k^*$ of an F-statistic testing the hypothesis that all coefficients in the autoregression break at date k. k^* is the trimming value, taken to be 15T, where T is the sample size. Critical values for the statistic are given in BHL (1998). The estimated break date is given by the column labeled "Median", with corresponding 90% confidence interval given by the columns labeled "5th Percentile" and "95th Percentile". Blanks in these latter two columns indicate that the estimated confidence interval exceeded the sample size. Significance of the break tests at the 10, 5, and 1% levels are denoted by *, **, and ***, respectively.

Table 3
Multivariate Break Tests

	Trivariate tests: Equity flows, dividend yields, returns					Quadravariate tests: World interest rates, equity flows, dividend yields, returns					Quintravariate tests: World interest rates, bond flows, equity flows, div. yields, returns				
Country	Statistic	5th Percentile	Median	95th Percentile	# of lags	Statistic	5th Percentile	Median	95th Percentile	# of lags	Statistic	5th Percentile	Median	95th Percentile	# of lags
Argentina	38.25 ***	Mar-95	Apr-95	May-95	1	40.42 **	Aug-94	Sep-94	Oct-94	1	126.84 **	May-94	Jun-94	Jul-94	3
Brazil	175.7 ***	Feb-90	Mar-90	Apr-90	3	198.68 ***	Feb-90	Mar-90	Apr-90	3	257.1 ***	Feb-90	Mar-90	Apr-90	3
Chile	84.35 ***	Mar-85	Apr-85	May-85	3	91.15 ***	Feb-85	Mar-85	Apr-85	3	149.24 ***	Dec-85	Jan-86	Feb-86	3
Colombia	79.43 ***	Apr-94	May-94	Jun-94	2	90.77 ***	Apr-94	May-94	Jun-94	2	128.07 ***	Apr-94	May-94	Jun-94	2
Greece	50.35 ***	Jun-88	Jul-88	Aug-88	2	70.8 **	Jun-88	Jul-88	Aug-88	3	99.86 **	Jun-88	Jul-88	Aug-88	3
India	78.6 ***	Feb-93	Mar-93	Apr-93	3	73.44 **	Mar-92	Apr-92	May-92	3	117.68 **	Mar-93	Apr-93	May-93	2
Indonesia	140.72 ***	Apr-97	May-97	Jun-97	2	191.93 ***	Apr-97	May-97	Jun-97	3	203.82 ***	Apr-97	May-97	Jun-97	3
Jordan															
Korea	96.6 ***	Dec-95	Jan-96	Feb-96	3	122.89 ***	Aug-95	Sep-95	Oct-95	3	591.9 ***	Mar-96	Apr-96	May-96	3
Malaysia	70.25 ***	May-96	Jun-96	Jul-96	3	81.97 ***	Jun-96	Jul-96	Aug-96	3	136.14 ***	Jul-96	Aug-96	Sep-96	3
Mexico	67.53 ***	Aug-87	Sep-87	Oct-87	3	106.13 ***	Aug-87	Sep-87	Oct-87	3	140.33 ***	Sep-87	Oct-87	Nov-87	3
Nigeria															
Pakistan	31.52 **	Nov-96	Dec-96	Jan-97	1	53.77 ***	Nov-96	Dec-96	Jan-97	1	135.36 ***	Jul-97	Aug-97	Sep-97	1
Philippines	52.46	Jul-88	Aug-88	Sep-88	3	99.4 ***	Feb-88	Mar-88	Apr-88	3	163.4 ***	Nov-88	Dec-88	Jan-89	3
Portugal	89.84 ***	Apr-89	May-89	Jun-89	3	106.07 ***	Jan-89	Feb-89	Mar-89	3	172.18 ***	May-96	Jun-96	Jul-96	3
Taiwan	59.13 **	Mar-88	Apr-88	May-88	3	109.69 ***	Mar-88	Apr-88	May-88	3	178.77 ***	Mar-88	Apr-88	May-88	3
Thailand	117.18 ***	May-96	Jun-96	Jul-96	3	132.3 ***	May-96	Jun-96	Jul-96	3	180.52 ***	May-96	Jun-96	Jul-96	3
Turkey	144.53 ***	Dec-96	Jan-97	Feb-97	3	182.85 ***	Dec-96	Jan-97	Feb-97	3	229.4 ***	Dec-96	Jan-97	Feb-97	3
Venezuela	128.14 ***	Jul-96	Aug-96	Sep-96	3	152.34 ***	Jul-96	Aug-96	Sep-96	3	183.38 ***	Aug-96	Sep-96	Oct-96	3
Zimbabwe															

Multivariate break tests based on the methods of Bai, Lumsdaine, Stock (1998), testing the null hypothesis of no structural change against the alternative of a single break. The test is computed from a VAR, where the number of lags is chosen by the BIC, and is analogous to the univariate tests in Table 2. In the quadravariate and quintravariate tests, only the returns, dividend yields, and flows are allowed to break, that is, the test does not let the variables in the world interest rate equation break. See also notes to Table 2.

Table 4

Tests that Allow for Multiple Breaks

	Log returns				Log dividend yield				Net equity flows to equity capitalization				Net bond flows to GDP			
Country	5th Percentile	Median	95th Percentile	Signif	5th Percentile	Median	95th Percentile	Signif	5th Percentile	Median	95th Percentile	Signif	5th Percentile	Median	95th Percentile	Signif
Argentina 1		No Break		not	Mar-92	May-92	Nov-93	1.0%	Mar-92	Dec-92	Feb-93	2.5%	Aug-80	May-81	Sep-81	10.0%
Argentina 2									Oct-94	Aug-95	Dec-95	2.5%	Feb-93	Mar-93	Apr-93	10.0%
Brazil 1	Feb-84	May-87	Jun-90	10.0%		Jan-91		not		No Break		not		No Break		not
Brazil 2						Feb-95		not		No Break		not		No Break		not
Chile 1	Oct-81	Mar-83	Jan-85	1.0%		Nov-90		not		No Break		not		No Break		not
Chile 2						Nov-94		not		No Break		not		No Break		not
Colombia 1	Feb-90	Feb-92	Jun-93	2.5%	Jan-91	Oct-91	Dec-91	5.0%		No Break		not		No Break		not
Colombia 2					Oct-93	Feb-94	Jun-95	2.5%		No Break		not		No Break		not
Greece		No Break		not	Dec-86	Jul-88	Sep-90	1.0%	Feb-90	Mar-92	May-92	10.0%		No Break		not
India		No Break		not		No Break		not	Apr-93	May-93	Jun-93	1.0%		No Break		not
Indonesia		No Break		not	Feb-92	Apr-92	Jun-92	1.0%		No Break		not	Mar-94	Feb-96	Oct-96	10.0%
Jordan 1				not	Oct-91	Apr-92	Jul-92	1.0%		No Data				No Data		
Jordan 2				not	Aug-94	Feb-95	Nov-95	1.0%		No Data				No Data		
Korea 1		No Break		not	Sep-89	Feb-91	Apr-91	1.0%	Sep-95	Jul-96	Oct-96	1.0%	Oct-90	Nov-90	Dec-90	1.0%
Korea 2									Aug-86	Dec-86	Aug-87	10.0%		No Break		10.0%
Korea 3									Aug-91	Oct-92	Dec-92	10.0%		No Break		10.0%
Malaysia		No Break		not	Jul-90	Jan-91	Feb-93	5.0%		No Break		not		No Break		not
Mexico 1	Apr-84	Mar-86	Oct-87	5.0%	Jan-82	Jan-83	Jul-83	5.0%		No Break		not		No Break		not
Mexico 2	Sep-94	May-95	Jun-96	5.0%	Apr-86	Jul-86	Dec-86	5.0%		No Break		not		No Break		not
Mexico 3					Aug-90	Mar-91	Feb-92	5.0%		No Break		not		No Break		not
Nigeria	Mar-95	May-95	Oct-96	1.0%		No Break		not		No Data				No Data		
Pakistan 1		No Break		not	Oct-90	Dec-90	Apr-91	5.0%		No Break		not		No Break		not
Pakistan 2					Apr-95	Mar-96	Jun-96	5.0%		No Break		not		No Break		not
Philippines 1	May-87	Aug-87	Jun-88	10.0%		No Break		not		No Break		not		No Break		not
Philippines 2	Jan-88	Jul-89	Jan-90	10.0%		No Break		not		No Break		not		No Break		not
Portugal		No Break		not		No Break		not		No Break		not	Sep-90	Jan-92	Aug-92	1.0%
Taiwan 1	Apr-86	Oct-87	Oct-88	10.0%		No Break		not		No Break		not	Mar-90	Apr-90	May-90	2.5%
Taiwan 2													Nov-90	Oct-91	May-93	2.5%
Thailand 1		No Break		not	Feb-89	Jan-90	Mar-90	2.5%	Jul-87	Aug-88	Mar-89	1.0%		No Break		1.0%
Thailand 2					Sep-92	Apr-93	Sep-94	10.0%								
Turkey	Feb-93	May-94	May-96	10.0%	Jun-89	Sep-89	Sep-90	10.0%		Dec-91		not	Mar-92	Jun-92	Jul-96	not
Venezuela		No Break		not		No Break		not		No Break		not		No Break		not
Zimbabwe		No Break		not		No Break		not		No Data				No Data		

Multiple break tests use the repartition methods of Bai and Perron (1998a,b), which allow for a maximum of 5 breaks with 15% trimming. All tests are performed assuming 2 lags in the autoregression. Estimated break dates are given in the column labeled "median", along with corresponding confidence intervals in the columns labeled "5th Percentile" and "95th Percentile". The significance level reports the lowest significance level for which the repartition procedure found each specific date to be significant.

Table 5
Selection of Break Dates

Country	Date	Series	Reason
Argentina	May-92	dy-BP	Also dy-15%. Close to Eq.Flow-BP (Dec-92). Follows introduction of Argentine Fund (Oct-91) which is the first time U.S. investors could access this market in modern times.
Brazil	Mar-90	Quad/Quint	Close to dy-15% (Nov-90) and Eq.Flows-15% (Jan-90). Official is May-91. Exactly coincides with introduction of Collor Plan (Mar-90).
Chile	Nov-90	dy-BP	Close to Official (Jan-92). Quad identifies the debt crisis. Shortly follows introduction of reform package (Apr-90), major ADR (July-90) and renewal of Andean Pact (Nov-90).
Colombia	Oct-91	dy-BP1	Close to official (Feb-91). Eq.Flows-15% follows (Jul-93). Exact month that Peso deregulated (Oct-91). In addition, exact month that foreign country funds is allowed to have up to 10% of ownership and foreign firms are permitted to remit 100% of profits.
Greece	Jul-88	Quad/Quint	Also dy-BP date. Official (Dec-87). Closely coincides with date of first ADR (Aug-88).
India	Apr-92	Quad	Close to dy-15% (Jan-92) and Eq.Flows-15% (May-93). Official is Nov-92. Closely follows establishment of Securities Exchange Board (Jan-92). In addition, the first ADR is Feb-92.
Indonesia	May-92	dy-BP	Official Sep-89. Equity and bond flows break much later. First ADR lauched Feb-92. Foreign Board for trading by foreigners established in July-92.
Jordan	Apr-92	dy-BP	Official is Dec-95. Closely precedes the lifting of controls on outbound and inbound direct investments; allowance of private holding of foreign exchange and other financial assets, and provision of market access to foreign financial institutions in 1993.
Korea	Oct-92	Eq.Flows-BP3	Close to dy-15% (Feb-91). Official is Jan-92. Foreigners can own up to 10% of stocks in selected industries (Jan-92). More industries included in May-92.
Malaysia	Feb-91	dy-BP	Exactly coincides with the Privatization Master Plan (Feb-91). Precedes the Outline Perspective Plan in Jun-91 which encouraged foreign investment and privatization. Official date is earlier Dec-88.
Mexico	Mar-91	dy-BP3	Corresponds to Eq. Flows-15% (Jul-90). Closely follows Telmex privatization in Dec-90 and the initiation of NAFTA talks in Feb-90 and bond flows in Mar-90. Official is earlier, May-89.
Nigeria	Jun-95	dy-15%	Official is Aug-95 but earlier in 1995 the Budget called for the opening of markets to foreign portfolio investors. Hence, the market might have anticipated the official introduction of the Nigerian Investment Decree in Aug-95.
Pakistan	Dec-90	dy-BP1	Very close to Official in Feb-91. Indeed, the annoucement of the liberalizations that were implement in Feb-91 was made in Nov-90.
Philippines	Jul-90	Eq. Flows-15%	Close to dy-15% (Oct-91). Official is Jun-91. Follows major bank restructuring agreement in Feb-90. First ADR is Mar-91.
Portugal	Feb-89	Quad	Close to dy-15%. Official is Jul-86. Portugal Fund launched in Aug-87. Precedes privatization law in Mar-90.
Taiwan	Apr-88	Quad/Quint	Also dy-15% date. Exchange controls lifted in Jul-87. Official is later, in Jan-91.
Thailand	Aug-88	Eq. Flows-BP	Official Sep-87 when Alien Board introduced. dy-15% is Jan-90 which seems late.
Turkey	Oct-89	dy-BP	Jul-89 communique stating that markets will be open to foreigners. Official in Aug-89. Turkish Investment Fund in Dec-89. Eq.Flow-BP is later, in Dec-91 and Bond Flow-BP is Jun-92.
Venezuela	Mar-92	dy-15%	Official Jun-90 but first ADR is later, in Aug-91. Major privatizations in Sep-91 and Nov-91. All other estimations strongly influenced by 1997-98.
Zimbabwe	Jun-93	dy-15%	Official is same date when new investment guidelines took effect. However, break is not significant.

The dating involves a joint examination of quadravariate (Quad), dividend yield 15% (dy-15%) and 5% trim, net capital flows to equity 15% (Flow-15%) and 5% trim, the Bai-Perron (BP1, BP2, BP3) dates which estimate up to three breaks, plus official liberalizations (Official) in Bekaert and Harvey (1998a). We also consulted with the chronology of important financial, economic and political events in Bekaert and Harvey (1998b).

Table 6

Pre-Post analysis of the variables used in vector autoregressions

		Dividend yield		Net bond flows/GDP		Net equity flows/mrk		Log returns	
Country		Mean	Std.dev.	Mean	Std.dev.	Mean	Std.dev.	Mean	Std.dev.
Argentina	Full	1.559	1.372	0.00018	0.00088	0.00075	0.00547	0.0116	0.2138
	Pre	1.125	1.318	-0.00002	0.00008	-0.00023	0.00452	0.0159	0.2458
	Post	2.639	0.783	0.00066	0.00154	0.00320	0.00674	0.0011	0.0963
Brazil	Full	5.494	4.403	0.00007	0.00064	0.00085	0.00205	0.0083	0.1602
	Pre	7.029	4.078	0.00000	0.00004	0.00024	0.00119	0.0056	0.1566
	Post	3.069	3.775	0.00019	0.00103	0.00180	0.00268	0.0126	0.1664
Chile	Full	4.946	2.022	-0.00027	0.00191	0.00034	0.00139	0.0177	0.0966
	Pre	5.779	2.022	-0.00026	0.00088	0.00021	0.00138	0.0188	0.1067
	Post	3.441	0.760	-0.00030	0.00299	0.00057	0.00139	0.0158	0.0756
Colombia	Full	4.655	3.119	0.00011	0.00087	0.00057	0.00206	0.0206	0.0797
	Pre	7.377	2.503	-0.00003	0.00011	-0.00005	0.00080	0.0224	0.0580
	Post	2.269	0.737	0.00044	0.00150	0.00120	0.00268	0.0187	0.0971
Greece	Full	5.593	3.299	0.00002	0.00027	0.00020	0.00185	0.0054	0.0948
	Pre	6.173	3.915	-0.00001	0.00005	-0.00010	0.00200	-0.0038	0.0865
	Post	4.926	2.242	0.00005	0.00039	0.00055	0.00162	0.0161	0.1029
India	Full	2.613	1.350	-0.00065	0.00240	0.00014	0.00041	0.0088	0.0793
	Pre	3.172	1.186	-0.00102	0.00268	0.00001	0.00008	0.0167	0.0725
	Post	1.247	0.456	0.00025	0.00103	0.00045	0.00066	-0.0103	0.0916
Indonesia	Full	1.368	0.695	0.00007	0.00033	0.00147	0.00259	-0.0191	0.1300
	Pre	0.276	0.159	0.00000	0.00004	0.00101	0.00142	-0.0150	0.1045
	Post	1.633	0.481	0.00023	0.00059	0.00164	0.00292	-0.0207	0.1391
Korea	Full	3.819	2.846	0.00011	0.00068	0.00069	0.00188	0.0035	0.0998
	Pre	4.632	1.593	0.00000	0.00027	0.00024	0.00090	0.0102	0.0885
	Post	1.593	0.549	0.00040	0.00120	0.00193	0.00300	-0.0148	0.1247
Malaysia	Full	1.990	0.624	0.00015	0.00195	0.00020	0.00065	-0.0002	0.0960
	Pre	2.160	0.398	-0.00007	0.00118	0.00022	0.00044	0.0061	0.0860
	Post	1.870	0.722	0.00056	0.00286	0.00018	0.00078	-0.0055	0.1037
Mexico	Full	4.298	4.172	0.00032	0.00178	0.00111	0.00404	0.0132	0.1337
	Pre	5.743	4.496	0.00015	0.00195	0.00077	0.00254	0.0155	0.1457
	Post	1.506	0.422	0.00064	0.00132	0.00175	0.00592	0.0089	0.1076
Pakistan	Full	4.496	2.619	0.00002	0.00024	0.00039	0.00229	0.0042	0.0828
	Pre	7.709	0.789	0.00000	0.00000	0.00000	0.00020	0.0101	0.0299
	Post	2.765	1.882	0.00006	0.00040	0.00069	0.00303	-0.0005	0.1073
Philippines	Full	1.540	1.476	0.00012	0.00105	0.00054	0.00239	0.0175	0.1039
	Pre	2.263	1.906	-0.00008	0.00028	0.00005	0.00313	0.0443	0.1042
	Post	0.913	0.534	0.00047	0.00162	0.00087	0.00162	-0.0009	0.1001
Portugal	Full	2.456	1.128	-0.00002	0.00016	0.00101	0.00397	0.0206	0.1045
	Pre	1.006	0.544	0.00000	0.00002	0.00015	0.00069	0.0515	0.1796
	Post	2.802	0.939	-0.00003	0.00023	0.00129	0.00452	0.0108	0.0628
Taiwan	Full	0.994	0.541	-0.00017	0.00043	0.00003	0.00028	0.0131	0.1331
	Pre	1.677	0.701	-0.00003	0.00007	0.00002	0.00026	0.0400	0.1469
	Post	0.832	0.334	-0.00033	0.00058	0.00004	0.00029	0.0046	0.1279

Table 6 (continued)

Pre-Post analysis of the variables used in vector autoregressions

		Dividend yield		Net bond flows/GDP		Net equity flows/mrk		Log returns	
Country		Mean	Std.dev.	Mean	Std.dev.	Mean	Std.dev.	Mean	Std.dev.
Thailand	Full	5.523	3.311	0.00004	0.00043	0.00030	0.00098	0.0056	0.0962
	Pre	7.680	2.860	-0.00001	0.00013	0.00035	0.00100	0.0165	0.0736
	Post	3.005	1.557	0.00011	0.00061	0.00024	0.00096	-0.0070	0.1162
Turkey	Full	4.349	2.205	0.00001	0.00013	0.00049	0.00240	0.0177	0.1803
	Pre	7.275	2.917	0.00000	0.00002	-0.00006	0.00052	0.0535	0.2191
	Post	3.708	1.352	0.00002	0.00020	0.00066	0.00272	0.0064	0.1659
Venezuela	Full	1.648	0.914	0.00015	0.00287	0.00001	0.00396	0.0083	0.1409
	Pre	1.394	0.914	0.00021	0.00329	-0.00010	0.00158	0.0266	0.1383
	Post	1.890	0.847	0.00001	0.00146	0.00015	0.00557	-0.0123	0.1418
All countries	Full	3.373	2.123	0.00002	0.00100	0.00053	0.00227	0.0092	0.1192
	Pre	4.263	1.900	-0.00007	0.00065	0.00016	0.00133	0.0197	0.1201
	Post	2.359	1.081	0.00020	0.00115	0.00101	0.00277	0.0014	0.1134
Latin America	Full	3.767	2.667	0.00009	0.00149	0.00061	0.00316	0.0133	0.137
	Pre	4.741	2.555	0.00001	0.00106	0.00014	0.00200	0.0175	0.142
	Post	2.469	1.221	0.00027	0.00164	0.00145	0.00416	0.0074	0.114
Asia	Full	2.539	1.582	0.00005	0.00081	0.00054	0.00146	0.0034	0.110
	Pre	3.115	1.270	-0.00003	0.00033	0.00032	0.00119	0.0170	0.101
	Post	1.641	0.696	0.00024	0.00124	0.00082	0.00159	-0.0074	0.119
Rely on stocks	Full	3.379	1.901	0.00002	0.00103	0.00051	0.00188	0.0108	0.0995
	Pre	3.920	1.554	-0.00007	0.00046	0.00020	0.00126	0.0246	0.1064
	Post	2.271	0.844	0.00020	0.00159	0.00085	0.00205	-0.0003	0.0972
Rely on bonds	Full	3.144	2.363	0.00013	0.00112	0.00076	0.00340	0.0044	0.1436
	Pre	3.879	1.959	0.00006	0.00090	0.00028	0.00191	0.0098	0.1368
	Post	2.250	1.365	0.00030	0.00105	0.00154	0.00448	-0.0018	0.1264
Top External	Full	3.135	2.389	0.00016	0.00147	0.00060	0.00301	0.0075	0.1407
	Pre	3.681	2.133	0.00005	0.00113	0.00019	0.00186	0.0133	0.1435
	Post	2.095	1.183	0.00041	0.00157	0.00150	0.00411	-0.0017	0.1234
Bottom External	Full	3.364	1.885	-0.00016	0.00105	0.00027	0.00144	0.0111	0.0984
	Pre	4.462	1.753	-0.00024	0.00066	0.00003	0.00117	0.0210	0.0911
	Post	2.354	1.035	0.00004	0.00117	0.00053	0.00143	0.0041	0.1009

All countries represents an equally weighted average across all countries. Asia is equally-weighted across six Asian countries (Indonesia, Korea, Malaysia, Philippines, Taiwan and Thailand), and Latin is equally weighted across six Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico and Venezuela). We also report equally-weighted across the six countries that rely most on equity financing (Chile, Philippines, Malaysia, Portugal, Thailand and Korea), equally weighted across the six countries that rely most on bond financing (Venezeula, Mexico, Argentina, Pakistan, Indonesia and Brazil), equally weighted across the six countries that have the highest proportion of external financing, that is, the bond plus equity capital flows to GDP (Mexico, Malaysia, Venezuela, Argentina, Brazil, and Korea) and the six countries with the lowest proportion of external financing to GDP (Chile, Taiwan, Pakistan, the Philippines, Greece and India). The means and standard deviations are estimated over the full sample, the pre-break sample and the post-break sample. The break dates for each country are presented in Table 5.

Table 7
Changes in capital flows after breaks

	Net equity flows			*Net bond flows*		
Country	Intercept	Break	3-yrs post	Intercept	Break	3-yrs post
Argentina	-0.00023	0.00613	-0.00526	-0.00002	0.00053	0.00029
	-0.69	4.04	-3.13	-2.34	2.92	0.87
Brazil	0.00030	0.00135	0.00019	-0.00001	0.00012	0.00014
	2.13	2.06	0.27	-0.98	1.54	0.89
Chile	0.00021	0.00015	0.00035	-0.00026	-0.00042	0.00063
	1.71	0.52	0.86	-3.09	-1.16	1.09
Colombia	-0.00005	0.00124	0.00007	-0.00004	0.00020	0.00052
	-0.53	2.75	0.11	-3.66	1.59	1.92
Greece	-0.00010	0.00024	0.00059	-0.00001	-0.00001	0.00011
	-0.57	1.30	1.92	-2.52	-1.04	2.23
India	0.00001	0.00027	0.00032	-0.00102	0.00102	0.00047
	1.49	3.24	2.02	-3.15	3.16	2.19
Indonesia	0.00080	0.00159	-0.00132	0.00000	0.00017	0.00011
	3.03	2.65	-1.97	0.66	2.04	0.75
Korea	0.00024	0.00102	0.00141	0.00024	0.00102	0.00141
	2.24	4.19	1.70	2.24	4.19	1.70
Malaysia	0.00022	0.00025	-0.00050	-0.00007	-0.00004	0.00112
	3.19	1.19	-2.27	-0.63	-0.15	2.35
Mexico	0.00077	0.00350	-0.00427	0.00015	0.00063	-0.00022
	3.25	2.70	-3.17	1.00	2.00	-0.65
Pakistan	0.00000	0.00026	0.00071	0.00000	0.00001	0.00008
	-0.04	2.10	1.20	-0.20	1.11	1.14
Philippines	0.00005	0.00089	-0.00010	-0.00008	-0.00010	0.00105
	0.10	1.40	-0.24	-2.68	-1.09	3.42
Portugal	0.00015	0.00042	0.00106	0.00000	-0.00007	0.00006
	1.47	2.23	1.72	-3.00	-3.40	1.99
Taiwan	0.00002	-0.00002	0.00006	-0.00003	-0.00011	-0.00027
	0.39	-0.45	1.15	-4.53	-1.69	-1.82
Thailand	0.00035	-0.00003	-0.00012	-0.00001	-0.00005	0.00025
	2.20	-0.15	-0.63	-1.19	-0.76	2.54
Turkey	-0.00006	0.00089	-0.00026	0.00000	0.00005	-0.00005
	-0.77	3.41	-0.58	-1.17	1.29	-1.14
Venezuela	-0.00010	0.00066	-0.00079	0.00021	-0.00022	0.00004
	-0.60	1.13	-0.61	0.89	-0.82	0.13

Table 7 (continued)
Changes in capital flows after breaks

	Net equity flows			Net bond flows		
Group	Intercept	Break	3-yrs post	Intercept	Break	3-yrs post
All countries		0.00116	-0.00046		0.00012	0.00022
		7.56	-2.75		2.82	3.51
Asia		0.00046	0.00003		0.00018	0.00040
		4.72	0.23		2.55	3.51
Latin		0.00219	-0.00154		0.00014	0.00022
		5.97	-3.72		1.43	1.50
Rely on stocks		0.00043	0.00024		-0.00007	0.00054
		3.82	1.39		-0.82	3.86
Rely on bonds		0.00236	-0.00168		0.00021	0.00006
		6.06	-3.97		2.75	0.68
Top external		0.00224	-0.00154		0.00021	0.00029
		6.18	-3.69		2.33	2.08
Bottom external		0.00032	0.00031		0.00008	0.00026
		3.31	2.55		1.05	2.27

Based on a regression with two indicator variables. The first indicator takes the value of one after a break. The second indicator takes on the value of one three years after the break. There are seven pooled estimations: all countries, six Asian countries (Indonesia, Korea, Malaysia, Phillipines, Taiwan and Thailand), six Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico and Venezuela), the six countries that rely most on equity financing (Chile, Philippines, Malaysia, Portugal, Thailand and Korea), the six countries that rely most on bond financing (Venezeula, Mexico, Argentina, Pakistan, Indonesia and Brazil), the six countries that have the highest proportion of external financing, that is, the bond plus equity capital flows to GDP (Mexico, Malaysia, Venezuela, Argentina, Brazil, and Korea) and the six countries with the lowest proportion of external financing to GDP (Chile, Taiwan, Pakistan, the Philippines, Greece and India). The break dates for each country are presented in Table 5. All regressions have heteroskedasticity-consistent standard errors. The pooled regressions allow for fixed effects.
The values below each coefficient represent the t-statistic.

Table 8
Dynamic analysis

Response	Sample		k=12	k=36	k=60	cumk=12	cumk=36	cumk=60	infinity
World interest rates to future capital flows	Full	3rd country	-0.0266	-0.0239	-0.0189	-0.3085	-0.9336	-1.3780	-5.4601
		15th country	0.0030	0.0025	0.0023	0.0379	0.1033	0.1610	1.1055
		Equal weight	0.0417	0.0298	0.0218	0.5407	1.3825	1.9912	3.2902
		Latin America	-0.0162	-0.0141	-0.0123	-0.2000	-0.5608	-0.8757	-3.3893
		Asia	0.1452	0.1079	0.0809	1.8663	4.8600	7.0958	13.8710
	Pre	3rd country	-0.0184	-0.0042	-0.0018	-0.2340	-0.2815	-0.5429	-0.3899
		15th country	0.0077	0.0101	0.0063	0.1355	0.4939	0.2408	0.3739
		Equal weight	-0.0284	0.0431	0.1366	-0.1970	0.6765	-1.8065	0.8426
		Latin America	0.0024	0.0011	0.0003	0.0283	0.0699	0.0844	0.1073
		Asia	-0.0778	0.1380	0.4407	-0.5425	2.1373	-4.1233	2.2270
	Post	3rd country	-0.0194	-0.0155	-0.0047	-0.4688	-0.7078	-1.1395	-1.5049
		15th country	0.0327	0.0057	0.0019	0.8146	1.0514	1.0640	1.0647
		Equal weight	0.0061	0.0335	0.0974	0.0435	0.4887	1.9761	1.7526
		Latin America	-0.0099	-0.0060	-0.0019	-0.0176	-0.2356	-0.3197	-0.3635
		Asia	-0.0051	-0.0007	-0.0003	-0.1356	-0.1784	-0.1883	-0.1542
World interest rates to future dividend yields	Full	3rd country	-19.77	-18.34	-15.69	-228.26	-691.70	-1098.70	-2096.00
		15th country	20.02	17.42	15.95	248.81	672.84	1053.90	4397.40
		Equal weight	3.51	2.29	0.80	43.86	114.43	150.21	1061.50
		Latin America	4.07	3.39	3.09	53.36	140.96	218.30	1102.10
		Asia	-1.62	2.00	3.43	-33.65	-21.59	47.28	1119.20
	Pre	3rd country	-3.22	-4.24	-6.00	-39.53	-111.04	-280.86	-547.33
		15th country	15.11	10.72	5.71	179.57	490.91	625.31	849.63
		Equal weight	-8.75	41.28	-19.04	16.11	384.86	-807.47	193.49
		Latin America	7.19	2.77	0.37	97.21	212.45	244.21	236.68
		Asia	-34.69	113.42	-51.29	-88.02	798.43	-2588.60	141.00
	Post	3rd country	-17.37	-8.65	-7.04	-254.19	-639.35	-878.84	-1921.20
		15th country	12.90	4.94	3.12	143.11	337.66	387.38	438.63
		Equal weight	9.75	29.08	80.52	93.40	532.26	1774.50	-432.55
		Latin America	-5.49	-5.15	-3.77	-60.82	-191.63	-298.70	-484.82
		Asia	-2.06	-1.46	-1.26	-20.08	-58.44	-91.34	-205.83
World interest rates to future returns	Full	3rd country	-0.4422	-0.3686	-0.3080	-0.4624	-0.4225	-0.3879	-64.3090
		15th country	0.5452	0.4726	0.4110	0.6374	0.5245	0.4906	100.1000
		Equal weight	0.0742	0.0804	0.0617	0.0628	0.0744	0.0735	5.7032
		Latin America	0.0348	0.0496	0.0492	0.0240	0.0379	0.0427	15.0760
		Asia	0.2030	0.1657	0.1324	0.1941	0.1879	0.1717	32.5510
	Pre	3rd country	-1.3539	-0.8816	-0.5614	-1.4626	-1.2142	-1.1899	-116.9500
		15th country	0.4703	1.3315	0.3820	0.5216	1.8744	0.3558	115.5100
		Equal weight	-3.2545	2.7314	-0.9761	-1.8629	0.1978	-5.0227	-15.9680
		Latin America	-0.0793	0.0405	0.0260	-0.1701	-0.0530	-0.0173	-2.3594
		Asia	-8.0458	13.8800	17.5070	-4.7722	3.0041	-7.8864	-86.9220
	Post	3rd country	-1.6042	-0.5033	-0.3056	-2.4314	-1.2862	-0.8134	-70.7920
		15th country	1.2979	0.5596	0.4689	1.4222	1.2763	0.8150	96.3130
		Equal weight	-0.2725	-1.1221	-3.2031	-0.0969	-0.4803	-1.1041	-12.2110
		Latin America	0.0433	0.1353	0.0993	-0.0364	0.0625	0.0852	9.4885
		Asia	0.9303	0.3931	0.2868	1.3551	0.8231	0.6259	115.8200

Table 8 (continued)
Dynamic analysis

Response	Sample		k=12	k=36	k=60	cumk=12	cumk=36	cumk=60	infinity
Capital flows and future dividend yields	Full	3rd country	-111.73	-93.39	-73.97	-1374.60	-3807.10	-5879.20	-18791.00
		15th country	28.38	21.57	17.97	73.48	964.02	1434.10	3993.40
		Equal weight	-27.31	22.95	50.23	-490.41	-479.47	464.91	-1576.50
		Latin America	-37.72	-26.61	-22.32	-517.87	-1258.80	-1838.10	-6696.50
		Asia	-11.06	-11.11	-9.97	-99.79	-372.67	-625.30	-2451.50
	Pre	3rd country	-16.54	-9.15	-14.12	-325.23	-2981.90	-659.97	-2118.20
		15th country	51.07	15.20	6.16	1152.80	1027.20	1858.10	1891.00
		Equal weight	57.84	119.85	-797.21	932.48	-108.05	1518.00	2171.50
		Latin America	-11.50	-2.02	-1.43	-272.98	-382.54	-420.79	-537.29
		Asia	77.58	277.26	-2295.80	1636.00	-3114.70	320.83	-38.55
	Post	3rd country	-16.95	-1.75	-0.58	-445.25	-563.99	-567.52	-565.10
		15th country	15.52	15.45	5.90	176.83	546.87	919.73	1937.00
		Equal weight	0.88	-6.57	-28.48	16.76	-34.97	-424.62	-77.44
		Latin America	-4.46	-0.28	0.30	-116.65	-153.65	-150.99	-123.13
		Asia	8.20	12.95	13.52	102.04	370.81	692.88	4358.00
Capital flows and future returns	Full	3rd country	-1.7099	-1.3234	-1.1586	-1.5361	-1.4947	-1.3888	-220.2200
		15th country	1.3486	0.5614	0.4938	1.8827	1.2955	1.1760	190.4400
		Equal weight	-1.2650	-1.2243	-0.6136	-0.4675	-1.0361	-0.9953	-14.0790
		Latin America	0.0368	-0.0255	-0.0332	0.2356	0.0749	0.0326	-12.9360
		Asia	0.5222	-0.0588	-0.0893	2.3128	0.8396	0.4706	11.5700
	Pre	3rd country	-3.2623	-3.1320	-3.9609	-5.9263	-8.1229	-6.8014	-53.0040
		15th country	1.2004	0.3341	0.0447	2.6861	0.9152	0.5124	70.6110
		Equal weight	0.1064	28.1930	-167.2200	5.8864	-5.4701	-7.8867	-66.3770
		Latin America	-0.0535	-0.2701	-0.1430	0.4784	-0.0061	-0.0848	-11.0290
		Asia	3.4527	87.5890	-452.0200	21.1420	-10.5430	-13.9070	-79.9920
	Post	3rd country	-0.1451	-0.0212	-0.0041	-0.1238	-0.0674	-0.0446	-12.6570
		15th country	3.3869	1.7917	1.6850	5.0591	4.2570	2.6447	141.2800
		Equal weight	1.4284	1.4957	2.2963	2.4706	1.7563	1.7887	-1332.8000
		Latin America	-0.0225	0.0265	0.0080	0.1033	0.0559	0.0397	2.4257
		Asia	0.8740	0.4617	0.3981	3.3117	1.4720	1.0542	185.1700
Dividend yields and future capital flows	Full	3rd country	-0.00045	-0.00040	-0.00033	-0.00718	-0.01365	-0.02146	-0.07765
		15th country	0.00033	0.00017	0.00014	0.00602	0.01115	0.01478	0.04567
		Equal weight	0.00100	0.00081	0.00061	0.01198	0.03374	0.05055	0.09696
		Latin America	-0.00027	-0.00020	-0.00017	-0.00364	-0.00914	-0.01349	-0.05440
		Asia	0.00313	0.00257	0.00197	0.03762	0.10635	0.16037	0.32510
	Pre	3rd country	-0.00054	-0.00010	-0.00158	-0.00939	-0.00852	-0.03147	-0.01262
		15th country	0.00006	0.00006	0.00002	0.00105	0.00982	0.00319	0.00594
		Equal weight	-0.00044	0.00066	-0.00159	-0.00238	-0.00411	-0.03094	-0.03346
		Latin America	0.00004	-0.00002	-0.00001	0.00096	0.00092	0.00060	0.00060
		Asia	-0.00124	0.00196	-0.00423	-0.00717	-0.01076	-0.08264	-0.09540
	Post	3rd country	-0.00015	-0.00001	0.00000	-0.00588	-0.00462	-0.00543	-0.02422
		15th country	0.00044	0.00015	0.00009	0.00801	0.01374	0.01609	0.01565
		Equal weight	0.00023	0.00046	0.00112	0.00230	0.01025	0.02826	-0.01513
		Latin America	0.00006	0.00006	0.00003	0.00019	0.00183	0.00285	0.00370
		Asia	-0.00001	0.00002	0.00002	-0.00069	-0.00032	0.00010	0.00334

Table 8 (continued)
Dynamic analysis

Response	Sample		k=12	k=36	k=60	cumk=12	cumk=36	cumk=60	infinity
Dividend yields and future returns	Full	3rd country	-0.0026	-0.0047	-0.0047	-0.0051	-0.0030	-0.0037	-0.9501
		15th country	0.0164	0.0073	0.0062	0.0220	0.0134	0.0093	1.1955
		Equal weight	0.0057	0.0022	0.0018	0.0089	0.0051	0.0038	0.4075
		Latin America	0.0038	-0.0001	-0.0008	0.0056	0.0027	0.0014	-0.0267
		Asia	0.0102	0.0027	0.0020	0.0162	0.0087	0.0061	0.7366
	Pre	3rd country	-0.0099	-0.0071	-0.0059	-0.0107	-0.0053	-0.0079	-0.7110
		15th country	0.0329	0.0107	0.0071	0.0400	0.0256	0.0163	1.2432
		Equal weight	-0.0101	0.0643	-0.1771	0.0121	0.0083	-0.0283	0.7421
		Latin America	0.0127	0.0047	0.0023	0.0161	0.0105	0.0076	0.5456
		Asia	-0.0371	0.2069	-0.4057	0.0191	0.0240	-0.0576	1.1422
	Post	3rd country	-0.0119	-0.0093	-0.0049	-0.0279	-0.0099	-0.0079	-0.4163
		15th country	0.0136	0.0069	0.0038	0.0293	0.0164	0.0101	1.2548
		Equal weight	-0.0031	-0.0132	-0.0357	0.0019	-0.0048	-0.0121	1.2038
		Latin America	0.0001	-0.0024	-0.0013	0.0102	0.0017	0.0003	-0.0217
		Asia	0.0015	0.0019	0.0028	-0.0019	0.0003	0.0012	1.7486
Returns and future capital flows	Full	3rd country	-0.00016	-0.00009	-0.00004	-0.00178	-0.00490	-0.00680	-0.00668
		15th country	0.00039	0.00044	0.00038	0.00796	0.01501	0.02490	0.10027
		Equal weight	0.00000	0.00030	0.00073	0.00104	0.00431	0.01688	0.07665
		Latin America	0.00016	0.00004	0.00000	0.00432	0.00631	0.00673	-0.00439
		Asia	0.00162	0.00114	0.00083	0.02296	0.05537	0.07864	0.14708
	Pre	3rd country	-0.00029	-0.00014	-0.00298	-0.00327	-0.01677	-0.05999	-0.01232
		15th country	0.00013	0.00018	0.00003	0.00562	0.00390	0.00457	0.00529
		Equal weight	-0.00113	0.00598	-0.02074	0.00201	-0.01333	-0.12079	-0.05944
		Latin America	-0.00004	0.00001	0.00000	-0.00019	-0.00036	-0.00025	-0.00070
		Asia	-0.00318	0.01708	-0.05827	0.00554	-0.03639	-0.33420	-0.17078
	Post	3rd country	-0.00030	-0.00011	-0.00006	-0.00125	-0.00437	-0.00408	-0.00627
		15th country	0.00043	0.00007	0.00007	0.00967	0.01373	0.01713	0.01418
		Equal weight	0.00009	0.00012	0.00016	0.00484	0.00727	0.01055	-0.22599
		Latin America	-0.00007	-0.00004	-0.00002	0.00650	0.00507	0.00434	0.00356
		Asia	0.00004	-0.00001	0.00000	0.00280	0.00276	0.00264	0.00665
Returns and future returns	Full	3rd country	-0.0033	-0.0002	-0.0001	-0.0011	-0.0005	-0.0004	-0.0460
		15th country	0.0182	0.0150	0.0065	0.0356	0.0217	0.0188	2.3398
		Equal weight	0.0358	0.0247	0.0037	0.0532	0.0386	0.0289	1.0306
		Latin America	-0.0001	0.0042	0.0046	0.0183	0.0079	0.0066	1.3264
		Asia	-0.0038	0.0011	0.0014	0.0130	0.0042	0.0030	0.4261
	Pre	3rd country	-0.0182	-0.0004	-0.0047	-0.0119	-0.0066	-0.0038	-0.1458
		15th country	0.0332	0.0283	0.0111	0.0561	0.0263	0.0211	2.0902
		Equal weight	-0.0238	0.4397	-1.7645	0.0767	-0.0112	-0.1117	1.6506
		Latin America	0.0096	0.0050	0.0025	0.0238	0.0127	0.0090	0.6744
		Asia	-0.0758	1.2893	-4.8219	0.1856	-0.0322	-0.2760	2.5754
	Post	3rd country	-0.0077	-0.0004	-0.0003	-0.0092	-0.0028	-0.0024	0.0545
		15th country	0.0172	0.0095	0.0050	0.0563	0.0197	0.0119	3.8460
		Equal weight	0.0066	0.0040	0.0011	0.0213	0.0108	0.0075	7.7974
		Latin America	0.0008	0.0029	0.0013	0.0070	0.0047	0.0036	0.2566
		Asia	0.0232	0.0177	0.0145	0.0491	0.0296	0.0242	5.7920

For our analysis of dynamic regression coefficients, we report the coefficients at three horizons, k=12 (one year), k=36 (three years), and k=60 (five years). We also report the cumulative responses over these horizons, and the infinite cumulative response. To investigate the cross-sectional distribution of the coefficients across countries, we order the coefficients from low to high and report the coefficients for the third and 15th country (there are 17 countries). We also report the equally-weighted average over the six Latin American, over the six Asian countries and over all countries. The break dates are provided in Table 5.

Table 9
Granger causality tests

		Probability values from the null hypothesis that:						
Country		World interest rates do not Granger cause net equity flows	World interest rates do not Granger cause dividend yields	World interest rates do not Granger cause returns	Net equity flows do not Granger cause dividend yields	Net equity flows do not Granger cause returns	Returns do not Granger cause net equity flows	Dividend yields do not Granger cause net equity flows
Argentina	Full	0.951	0.652	0.283	0.927	0.438	0.819	0.955
	Pre	0.981	0.940	0.183	0.978	0.395	0.687	0.903
	Post	0.316	0.624	0.172	0.804	0.064	0.832	0.557
Brazil	Full	0.936	0.911	0.921	0.002	0.575	0.621	0.093
	Pre	0.940	0.962	0.885	0.000	0.008	0.024	0.157
	Post	0.090	0.028	0.071	0.029	0.454	0.305	0.733
Chile	Full	0.691	0.162	0.348	0.595	0.956	0.526	0.924
	Pre	0.806	0.268	0.121	0.208	0.991	0.586	0.607
	Post	0.406	0.986	0.340	0.082	0.938	0.697	0.234
Colombia	Full	0.146	0.298	0.051	0.581	0.310	0.913	0.000
	Pre	0.299	0.797	0.757	0.349	0.299	0.982	0.127
	Post	0.191	0.664	0.134	0.802	0.415	0.959	0.015
Greece	Full	0.535	0.093	0.765	0.496	0.129	0.481	0.947
	Pre	0.909	0.327	0.734	0.720	0.024	0.188	0.792
	Post	0.635	0.826	0.453	0.898	0.575	0.994	0.994
India	Full	0.901	0.588	0.978	0.879	0.051	0.507	0.774
	Pre	0.312	0.665	0.999	0.996	0.900	0.730	0.121
	Post	0.570	0.240	0.141	0.927	0.090	0.812	0.842
Indonesia	Full	0.995	0.308	0.290	0.187	0.511	0.307	0.669
	Pre	0.099	0.195	0.372	0.040	0.201	0.495	0.833
	Post	0.999	0.920	0.513	0.163	0.754	0.384	0.566
Korea	Full	0.741	0.953	0.049	0.934	0.010	0.000	0.981
	Pre	0.144	0.998	0.030	1.000	0.614	0.518	0.982
	Post	0.999	0.070	0.558	0.287	0.010	0.000	0.890
Malaysia	Full	0.948	0.876	0.340	0.413	0.023	0.092	0.125
	Pre	0.759	0.442	0.462	0.280	0.194	0.114	0.423
	Post	0.901	0.788	0.592	0.468	0.095	0.213	0.033
Mexico	Full	0.998	0.051	0.617	0.682	0.884	0.960	0.734
	Pre	0.871	0.111	0.189	0.326	0.302	0.996	0.455
	Post	0.575	0.214	0.726	0.623	0.647	0.994	0.510
Pakistan	Full	0.346	0.426	0.142	0.000	0.000	0.466	0.048
	Pre	0.545	0.090	0.458	0.943	0.702	0.495	0.862
	Post	0.532	0.277	0.205	0.000	0.015	0.844	0.179
Philippines	Full	0.015	0.444	0.597	0.415	0.831	0.563	0.499
	Pre	0.383	0.249	0.685	0.008	0.320	0.353	0.001
	Post	0.052	0.240	0.456	0.833	0.976	0.423	0.180
Portugal	Full	0.692	0.438	0.570	0.958	1.000	0.988	0.964
	Pre	0.527	0.889	0.903	0.963	0.795	0.738	0.977
	Post	0.750	0.133	0.281	0.820	0.983	0.985	0.907

Table 9 (continued)
Granger causality tests

		Probability values from the null hypothesis that:						
Country		World interest rates do not Granger cause net equity flows	World interest rates do not Granger cause dividend yields	World interest rates do not Granger cause returns	Net equity flows do not Granger cause dividend yields	Net equity flows do not Granger cause returns	Returns do not Granger cause net equity flows	Dividend yields do not Granger cause net equity flows
Taiwan	Full	0.598	0.697	0.819	0.956	0.651	0.759	0.408
	Pre	0.650	0.303	0.421	0.491	0.847	0.703	0.599
	Post	0.692	0.740	0.803	0.723	0.301	0.782	0.472
Thailand	Full	0.992	0.265	0.585	0.005	0.251	0.006	0.383
	Pre	0.996	0.159	0.349	0.326	0.001	0.069	0.137
	Post	0.562	0.490	0.589	0.013	0.202	0.187	0.538
Turkey	Full	0.951	0.928	0.040	0.996	0.331	0.303	0.490
	Pre	0.427	0.991	0.037	0.054	0.148	0.705	0.524
	Post	0.953	0.651	0.009	0.984	0.230	0.427	0.090
Venezuela	Full	0.990	0.167	0.296	0.288	0.526	0.938	0.546
	Pre	0.823	0.580	0.323	0.019	0.054	0.893	0.759
	Post	0.977	0.967	0.830	0.303	0.386	0.869	0.398

Granger causality analysis is based on quadravariate system of world interest rates, net equity capital flows, dividend yields and equity returns. The VARs are estimated over the full sample, the pre-break sample and the post-break sample. The break dates for each country are presented in Table 5.

Table 10
Analysis of VAR coefficients (post-break estimation)

VAR equation	Equal weighted	Value weighted	Asian	Latin	Rely on equity	Rely on bonds	Top external financing	Bottom external financing	Residual weights	3rd coefficient	15th coefficient
Equity flows on lagged flows	0.13197	0.13597	0.11331	0.12492	0.07810	0.15707	0.12796	0.20842	0.13505	-0.02454	0.29025
Equity flows on lagged returns	0.00187	0.00233	0.00086	0.00348	0.00120	0.00358	0.00342	0.00037	0.00160	-0.00053	0.00489
Returns on lagged equity flows	4.73779	6.67460	9.14452	1.92151	8.29190	1.28163	5.18139	4.51664	6.50328	-0.92257	10.63668

We report the VAR coefficient denoted in the first column from country specific estimations based in the post-break sample. Value weighting represents 17 countries weighted by their market capitalization in December 1991. Asia represents six Asian countries. Latin represents six Latin American countries. Rely on stocks are the six countries that tend to rely on stocks more than bonds for external financing since 1989. Rely on bonds are the six countries which tend to rely more on bonds for external financing. Top external are the six countries which have the largest proportion of cumulative net bond plus equity flows to GDP. Bottom external are the six countries with the smallest proportion of cumulative net bond plus equity flows to GDP. For the 3rd and 15th coefficient, we rank the coefficients across countries, eliminate "outliers", that is the smallest two and highest two and report the range from the remainder (min and max), (the 3rd and 15th coefficient given there are 17 countries).

Table 11
Cumulative impulse response analysis on post break sample

A. Interest rate shock on cumulative flows

Country group	k = 12	k = 36	k = 60
Equally weighted	0.00020	0.00069	0.00158
Value weighted	0.00011	0.00010	0.00026
Asia	0.00031	0.00040	0.00041
Latin	0.00003	0.00033	0.00044
Rely on Stocks	0.00033	0.00048	0.00054
Rely on Bonds	0.00006	0.00108	0.00340
Top External	0.00008	0.00024	0.00028
Bottom External	0.00036	0.00143	0.00388
3rd coefficient	-0.00022	-0.00045	-0.00063
15th coefficient	0.00101	0.00145	0.00172

B. Dividend yield shock on cumulative flows

k = 12	k = 36	k = 60
0.00004	0.00077	0.00253
0.00042	0.00074	0.00112
-0.00012	-0.00003	0.00003
-0.00037	-0.00032	-0.00025
-0.00014	-0.00001	0.00008
0.00014	0.00189	0.00667
-0.00019	-0.00021	-0.00017
0.00013	0.00197	0.00680
-0.00077	-0.00133	-0.00155
0.00100	0.00184	0.00216

C. Return shock on cumulative flows

k = 12	k = 36	k = 60
0.00012	0.00002	-0.00010
0.00012	0.00002	-0.00001
0.00011	0.00011	0.00011
0.00022	0.00004	0.00000
0.00011	0.00011	0.00010
0.00020	-0.00004	-0.00031
0.00014	-0.00002	-0.00004
0.00009	-0.00001	-0.00029
-0.00015	-0.00021	-0.00028
0.00044	0.00045	0.00046

D. Interest rate shock on average long-run returns

Country group	k = 12	k = 36	k = 60
Equally weighted	0.00054	-0.00018	-0.00061
Value weighted	0.00071	0.00007	-0.00008
Asia	0.00079	0.00016	0.00002
Latin	0.00125	0.00035	0.00015
Rely on Stocks	-0.00017	-0.00046	-0.00042
Rely on Bonds	0.00137	-0.00031	-0.00147
Top External	0.00156	0.00049	0.00027
Bottom External	0.00009	-0.00084	-0.00183
3rd coefficient	-0.00220	-0.00130	-0.00102
15th coefficient	0.00284	0.00130	0.00084

E. Net equity flow shock on average long-run returns

k = 12	k = 36	k = 60
0.00097	0.00040	0.00030
0.00127	0.00049	0.00033
0.00080	0.00038	0.00028
0.00122	0.00041	0.00025
0.00144	0.00061	0.00043
0.00086	0.00036	0.00034
0.00182	0.00072	0.00047
0.00053	0.00027	0.00030
-0.00079	-0.00032	-0.00019
0.00189	0.00091	0.00071

We analyze cumulative impulse response functions for two variables: average long run returns and change in equity holdings. The change in equity holdings is simply the cumulative sum of net equity capital flows. For the average long-run returns we examine shocks in capital flows and world interest rates. For the change in equity holdings we measure the effect of a shock in world interest rates, returns and dividend yields. The effects are calculated by summing the impulse response until k (in months) not including the contemporaneous effect. Equal weighting is an equal weighting of all 17 countries. Value weighting represents 17 countries weighted by their market capitalization in December 1991. Asia represents six Asian countries. Latin represents six Latin American countries. Rely on stocks are the six countries that tend to rely on stocks more than bonds for external financing since 1989. Rely on bonds are the six countries which tend to rely more on bonds for external financing. Top external are the six countries which have the largest proportion of cumulative net bond plus equity flows to GDP. Bottom external are the six countries with the smallest proportion of cumulative net bond plus equity flows to GDP. For the 3rd and 15th coefficient, we rank the coefficients across countries, eliminate "outliers", that is the smallest two and highest two and report the range from the remainder (min and max), (the 3rd and 15th coefficient given there are 17 countries). The VARs are estimated on the post-break sample. The break dates are detailed in Table 5.

Table 12

Important contemporaneous effects

Coefficient	Equal weighted	Value weighted	Asian	Latin	Rely on equity	Rely on bonds	Top external financing	Bottom external financing	Residual weights
nf on i	0.0623	-0.0571	0.0595	0.0322	0.0453	0.0793	-0.0216	0.1394	0.0761
dy on i	12.1828	14.4512	18.5580	13.3682	14.1802	14.6054	18.7088	4.2519	11.1440
r on i	-8.6653	-12.9565	-10.7128	-11.9839	-8.2843	-14.3773	-15.5770	-3.4362	-7.6166
dy on nf	-4.5355	-5.5996	-10.0817	-1.6151	-11.6468	-0.9537	-7.2108	-3.5636	-5.8819
r on nf	3.7190	5.3209	6.5492	2.3367	8.4707	-0.3618	7.7257	3.8889	5.6144
r on dy	-0.2945	-0.2724	-0.2988	-0.2985	-0.3070	-0.2928	-0.3091	-0.2753	-0.3225

The coefficients reported are based on the contemporaneous betas implied by the causal ordering of our VAR in the post-break estimation. That is, they are taken from the matrix B, where $\Sigma=BHB'$, where B is lower triangular and H has the variances of the structural shocks along its diagonal. Value weighting represents 17 countries weighted by their market capitalization in December 1991. Asia represents six Asian countries. Latin represents six Latin American countries. Rely on stocks are the six countries that tend to rely on stocks more than bonds for external financing since 1989. Rely on bonds are the six countries which tend to rely more on bonds for external financing. Top external are the six countries which have the largest proportion of cumulative net bond plus equity flows to GDP. Bottom external are the six countries with the smallest proportion of cumulative net bond plus equity flows to GDP. The variables are: the world interest rate (i), net equity flows (nf), dividend yields (dy) and returns (r).

Figure 1

Asset Prices and Market Integration

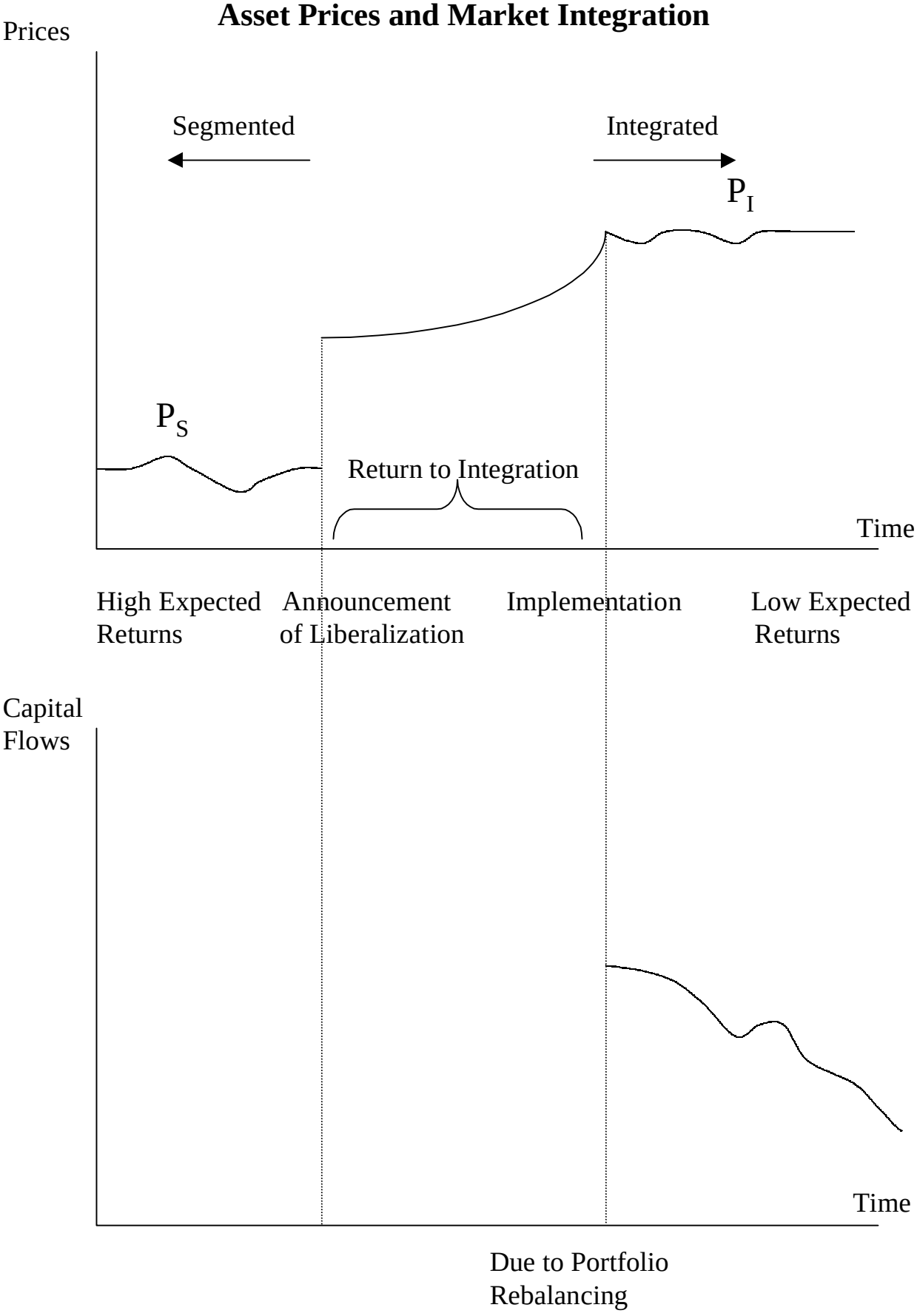
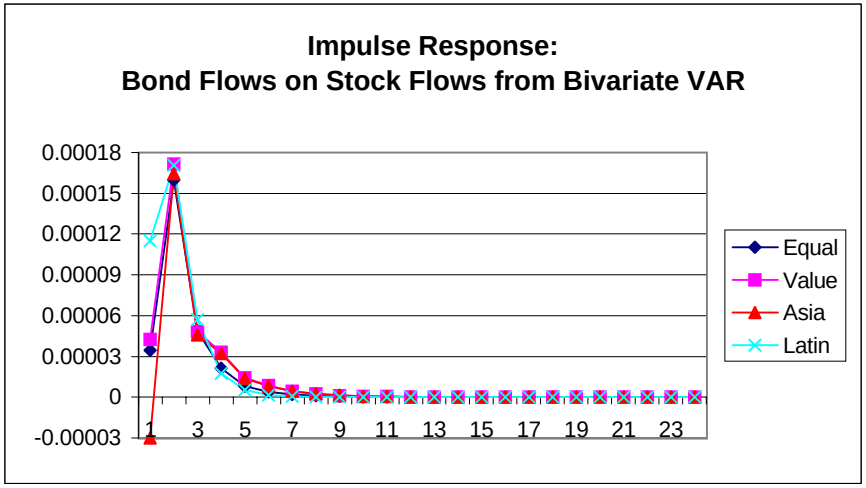
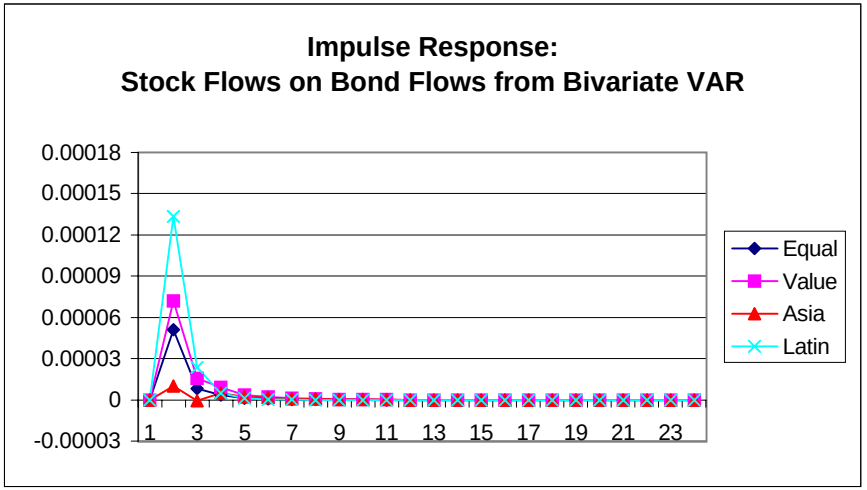


Figure 2

The relation between net bond and net equity flows



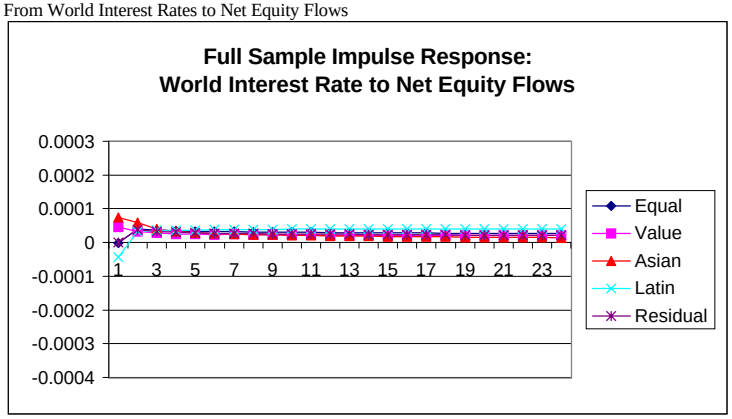


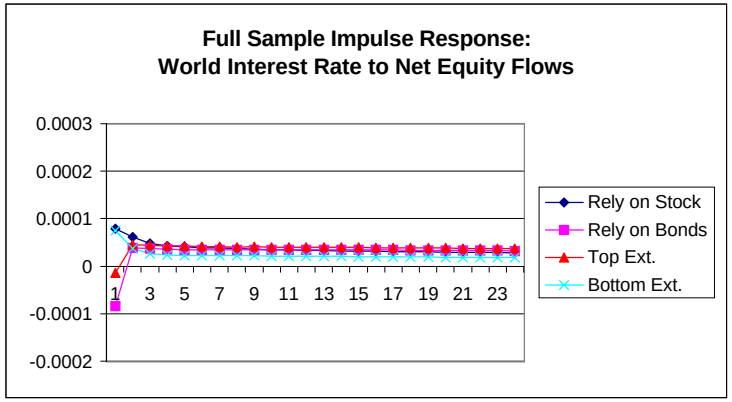
Impulse reponse analysis is based on bivariate system of net equity capital flows and net bond flows. The first data point represents the contemporaneous response. The impulse responses are weighed: equally across 17 countries, value-weights (based on equity capitalization in December 1991), equally across six Asian countries (Indonesia, Korea, Malaysia, Phillipines, Taiwan and Thailand), and equally weighted across six Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico and Venezuela).

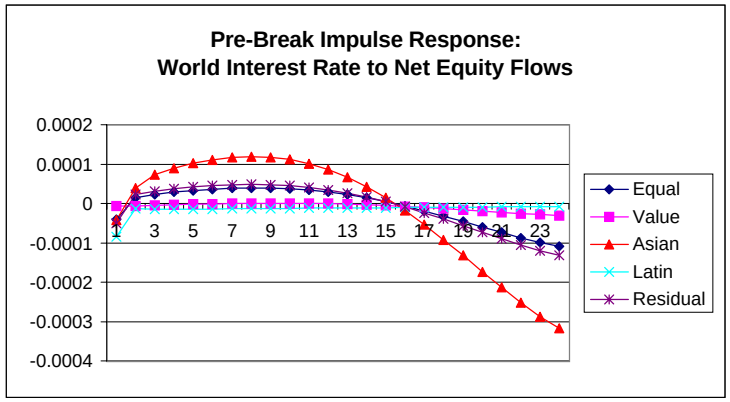
Figure 3

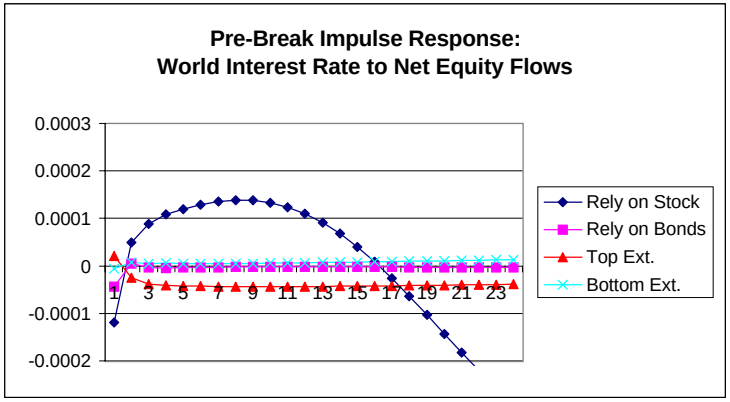
Impulse response analysis

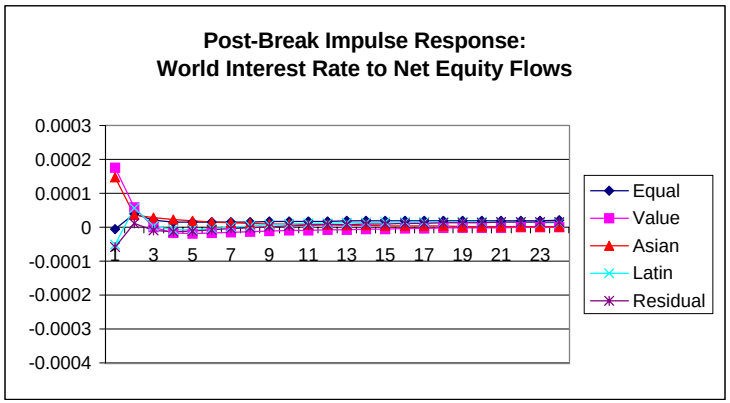
A. From World Interest Rates to Net Equity Flows











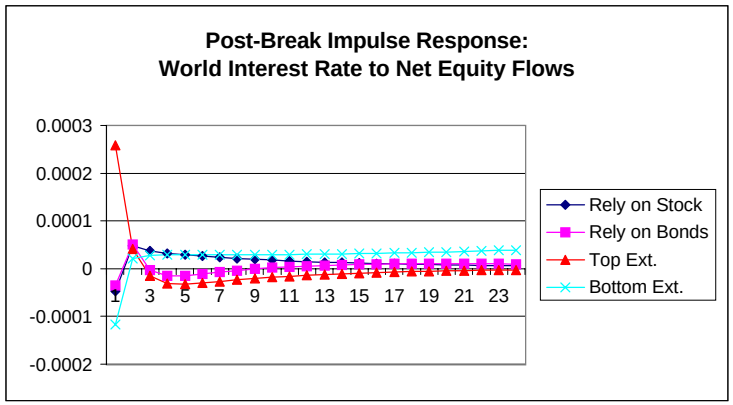
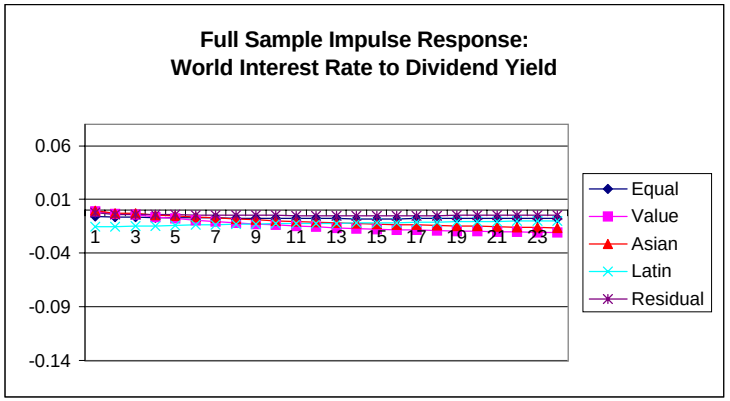
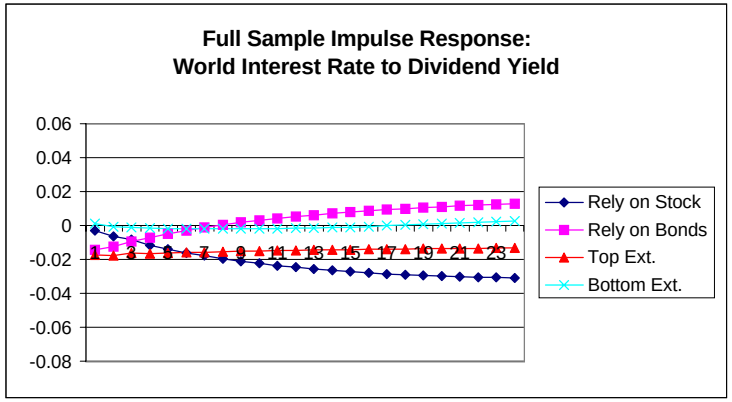


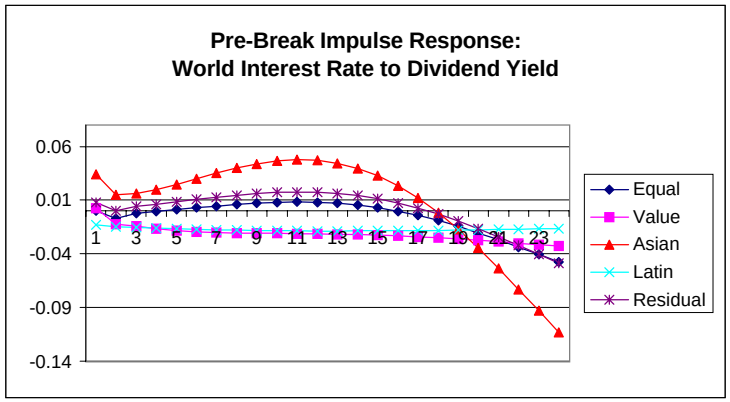
Figure 3 (continued)

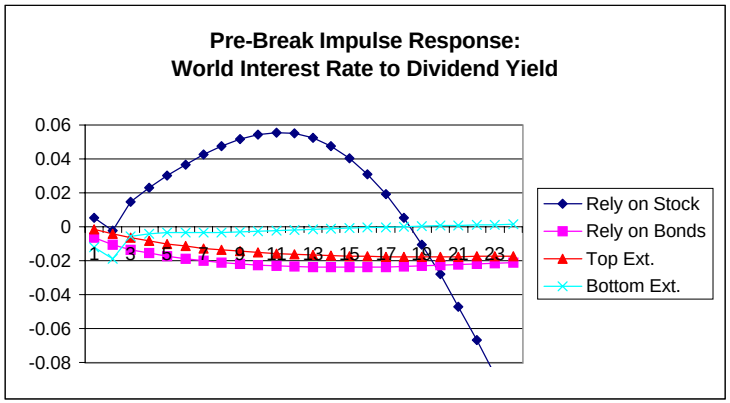
Impulse response analysis

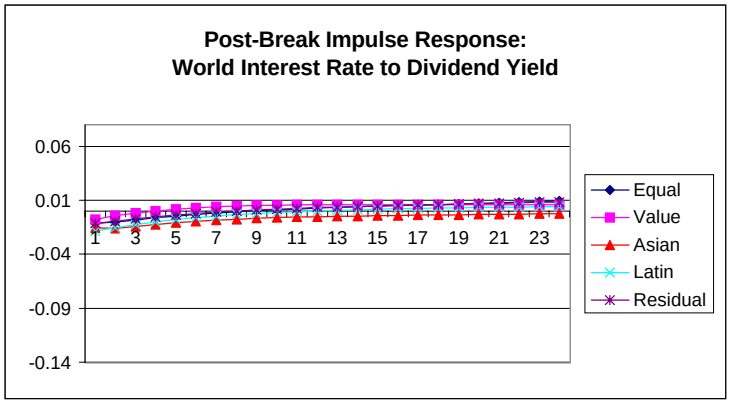
B. From World Interest Rates to Dividend Yields











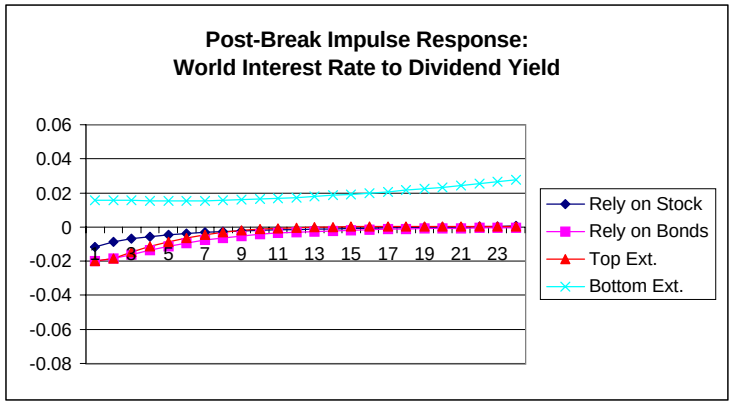
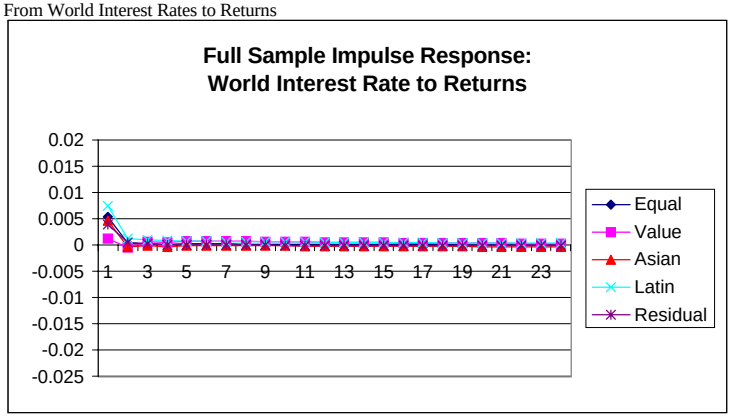
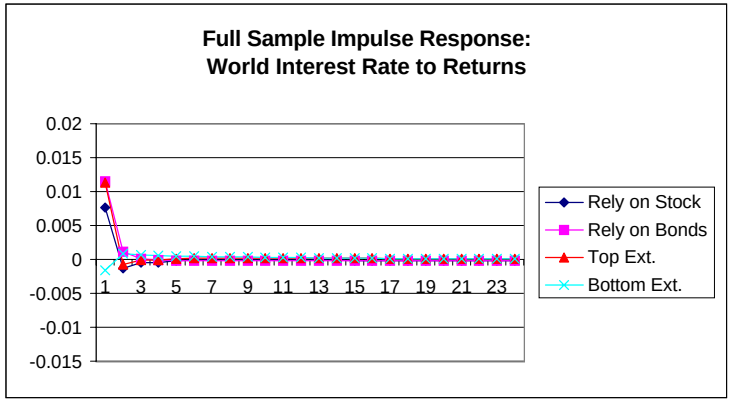


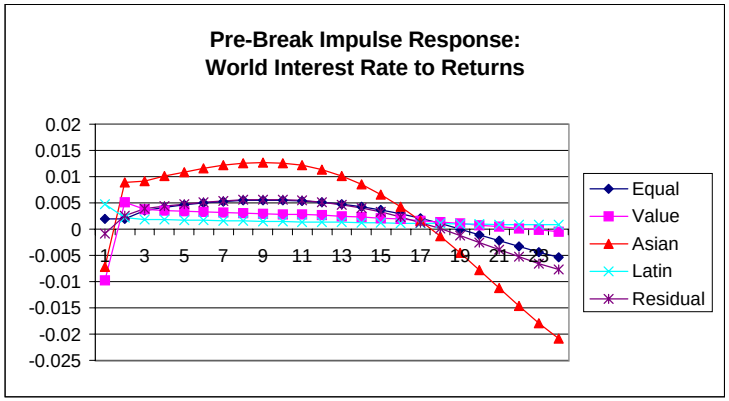
Figure 3 (continued)

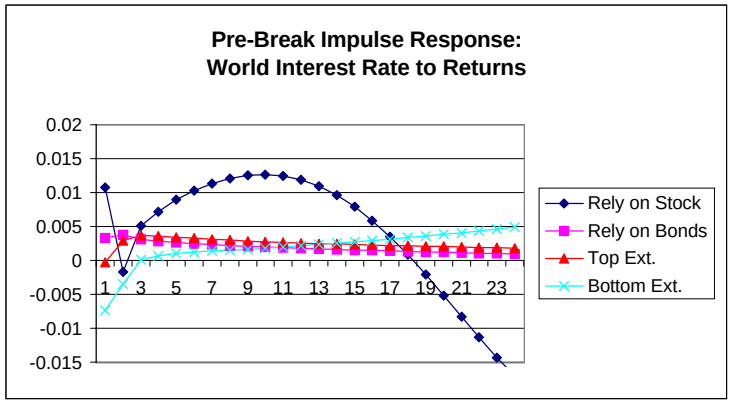
Impulse response analysis

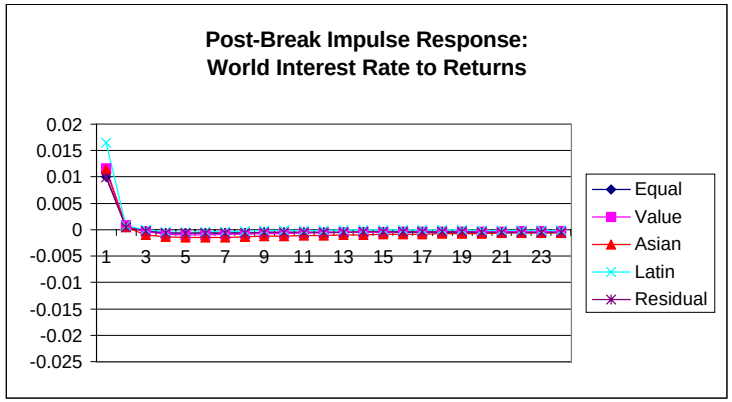
C. From World Interest Rates to Returns











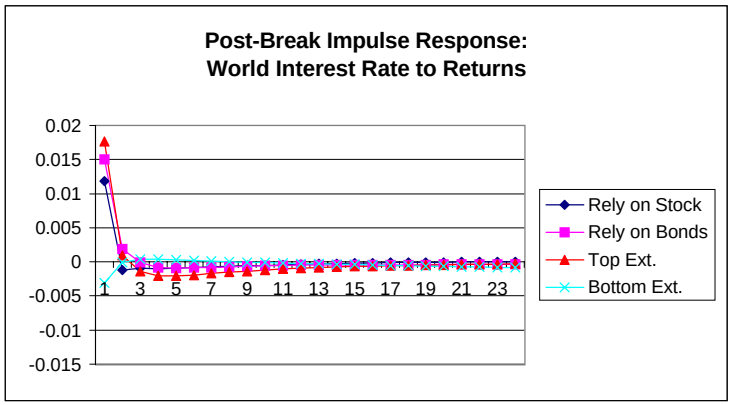
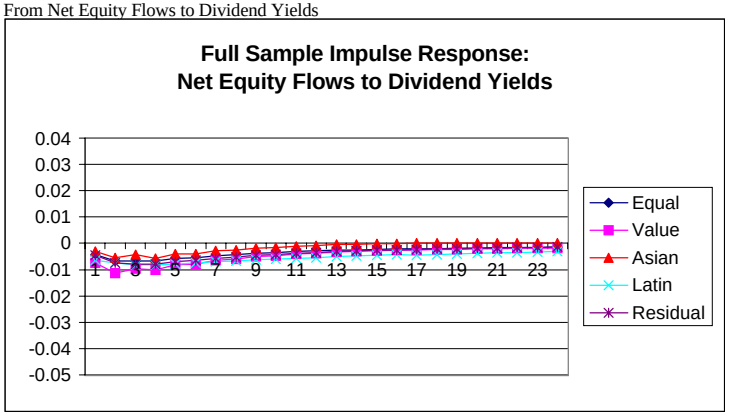
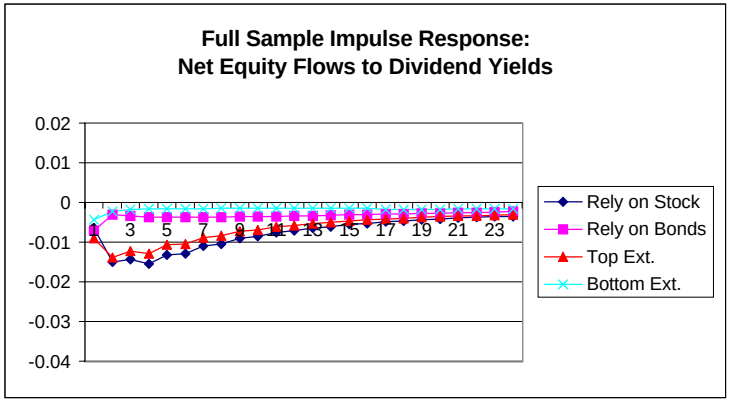
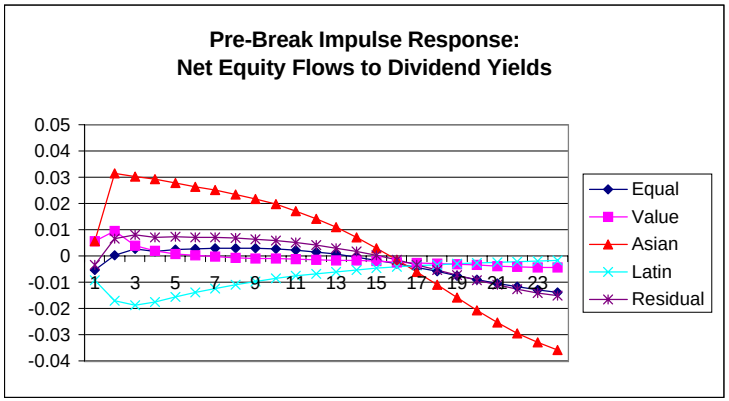
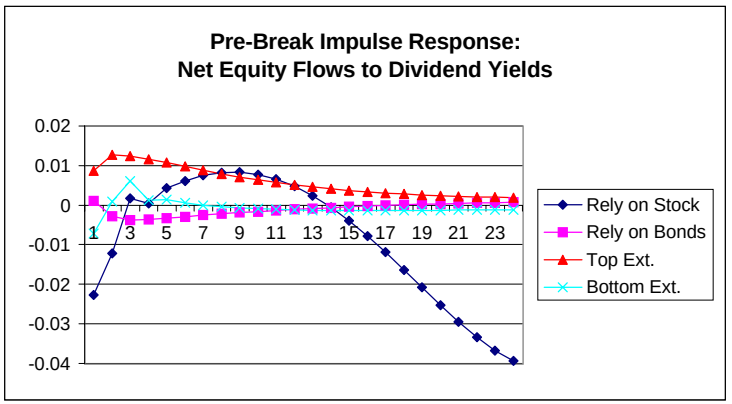


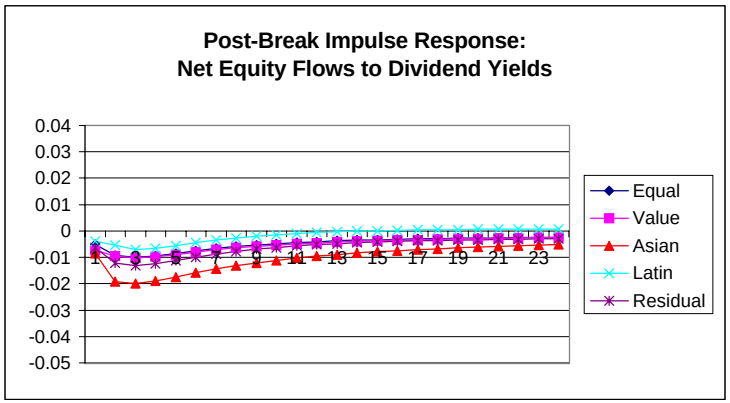
Figure 3 (continued)
Impulse response analysis
D. From Net Equity Flows to Dividend Yields











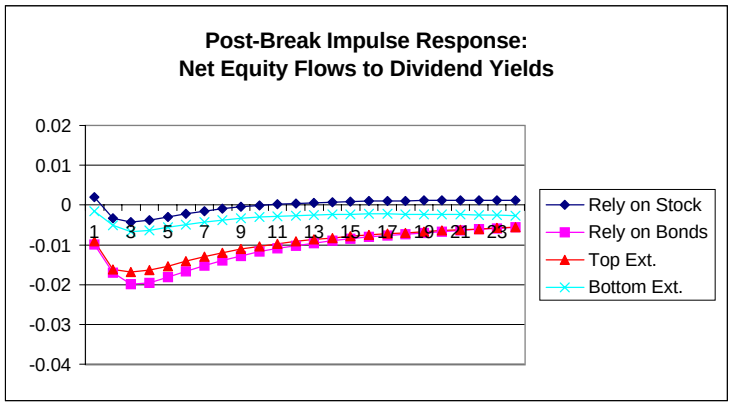
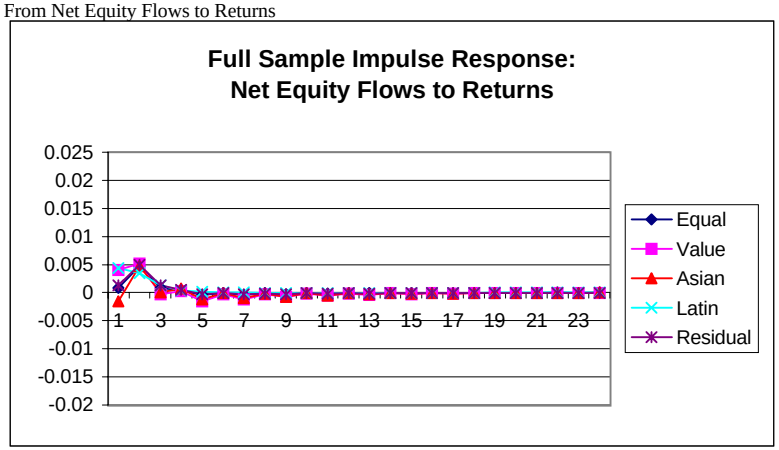
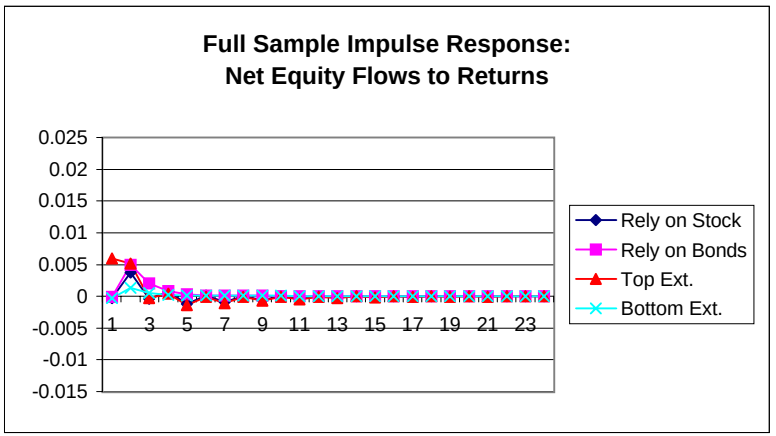


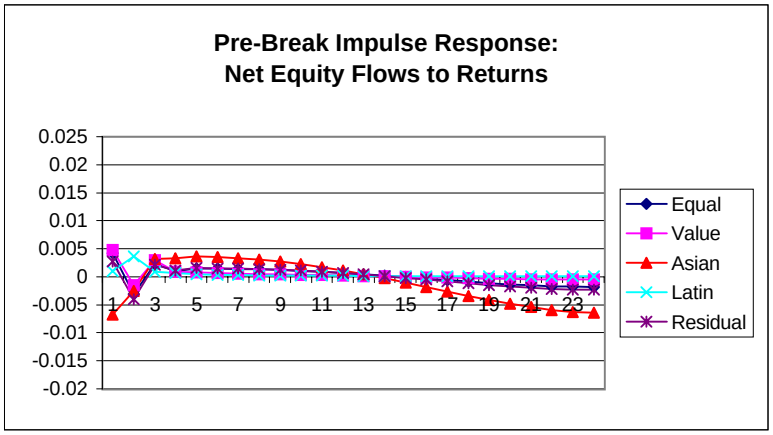
Figure 3 (continued)

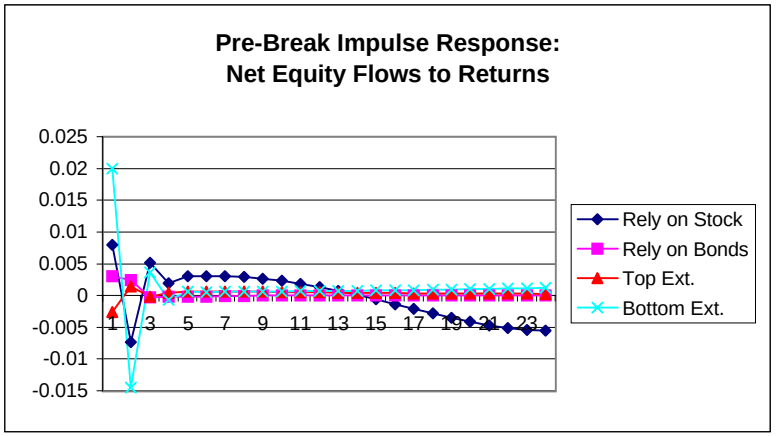
Impulse response analysis

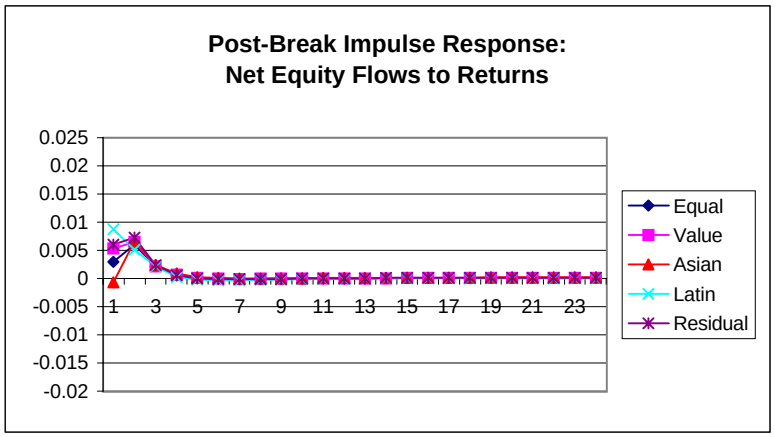
E. From Net Equity Flows to Returns











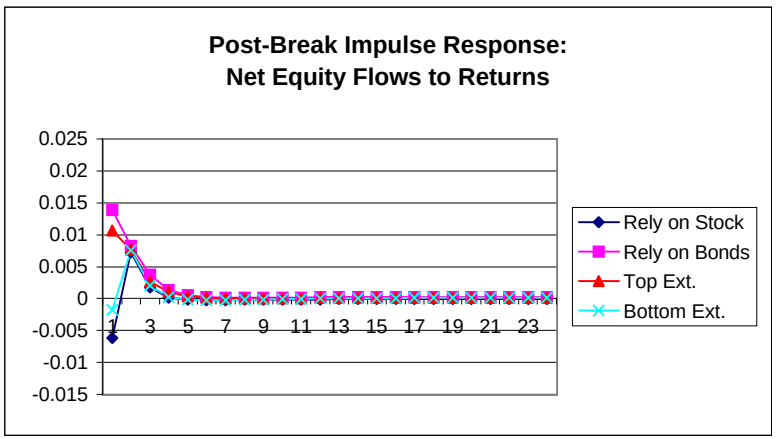
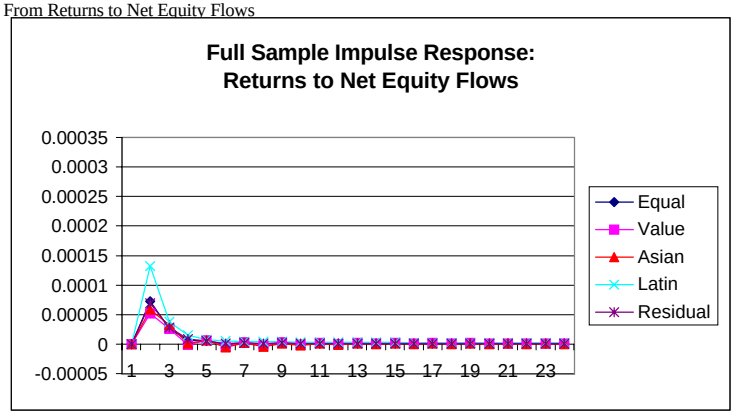
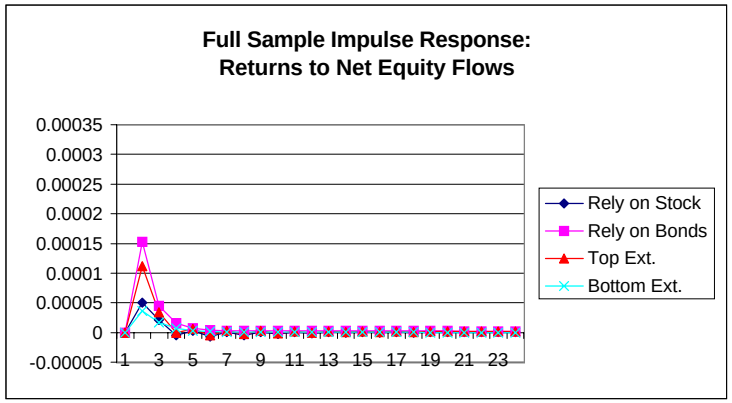


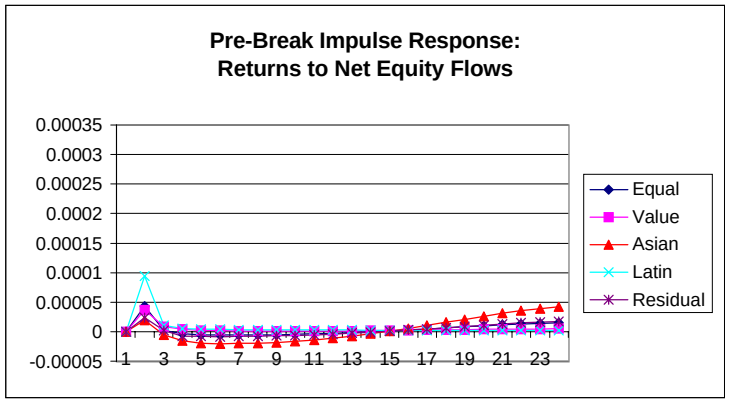
Figure 3 (continued)

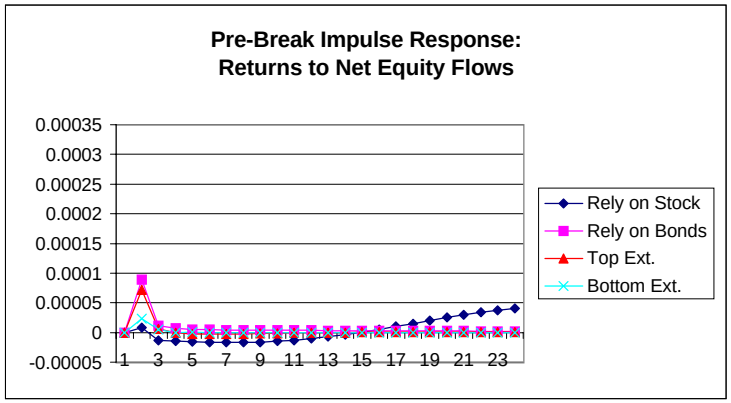
Impulse response analysis

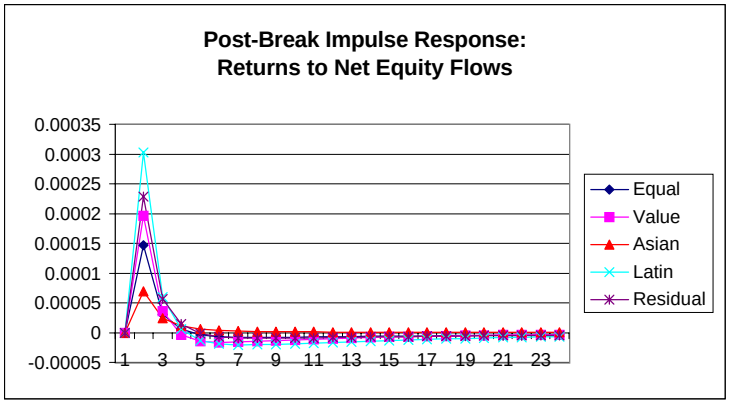
F. From Returns to Net Equity Flows











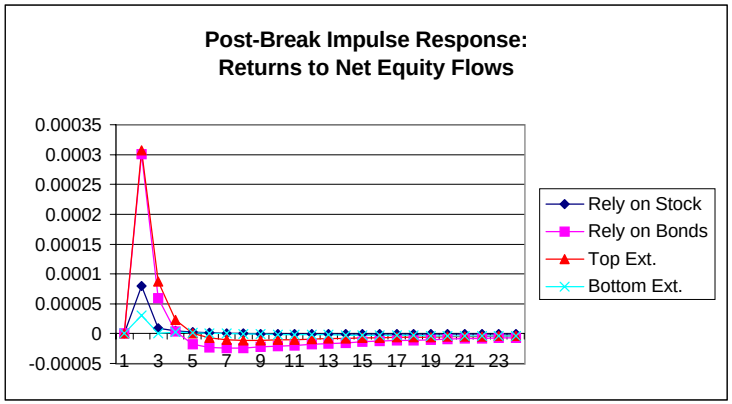
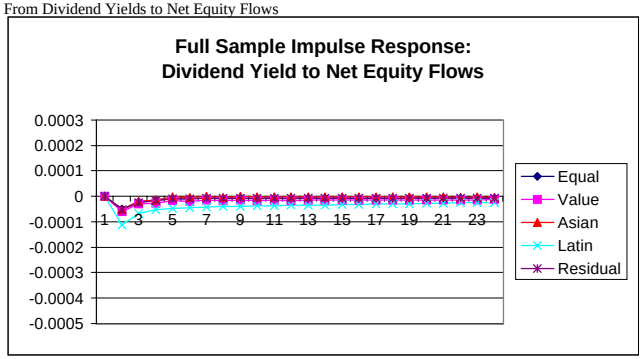
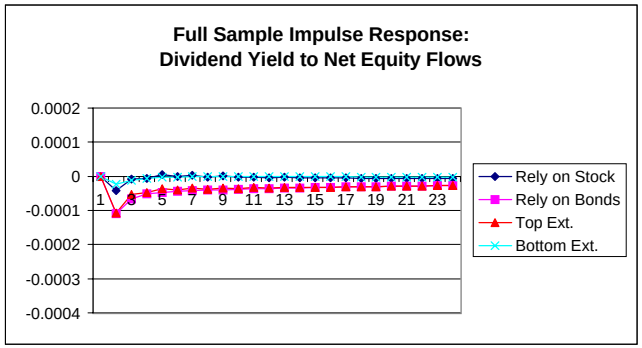
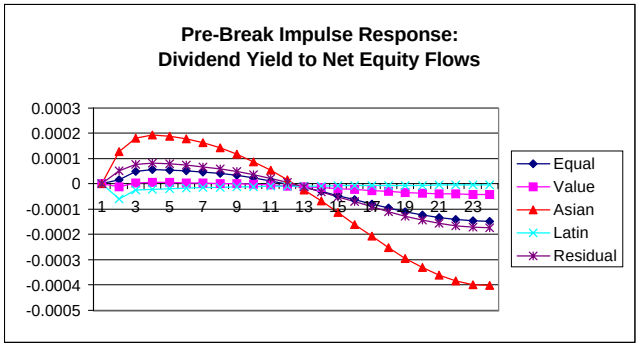
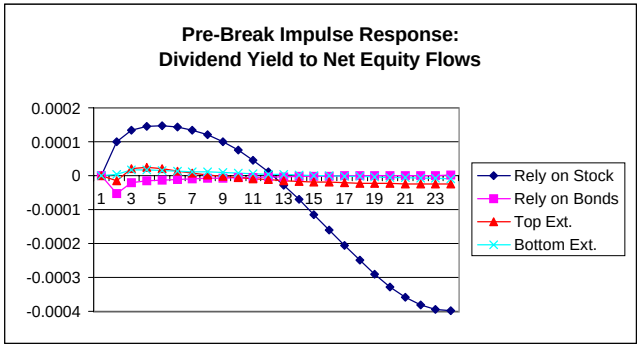


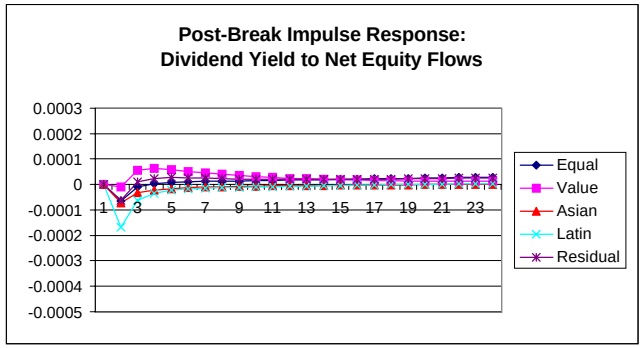
Figure 3 (continued)
Impulse response analysis
G. From Dividend Yields to Net Equity Flows

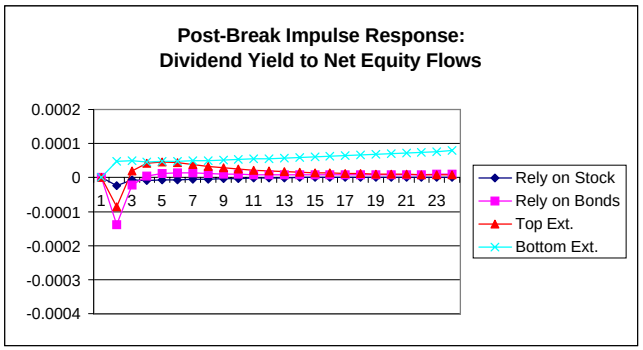






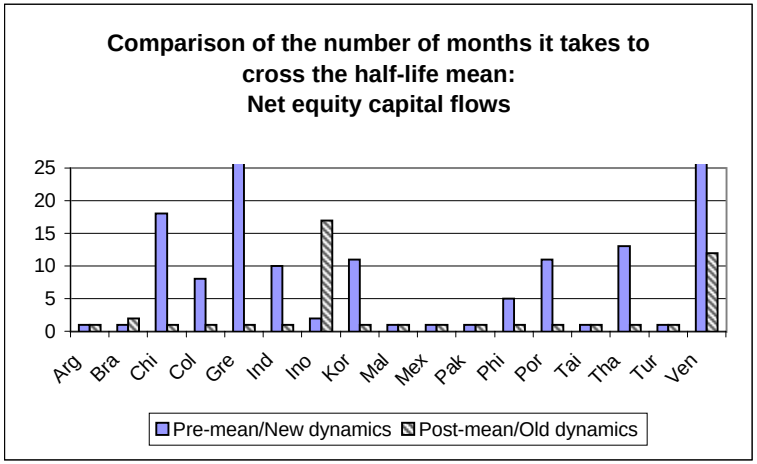


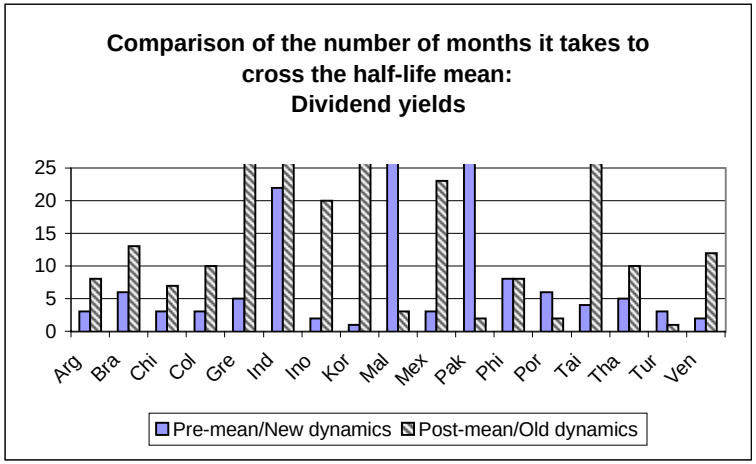




Impulse reponse analysis is based on quadravariate system of world interest rates, net equity capital flows, dividend yields and equity returns. The first data point represents the contemporaneous response. In the left panels, the impulse responses are weighed: equally across 17 countries, value-weights (based on equity capitalization in December 1991), equally across six Asian countries (Indonesia, Korea, Malaysia, Phillipines, Taiwan and Thailand), and equally weighted across six Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico and Venezuela). In the right panels, we report equally-weighted across the six countries that rely most on equity financing (Chile, Philippines, Malaysia, Portugal, Thailand and Korea), across the six countries that rely most on bond financing (Venezeula, Mexico, Argentina, Pakistan, Indonesia and Brazil), across the six countries that have the highest proportion of external financing, that is, the bond plus equity capital flows to GDP (Mexico, Malaysia, Venezuela, Argentina, Brazil, and Korea) and the six countries with the lowest proportion of external financing to GDP (Chile, Taiwan, Pakistan, the Philippines, Greece and India). The VARs are estimated over the full sample, the pre-break sample and the post-break sample. The break dates for each country are presented in Table 5.

Figure 4
Transition dynamics





The transition half-life statistic (THL) is measured as follows. Consider the point in time at which the break occurs and imagine the current realization of the variable is at the unconditional mean before the break. Now consider forecasting k periods in the future using the new dynamics. If the VAR is stationary, eventually the forecasts will reach the new unconditional mean. How fast they will get there depends on the persistence of the system and how far way the post-break mean is from the starting point (pre-break mean). Our THL statistic records the time it takes (in months) to reach half the distance between old and new mean. We can also reverse the computation. That is, we compute the THL statistic starting from the new mean going to the old mean using the pre-break dynamics. A comparison of the two statistics is informative about the different dynamics before and after the break.