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Portfolio Flows into India:
Do Domestic Fundamentals Matter?

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Abstract

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This paper analyzes the factors affecting portfolio equity flows into India using monthly data. Flows to India are small compared to other emerging markets, but seem to be relatively less volatile. They also seem to be quite resilient. The paper shows that portfolio flows are determined by both external and domestic factors. Among external factors, LIBOR and emerging market stock returns are important, while the primary domestic determinants are the lagged stock return and changes in credit ratings. In quantitative terms, both external and domestic factors are found to be about equally important.

Contents   Page

I. INTRODUCTION

A major development in international capital markets over the past two decades has been the rapid growth of cross-border portfolio investment. This has occurred in tandem with the liberalization of capital controls by many countries. International diversification of portfolios has boosted the demand for foreign securities and caused capital to flow to developed and emerging markets alike. In the process, the traditional "home bias" in investment portfolios has become diluted (Bohn and Tesar, 1996).

In India, the purchase of domestic securities by foreign institutional investors (FIIs) was first allowed in September 1992 as part of the liberalization process that followed the balance of payments crisis in 1990-91. Since then, India has attracted portfolio inflows averaging about US$1.5 billion per annum (Tables 1-3, Figure 1). At end-June 2002, FII investment in domestic equities totaled about US$14 billion, which constituted 11 percent of the stock market capitalization, and 25 percent of foreign reserves (Figure 2).[2] Besides direct purchases in the Indian stock markets through FIIs, foreign investors can also invest in Indian equities through ADRs and GDRs. Total portfolio inflows into India (including equities, bonds, and ADRs/GDRs) amounted to US$18½ billion during the 1990s.[3]

Since the Mexican and Asian crises in the 1990s, the stability of portfolio flows to emerging markets has been a subject of intense discussions in academic and policy circles. Critics of capital account liberalization argue that portfolio investment decisions depend less on domestic fundamentals and more on the sentiment of foreign investors. A sudden change in sentiment towards a particular market can generate a second generation type of financial crisis despite sound fundamentals. Terms such as "hot," "reversible," "short term" are therefore often used to describe portfolio flows. Cross-country evidence shows that reversals of these flows can be disorderly, and inflict substantial real costs on the economy.[4]

Data show that portfolio flows into India have relatively low volatility compared with many other emerging markets. India has also yet to witness any sharp portfolio outflows, and with the exception of 1998, net inflows have been positive each year. The data show that domestic political events such as nuclear tests, or external shocks such as the Asian crisis, have caused FII flows to slow down, but that these effects have tended to be mild and short lived.

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[2] FIIs can also invest in bonds, but such investment has been very small compared to investment in equities. In the period since March 1997, when such investment was first permitted, net debt purchases are virtually zero on a cumulative basis, and we focus only on equity flows in the paper.

[3] Chopra et al. (1995) describe India's experience with capital flows through 1994/95.

[4] See Calvo and Reinhart (1999), and Gupta, Mishra and Sahay (2002).

Nonetheless, it is important to understand the risks of a reversal, since such an event could obviously have serious implications for economic stability.[5]

This paper analyzes the determinants of FII equity flows into India in a multivariate regression model using monthly data from March 1993 to October 2001. In framing the econometric analysis, we refer to the substantial empirical literature on the determinants of portfolio flows. A common approach adopted in the literature is to separate **domestic** influences on portfolio flows, from **external** influences such as global stock market returns, interest rates and business cycle conditions. Results vary across papers, but in general both domestic and external factors (or pull and push factors, respectively) have been found to be important.

In this paper, we separate the possible external determinants of portfolio investment into those that are **regional**, and those that are more **global** in nature. Regional factors can relate to geographic proximity, or to similarity in asset class, such as emerging markets.

Domestic determinants of portfolio inflows can also be separated into two groups. The first group consists of macroeconomic and political variables specific to the country. If foreign investors focus on these factors when they choose between emerging markets, they are described as following a **top-down** approach. A contrasting view, with some currency among market participants in India, is that FIIs invest on a **bottom-up** basis. In terms of this strategy, foreigners invest in top-quality Indian companies, and are less concerned with larger issues such as macroeconomic fundamentals (Sharma, 2002). That investors follow a bottom-up strategy to India might explain the relatively low volatility of FII flows discussed above.

The regression results show that a combination of global, regional and domestic macroeconomic factors are important in determining FII flows to India. Quantifying the effect of domestic and external variables in influencing FII flows into India, we find that both types of factors are of roughly equal importance.

The principal global factor found to be significant is the London interbank offered rate (LIBOR), which is negatively associated with FII flows in the regressions. The implication of this result is that the onset of a phase of global monetary tightening could lead to a slowdown in FII inflows. The most important regional influence is the return on emerging market stocks, which is found to positively influence portfolio investment in India. This implies that FII flows are likely to be correlated with flows to other emerging markets and that Indian markets may be vulnerable to contagion should flows across emerging markets decline.

Domestic variables of significance include the return on domestic stocks, rating downgrades, and exchange rate depreciation. We find a negative and significant coefficient on the lagged

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[5] This paper does not analyze the effects of FII flows, although there is a growing literature on this issue. For a recent example, see Mody and Murshid (2002) which, using a sample of 60 developing countries, shows that portfolio inflows have a weak impact on domestic investment.

domestic stock market return, and even though there is no consensus in the literature on the relationship between domestic stock returns and portfolio inflows, this result is unexpected. The negative relationship between lagged domestic stock returns and portfolio inflows may reflect investors attempting to keep a constant India weight, so that they take profits after a run-up in the Indian market. We also test for the robustness of the result by analyzing this relationship using daily data.

We address the issue of potential multicollinearity between various independent variables by omitting specific variables from the regressions and analyzing the effect on other variables. We also test for a structural break in the data since 1997, as many observers feel that the financial markets of India have become more globally integrated since the Asian crisis. The Chow test indicates no structural break in the data.

Finally, while we do not have data on company specific variables, and cannot directly test the bottom-up hypothesis, we interpret the significance of domestic macroeconomic variables in the regressions as evidence that FII strategy is not purely bottom-up. In other words, India's macroeconomic fundamentals do affect FII flows.

The paper is organized as follows: Section II presents some stylized facts on FII investment in India. Section III surveys the empirical literature and discusses some theoretical considerations. Section IV describes the data and explains the econometric methodology used in the regression analysis. Section V discusses the regression results; and Section VI concludes.

II. STYLIZED FACTS ON FII INFLOWS IN INDIA

There are currently nearly 500 registered FIIs in India, which include asset management companies, pension funds, mutual funds, investment trusts, and incorporated institutional portfolio managers. FIIs can invest in listed and unlisted securities including shares, derivatives, debt instruments, dated government securities, and treasury bills. By declaring itself a 100 percent debt fund, an FII can invest fully in bonds, otherwise it cannot invest more than 30 percent of the funds in debt instruments. With permission from the Reserve Bank of India (RBI), an FII can open foreign currency and rupee accounts under the Foreign Exchange Management Act (FEMA).[6]

Investments in equities are subject to restrictions on the maximum holding in a company by each FII, and by all FIIs in aggregate. These restrictions on FII investments have been progressively relaxed over time (see Annex I). An individual FII can currently hold up to 10 percent of a company's paid up capital. The limit on holding by all FIIs is 24 percent, which can be increased to 100 percent with the approval of the company's Board.[7] The RBI

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[6] FII inflows and sales proceeds are credited to their rupee accounts, but they can transfer sums between their foreign currency and rupee accounts at the market exchange rate. FIIs are also free to repatriate their capital, capital gains, dividend and interest income, net of taxes.

[7] An *Economic Times* survey of 100 large private sector companies in June 2002 finds 23 companies where FIIs held more than 5 percent of equity; 15 companies where FIIs held

monitors FII investment ceilings on a daily basis, and if FIIs are about to reach the limit set on the purchase of shares in a particular company, the RBI cautions designated bank branches not to purchase any more shares on behalf of an FII. A comparison of Indian experience with other emerging markets suggests:

- *Magnitude*: India receives a small percentage of portfolio flows to emerging markets. FII flows are even smaller in proportion to the size of the Indian economy. Over the past decade, FII equity flows into India have averaged ½ percent of GDP per annum, which is among the lowest that was received by other emerging markets (Figure 3). Portfolio investment is less than FDI in India in absolute terms (Figure 4). Nonetheless, India receives a slightly higher proportion of portfolio investment going to emerging markets (3 percent average between 1992-2000) as compared with FDI (about 1.7 percent) as a percentage of total flows of the respective investments to about 24 emerging markets for which annual data are available in the IMF's *International Financial Statistics (IFS)*, (Figure 5).

- *Volatility*: An analysis of the quarterly data for about 17 emerging markets for which comparable data are available from the *IFS* suggests that the volatility of portfolio flows into India is small in comparison to other emerging markets (Table 4). While the data indicate that FII flows into India have become more volatile since 1998, this applies to other emerging markets as well.

  Monthly FII flows to India have been mostly positive, except for a few instances of net outflows, often coinciding with an external shock or a domestic political event. The data show that there tends to be an immediate negative reaction to adverse domestic or external events (Figure 6). However, the effect has tended to be short-lived. For example, FII flows turned negative in September 2001 following the 9/11 terrorist attacks, but recovered after a month. This could be due to the fact that the Indian economy is less integrated with the global economy and is insulated from external shocks, thus its macro-aggregates exhibit less volatility. India's economic performance over the last decade has also been strong compared to many other emerging markets. As a result, India may be considered to be a relatively safe haven among emerging markets by foreign investors.

- *Seasonality*: There is a seasonal pattern in FII flows to India. FII flows tend to be higher during the first four months of the year (Figure 7). This could be due to global factors such as money flowing into the market at the start of the year from tax-saving investments, such as 401(k) plans in the United States, and from year-end bonuses. In India, the pattern might also reflect improved sentiment, since reforms are typically announced in the run-up to the end-February budget. As a recent example, FII inflows

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more than 10 percent; 6 companies where FII holdings exceeded 20 percent, and 2 companies where FII holdings exceeded 24 percent (Infosys and Satyam Computer). FIIs also hold significant stakes in public sector units.

were particularly buoyant during January and February 2002, coinciding with progress made on privatization, and relaxation of FDI limits in the banking sector.[8]

III. PREVIOUS RESEARCH AND THEORETICAL FRAMEWORK

A. Previous Empirical Work

Initial research on foreign portfolio investment highlighted the phenomenon of home bias, whereby despite the advantages of international diversification, portfolios were found to be heavily skewed towards domestic securities (French and Poterba, 1991). Over time, the degree of home bias in equity portfolios has declined. In keeping with this trend, the literature now focuses on explaining cross-border equity flows, rather than explaining their absence. The main questions addressed in the literature are: (i) what is the association between portfolio inflows and pull factors such as domestic market returns; (ii) what is the association between portfolio inflows and push factors such as foreign market returns; and (iii) what is the relative importance of pull versus push factors in determining portfolio inflows.

The literature generally shows a positive contemporaneous relationship between portfolio inflows and domestic stock market returns (Bohn and Tesar, 1996). However, this association need not necessarily imply causality or "return chasing" by foreign portfolio investors. The observed relationship might reflect exogenous changes in investor preferences that cause funds to flow into the host market, and hence bid up prices (Brennan and Cao, 1997). A positive contemporaneous correlation between inflows and domestic returns may thus be entirely spurious. Nevertheless, using daily data for Asian economies, Richards (2002) finds portfolio inflows to be positively associated with the lagged return in the domestic stock market. This is consistent with foreign investors being positive feedback traders. Griffin et al. (2002) also establish this relationship for several Asian countries using daily data. However, they do not find evidence of positive feedback trading for India, a point to which we return below.[9]

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[8] Because of seasonality in the data, a 12-month difference in the stock of FII investment, or seasonally adjusted data, may be more appropriate for econometric analysis. However, the series constructed by taking a 12-month difference in the stock of FII was found to be an I(1) process. Differencing this series yielded an I(0) process, but the differenced series is not very meaningful. Moreover, the regressions using it had very little explanatory power. Since the FII data had a few negative values, we did not attempt to seasonally adjust the data. As explained in Section IV, we account for the seasonality using dummies for the beginning of the year and for the end of the year.

[9] Kim and Wei (2000) show that the association between domestic stock market returns and portfolio investment may alter during a currency crisis. They find that foreign investors in Korea did not strongly follow the strategy of positive feedback trading prior to the Asian crisis, but did so thereafter. By contrast, Choe et al. (1998) find that portfolio investors in Korea were positive feedback traders before the crisis, but not afterwards.

There is little consensus on the relationship between portfolio inflows and external or source market returns. For example, Bohn and Tesar (1996) and Brennan and Cao (1997) do not find any significant association between the purchase of foreign equities by U.S. investors and U.S. equity returns. Again the studies using daily data are more definitive. Both Richards (2002) and Griffin et al. (2002) find a positive and significant association between daily portfolio flows to Asian economies and lagged U.S. stock returns.

Results also vary across papers regarding the general question of whether external or domestic factors are more important in influencing portfolio flows.[10] Calvo et al. (1993) find that global interest rates and business cycle conditions have been the most important determinants of inflows into Latin America. By contrast, Chuhan et al. (1998) find that domestic factors are at least as important as external factors in explaining flows to Asian countries. For transition economies, Garibaldi et al. (2002) find that both domestic and external factors, including past inflation, credit ratings, exchange rate regime, the level of reserves, world interest rates, and improvements in securities market infrastructure, are significantly associated with portfolio investment.[11]

Regional factors have also been considered in the literature. An early paper to recognize their importance was Buckberg (1996), who proposed that portfolio flows to an emerging market be thought of as a two stage process. In the first stage, the total allocation to emerging markets is determined, and in the second stage, the allocation to each individual market is made. This decision-making process would imply that returns on emerging markets as a whole would affect the allocation to an individual country. Buckberg's paper finds empirical support for this hypothesis. More recently, Richards (2002) and Griffin et al. (2002) include regional equity returns in their analysis of daily portfolio flows to individual emerging markets, and find the association to be positive. These results are consistent with Hernandez et al. (2001), who show that capital flows (much like currency crises) occur in clusters and that there is contagion in private capital flows to developing countries.

Studies on portfolio flows to India include Samal (1997), Pal (1998), and Chakrabarti (2002). The first two authors find the comovement between FII flows and the Bombay Stock Exchange (BSE) index to be high. Since this could be due to both series being I(1) processes and possibly cointegrated, little can be learned about their short-term movements from the high correlation coefficients. Chakrabarti (2002) conducts a systematic analysis of the determinants of FII investment into India. The paper finds that the contemporaneous domestic stock market return has a positive and significant coefficient in the regressions for

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[10] The reasons for the lack of unanimity in the results could be due to different econometric methodologies, and data used in these papers. Data frequencies range from daily to annual, and the type of data used ranges from the data on aggregate flows (sometimes derived from the balance of payments data on international reserves) to portfolio allocation by individual investors.

[11] The same authors note that regression equations for portfolio flows tend to have poor explanatory power, especially as compared to equations for FDI.

FII flows. Chakrabarti also finds that the beta of the Indian market is negatively associated with FII inflows up until the Asian crisis, but the relationship disappears thereafter.[12]

However, Chakrabarti's analysis has a number of limitations. First, the paper does not include either foreign interest rates or factors specific to emerging markets, even though these have been found to be important in the literature. Second, the relationship between the BSE return and FII flows is estimated using contemporaneous values. As Chakrabarti himself recognizes, this implies the possibility of endogeneity bias and limits the ability to draw inferences about causality. In any case, Griffin et al. (2002) find some evidence that lagged Indian stock market returns are negatively associated with daily FII flows, and this is consistent with our results presented below.

B. Theoretical Framework and Suggested Regressors

Following Lewis (1999), FII investment can be modeled as a portfolio allocation choice. An international investor is assumed to choose portfolio shares for foreign and Indian equities (S^F and S^I, respectively) so as to maximize a simple mean-variance objective function:

$$\text{Max}\, V \quad = \quad V(E_t W_{t+1}, Var(W_{t+1})) \qquad s.t. \quad S^F + S^I \; = \; 1 \qquad (1)$$

where $V_1 > 0$ and $V_2 < 0$, i.e., the objective function V is increasing in the expected value of the portfolio, W, and decreasing in its variance. $E_t(.)$ is the expectations operator conditional upon information available at time t, Var(.) is the variance operator, and

$$E_t W_{t+1} = W_t \,(1 + S^F E_t r^F_{t+1} + S^I E_t r^I_{t+1})$$

where the returns on foreign and Indian equities are denoted by r^F and r^I, respectively.

The first order condition used to solve (1) will include the following partial derivatives of with respect to S^I:

$$\partial E_t W_{t+1} / \partial S^I \; = \; W_t E_t (r^I_{t+1} - r^F_{t+1}) \qquad (2)$$

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[12] Chakrabarti defines the beta of the Indian market as the covariance of returns on the BSE and the S&P 500, divided by the variance of the S&P 500. This is not strictly the same as the Sharpe β in the Capital Asset Pricing Model (CAPM), which would be calculated using the covariance between the return on Indian equities and on the global equity market portfolio (see Merton, 1982). However, since India's share in the world portfolio is small, the two β's will be quite similar in practice.

$$\partial Var(W_{t+1})/\partial S^I = 2W_t^2[S^I Var(r_{t+1}^I - r_{t+1}^F) + (\sigma_{IF}^2 - \sigma_I^2)] \tag{3}$$

where σ_{IF}^2 is the covariance between Indian and foreign returns and σ_I^2 is the variance of Indian returns. With homogeneous investors, the equilibrium obtained by solving (1) is the Capital Asset Pricing Model (Merton, 1982).

In the case of India, this theoretical model should not be taken too literally. As noted, limits still exist on FII holdings of individual Indian stocks. More importantly, domestic investors (the major players in the Indian market) are not permitted to hold foreign equities. It is therefore not plausible to think that S^I is chosen optimally, or that the actual share of international equity investment going to India constitutes an equilibrium allocation. Thus, rather than solve for the optimal S^I, we simply use (2) and (3) to gain some intuition about the likely determinants of FII flows.

Inspection of the r.h.s. of (2) reveals that increasing S^I can raise the expected value of the portfolio if $E_t r_{t+1}^I > E_t r_{t+1}^F$, i.e., the Indian market promises higher returns. Moreover, FII inflows should be increasing in the expected return on the domestic market. They should also be negatively related to the expected foreign return, although this relationship may not be so straightforward. The mean-variance framework is a one-period model, and in a richer (multi-period) model, a positive correlation between FII inflows and foreign returns might be expected as a result of a wealth effect. This could occur, for example, through U.S. investors, made wealthier by rising U.S. stocks, buying more non-U.S. assets so as to rebalance their portfolios.[13] As noted above, recent studies using daily data find just such a positive association between portfolio flows and U.S. returns. Thus, a priori, we regard the effect of the return on foreign (developed country) stocks on FII flows to India as ambiguous.

Even if the condition $E_t r_{t+1}^I > E_t r_{t+1}^F$ does not hold in (2), increasing S^I may still be desirable if it reduces the overall variance of the portfolio. Equation (3) shows that this is most likely to be the case—i.e., the r.h.s. of (3) is most likely to be negative—when either the variance of the Indian market is small relative to that of the foreign market, or when σ_{IF} is small (or even negative), which implies that there are diversification gains from investing in India. Thus the variances and covariances of returns on Indian and foreign stocks are also likely to influence FII inflows.

If the mean-variance framework is extended to include a safe asset, then global interest rates become an additional determinant of FII inflows. Since fixed income investments in developed countries are an alternative to equity investment, we would in general expect global interest rates to negatively affect portfolio inflows. As noted, this is a common result in the empirical literature.

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[13] A positive association would be reinforced if higher U.S. returns were expected to boost Indian returns. For example, an improvement in NASDAQ might mean better prospects for Indian technology scrips and push more investment to the Indian market.

Splitting the return on foreign assets into the return on developed market assets, r^{FD}, and the return on emerging markets other than India, r^{FE}, and denoting global interest rates by R, the above discussion suggests that portfolio inflows into the Indian market, F^I, are likely to be some function:

$$F_t^I \quad = \quad \overset{+}{F(E_t r_{t+1}^I}, \overset{?}{E_t r_{t+1}^{FD}}, \overset{?}{E r_{t-1}^{FE}}, \overset{-}{E_t R_{t+1}}, \overset{-}{\sigma_I^2}, \overset{+}{\sigma_F^2}, \overset{-}{\sigma_{IF}^2}) \tag{4}$$

with the expected signs as noted.[14]

Equation (4) provides a basis to select explanatory variables for the regressions. The difficulty with this equation, however, is that expected returns are not observable. The challenge therefore is to find variables that might plausibly condition expected returns:

Global variables: One factor that is likely to affect expected stock returns in developed countries (the source of investment for India) is industrial production, since a pickup in economic activity in these countries is likely to increase future profits. Since current returns may be a good predictor of future returns, we also include the current return on U.S. stock markets as a potential explanatory variable. Portfolio flows to India are small in global terms, so we can include contemporaneous U.S. returns in the regressions without having to worry about endogeneity. We also include various global interest rate variables in the regressions, including LIBOR.

Regional variables: To capture the likely determinants of expected returns in emerging markets other than India, we include the return on the Morgan Stanley Capital International (MSCI) emerging market index,[15] a dummy for currency crises in major emerging markets, and industrial production growth in emerging markets.

Domestic variables: As factors conditioning expectations of Indian equity returns, we include Indian industrial production, exchange rate depreciation, sovereign credit ratings, and dummies to capture political events such as a war or government resigning mid-term. Since higher expected Indian returns should boost FII flows, a positive outlook for growth and profitability, a strong external position, and a stable political environment are all likely to be FII positive. We also include the liquidity on the Bombay Stock Exchange (BSE) as a possible positive influence on expected returns. This is because the more liquid is the market, the easier it will be to close positions and the lower is likely to be the bid-ask spread.

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[14] We also regard the effect of the expected return on emerging market stocks r^{FE} as ambiguous a priori. In a two-stage model such as Buckberg (1996), the higher the emerging market return, the higher the portfolio allocation to all emerging markets including India. On the other hand, the higher the expected return in other emerging markets, the smaller the share of the emerging market allocation that is likely to be devoted to India.

[15] The Indian market is included in this index, but with a weight of only 3-4 percent.

Current domestic stock returns are likely to condition expectations of future returns. However, because of potential endogeneity we include the return on BSE with a one-month lag in the regressions. This also applies to the exchange rate depreciation variable. For the sake of consistency, we also include the returns on emerging market stocks and NASDAQ and LIBOR with a lag, even though for endogeneity reasons this is not strictly necessary.

Other variables. We also run variants of the regression which include as explanatory variables the variance and covariances of returns on the BSE, the NASDAQ and the MSCI emerging market index. Finally, we use dummy variables to account for seasonal (and budget) effects and a dummy for relaxation in the rules for FII investment in India. Construction of these variables is explained in Box 2.

IV. DATA AND METHODOLOGY

A. Data

There are three different sources of data for FII flows: RBI, Securities and Exchange Board of India (SEBI), and *IFS*. The RBI has monthly data on FII equity flows for the entire period up to October 2001. SEBI has annual data on equity and debt flows for the entire period, but daily and monthly data are available only for the past two years. From *IFS*, quarterly data on equity flows are available from 1993:1–2000:4. However, the data from different sources do not match, probably because of different exchange rates being used, and due to some definitional differences, such as the RBI's data being balance of payments data.

Thus, data from alternative series cannot be combined to construct a complete time series of FII flows. To use the longest time series available, we use the RBI's monthly data on equity flows for the period 1992:9–2001:10. However, data on some of the other variables were not available for the first few months of this period and the usable data are from 1993:3-2001. The rest of the data have been drawn from various sources including RBI and *IFS* (see Box 2 for details).

In the literature, researchers have used several alternative forms of the **dependent variable**. In addition to using absolute values (Claessens, Dooley, and Warner, 1998), portfolio flows have been expressed relative to stock market capitalization (Froot, O'Connell, and Seasholes, 1998; Richards, 2002); as a percent of GDP (Hernandez, Mellado, and Valdes, 2001); and as a lagged moving-average (Brennan and Cao, 1997). We conduct the econometric analysis for FII equity flows in millions of U.S. dollars (FIIDOL); and FII equity flows as a percentage of market capitalization on the BSE (FIICAP). The regression model fits better for the FIICAP variable—R^2 is higher when this dependent variable is used—but otherwise the results are broadly similar irrespective of which dependent variable is used. Table 3 summarizes the basic statistics of the dependent and independent variables.

B. Regression Framework

The basic regression framework used in the analysis is given below.

$$FII_t = c + \sum_i \alpha_i LDV_{it} + \sum_j \lambda_j X_{jt} + \sum_k \gamma_k Y_{kt} + \sum_m \delta_m Z_{mt} + \varepsilon_t, \quad \varepsilon_t \approx N(0, \sigma^2), \quad t = 1, 2, .., T \quad (5)$$

Where FII_t is the FII equity flow in month t; c is the constant term; LDV_i is the lagged dependent variable with ith lag (we use a lagged dependent variable with one lag in the regressions), thus $LDV_{1t} = FII_{t-1}$; X_j is the jth global variable; Y_k is the kth emerging market variable; Z_m is the mth domestic factor; and ε_t is the normally distributed error term with zero mean and constant variance. T is the number of observations in the regressions.

V. ECONOMETRIC RESULTS

A. Tests for Unit Roots and Autocorrelation

As a first step, the time series properties of the dependent and independent variables are analyzed by estimating the following equation for each variable:

$$W_t = c + \rho W_t + \upsilon_t, \upsilon_t \approx iid \, N(0, \sigma^2), \quad t = 1, 2, ..., T \quad (6)$$

and testing for the null hypothesis, $\rho = 1$, against the alternative hypothesis $\rho \neq 1$. The results are presented in Table 5. Since most of the series are in percentage terms, the series are found to be I(0) and the null hypothesis of a unit root is rejected in favor of the alternative hypothesis.[16]

We test for autocorrelation in the regressions using the Durbin h test (since we have a lagged dependent variable in our regressions, the Durbin Watson test is likely to give biased estimates). On the basis of the results, we cannot reject the null hypothesis of no autocorrelation. Thus the OLS estimates are unbiased and efficient. If the error terms were serially correlated, OLS estimates with the lagged dependent variable would have been biased and inefficient.

B. Correlations Between Dependent and Independent Variables

Bivariate correlation coefficients between the dependent and various independent variables are presented in Table 6. The alternative dependent variables, FIIDOL and FIICAP, are highly correlated, so we expect regression results to be similar for these variables. The only right-hand side variable with which the dependent variable is significantly correlated is the

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[16] See Hamilton (1994). The tests used are Augmented Dicky-Fuller (ADF) and Phillips-Perron (PP).

domestic stock market yield. This strong contemporaneous correlation between equity yields and FII flows could be due to the simultaneity between these variables.[17]

Some of the independent variables are significantly correlated with each other. For example, stock market yields in domestic, emerging, and developed markets; exchange rate depreciation and domestic political events; and rating downgrades and domestic political events. This may give rise to multicollinearity. We address this issue by dropping the variables that are susceptible to multicollinearity and analyzing the effects on the coefficients of the remaining variables, and on R^2. Encouragingly, regression results for respective variables (not shown) do not differ much across these different specifications, indicating that multicollinearity is probably not a serious problem in our regressions.

C. Results from Multivariate Regressions

The multivariate regressions for FIICAP—FII flows as a percent of market capitalization—are reported in Table 7. The first variant includes a whole host of variables—a "kitchen sink" regression. Thereafter, variables with the least significant coefficients were dropped sequentially so as to arrive at the regression labeled "parsimonious." Results for the "kitchen sink" and "parsimonious" specifications are similar, and show that a combination of global, regional, and domestic factors are important in the regressions.[18] The third column shows the results when the seasonal dummy, Time1, is replaced by the dummy for budget months.

Coefficients for the following variables are found to be significant (signs in parentheses): the lagged dependent variable (positive), lagged domestic stock market return (negative), lagged exchange rate depreciation (negative), lagged rating downgrades (negative), beginning of the year effect (positive), lagged or contemporaneous emerging market yield (positive), and LIBOR (negative).

The following variables were not found to be significant in the regressions: liquidity in the domestic stock market; industrial production growth in India, in emerging markets, or in developed countries; and the dummy variable for the relaxation of rules governing FII investment in India. In order to maximize the degrees of freedom, these variables were not included in the regressions reported in the Tables.

Global variables: Global interest rates have a negative and significant effect on FII flows, consistent with the findings in the literature. The coefficient for LIBOR, in Table 7, is -0.018 (the coefficient ranges between -0.016—0.028 in different specifications), which implies that

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[17] Variables with which FII flows are weakly correlated include rating changes, budget announcements, yields in emerging markets, and LIBOR.

[18] We detected a couple of outliers in the data. The regressions results reported in Table 7 were obtained after dropping these extreme values from the sample. These are: January 2001, when FII flows were US$854 million and July 2000, when they totaled US$-350 million.

a 1 percentage point increase in LIBOR has been associated with a slowdown in FII flows of about 20 percent, as compared to its monthly average (0.093). The lagged return on NASDAQ also has a negative coefficient in the regressions but it is not significant.

Emerging market variables: The lagged return in emerging markets (EMFY) has a positive coefficient, which is significant at the 1 percent level. The coefficient is about 0.005, which implies that a 1 percentage point increase in emerging market stocks return has been associated with an increase in FII flows to India of the order of 5 percent of the monthly average. This result is obtained with lagged as well as contemporaneous returns, but is stronger with lagged returns. Since flows to emerging markets and emerging market returns would be positively correlated, the result indicates that when emerging markets as a group receives more flows, India is also likely to benefit (consistent with Griffin et al. (2002)). This result is consistent with a two stage allocation process as suggested by Buckberg (1996).

The positive association with EMFY also suggests that Indian markets may be susceptible to contagion from a general decline in returns in emerging stock markets, or a reversal of capital flows from emerging countries. To specifically look at the effect of contagion from currency crisis in other emerging markets, we included a dummy for crises in emerging markets. We also included separate dummies for crises in emerging markets other than Asia, and for crisis in Asia. The coefficients of these variables are found to be negative but insignificant.

Domestic variables: The lagged domestic stock market return (BSEY) is found to be negatively associated with FII flows, with the coefficient statistically significant at a one percent level. This finding is somewhat surprising, since as noted above, theory would suggest a positive relationship between portfolio flows and (expected) domestic returns. The coefficient is about -0.004, which implies that a 1 percentage point increase in the domestic stock market yield has been associated with a decrease in FII flows of about 4 percent of its monthly average. Thus, rather than evidence of positive feedback trading, we find that FII investors are bargain hunters (i.e., "buying on the dips").[19] Another interpretation is that global investors allocate a fixed share of their portfolio to India and this results in FIIs selling after the market rises and buying after the market falls.

As noted earlier, this finding is consistent with Griffin et al. (2002) who find the effect of lagged stock return on FII investment to be negative and somewhat significant for India, unlike in many other emerging markets. Nonetheless, in order to test for the robustness of this result, we estimate a VAR model using daily data for FII flows, BSE returns and forward exchange rates. Results (not reported here), also indicate the coefficient on the lagged stock market return in the FII flows equations to be negative. Impulse response functions suggest that a one unit standard deviation shock to stock returns results in lower FII in the period ahead.

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[19] If we regress our dependent variable on contemporaneous domestic stock market yield (in a bivariate or a multivariate set up), the coefficient is found to be positive and significant. This result replicates Chakrabarti's finding, but is probably due to the simultaneity problem and indicates spurious correlation.

Other domestic variables are also found to be significant. Depreciation of the Indian rupee in the previous month is found to adversely affect FII flows in many specifications. A depreciating exchange rate would imply a weaker external position and raise concerns about erosion of the dollar value of returns on the Indian market. An alternative measure of external weakness would be a combination of exchange rate depreciation and reserve loss, however, such a variable was found to be insignificant.

A significant negative relationship is also found between FII flows and credit rating downgrades.[20] The coefficient on the credit rating variable is -0.07, implying that a rating downgrade has been associated on average with almost a 70 percent slowdown in FII flows to India, as compared to its monthly average. However, this result may exaggerate the importance of rating downgrades. An alternative interpretation is that since rating downgrades are usually announced following adverse economic or political conditions, it is these domestic factors (including progress on structural reforms) that are the primary determinants. Even so, the coefficients on the domestic political event dummies—war and government resigning mid term—are negative, but insignificant.

The finding that Indian macro variables—such as local market returns and rating downgrades—are significantly associated with portfolio inflows can be interpreted as implying that FIIs allocate funds to India at least partly on a top-down basis. Nonetheless, this result is not entirely conclusive, since it would also be consistent with a world where decision-making was entirely bottom-up, but returns on individual stocks were correlated with macroeconomic variables.

Finally, FII flows are found to be statistically stronger during the first four months of the year. As noted earlier, the significance of the coefficient on a beginning-of-the year dummy could reflect global factors. In the Indian context, it could also be a reflection of reform announcements that are often made during or ahead of the budget. To dig deeper into this issue, separate dummies for the first four months of the year were included in the regressions. The coefficient for February was found to be positive and significant, while the coefficients for January, March and April, are positive but insignificant. Further, if the Time1 variable is replaced with a dummy variable that takes a value one for the budget month and a month ahead of it, and zero otherwise, the coefficient is positive and significant. These findings are not definitive, but they do suggest that at least part of the beginning-of-the-year effect is India-specific.[21]

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[20] We also experimented with a continuous ratings variable, created as an average index of the ratings assigned by the Standard and Poor's, Moody's, and Fitch-IBCA, but the results do not change.

[21] We include a dummy variable, Time2, which takes a value one for the months of September-December, to account for any end of the year effect. The coefficient of this dummy was found to be negative but insignificant.

D. Quantifying the Importance of Domestic Versus External Factors

Significance of global, emerging market and domestic factors: FII flows are also regressed separately on domestic, regional, and global factors (Table 8). We find that domestic variables, regional variables, and global variables each exert significant influences on equity flows to India. This lends support to the hypothesis that portfolio investment in India is not independent of events in other emerging markets.

To further test for the significance of global, emerging market, and domestic factors, we conducted F tests for the joint significance of each set of variables in the regressions. In terms of equation (5), the null hypotheses are: all the λs are jointly zero; or all the γs are jointly equal to zero; or all the δs are equal to zero. The F tests overwhelmingly reject these null hypotheses.

In order to gauge the relative importance of domestic and external factors in determining FII flows to India, we compare the standardized coefficients of different sets of variables. The standardized coefficients correspond to those that would be obtained by estimating the regression model for normalized variables (with mean zero and standard deviation equal to one). The coefficients of different variables thus obtained indicate how much change in the dependent variable in standard deviation terms is induced by a one standard deviation change in the independent variable. An easy way to calculate these normalized coefficients is to multiply the original coefficients by the standard deviation of the respective independent variables, and divide by the standard deviation of the dependent variable.[22]

Using this methodology, and adding up the absolute values of standardized coefficients of domestic and external variables, we find that the two sets of variables are about equally important in determining FII flows to India. Individually, the lagged domestic stock market return exerts the greatest influence on FII flows, followed by emerging market returns, credit rating downgrades, seasonal/budget effect, and LIBOR.

E. Testing for Importance of Variances and Covariances of Returns

In order to test for the relevance of the mean variance framework for India, we include the variances and covariances of stock market returns in our regressions. The coefficients on all variance variables are found to be insignificant (Table 9). The "betas", calculated as the covariance between the returns in the concerned markets divided by the variance of the returns (see footnote 9), between emerging market and developed country stock returns, between Indian and emerging market stock returns, and between Indian and developed country stock returns, all have negative but insignificant coefficients.

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[22] See Pindyck and Rubinfeld (1981) for details. Chuhan et al. (1998) use this technique to compare the relative importance of domestic and external factors in determining portfolio flows to Latin American and Asian countries.

F. Robustness Analysis

Alternative series for explanatory variables: For some of the explanatory variables, more than one series were available (BSE or the NSE for returns on domestic shares; Dow Jones Index, NASDAQ or Standard and Poor's index for stock market returns in the source country; LIBOR, federal funds rate, or treasury bill rates for the external interest rate). The alternative series were highly correlated, so it seemed legitimate to use any one of them. Nonetheless, the robustness of results was checked using alternative series.[23]

Lagged dependent variable: We checked the robustness of results to using different lag lengths of the dependent variable. If we include higher lags of the dependent variable in the regressions, the coefficient for the first lag becomes smaller and less significant, and coefficients for the higher lags are positive and insignificant. Results on other explanatory variables remain the same. An alternative specification is one in which a lagged dependent variable is not included. For such a specification, the Durbin-Watson test rejects the null hypothesis of no autocorrelation. We correct for it through the Cochrane-Orcutt two-step method (see Judge et al. (1985)). The results on individual variables mostly remain unchanged, as compared with the results of our benchmark case (except for exchange rate depreciation), as shown in Table 10. We also estimate the model using FIIDOL as the dependent variable. The results are broadly similar to the ones with FIICAP variable, though the R^2 for regressions using FIIDOL is somewhat smaller.

Structural break: We test for the presence of a structural break in the data after 1997. Many observers feel that as a result of the crisis in Asia and ongoing capital account liberalization, Indian financial markets have become more integrated with Asian and global markets since 1997. To test whether there is a change in the relationship between portfolio flows and various explanatory variables, we test for a structural break using the Chow Test and are unable to reject the null hypothesis of no structural break. However, this result is not very robust, because when we break the sample at 1998 we reject the null hypothesis.

VI. CONCLUSIONS

This paper analyzes the determinants of FII inflows into India. The analysis shows that while the magnitude of these flows is small compared to other emerging markets, portfolio flows to India are less volatile than in other emerging markets. FII inflows into India also seem to be quite resilient. The econometric results indicate that a combination of domestic, regional, and global variables are important in determining equity flows to India. In particular, an increase in external interest rates adversely affects FII flows into India; while the performance of emerging market stocks positively influences FII flows to India. These flows are, therefore, not insulated from the performance of this asset class in general, and there could be a risk of outflows if stock market yields across emerging markets decline.

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[23] We used the principal components of various series in the regressions: the first principal component of the returns on NASDAQ, Dow Jones, and S&P 500; and the first principal component of the changes in LIBOR, federal funds rate, and treasury bill rate. However, the results did not change.

Lagged domestic stock market returns, and other events such as credit rating downgrades or a depreciation of the exchange rate, affect FII flows negatively. The negative relationship between portfolio inflows and the domestic stock market is somewhat surprising, but might be explained by portfolio rebalancing. In general, the finding that domestic macro factors are significant suggests that foreigners do not follow a pure bottom-up approach to investing in India and that their interest in stocks such as Infosys and Reliance is not impervious to macro events in India.

Box 1. Regulations Governing Foreign Institutional Investors

September 1992: Registered FIIs allowed to make direct purchases of debt and equity securities on local markets. Debt holdings limited to 30 percent of each individual fund administered by an FII (subsequently changed to an aggregate limit of 30 percent debt holdings of each FII's portfolio). Equity holdings by individual FIIs limited to no more than 5 percent of a company. Equity holdings by FIIs in aggregate limited to a 24 percent stake.

March 1993: Tax on FIIs' interest and dividend earnings set at a concessional rate of 20 percent. Capital gains tax rate set at 30 percent for short-term gains (holdings less than a year) and 10 percent for long-term gains. (Registration in Mauritius allows FIIs to avoid tax altogether.)

October 1996: FIIs allowed in invest in unlisted securities. Ceiling on investment by an individual FII in a company raised to 10 percent.

January 1997: FIIs allowed to invest 100 percent in to debt securities through 100 percent dedicated funds.

March 1997: FIIs permitted to invest in long-term government dated securities (up to 30 percent). FIIs permitted to invest up to 100 percent of their funds in corporate bonds. The ceiling on aggregate FII investment in a company raised to 30 percent.

August 1997: FIIs allowed to purchase forward foreign exchange for debt exposures. FII 100 percent debt funds permitted to invest in unlisted debt securities

April 1998: FIIs permitted to invest in treasury bills.

June 1998: FIIs allowed to invest in derivatives on recognized stock exchanges. FIIs allowed access to forward cover for new equity investments.

2000/01: Limit on FII investment in a company raised to 40 percent providing approved by special resolution of the company board (up to 24 percent remains automatic).

April 2000: Income tax notices issued to Mauritius-based FIIs for alleged tax evasion.

February 2001: FIIs Permitted to invest in commercial papers.

March 2001: Limit on FII investment in a company raised from 40 percent to 49 percent providing approved by special resolution of the company board

September 2001: FIIs allowed to buy ownership stakes in companies up to the sectoral foreign direct investment (FDI) limits (74-100 percent in most sectors). This serves to increase India's (MSCI) free float.

November 2001: Overseas Corporate Bodies (OCBs) (using FII sub-accounts) barred from portfolio investment schemes. First phase of adjustment to MSCI indices for free float (second phase is May 2002).

December 2001: SEBI allows FIIs to participate in all derivatives products.

Box 2. Data Sources and Construction of Variables

| Variable Name	Construction of Variable	Source
FIIDOL; FIICAP	FII equity flows in US$; FII flows/market capitalization in percent.	Handbook of Statistics, RBI
Global variables		
NASDAQY, DOWY, SPY	Month on month percentage yield in respective indices.	Yahoo.com
LIBOR, FFUND, TB	3 month LIBOR in US$, Federal fund rate, treasury bill rate	IFS
IPINDC	12 month percentage change in the industrial production of industrial countries	IFS
Regional variables		
EMFY	Month on month percentage change in MSCI Emerging Market Index.	Morgan Stanley
CONT, ASIA	Contagion dummy takes a value 1 for the months in which crises occurred in, Mexico, Russia, Turkey, Brazil. ASIA is Asia crisis specific.	Inferred using *IFS* exchange rate data
IPEMC	12-month percentage change in emerging market industrial production index	Staff calculations
Domestic variables		
BSEDY; BSEY	M-o-m percentage yield in BSE index in dollar terms; and in rupee terms	Handbook of Statistics, RBI
LIQ	BSE market capitalization, liquidity constructed as market turnover/market capitalization	Handbook of Statistics, RBI
EXCC	M-o-m percentage change in exchange rate with respect to U.S. dollar.	*IFS*
FIIDUM	Dummy takes a value 1 for the months when the rules for FII investment were relaxed and for the following month.	RBI, SEBI, Dow Jones Newwires, various issues of IMF Staff Country Reports.
GOVT	Dummy equals 1 in the month during which the central government resigned midterm and the following month	Dow Jones Newswire
WAR	Dummy takes a value 1 for the months of Kargil war and nuclear test and one month after it	Dow Jones Newswire
POLT	Dummy created by adding up the GOVT and WAR	Staff calculations
RATE, RATING	Index of weighted average of ratings by S&P and Moody's; dummy which takes a value one for the month in which the rating/outlook is revised down, and the following month	S&P, Moody's
IPC	12-month percentage change in industrial production index	CSO and *IFS*
BUDG	Dummy takes a value 1 for the months in which the budget is presented and the month before it	Constructed
TIME1; TIME2	Dummy takes a value 1 for the months of January-April; for September-December	Constructed
β_{ED}, β_{ID}, β_{IE}	Correlation between emerging market and developed market returns, between Indian and developed market returns, between Indian and emerging market returns in previous 24 months	Staff calculations

Figure 1. Net and Cumulated Annual FII Equity Flow

Cumulated FII flows in mln US $ ———— Net FII flows in mln US $
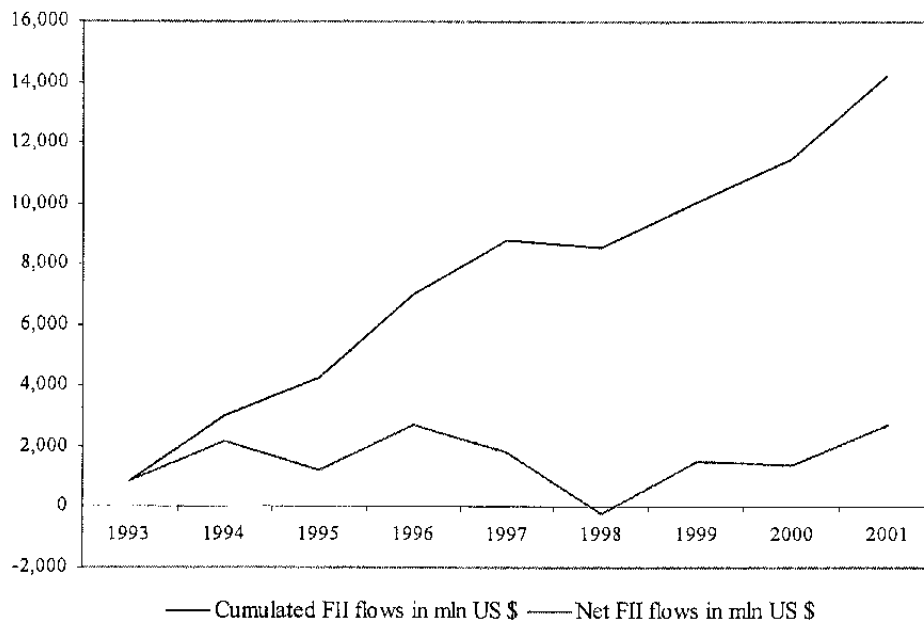
Figure 2. FII Equity Investment as Percent of Stock Market Capitalization,
Foreign Exchange Reserves

— — as % of stock market Capn ———— as % of Foreign Exc Reserves
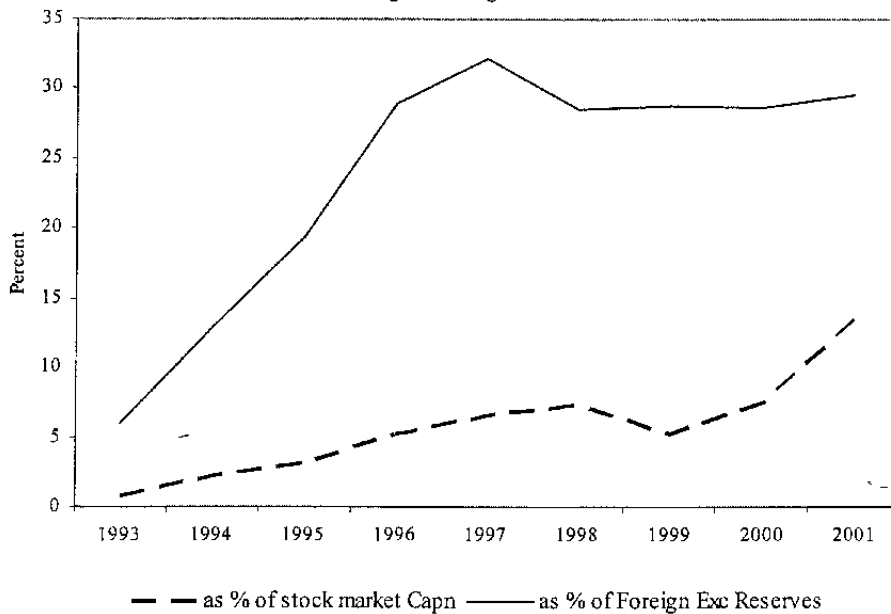
Figure 3. FII Investment as a Percentage of GDP
(Average for 1992-2000)
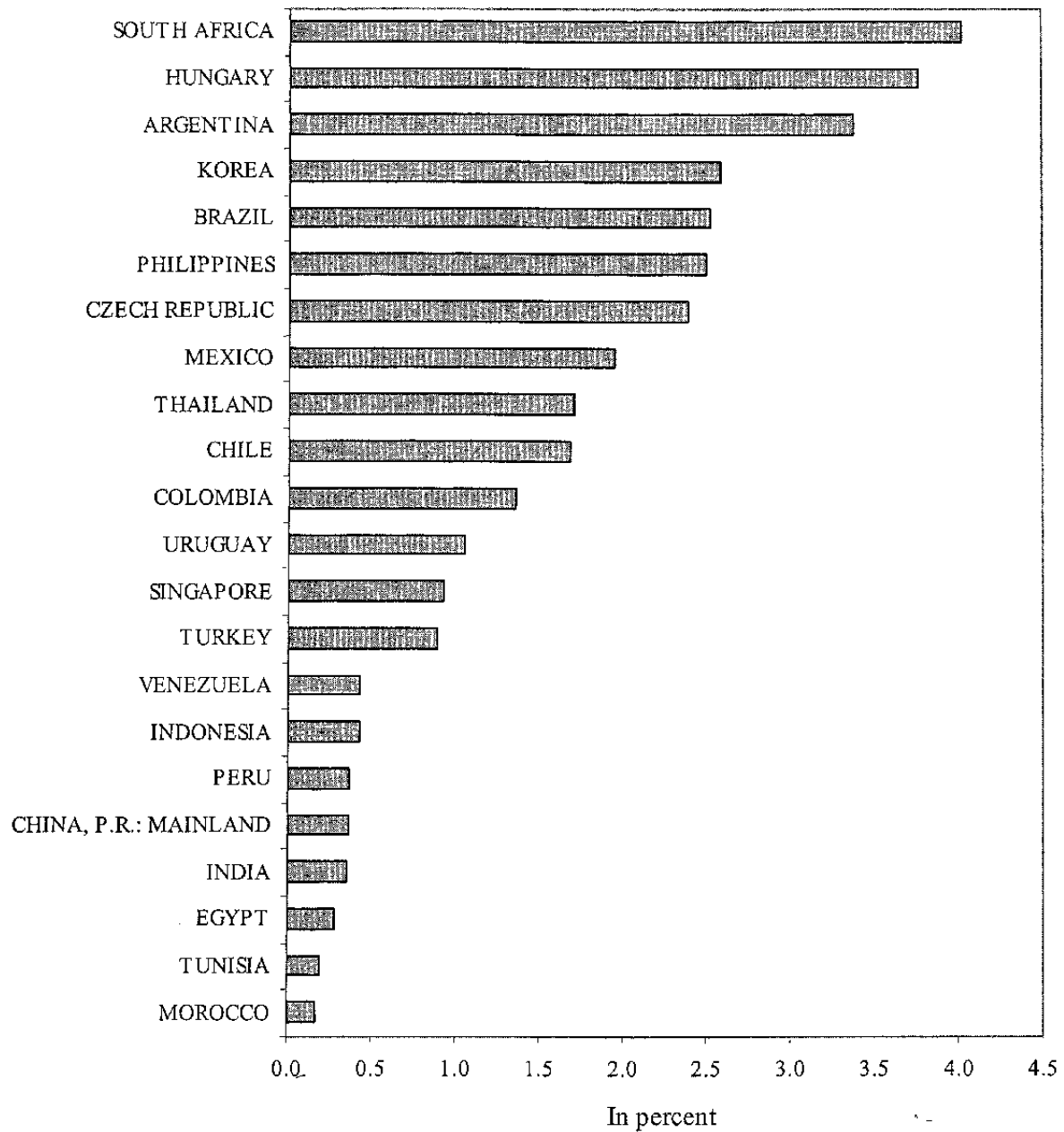
Figure 4. FDI and FII Equity Inflows in India
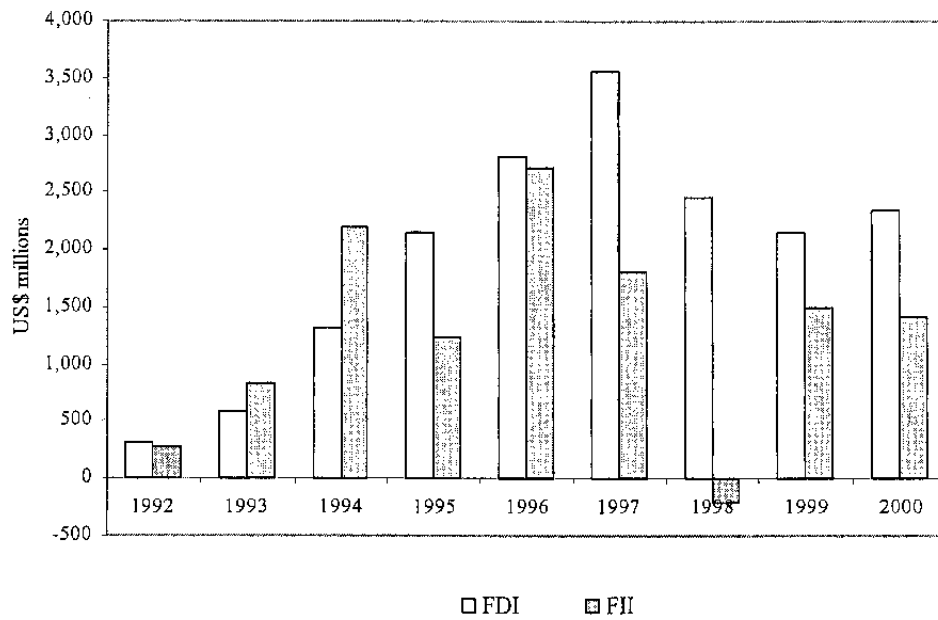
Figure 5. FDI and FII Equity Inflows in India as a Percent of Total to Emerging Markets 1/
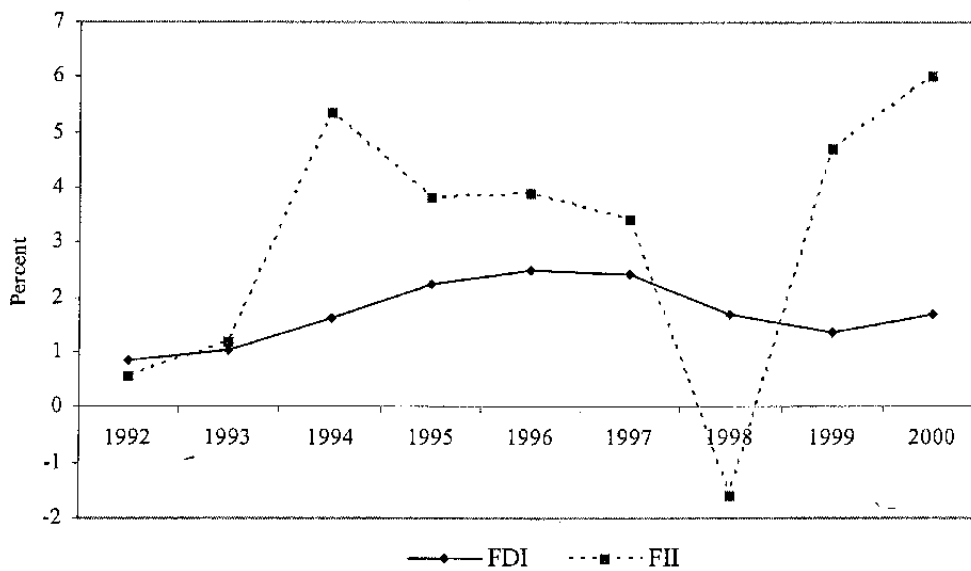
1/ In 1998 total FII equity flow to emerging markets was negative. Outflow from India equaled about 2 percent of the outflow from emerging markets.

Figure 6. Net Monthly FII Flows

FII (Equity) in mln US $ □ rating downgrade   △ War/nuclear test   ● Sept 11   ✕ govt resigns
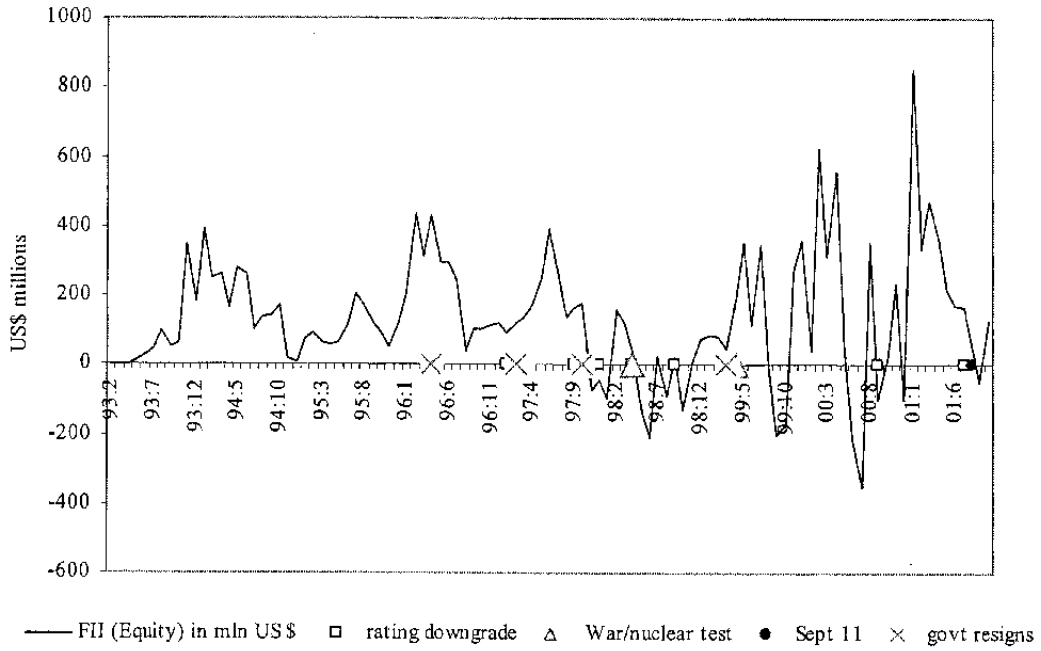
Figure 7. Average Monthly Flows

average monthly flows   ⋯◆⋯ mean+std dev   ⋯◆⋯ mean-std dev
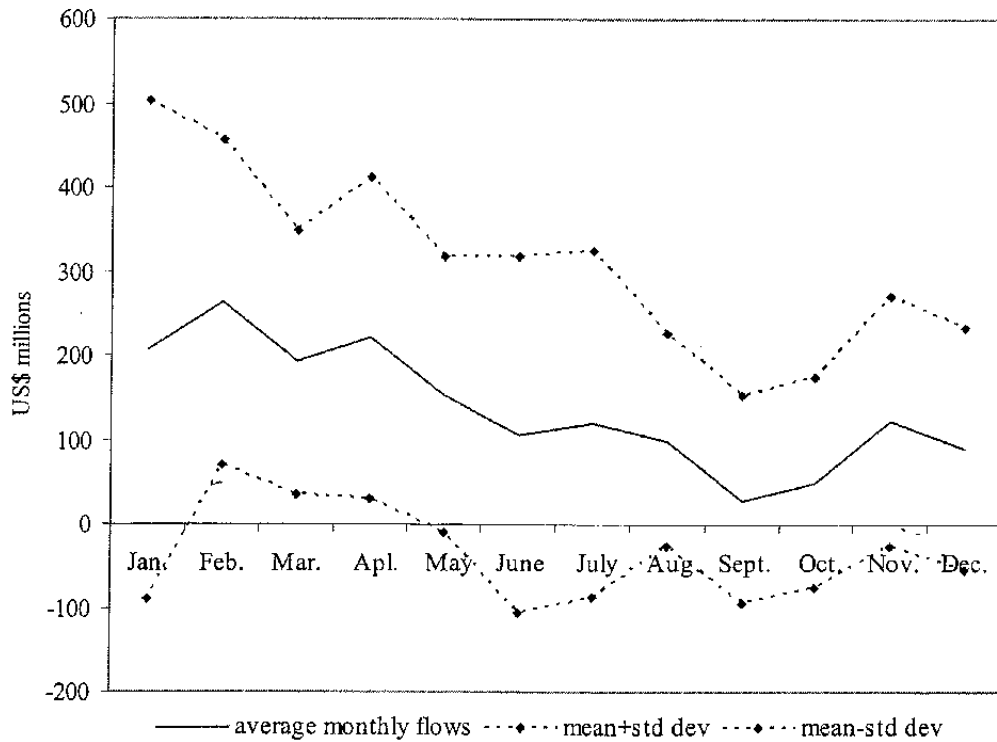
Table 1. India: Capital Flows over Three Decades

(In millions of U.S. dollars)

	1970s	1980s	1990s
Capital Account Balance	6,154	39,317	77,689
External Assistance	6,616	14,871	15,153
Commercial Borrowings 1/	1,136	10,349	17,780
Deposits by Nonresident Indians	854	11,349	14,664
Portfolio Investment	...	...	18,498
FDI	366	1,396	15,580
Other	-2,818	1,262	-3,986
Current Account Balance	-287	-44,140	-43,141
Change in Reserves (- increase)	-5,866	4,823	-34,548

Source: RBI, *Handbook of Statistics of the Indian Economy*, 2000.

1/ Includes US$4.2 billion from Resurgent India Bond in 1998.

Table 2. India: Foreign Institutional Equity Investment
(In millions of U.S. dollars)

	Annual Net FII	Cumulated Net FII
1993	831	831
1994	2197	3028
1995	1238	4267
1996	2710	6977
1997	1801	8778
1998	-209	8569
1999	1492	10061
2000	1412	11474
2001	2718	14192

Source: RBI, *Handbook of Statistics of the Indian Economy*, 2000.

Table 3. India: Sample Statistics of Dependent and Independent Variables

	Mean	Std Dev
FIICAP	0.09	0.12
FIIDOL	139	183
BSEY	0.60	8.15
EMFY	-0.03	7.15
NASDAQY	1.16	8.20
EXCC	0.43	1.32
LIBOR	5.35	0.97
RATING	0.14	0.35
LIQ	0.04	0.04

Sample Statistics of FII Equity Investment			
	93:2-97:12	98:1-01:12	99:1-01:12
Mean (in millions of US dollars)	151	118	165
Std Dev	118	240	256
CV	0.78	2.04	1.55

Sources: RBI, *IFS*, and IMF staff estimates.

Table 4. India: Average FII Received and its Volatility Across Emerging Markets
(In millions of U.S. dollars)

1993:1-2000:4				1998:1-2000:4			
Country	Mean	s.d.	CV 1/	Country	Mean	s.d.	CV
Korea	2,808	2,629	0.94	Colombia	256	255	0.99
Colombia 2/	349	331	0.95	South Africa	2,123	2,129	1.00
India	359	339	.95	Israel	445	628	1.41
South Africa	1,456	1,667	1.15	India	225	354	1.58
Chile	273	362	1.33	Philippines	445	795	1.79
Czech Republic	265	353	1.33	Korea	1,760	3,206	1.82
Israel	309	421	1.36	Chile	248	481	1.94
Thailand	615	839	1.36	Czech Republic	177	379	2.14
Philippines	471	676	1.44	Brazil	2,600	5,565	2.14
Hungary	346	637	1.84	Hungary	314	759	2.42
Brazil	4,078	7,642	1.87	Indonesia	-465	1,346	2.90
Argentina	2,382	4,747	1.99	Peru	-23	83	3.65
Peru	45	102	2.27	Mexico	680	2,675	3.93
Mexico	1,803	4,227	2.34	Argentina	382	3,418	8.96
Turkey	376	1,815	4.83	Thailand	-11	274	25.07
Indonesia	206	1,510	7.35	Venezuela	22	635	29.29
Venezuela 3/	58	586	10.05	Turkey	60	2,943	49.47

Sources: RBI for India, *IFS* for other emerging economies, and IMF staff estimates.

1/ CV is coefficient of variation.
2/ For Colombia the data are available only from 1996: 1.
3/ For Venezuela the data are available only from 1994:1.

Table 5. India: Unit Root Tests of Dependent and Independent Variables 1/

	Augmented Dickey-Fuller	P Value	Phillips-Perron	P Value
FIIDOL	-2.5	0.12	-61.4	0.00
FIICAP	-2.4	0.13	-68	0.00
BSEDY	-4.0	0.00	-110.4	0.00
BSEY	-3.9	0.00	-115.9	0.00
EXCC	-4.4	0.00	-81.2	0.00
EMFY	-5.3	0.00	-86.8	0.00
NASDAQY	-5.5	0.00	-97.1	0.00
DOWY	-5.9	0.00	-107.7	0.00
SPY	-5.2	0.00	-103.6	0.00
LIBOR	-2.6	0.09	-6.8	0.28
FFUND	-3.2	0.01	-7.1	0.27
TB	-2.7	0.07	-6.9	0.28
LIQ	-1.6	0.47	-6.4	0.31
β_{ED}	-3.1	0.02	-11.1	0.10
β_{IE}	-5.7	0.00	-20.4	0.01
IPINDC	-2.0	0.27	-11.3	0.10
IPEMC	-4.3	0.00	-6.7	0.30
IPC	-1.7	0.44	-9.0	0.17

1/ The Phillips-Perron test allows for serial correlation and heteroscedasticity in the error term. The p value is the probability with which the null hypothesis of unit root can be accepted.

Table 6. India: Correlation Coefficients Between Dependent and Independent Variables 1/

	FIIDOL	FIIDOL(-1)	FIIDOL(1)	FIICAP	FIICAP(-1)	FIICAP(1)	BSEDY	BSEY	EXCC	LIBOR	NASDAQY	EMFY	RATING	BUDG	GOVT	CONT	ASIA2
FIIDOL	1.00																
FIIDOL(-1)	0.35	1.00															
FIIDOL(1)	0.34	0.31	1.00														
FIICAP	0.96	0.34	0.34	1.00													
FIICAP(-1)	0.34	0.96	0.32	0.38	1.00												
FIICAP(1)	0.34	0.32	0.96	0.37	0.35	1.00											
BSEDY	0.34	-0.04	0.02	0.39	0.03	0.02	1.00										
BSEY	0.33	-0.05	-0.02	0.38	0.02	-0.02	0.99	1.00									
EXCC	-0.17	-0.08	-0.25	-0.18	-0.11	-0.25	-0.28	-0.13	1.00								
LIBOR	-0.11	-0.07	-0.11	-0.25	-0.20	-0.26	-0.21	-0.19	0.14	1.00							
NASDAQY	0.09	-0.29	0.01	0.06	-0.26	-0.03	0.39	0.39	-0.07	0.01	1.00						
EMFY	0.19	-0.09	0.24	0.22	-0.04	0.26	0.51	0.49	-0.19	-0.18	0.63	1.00					
RATING	-0.27	-0.25	-0.22	-0.31	-0.26	-0.23	-0.25	-0.23	0.24	0.03	-0.23	-0.22	1.00				
BUDG	0.25	0.26	0.20	0.21	0.22	0.20	-0.11	-0.14	-0.17	0.05	-0.19	-0.14	-0.05	1.00			
GOVT	0.01	0.01	0.01	0.02	0.00	0.01	-0.01	0.02	0.22	0.06	-0.04	0.03	0.12	0.10	1.00		
CONT	-0.02	0.04	-0.02	-0.01	0.02	0.01	-0.11	-0.12	-0.08	0.04	-0.21	-0.31	-0.12	0.16	-0.08	1.00	
ASIA	-0.09	0.01	-0.12	-0.12	-0.02	-0.14	-0.16	-0.15	0.15	0.12	0.02	-0.19	0.23	-0.16	0.23	-0.08	1.00

1/ A coefficient larger than .37 is significantly different from zero at 10 percent.

Table 7. India: Regression Results

	"Kitchen sink" OLS		"Parsimonious" OLS		"Parsimonious"OLS with BUDG	
	Coeff	t-ratio	Coeff	t-ratio	Coeff	t-ratio
C	0.159***	3.09	0.160***	3.17	0.158***	3.09
FIICAP(-1)	0.302***	3.31	0.312***	3.56	0.303***	3.34
BSEY(-1)	-0.004***	-3.05	-0.004***	-3.29	-0.004***	-2.93
EXCC(-1)	-0.010	-1.36	-0.009	-1.41	-0.012	-1.76
RATING(-1)	-0.071**	-2.47	-0.072***	-2.83	-0.070***	-2.69
POLT	0.003	0.10				
BUDG	0.011	0.40			0.042**	2.08
EMFY(-1)	0.005**	2.57	0.005***	2.91	0.005***	3.04
CONT	-0.012	-0.36				
ASIA	-0.009	-0.26				
NASDAQY(-1)	-0.001	-0.86	-0.001	-0.98	-0.001	-0.91
LIBOR(-1)	-0.018*	-1.87	-0.018**	-1.95	-0.016*	-1.76
TIME1	0.048*	1.86	0.053***	2.77		
R2;	.44		.43		.41	
AdjR2	.36		.38		.36	

*, ** and *** indicate significance at 10 percent, 5 percent and 1 percent levels, respectively.

Table 8. India: OLS Regression Results for Different Sets of Variables

	Full Sample Domestic Variables		Full Sample Regional Variables		Full Sample Global Variables	
	Coeff	t-ratio	Coeff	t-ratio	Coeff	t-ratio
C	0.064***	4.18	049***	3.66	0.16***	2.91
FIICAP(-1)	0.337***	3.68	.32***	3.71	0.31***	3.64
BSEY(-1)	-0.003**	-2.04				
EXCC(-1)	-0.014**	-2.01				
RATING(-1)	-0.077***	-2.86				
EMFY(-1)			.003**	2.01		
NASDAQY(-1)					-0.0003	.24
LIBOR(-1)					-0.021**	-2.17
TIME1	0.049**	2.43	0.049**	2.23	0.053**	2.53
R2;	.31		.26		.26	
AdjR2	.27		.23		.23	

*, ** and *** indicate significance at 10 percent, 5 percent and 1 percent levels respectively,.

Table 9. India: Regression Results When Variances and Covariances Are Included

	I Coeff (t ratio)	II Coeff (t ratio)	III Coeff (t ratio)	IV Coeff (t ratio)	V Coeff (t ratio)	VI Coeff (t ratio)
C	0.201** 2.49	0.161*** 3.12	0.164*** 3.23	0.165*** 3.05	0.147** 2.10	0.159*** 2.83
FIICAP(-1)	0.301*** 3.38	0.315*** 3.47	0.301*** 3.41	0.334*** 3.59	0.349*** 3.80	0.346*** 3.81
BSEY(-1)	-0.004*** -3.18	-0.004*** -3.23	-0.004*** -3.27	-0.005*** -3.37	-0.005*** -3.35	-0.005*** -3.35
EXCC(-1)	-0.010 -1.43	-0.009 -1.40	-0.010 -1.45	-0.007 -1.02	-0.007 -1.01	-0.007 -1.00
RATING(-1)	-0.076*** -2.89	-0.072*** -2.75	-0.075*** -2.92	-0.040 -1.41	-0.035 -1.25	-0.036 -1.22
EMFY(-1)	0.005*** 2.95	0.005*** 2.90	0.005*** 2.96	0.005*** 2.82	0.005*** 2.76	0.005*** 2.76
NASDAQY(-1)	-0.001 -1.03	-0.001 -0.99	-0.001 -1.00	-0.001 -0.80	-0.001 -0.84	-0.001 -0.84
LIBOR(-1)	-0.023* -1.87	-0.018** -1.94	-0.016* -1.69	-0.017* -1.75	-0.017 -1.31	-0.019** -2.01
TIME1	0.052*** 2.72	0.053*** 2.75	0.053*** 2.80	0.055*** 2.74	0.054*** 2.69	0.053*** 2.68
VBSE	0.000 -0.65					
VNAS		0.000 -0.15				
VEMF			0.000 -0.91			
β_{ED}				-0.027 -0.61		
β_{ID}					-0.006 -0.23	
β_{IE}						-0.003 -0.06
R2;	.44	.43	.44	.40	.39	.39
AdjR2	.38	.38	.38	.34	.33	.33

*, ** and *** indicate significance at 10 percent, 5 percent and 1 percent levels, respectively.

Table 10. India: Regression Results for AR1 and FIIDOL

	AR1 Regression		Regression for FIIDOL	
	Coeff	t-ratio	Coeff	t-ratio
C	0.241***	3.32	139.12***	1.81
FIIDOL(-1)			0.30***	3.43
BSEY(-1)	-0.005***	-3.76	-5.80***	-2.77
EXCC(-1)	-0.005	-0.74	-15.69**	-2.56
RATING(-1)	-0.083***	-2.75	-96.03**	-2.36
EMFY(-1)	0.005***	2.97	6.83**	2.57
NASDAQY(-1)	-0.002	-1.42	-1.54	-0.69
LIBOR(-1)	-0.028**	-2.08	-8.81	-0.62
TIME1	0.076***	3.30	83.89***	2.83
RHO	0.299***	2.68		
R2;	.41		.37	
AdjR2	.36		.31	

*, ** and *** indicate significance at 10 percent, 5 percent and 1 percent levels, respectively.

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