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A Case Study of US FDI in Emerging Market Countries

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Abstract: *This paper investigates the impact of exchange rates on US Foreign Direct Investment (FDI) inflows to a sample of 16 emerging market countries using panel data for the period 1990-2002. Three variables are used to capture separate exchange rate effects. The nominal bilateral exchange rate to the $US captures the value of the local currency (a higher value implies a cheaper currency and attracts FDI). Changes in the real effective exchange rate index (REER) proxy for expected changes in the exchange rate: an increasing (decreasing) REER is interpreted as devaluation (appreciation) being expected, so that FDI is postponed (encouraged). The temporary component of bilateral exchange rates is a proxy for volatility of local currency, which discourages FDI. The results support the 'Chakrabarti and Scholnick' hypothesis that, ceteris paribus, there is a negative relationship between the expectation of local currency depreciation and FDI inflows. Cheaper local currency (devaluation) attracts FDI while volatile exchange rates discourage FDI.*

JEL classification: F23, F30, C23
Key words: Foreign Direct Investment, Exchange Rate, and Panel Data Estimation

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Foreign Direct Investment and Exchange Rates:
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I. Introduction

Empirical studies on FDI and exchange rates linkages are important for the formulation of FDI policies given that there has been an increase in the number of countries adopting floating exchange rates (or abandoning fixed pegs, if only temporarily). FDI brings various advantages to source and host countries. FDI not only brings in capital but also introduces advanced technology that can enhance the technological capability of host country firms, thereby generating long-term and sustainable economic growth of the investment receiving country. It is also important to note that FDI benefits a home country and its investing firms since FDI enables them to employ their resources efficiently (see, for example, Lipsey (2000) – home and host country effects of FDI).

During the 1990s, many studies attempted to examine whether exchange rates are determinants of FDI inflows to host countries. The existing literature has generally found a positive effect of local currency depreciation on FDI inflows. Various reasons are suggested, with some studies clarifying the effect of the exchange rates as a supply-side or push factor on the FDI inflows. Specifically, stronger home currency increases outward FDI (see Froot and Stein (1991) and Klein and Rosengren (1994)). Others explain it as the allocation effect - FDI goes to countries where the currency is weaker as a given amount of foreign currency can buy more investment (see Cushman (1985, 1988), Campa (1993), Goldberg and Kolstad (1995), Blonigen (1997) and Chakrabati and Scholnick (2002)).

Froot and Stein (1991) investigate the impact of US dollar values on FDI in US dollar terms from industrialised countries to the United States using annual data covering 1974-87. They find that the value of the US dollar is statistically negatively correlated with FDI. Blonigen (1997) confirms that the depreciation of the US dollar is significantly related to the number of Japanese acquisitions in the United States. Chakrabati and Scholnick (2002) also examine the effects of US dollar exchange rates in 20 OECD countries from 1982-95 on FDI inflows in US dollar terms from the United States. Their results, however, are inconclusive, and it seems to be difficult to show robust effects.

This paper contributes to the literature on the impact of exchange rates on FDI inflows to host countries in several ways. The first main contribution is that we employ recent annual aggregate data for 16 emerging market countries over 1990-2002, which are collected from various official data sources. There are analysed using panel data econometric techniques. Secondly, not only do we utilise average official bilateral exchange rates (local currency unit against US dollar) adjusted for inflation to evaluate the effects, but we also employ changes in real effective exchange rate indices (REER) to capture the effect of local currency value expectation on FDI inflows. Lastly, based on the Hodrick-Prescott filter, we estimate temporary components of the bilateral exchange rates to capture the effect of host countries' exchange rate variability on FDI flows into the countries. Therefore, this paper specifically tests three hypotheses:

1. If devaluation expected, lower FDI.
2. FDI rises when devaluation occurs.
3. Exchange rate volatility discourages FDI.

In line with the hypotheses, we discover three related effects of exchange rates on FDI inflows. First, an expected devaluation postpones FDI. Second, a devaluation attracts FDI. Finally, we find that a volatile exchange rate discourages FDI. Moreover, we find that good economic conditions and foreign investors' confidence in political and economic conditions of the countries are significant. As a consequence a government's ability to provide a good investment environment for foreign entrepreneurs will secure greater amounts of FDI inflows to its country.

The remainder of the paper begins with section 2, which demonstrates the benchmark model. The subsequent section describes the data set and the econometric framework, followed by a discussion of the results. Finally, the last section summarises findings and concludes the paper.

II. The Benchmark Model

The paper follows the model of Chakrabarti and Scholnick (2002), but with different specification and variables, to investigate the impacts of exchange rate, exchange rate expectation, and exchange rate variability on FDI into emerging market countries.

Chakrabarti and Scholnick (2002) explain that owing to inelasticity in expectation, investors do not revise their expectations of future exchange rate to the full extent of changes in current exchange rate. Therefore, if they believe that a devaluation of a foreign currency will be followed by a mean reversion of the exchange rate, this implies that immediately after devaluation the foreign currency would be temporarily 'cheap' (temporary change in foreign currency value). As a consequence, ceteris paribus, FDI would flow to the country under these circumstances because the foreign asset currently appears to be cheap relative to its expected future income stream. Their model is shown as follows:

Assume that there is a multinational firm in a source country contemplating FDI in a host country. The project concerned is free in scale and is subject to diminishing returns to scale. Also, for simplicity, assume that the project makes a single payment at a certain point in the future. They support this assumption with the argument that although most FDI projects would lead to a stream of earnings rather than a single earning, such a stream may be represented by a single payment coming at the end of the original project. Then the expected net payoff of the home country's firm from the venture is expressed as:

$$p = N\left[\frac{R(N)E(e_1)}{1+r}\right] - C(N)e_0 \qquad (1)$$

where N is a measure of the scale of the project, R is the revenue in host country currency occurring at a future point in time for unit N, C is the cost of the project in host country currency payable up-front for unit N, e_0 is the exchange rate (source country currency unit per local currency unit) at the time of making the investment, $E(e_1)$ is the expected exchange rate at the time when the project pays back, and r is opportunity cost of capital over the project's life.

They indicate that, given the assumption of diminishing returns to scale, the firm then maximises the value of the expected net payoff by choosing the appropriate value of N. As a result given this set-up there exists an expected dollar-profit maximising value of N that solves this problem. This optimal level of N, say N^*, is a function of the opportunity cost of capital and the expected level of depreciation of a source country's currency, say $\boldsymbol{d} = log\,[e_0] - log\,[E(e_1)]$ such that:

$$N^* = N^*(r,\boldsymbol{d});\ \partial N^* / \partial r < 0 \text{ and } \partial N^* / \partial \boldsymbol{d} < 0 \qquad (2)$$

Based on a concept of inelasticity in expectation as found by Frankel and Froot (1987), they claim that agents do not revise their expectations of the future exchange rate levels to the full extent of changes in the current level of exchange rate. Analytically,

$$dE(e_1) / de_0 < 1 \quad (3)$$

From equation 2 and 3 they summarise that

$$dN^* / de_0 < 0 \quad (4)$$

In other words, an appreciation in a host country currency raises expectations about the future level of the exchange rate by less than the amount of the current appreciation, creating expectation of a future devaluation of the currency and reducing FDI inflows to the host country. The opposite happens in case of the depreciation (Chakrabarti and Scholnick (2002)).

The effect can be seen most easily using a stylised example. Imagine first that a US investor is interested buying a Thai office building. The building costs 50 million baht (Thai currency unit). The investor has one million US dollar in cash available. The exchange rate is 25 baht/ US dollar. Under this scenario obviously the investor cannot purchase the building. Now just suppose that the dollar appreciates to a value of 50 baht. The investor's baht wealth increases to 50 million baht and now he is able to buy the building. Thus, the depreciation of the baht has increased the relative wealth of the investor and changed the purchasing outcome. Moreover, the investor may also expect the dollar would depreciate to a value of 40 baht. The investor would gain benefits from the expected devaluation once he would like to repatriate some profits in the dollar terms. In sum, the devaluation of local currency and the expectation in (future) local currency appreciation lead to higher FDI inflows to a host country.

The effects of exchange rates will depend on the motives for FDI. For example, the model is probably inappropriate for explaining export oriented FDI in the country. In this case when the foreign investor expects that an appreciation of local currency may happen, he would deter his export-oriented investment to the country. As a consequence, in this circumstance, FDI would not be higher in the country and a negative relationship of the expectation in local currency appreciation and the FDI inflows would be existed instead. However, we cannot test for this in this paper due to unavailability of detailed data on FDI motives.

III. The Data

To test the hypotheses, the full econometric model to estimate is specified as follows:

$$FDI_{i,t} = a_i + b_1 \Delta REER_{i,t} + b_2 FXD_{i,t} + b_3 TFXD_{i,t} + b_4 MNU_{i,t} + b_5 INF_{i,t} + b_6 EXP_{i,t} + b_7 PGDP_{i,t} + b_8 POR_{i,t} + b_9 TEL_{i,t} + b_{10} GGDP_{i,t} + e_{i,t} \quad (5)$$

where $FDI_{i,t}$ is the US FDI inflows to the countries, $\Delta REER_{i,t}$ is the first difference of log of REER, $FXD_{i,t}$ is log of bilateral exchange rates adjusted for inflation, $TFXD_{i,t}$ is the temporary components of log of the bilateral exchange rates, $MNU_{i,t}$ is the manufacturing, $INF_{i,t}$ is the inflation, $EXP_{i,t}$ is the exports, $PGDP_{i,t}$ is log of the real per capita GDP, $POR_{i,t}$ is the portfolio investment, $TEL_{i,t}$ is log of the number of telephone mainlines, $GGDP_{i,t}$ is the real GDP growth.

We utilise average official bilateral exchange rate (local currency unit against US dollar) adjusted for inflation (*FXD*) to capture the impacts of exchange rate on FDI flows into a host country. We also calculate the first difference of log of host countries' real effective exchange rate index ($\Delta REER$) as a proxy of the expectation in local currency value. An increase (decrease) implies that the foreign investor may expect devaluation (appreciation) of local currency (assuming that first difference proxies deviation from equilibrium).

The reason is that the REER is one of the popular methods used for considering fluctuations in a country's currency against that of its trading partners to indicate its trade competitiveness. This method refers to a calculation of average exchange rate of major trading partners by giving weightings in accordance with each country's trade proportion prior to adjusting it to differences in inflation rates between a country and its trade partners.

However, to decide whether the REER at a given time is too weak or too strong, comparison to the index of a base year fixed at 100 must be undertaken[1]. If it is found that the index is higher than that of the base year, it is deemed that the currency is appreciating. On the contrary, if the index is lower than that of the base year, it means that the currency is weakening. Additionally, the index should be compared to other countries' REERs, particularly, that of rivals to see their direction. If the REER of the country in question is higher than that of its rivals, it means that the country's competitiveness has been declining.

[1] Strictly speaking, one wants to know if the REER is at its equilibrium value. In practice, it is difficult to identify the equilibrium REER so we use the proxy of changes relative to a base value.

Conversely, if the REER is lower than that of its competitors, it will indicate that the country's competitiveness is gaining.

Furthermore, to test a hypothesis of an exchange rate uncertainty, we employ Hodrick-Prescott (HP) filter (see Appendix 1 for details) to estimate transitory components of the real exchange rates (*TFXD*). In sum, it is a smoothing technique to receive a smooth estimate of the long-term trend component of a series. Technically, it is a curve fitting procedure to estimate the long-term trend path of a series subject to the constraint that the sum of the squared differences of the trend series is not too large (Hodrick and Prescott (1997)).

The long-term trends of the real exchange rates estimated by the approach are treated as permanent components of the real exchange rates and differences of the exchange rates and the permanent components are the temporary components of the exchange rates. The temporary components as a proxy of the exchange rate volatility are utilised in this study.

$$\textit{exchange rate} = \textit{permanent component of exchange rate} + \textit{(exchange rate – permanent component of exchange rate)} \quad (6)$$

Thus, this study differs from Chakrabarti and Scholnick (2002) in the sense that they solely evaluate the impacts of exchange rates and exchange rate uncertainty on US FDI inflows to the OECD countries. However, we examine the impacts of exchange rate, exchange rate expectation and exchange rate volatility on FDI inflows to emerging market countries.

We also control for other factors that could significantly determine an entry of a multinational company to invest in the country, as identified in the previous empirical literature.

A large domestic market (*GGDP*) permits the exploitation of economies of scale, which is likely to stimulate FDI. Empirical evidence of the host country’s domestic market as a driving factor of FDI has been found in former studies. The studies employ the domestic demand as an independent variable to test the locational determinants of FDI and most discover it to be significant. Domestic market potential is usually measured by real GDP growth of host country (see Culem (1988), Wheller and Mody (1992), Aristotelous and Fountas (1996), Tuman and Emmert (1999) and Lipsey (2000)).

There is empirical support for the claim that export orientation (*EXP*) attracts FDI (see Culem (1988), Tuman and Emmert (1999), Globerman and Shapiro (1999), Lipsey (2000) and Aseidu (2002)). Multinational enterprises are attracted to export-oriented countries because of the export potential. In addition, the export-oriented countries have better economic records suggesting a more stable economic climate.

As for industrialisation (*MNU*), its importance results from the informal skills embodied in the labour force. More industrialised countries also attract more technology intensive FDI (see Lucas (1993)). The absence of infrastructure (*TEL*) in the host country can also be a deterrent of FDI. Low levels of infrastructures can substantially increase operational costs (see Aseidu (2002)).

The importance of labour costs (*PGDP*) as a determinant of the FDI inflows to the host country is almost self-evident. In contrast to capital and technology, labour has very low mobility. Thus multinational companies can reduce production costs by transferring the more mobile production factors to countries where labour is cheaper. Schneider and Frey (1985) argue that relative labour costs are important determinants of FDI inflows in US dollar terms to 54 developing countries.

Political instability (*POR*) can reduce host country's attractiveness. Political events can even put past FDI at risk in the case of nationalisation of foreign owned assets, and political instability can make it difficult to predict cash flows. Empirical studies frequently succeed to establish a relationship of the political risk and the FDI inflows (see Meredith (1984), Scheider and Frey (1985) and Tuman and Emmert (1999)).

Previous empirical studies have also tested the important effects of macroeconomic management of host countries (*INF*). Schneider and Frey (1985) find that in developing country case high inflation in a host country can discourage FDI inflows to the country by using cross-section data estimation.

Based on the significance in all of the factors, we collect annual aggregate data representing those variables for our estimation. The data covering 1990-2002 for 16 emerging market countries are selected from International Monetary Fund (2003) on bases of data availability. The countries consist of 8 Latin American countries (Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, Paraguay, Uruguay, and Venezuela, Republic), 5 countries from Asia (China, Malaysia, Pakistan, Philippines, and Thailand), and 3 African countries (Morocco, South Africa, and Tunisia).

Net FDI inflows (constant 2000, Billions of US dollars) from the United States to the countries are treated as the regressand. The data are available form Bureau of Economic Analysis, US Department of Commerce. Appendix 2 presents US FDI trends in the countries.

In the 1990s FDI flows to the countries decreased rapidly owing largely to falling investments in Latin America. To some extent, the recent decline can be attributed to cyclical movements reflecting, among other things, growth trends in the world economy and the fallout from the bursting of the technology and telecommunications bubble. At the same time, regional and domestic growth prospects have also affected FDI in the countries. Some concern has also been expressed that risks pertaining to FDI in the countries, particularly of a regulatory nature and in light of the global economic uncertainty and increasing balance-sheet pressures, a broad-based reassessment of risks could lead to a corresponding decline of FDI to many of the countries. However, following the 1997 Asian economic crisis, the acquisitions of distressed banking and corporate assets surged in several Asian countries. Driven by both market seeking and efficiency seeking investment, FDI in Asia increased in the late 1990s (International Monetary Fund (2003)).

Following are the data utilised independent variables in the estimation.

1. Real effective exchange rate indices (REER, 2000=100) are from International Financial Statistics, International Monetary Fund through World Development Indicators 2004. The organisation defines the index as a nominal effective exchange rate (NEER) adjusted for relative movements in national price indicators (CPI) of the home country and selected countries. They also define the NEER to represent the ratio of an index of the period average exchange rate of the currency in question to a trade weighted geometric average of exchange rates for the currencies of selected countries.

2. Average official bilateral exchange rates (local currency unit against US dollar) are collected from World Development Indicators 2004. They are adjusted by CPI (2000=100) of host countries to acquire real exchange rates (see Cushman (1985,1988), Froot and Stein (1991), Klein and Rosengren (1994) and Blonigen (1997)).

3. Manufacturing, value added as a share of GDP (constant 2000, US dollar) is collected from World Development Indicators 2004. It is used as a proxy of the industrialisation factor (see Lucas (1993)).

4. Inflation, which is measured as percentage annual growth of GDP deflator, is obtained from World Development Indicators 2004 and employed as a proxy of the macroeconomic environment factor (see Scheider and Frey (1985) and Tuman and Emmert (1999)).

5. Exports of goods and services as a ratio of GDP (constant 2000, US dollar) are from World Development Indicators 2004. It is treated as a proxy of the export market factor (see Culem (1988), Lipsey (2000) and Aseidu (2002)).

6. GDP per capita (constant 2000, US dollar) is collected from World Development Indicators 2004. We utilise the data for the labour cost factor (see Lucas(1993) and Scheider and Frey (1985)).

7. Portfolio investment at current prices (US dollar) is collected from World Development Indicators 2004, and is adjusted by GDP at current prices (US dollar) to obtain portfolio investment as a ratio of GDP as a proxy of foreign investors' confidence in political and economic conditions of the host country (see Meredith (1984), Scheider and Frey (1985) and Tuman and Emmert (1999)).

   Because of undertaking portfolio investment in a host country, foreign investor has to carefully investigate both political risk and economic conditions. If he is not confident in the political and economic conditions of the host country, he is able to easily adjust his portfolio to invest in another country. An increase in portfolio investment in the country thus implies that the country has good economic and political stability that can attract FDI inflows.

8. Data on number of telephone mainlines per 1,000 persons extracted from World Development Indicators 2004 are utilised as a proxy of the infrastructure factor (see Aseidu (2002)).

9. GDP growth (constant 2000, US dollar) obtained from World Development Indicators 2004 is employed as a proxy of the domestic market potential factor (see Culem (1998) and Aristotelous and Fountas (1996)).

Appendix 3 and 4 provide descriptive statistics and the correlation of those variables.

IV. Econometric Framework

We firstly test the hypotheses by employing the fixed and random effects (or pooled OLS estimation when estimate of summation of unobserved effect equals to zero) estimation techniques to allow for country specific factors. The Hausman or F-test is used to justify which technique is more suitable for the data. We check for first-order autocorrelation by LM test, as it is possible that the errors in our model show first-order autocorrelation over time owing to funds projection of FDI projects in first few years of FDI in the country.

Fixed and random effects estimations however assume error terms are independent and identically distributed (iid). If the errors are not 'iid', the estimators are still consistent but inefficient, which could lead us to be either too or insufficiently confident in our estimators (Beck and Katz (1995)). Fixed or random effects with first-order autocorrelation disturbances estimation[2] is employed in this study to remedy the problem. We finally perform a robustness check of regional effects on FDI determination by dividing the countries into two regions: Latin America and Asia.

In estimation results, we expect positive coefficients on the bilateral exchange rate, real GDP growth, manufacturing, the number of telephone mainlines, portfolio investment and exports. Other coefficients are expected to be negative.

V. Estimation Results

Table 1 and 2 report estimated coefficients of the independent variables on the net US FDI flows into the emerging market countries and the Latin American and the Asian countries including related statistics from over 1990-2002 periods.

The Emerging Market Countries

In Table 1, fixed effects estimation results are presented for 192 observations. The estimates reveal negative response of the FDI inflows to expectation in local currency devaluation and local currency volatility. The positive response of the FDI inflows to depreciation of local currency is also shown. The estimated coefficients of these variables are statistically significant at 5 percent level. In addition, the results provide evidence that higher inflation discourages the FDI inflows to the countries, and an increase in foreign investor

[2] STATA provides fixed and random effects with first-order autocorrelation disturbances estimation.

confidence stimulates the FDI flows into the countries. The estimated coefficients are statistically significant at 10 percent level. The estimated coefficients of exports and real per capita GDP have unexpected signs but are not statistically significant. The estimated coefficients of value added of manufacturing and the number of telephone mainlines have expected signs but are statistically insignificant at 5 percent level.

Table 1: Effects of the exchange rate expectation, the bilateral exchange rate (Local currency unit per US dollar) and the exchange rate uncertainty on US FDI flows into the emerging market countries: 1990-2002

Dependent Variable: Annual net US FDI inflows (constant 2000, Billions of US dollars) to the emerging market countries

INDEPENDENT VARIABLES	*FIXED EFFECTS WITH AR(1) DISTURBANCES ESTIMATION*	*FIXED EFFECTS ESTIMATION*
First difference of log of REER	**-0.54(0.07)**	**-1.92(0.01)**
Log of the bilateral exchange rate	**5.83(0.00)**	**6.61(0.00)**
Temporary component of log of the bilateral exchange rate	**-6.49(0.01)**	**-7.95(0.00)**
Manufacturing, value added/ GDP	-0.04(0.61)	0.03(0.66)
Inflation	**-0.02(0.08)**	**-0.01(0.09)**
Exports of goods and services/ GDP	-0.01(0.54)	-0.01(0.16)
Log of real per capita GDP	3.11(0.07)	3.69(0.01)
Portfolio Investment/ GDP	**0.02(0.06)**	**0.08(0.09)**
Log of number of telephone mainlines	-0.67(0.19)	-0.47(0.17)
Real GDP growth	0.01(0.89)	0.02(0.26)
Constant	**-41.43(0.00)**	-
Coefficients of determinations	0.99	0.99
Hausman test statistic (Chi-squared)		85.48(0.00)
LM test statistic		179.65[2]
Koenker-Bassett test (t-test) statistic		0.89(0.55)
Number of observations	176	192

Remarks: 1. The figures are the coefficient estimates, and the quantities in parentheses are the P-values.
2. The 5% critical value of Chi-squared distribution with 1 degree of freedom is 3.84.

We undertake a LM test[3] for the fixed effects model to check the first-order autocorrelation problem. The calculated test statistic is greater than the critical value of the 5% critical value of the chi-squared distribution with 1 degree of freedom. Thus we can reject the null hypothesis of no first-order autocorrelation[4].

To remedy the problem, the fixed effects with first-order autocorrelation errors estimation is utilised (176 observations). The result indicates that local currency devaluation stimulates the FDI inflows to the countries, while volatile exchange rate and expectation in local currency depreciation decrease FDI inflows. These results also confirm the negative response of FDI inflows to inflation, and that portfolio investment encourages FDI inflows. The other regressors are statistically insignificant.

The Robustness Check of Regional Effects on FDI Inflows

The final column of results in Table 2 are based on fixed effects including a dummy variable for Asian countries interacted with the core explanatory variables[5]. The previous results are largely confirmed but Asia exhibits some differences compared to Latin America (the samples are too small to reliably estimate each region separately). However, the LM test on the fixed effects model suggests misspecification due to first-order autocorrelation.[6] The calculated test statistic is greater than the 5% critical value of the chi-squared distribution with 1 degree of freedom so we can reject the null hypothesis of no first-order autocorrelation.[7]

[3] We also perform Koenker-Bassett test to investigate the heteroscedasticity problem. The statistic shows that the errors are homoscedastic.

[4] Employing random effects estimation, we obtain a different result. The estimates only show positive response of the FDI inflows to local currency devaluation, value added of manufacturing and real GDP growth. The Hausman test statistic of 85.48 is greater than the critical value of the chi-squared distribution with 10 degree of freedom at 5 percent level, indicates that fixed effects estimation is more appropriate than random effects estimation for the data.

[5] The econometric model is $FDI_{i,t} = \alpha_i + \beta_1 \Delta REER_{i,t} + \beta_2 FXD_{i,t} + \beta_3 TFXD_{i,t} + \beta_4 MNU_{i,t} + \beta_5 INF_{i,t} + \beta_6 EXP_{i,t} + \beta_7 PGDP_{i,t} + \beta_8 POR_{i,t} + \beta_9 TEL_{i,t} + \beta_{10} GGDP_{i,t} + \beta_{11} ASIA + \beta_{12} ASIA*\Delta REER_{i,t} + \beta_{13} ASIA*FXD_{i,t} + \beta_{14} ASIA*TFXD_{i,t,} + \varepsilon_{i,t}$. ASIA is a dummy variable that is 1 for Asian countries and 0 otherwise.

[6] The Koenker-Bassett test statistic shows that the errors are homoscedastic.

[7] Utilised pooled OLS estimation technique, the estimates only show positive response of the FDI inflows to the real GDP growth in all of the countries. However, in the Latin American countries, local currency devaluation increases FDI inflows. The remaining variables are not statistically significant. The F-test statistic of 18.76 is greater than the critical value of the F-distribution with 12 and 130 degree of freedom at 5 percent level, indicates that fixed effects estimation is more appropriate than pooled OLS estimation for the data.

Table 2: Effects of the exchange rate expectation, the bilateral exchange rate (Local currency unit per US dollar) and the exchange rate uncertainty on US FDI flows into the Latin America and Asian countries: 1990-2002

Dependent Variable: Annual net US FDI inflows (constant 2000, Billions of US dollars) to the Latin America and Asian countries

INDEPENDENT VARIABLES	*FIXED EFFECTS WITH AR(1) DISTURBANCES ESTIMATION*	*FIXED EFFECTS ESTIMATION*
First difference of log of REER (b_1)	**-4.00(0.01)**	**-3.36(0.02)**
Log of the bilateral exchange rate (b_2)	**9.38(0.00)**	**9.58(0.00)**
Temporary component of log of the bilateral exchange rate (b_3)	**-9.05(0.00)**	**-10.87(0.00)**
Manufacturing, value added/ GDP (b_4)	-0.07(0.27)	-0.11(0.88)
Inflation (b_5)	**-0.02(0.01)**	**-0.01(0.01)**
Exports of goods and services/ GDP (b_6)	0.01(0.89)	0.01(0.68)
Log of real per capita GDP (b_7)	5.24(0.00)	4.69(0.00)
Portfolio Investment/ GDP (b_8)	0.06(0.23)	-0.02(0.74)
Log of number of telephone mainlines (b_9)	-0.99(0.01)	-0.87(0.02)
Real GDP growth (b_{10})	**0.04(0.09)**	**0.05(0.05)**
ASIA (dummy variable) (b_{11})	**6.44(0.01)**	-
ASIA*First difference of log of REER (b_{12})	**-5.95(0.04)**	**6.38(0.01)**
ASIA*Log of the bilateral exchange rate (b_{13})	**-0.79(0.08)**	**-7.29(0.01)**
ASIA*Temporary component of log of the bilateral exchange rate (b_{14})	**0.37(0.00)**	**1.93(0.06)**
Constant	**-67.76(0.00)**	-
Coefficients of determinations	0.99	0.99
F-test: H_0: $b_1+b_{12} = 0$	10.56(0.01)	
F-test: H_0: $b_2+b_{13} = 0$	3.19(0.07)	
F-test: H_0: $b_3+b_{14} = 0$	24.29(0.00)	
F-test statistic		18.76(0.00)
LM test statistic		143.43[2]
Koenker-Bassett test (t-test) statistic		0.55 (0.17)
Number of observations	143	156

Remarks: 1. The figures are the coefficient estimates, and the quantities in parentheses are the P-values.

2. The 5% critical value of Chi-squared distribution with 1 degree of freedom is 3.84.

The results for fixed effects allowing for first-order autocorrelation in Table 2 indicate that inflation discourages whereas host country growth stimulates FDI inflows. Exchange rate volatility, local currency appreciation and expectation of local currency depreciation all discourage FDI inflows to both Latin American and Asian countries. The other independent variables are statistically insignificant.

The coefficient on the Asia dummy variable, 6.44, is an estimate of the extent of extra FDI to the Asian countries compared to Latin America. In Latin American countries, the expectation of local currency devaluation (increasing REER) coefficient is –4.0, but for Asian countries it is –9.95 (-4+-5.95). Thus, the impact of expected local currency devaluation is considerably greater for Asian countries. In contrast, the impact of volatile exchange rates and local currency appreciation effects are slightly weaker for Asian countries.

Thus, for both Latin American and Asian countries, the impacts of exchange rate changes, volatile exchange rates and expectations on FDI inflows are consistent with those reported in Table 1, albeit with some regional variations.

VI. Concluding Remarks

This paper examines the effects of exchange rates, exchange rate expectation, and exchange rate volatility on net US FDI inflows in US dollar terms to the 16 emerging market countries. Our model draws on a model of Chakrabarti and Scholnick (2002) with different specification and variables. We employ annual aggregate data over the period of 1990-2002. Our expectation based on the model is that expectation in local currency appreciation and local currency depreciation might stimulate the FDI inflows to the countries. In addition, we expect that exchange rate volatility has probably a significant role on FDI flows into the countries.

This paper contributes to the empirical literature in the following ways:

1. We use average bilateral exchange rates (local currency unit against US dollar) adjusted for inflation to test the impacts of exchange rates on FDI inflows.
2. We utilise changes in REER to capture the effects of exchange rate expectation on FDI inflows.

3. Temporary component of exchange rate is used to capture the impacts of exchange rate volatility on FDI inflows.

Results can be summarised as:

1. There is robust evidence of the positive (negative) relationship of local currency devaluation (appreciation) and FDI inflows.
2. There is evidence of the negative (positive) relationship of expectation in local currency depreciation (appreciation) and FDI inflows. The result implies that FDI in the countries is increasingly being undertaken to service domestic demand for finance, telecommunications, wholesaling, and retailing rather than to tap cheap labour (supports an argument by International Monetary Fund (2003)).
3. There is evidence of the negative relationship of exchange rate volatility and FDI inflows.
4. We find that economic conditions and foreign investor confidence in the countries are significant.

Foreign investors in emerging markets do respond to the exchange rate: devaluation attracts FDI (reduces the price), although expected devaluation postpones FDI. US investors are discouraged by volatile exchange rates, perhaps because this is correlated with economic and political uncertainty, which also appear to discourage FDI.

Our analysis contributes to the discussion of the impacts of exchange rates on FDI. However, the country-level analysis has some limitations, particularly when foreign entrepreneurs have different FDI objectives. Suppose two types of foreign firms with two different FDI objectives exist in a host country. One type of foreign firm is interested in low cost production and thereby undertakes export-oriented FDI. The other type of foreign firm is interested in local sales and therefore undertakes market-seeking FDI. Under such circumstances, country-level analysis cannot clearly clarify the FDI type in the country by capturing the impacts of exchange rate expectation on FDI flows. This investigation also indicates the need to undertake firm-level analysis that requires detailed information on firm activities.

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APPENDICES

Appendix 1: A Summary of Hodrick-Prescott Filter Approach

According to Hodrick and Prescott (1997), this technique widely used among economists is a smoothing method to receive a smooth estimate of the long-term trend component of a series. Technically, they consider a given time series y_t, which is seasonally adjusted, is the sum of a growth component g_t, which varies 'smoothly' over time, and a cyclical component c_t:

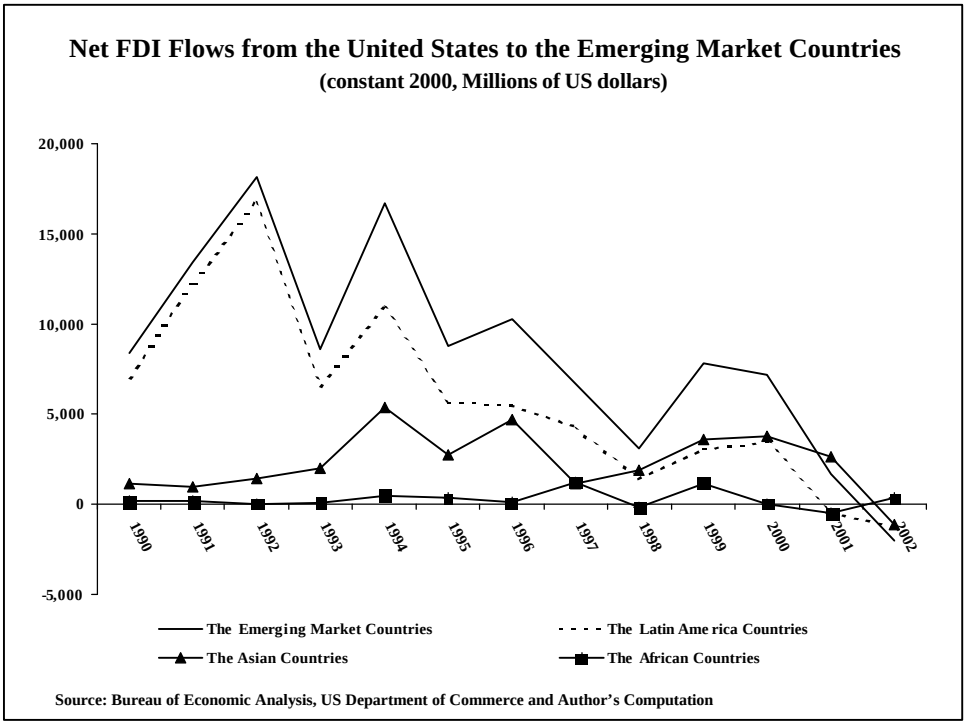
$$y_t = g_t + c_t \quad \text{for } t = 1, 2, \ldots, T.$$

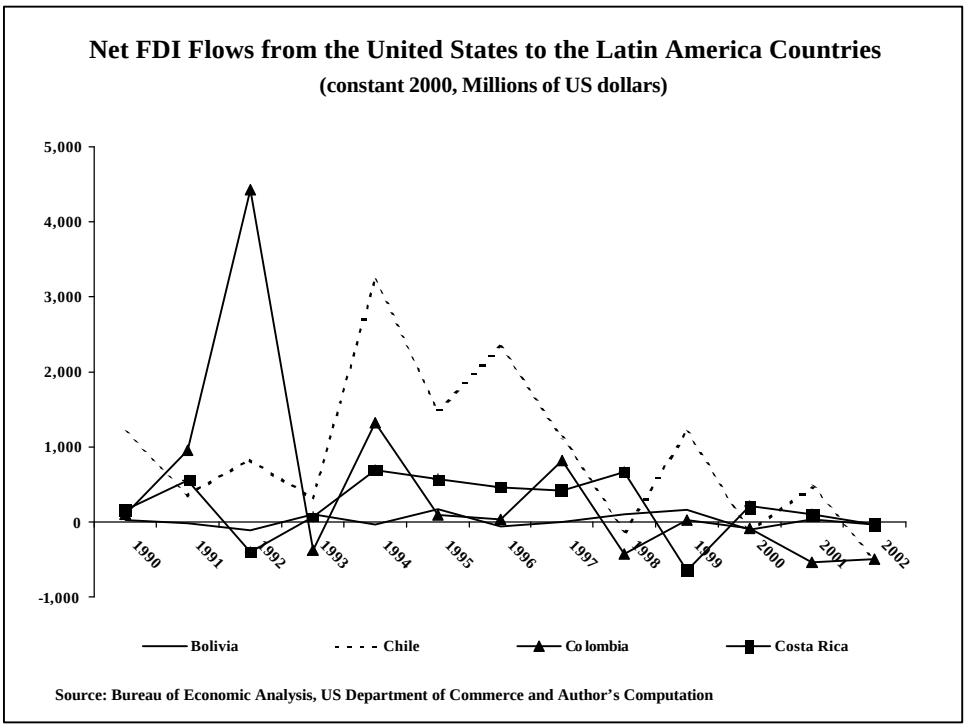
Their measure of the smoothness of the $\{g_t\}$ path is the sum of the squares of its second difference. The c_t are deviations from g_t but their average is near zero over long time periods. These considerations lead to the following programming problem for determining the growth components:

$$\underset{g_t}{Min} \sum_{t=1}^{T} \left[\sum_{t=1}^{T} c_t^2 + l \sum_{t=1}^{T} \left((g_t - g_{t-1}) - (g_{t-1} - g_{t-1}) \right)^2 \right]$$

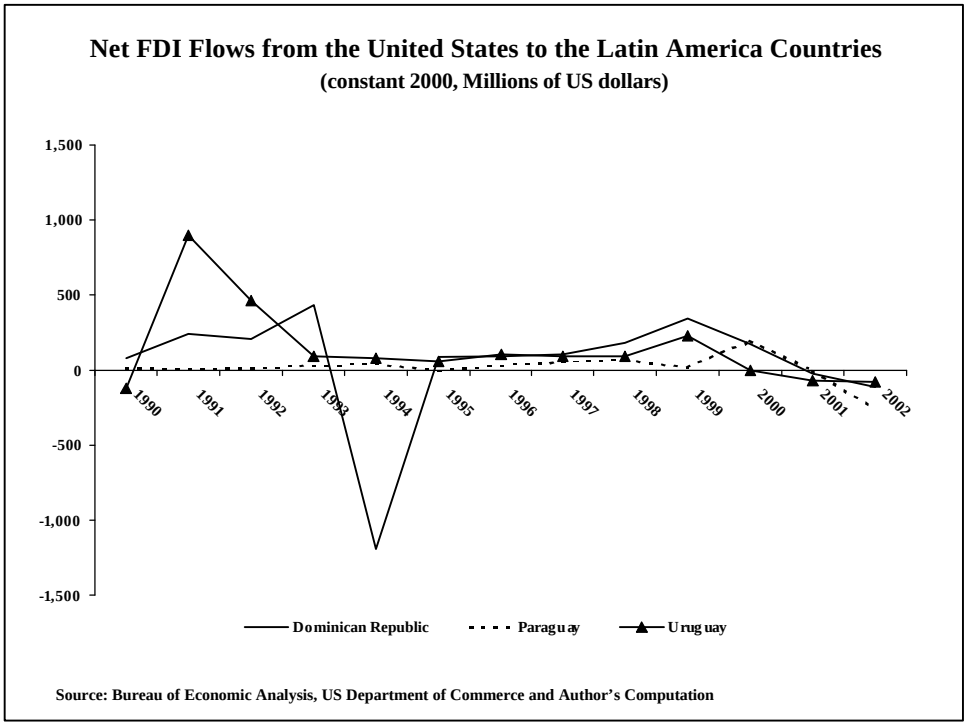
where $c_t = y_t - g_t$. The parameter l is a positive number, which penalises variability in the growth component series. The larger the value of l, the smoother is the solution series. For a sufficiently large l, at the optimum all the g_{t+1} - g_t must be arbitrarily near some constant b and therefore the g_t arbitrarily near $g_0 + b\,t$. This implies that the limit of solutions to program the function as l approaches infinity is the least squares fit of a linear time trend model.

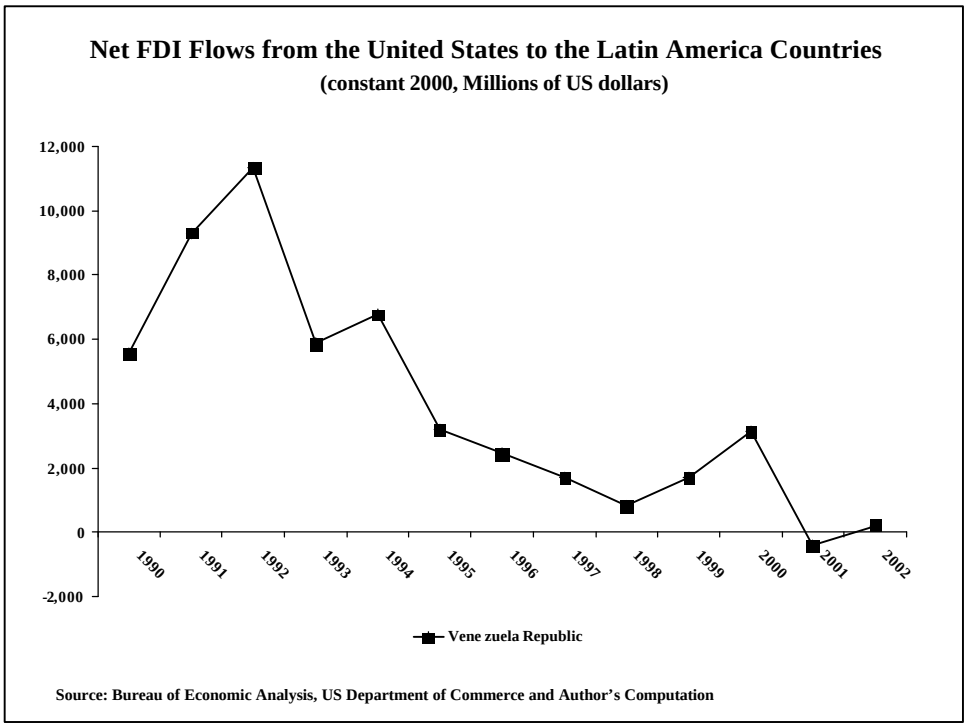
Appendix 2: Net FDI flows from the United States to the emerging market countries over 1990-2002 period



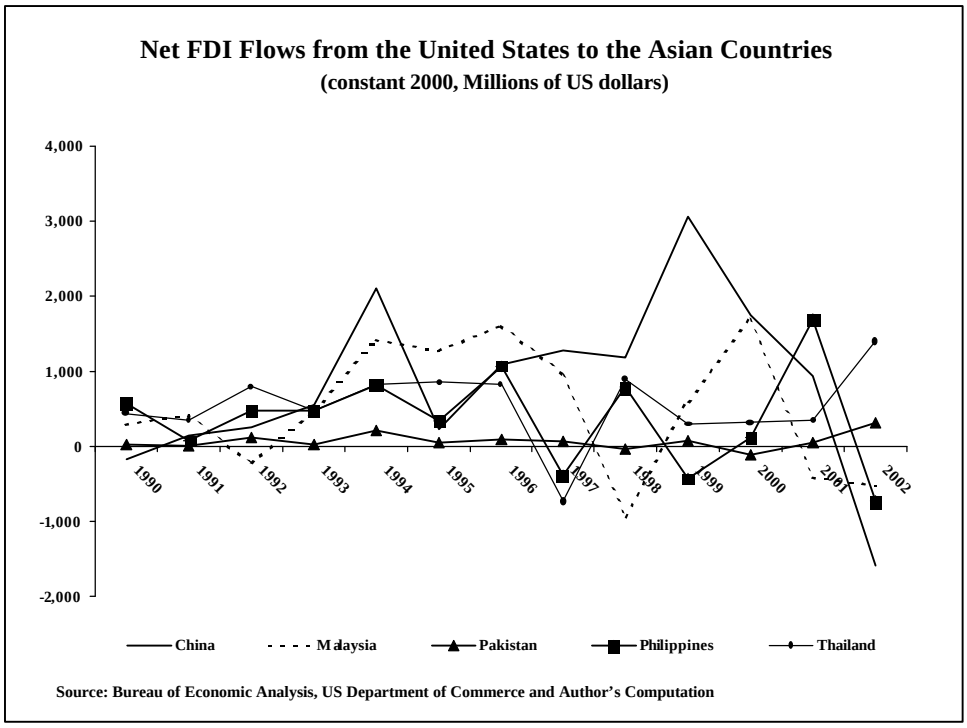


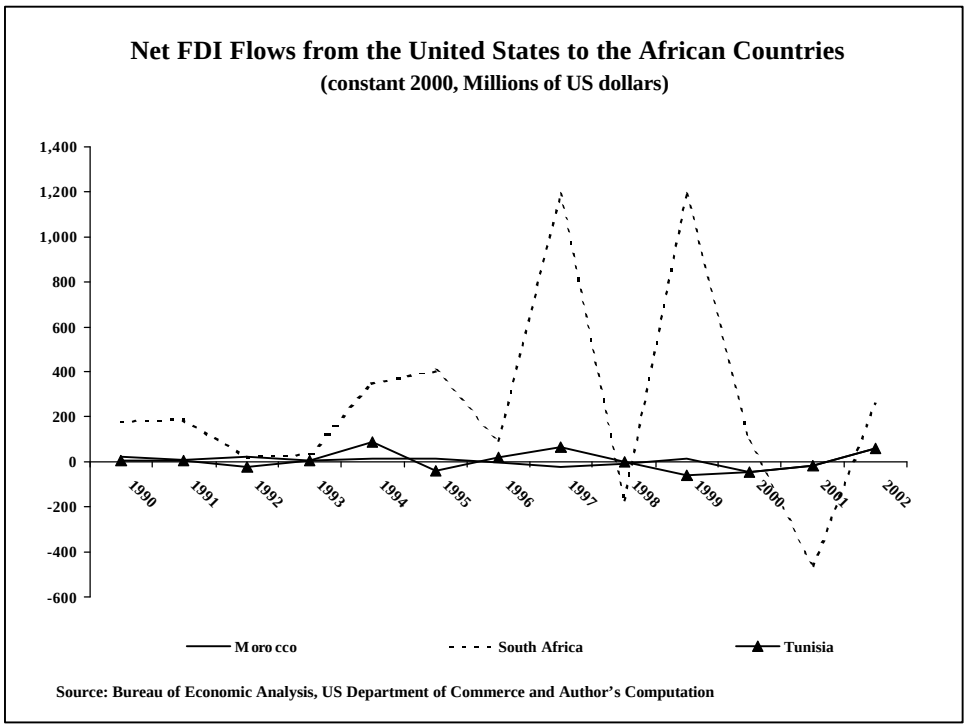
Appendix 2: Net FDI flows from the United States to the emerging market countries over 1990-2002 period (continued)





Appendix 2: Net FDI flows from the United States to the emerging market countries over 1990-2002 period (continued)





Appendix 3: Descriptive statistics

Sample: the 16 countries and 1990-2002

Variable	Mean	Max	Min	S.D.
Net inflows of US FDI to the emerging market countries (constant 2000, Millions of US dollar)	522.65	11,320.03	-1,586.85	1,406.56
Average official bilateral exchange rates (Local currency unit against US dollar, constant 2000)	500.48	4,822.20	1.10	999.63
Real effective exchange rates (REER)	95.96	133.83	43.87	14.87
GDP growth (constant 2000, US dollar)	3.95	14.20	-11.03	4.12
GDP per capita (constant 2000, US dollar)	2,408.76	6,377.73	363.58	1,596.68
Manufacturing, value added as a ratio of GDP (constant 2000, US dollar)	20.57	35.39	8.93	5.97
Inflation (percentage annual growth of GDP deflator)	12.95	115.52	-4.04	16.71
Number of telephone mainlines per 1,000 persons	91.97	282.91	5.93	65.20
Portfolio investment deflated by GDP at current prices (constant, US dollar)	0.47	32.88	-7.27	2.75
Exports of goods and services as a ratio of GDP (constant 2000, US dollar)	34.07	124.41	14.53	20.10

Source: US Department of Commerce, World Development Indicators 2004 and the author's computation

Appendix 4: Correlation matrix

Sample: the 16 countries and 1990-2002

	FDI	FXD	REER	GGDP	PGDP	MNU	INF	TEL	POR	EXP
FDI	**1**									
FXD	0.14	**1**								
REER	-0.48	-0.14	**1**							
GGDP	0.13	-0.17	0.02	**1**						
PGDP	0.33	0.01	-0.27	-0.14	**1**					
MNU	-0.04	-0.36	0.04	0.36	-0.16	**1**				
INF	0.27	0.21	-0.55	-0.19	0.39	-0.14	**1**			
TEL	0.02	-0.07	0.01	-0.16	0.81	0.03	0.10	**1**		
POR	0.22	0.05	-0.15	0.02	0.09	-0.07	0.12	-0.05	**1**	
EXPO	-0.01	-0.18	0.14	0.14	0.15	0.43	-0.20	0.27	-0.09	**1**

Source: US Department of Commerce, World Development Indicators 2004 and the author's computation

Note: For the definitions, please see the Data in the main text.

Appendix 5: Raw Data

Country	Year	FDI	FXD	REER	GGDP	PGDP	MNU	INF	TEL	POR	EXP
Bolivia	1990	0.012	3.17	90.37	4.64	871.06	18.50	16.27	27.57	0.15	22.78
	1991	-0.011	3.58	93.98	5.27	896.21	19.50	17.69	30.14	0.25	21.48
	1992	-0.063	3.90	92.58	1.65	890.31	19.07	13.20	32.40	0.52	20.05
	1993	0.069	4.27	91.98	4.27	907.21	18.81	6.56	32.80	0.31	19.08
	1994	-0.017	4.62	87.28	4.67	927.89	18.70	7.95	33.54	-0.25	21.66
	1995	0.126	4.80	84.98	4.68	949.07	19.01	11.43	33.32	0.14	22.55
	1996	-0.048	5.07	89.22	4.36	968.44	18.96	11.58	45.94	0.24	22.58
	1997	-0.004	5.25	92.90	4.95	994.48	16.78	5.71	49.46	-0.67	21.11
	1998	0.101	5.51	97.56	5.03	1022.62	16.26	7.05	56.85	-0.88	19.70
	1999	0.155	5.81	100.52	0.43	1006.15	15.49	2.41	61.72	-0.74	16.88
	2000	-0.101	6.18	100.00	2.28	1008.85	15.39	5.34	62.22	0.66	17.93
	2001	0.036	6.61	99.79	1.51	1004.44	15.18	0.65	63.38	-0.29	19.69
	2002	-0.031	7.17	98.07	2.75	1012.32	14.99	2.69	67.61	-0.25	21.93
Chile	1990	0.484	304.90	77.84	3.70	3072.16	19.57	21.24	65.97	1.19	34.62
	1991	0.173	349.22	80.45	7.97	3262.05	20.46	21.22	79.28	0.54	33.16
	1992	0.475	362.58	85.14	12.28	3601.67	20.49	11.77	94.76	1.09	30.65
	1993	0.205	404.17	87.13	6.99	3789.97	18.55	10.64	110.41	1.64	27.50
	1994	2.313	420.18	89.68	5.71	3942.41	18.36	12.60	113.44	1.78	29.30
	1995	1.154	396.77	95.07	10.63	4295.10	18.09	9.32	127.36	0.05	30.55
	1996	1.940	412.27	97.63	7.41	4546.84	17.52	1.71	149.18	1.65	28.74
	1997	0.992	419.30	106.70	7.39	4814.95	17.20	3.98	184.19	2.16	28.12
	1998	-0.119	460.29	105.52	3.92	4936.62	16.04	2.51	205.57	-3.38	26.72
	1999	1.148	508.78	100.05	-1.14	4816.44	16.42	11.79	207.02	-4.40	26.88
	2000	-0.125	539.59	100.00	4.40	4964.40	16.34	4.22	217.11	0.85	29.75
	2001	0.474	634.94	91.05	2.80	5040.22	15.79	1.50	225.85	0.21	34.68
	2002	-0.535	688.94	85.70	2.20	5089.31	15.79	7.63	230.36	-3.09	33.10

Source: US Department of Commerce and World Development Indicators 2004

Note: For the definitions, please see the Data and Econometric Framework section in the main text.

Appendix 5: Raw Data (continued)

Country	Year	FDI	FXD	REER	GGDP	PGDP	MNU	INF	TEL	POR	EXP
Colombia	1990	0.017	502.26	76.91	6.04	1869.39	20.58	26.11	69.05	-0.01	20.57
	1991	0.199	633.05	79.63	2.28	1874.92	20.90	26.19	73.79	0.21	21.34
	1992	1.177	759.28	86.70	5.03	1931.43	19.77	22.23	77.51	0.26	17.71
	1993	-0.123	863.06	91.27	2.37	1939.23	20.49	27.95	84.56	0.89	16.43
	1994	0.533	844.84	102.91	5.84	2012.97	16.13	45.36	92.82	0.26	15.00
	1995	0.043	912.83	104.59	5.20	2076.72	15.92	18.85	100.48	1.55	14.53
	1996	0.025	1036.69	111.91	2.06	2078.75	15.49	16.87	118.22	1.73	15.20
	1997	0.566	1140.96	124.50	3.43	2108.84	14.92	16.84	134.65	0.87	14.84
	1998	-0.348	1426.04	118.75	0.57	2081.22	15.07	14.77	155.95	1.22	15.01
	1999	0.026	1756.23	107.38	-4.20	1957.20	14.78	12.62	160.27	-0.72	18.35
	2000	-0.082	2087.90	100.00	2.92	1979.60	15.79	12.11	169.96	0.33	21.50
	2001	-0.571	2299.63	100.23	1.39	1972.07	15.55	5.99	172.22	-0.01	20.83
	2002	-0.565	2504.24	95.24	1.85	1973.60	15.66	5.12	179.39	1.37	19.77
Costa Rica	1990	0.038	91.58	91.30	3.56	3150.84	21.94	18.56	100.51	-0.49	34.59
	1991	0.166	122.43	84.96	2.26	3138.77	22.84	63.98	106.22	-0.18	33.56
	1992	-0.143	134.51	89.91	9.15	3341.81	23.34	20.48	108.93	-0.20	35.22
	1993	0.024	142.17	92.37	7.41	3506.01	22.24	10.62	116.15	-0.05	35.77
	1994	0.309	157.07	91.66	4.73	3591.18	21.74	15.55	131.50	-0.01	35.56
	1995	0.314	179.73	93.45	3.92	3654.90	21.84	22.19	143.83	-0.21	37.56
	1996	0.302	207.69	94.13	0.89	3610.97	22.11	15.80	154.70	-0.18	39.31
	1997	0.306	232.60	96.46	5.58	3733.30	22.39	14.89	189.15	0.60	40.75
	1998	0.545	257.23	98.02	8.40	3962.67	23.04	12.08	193.29	-0.57	47.35
	1999	-0.581	285.68	96.72	8.22	4199.10	29.01	15.02	204.06	0.54	51.64
	2000	0.223	308.19	100.00	1.80	4185.39	25.33	6.98	223.40	-0.43	48.52
	2001	0.119	328.87	104.53	1.04	4160.24	21.89	8.57	229.75	0.05	41.32
	2002	-0.033	359.82	102.20	2.92	4207.12	21.41	9.05	250.54	0.61	42.37

Source: US Department of Commerce and World Development Indicators 2004

Note: For the definitions, please see the Data and Econometric Framework section in the main text.

Appendix 5: Raw Data (continued)

Country	Year	FDI	FXD	REER	GGDP	PGDP	MNU	INF	TEL	POR	EXP
Dominican	1990	0.029	8.53	79.28	-5.83	1575.52	17.96	51.05	47.59	0.10	33.83
Republic	1991	0.132	12.69	80.04	0.94	1564.27	18.49	58.25	56.08	-0.05	28.21
	1992	0.118	12.77	80.51	8.04	1661.95	18.94	8.28	64.19	1.25	26.19
	1993	0.260	12.68	84.02	3.02	1683.17	18.80	4.92	69.55	0.80	30.17
	1994	-0.773	13.16	87.83	4.20	1723.91	18.76	8.48	71.49	4.40	31.54
	1995	0.064	13.60	90.36	4.85	1776.20	18.30	12.46	74.80	-0.02	30.94
	1996	0.070	13.77	92.25	7.25	1872.51	17.61	5.38	79.22	-0.05	30.68
	1997	0.088	14.27	96.74	8.21	1992.27	17.47	8.21	88.18	-0.05	46.78
	1998	0.157	15.27	96.14	7.32	2102.83	17.28	4.93	94.50	-0.13	47.03
	1999	0.323	16.03	95.21	8.00	2234.11	16.77	6.62	98.98	-2.51	45.90
	2000	0.175	16.42	100.00	7.30	2358.83	16.81	8.18	104.53	1.34	45.02
	2001	-0.027	16.95	106.27	3.20	2396.65	16.09	9.71	110.17	2.79	38.55
	2002	-0.133	18.61	101.10	4.10	2457.66	15.71	5.42	110.43	-0.12	37.79
Paraguay	1990	0.002	1229.81	87.41	3.09	1530.95	16.78	36.28	26.65	0.02	33.25
	1991	0.002	1325.18	98.25	2.47	1528.06	16.47	24.82	27.77	0.01	30.17
	1992	0.003	1500.26	95.52	1.80	1516.33	16.48	14.71	28.34	-0.01	28.07
	1993	0.015	1744.35	96.80	4.15	1540.50	15.99	19.07	30.57	0.03	36.93
	1994	0.023	1904.76	101.25	3.09	1550.29	15.21	21.02	32.16	-0.01	34.23
	1995	-0.004	1963.02	102.71	4.71	1585.87	15.20	12.99	34.56	-0.01	34.83
	1996	0.023	2056.81	107.01	1.27	1569.14	15.46	10.50	35.58	-0.04	28.82
	1997	0.040	2177.86	112.76	2.59	1572.98	15.25	3.04	42.87	-0.04	27.21
	1998	0.058	2726.49	103.48	-0.42	1530.80	15.49	12.43	49.93	0.10	28.22
	1999	0.018	3119.07	100.67	0.49	1503.46	13.55	2.52	50.03	-0.12	22.98
	2000	0.197	3486.35	100.00	-0.30	1465.22	13.37	11.84	51.48	0.03	20.79
	2001	-0.005	4105.93	95.65	2.66	1470.75	14.08	1.74	51.24	0.01	19.49
	2002	-0.300	5716.26	78.07	-2.32	1405.37	13.99	16.42	47.25	0.01	30.72

Source: US Department of Commerce and World Development Indicators 2004

Note: For the definitions, please see the Data and Econometric Framework section in the main text.

Appendix 5: Raw Data (continued)

Country	Year	FDI	FXD	REER	GGDP	PGDP	MNU	INF	TEL	POR	EXP
Uruguay	1990	-0.006	1.17	54.53	0.30	4802.41	27.97	106.84	134.26	1.16	23.53
	1991	0.089	2.02	62.57	3.54	4935.70	28.31	100.81	145.05	0.42	20.69
	1992	0.077	3.02	67.24	7.93	5288.79	24.78	59.62	157.20	0.65	20.45
	1993	0.024	3.94	79.94	2.66	5391.05	21.10	47.85	168.42	0.20	19.13
	1994	0.030	5.04	86.30	7.28	5743.65	18.88	38.96	183.82	0.91	19.77
	1995	0.030	6.35	89.21	-1.45	5622.23	19.69	41.05	194.98	1.50	19.00
	1996	0.074	7.97	90.36	5.58	5891.90	19.26	26.43	208.86	0.88	19.67
	1997	0.075	9.44	95.01	5.05	6145.70	18.88	19.28	234.46	0.97	20.55
	1998	0.083	10.47	96.83	4.54	6377.73	18.41	9.36	250.38	1.87	19.85
	1999	0.217	11.34	99.66	-2.85	6170.30	16.68	4.19	270.70	0.40	18.03
	2000	-0.005	12.10	100.00	-1.44	6045.97	16.89	3.98	278.44	0.95	19.30
	2001	-0.078	13.32	98.83	-3.39	5807.42	16.30	5.29	282.91	2.70	18.35
	2002	-0.091	21.26	78.31	-11.03	5136.81	17.47	18.65	279.63	2.44	21.97
Venezuela	1990	0.152	46.90	43.87	6.47	5026.95	14.94	41.74	76.29	32.87	39.45
Republic	1991	0.340	56.82	47.43	9.73	5393.98	15.52	21.45	80.80	0.66	31.35
	1992	0.545	68.38	49.32	6.06	5592.95	14.95	28.24	89.61	1.66	26.35
	1993	0.390	90.83	51.49	0.28	5485.67	14.71	31.65	99.61	1.03	26.96
	1994	0.725	148.50	49.43	-2.35	5242.12	14.63	62.89	109.18	0.43	30.86
	1995	0.547	176.84	61.90	3.95	5335.56	15.11	51.76	113.82	-1.04	27.11
	1996	0.840	417.33	52.18	-0.20	5216.38	13.65	115.52	117.43	1.05	36.51
	1997	0.865	488.63	68.41	6.37	5438.26	12.81	38.42	122.04	-0.83	28.41
	1998	0.573	547.56	83.84	0.17	5341.89	12.48	20.88	111.54	0.81	19.90
	1999	1.473	605.72	94.29	-6.09	4921.37	10.69	26.96	107.60	2.04	21.65
	2000	3.146	679.96	100.00	3.24	4987.79	9.54	27.63	104.92	-2.58	28.45
	2001	-0.462	723.67	107.19	2.79	5032.91	9.67	7.76	109.42	0.88	22.25
	2002	0.261	1160.95	82.67	-8.88	4503.33	8.93	33.13	112.75	-2.42	29.27

Source: US Department of Commerce and World Development Indicators 2004

Note: For the definitions, please see the Data and Econometric Framework section in the main text.

Appendix 5: Raw Data (continued)

Country	Year	FDI	FXD	REER	GGDP	PGDP	MNU	INF	TEL	POR	EXP
China	1990	-0.082	4.78	98.94	3.80	363.58	32.87	5.68	5.93	-0.07	17.53
	1991	0.072	5.32	87.75	9.20	391.65	32.73	6.73	7.22	0.06	19.43
	1992	0.137	5.51	78.90	14.20	441.81	33.09	7.90	9.69	-0.01	19.50
	1993	0.353	5.76	69.81	13.50	495.73	34.55	14.55	14.49	0.71	17.08
	1994	1.641	8.62	75.90	12.60	551.91	34.45	19.90	22.58	0.65	25.32
	1995	0.208	8.35	84.57	10.50	603.28	34.66	13.18	33.04	0.11	23.99
	1996	1.083	8.31	92.76	9.60	654.30	34.70	5.92	44.09	0.21	21.03
	1997	1.302	8.29	98.84	8.80	704.63	34.65	0.82	56.20	0.77	23.07
	1998	1.200	8.28	100.81	7.80	752.33	33.67	-2.40	69.62	-0.39	21.92
	1999	3.051	8.28	97.51	7.10	798.16	33.78	-2.19	85.82	-1.13	22.29
	2000	1.739	8.28	100.00	8.00	855.93	34.74	0.94	111.81	-0.37	25.87
	2001	0.941	8.28	104.32	7.50	913.47	34.66	1.18	137.40	-1.65	25.47
	2002	-1.582	8.28	102.64	8.30	982.68	35.39	-0.57	166.92	-0.81	28.86
Malaysia	1990	0.203	2.70	114.16	9.01	2497.51	24.22	3.81	89.29	-0.58	74.54
	1991	0.308	2.75	111.54	9.55	2669.18	25.55	3.58	99.12	0.35	77.83
	1992	-0.178	2.55	119.22	8.89	2834.90	25.82	2.41	111.49	-1.90	75.98
	1993	0.379	2.57	120.46	9.89	3038.84	25.93	3.99	125.49	-1.06	78.92
	1994	1.173	2.62	115.80	9.21	3237.20	26.64	3.94	145.66	-2.21	89.15
	1995	1.089	2.50	115.70	9.83	3467.99	26.38	3.63	165.71	-0.49	94.09
	1996	1.426	2.52	121.11	10.00	3721.11	27.84	3.68	178.14	-0.27	91.58
	1997	0.867	2.81	119.43	7.32	3894.48	28.38	3.48	194.88	-0.25	93.29
	1998	-0.901	3.92	94.86	-7.36	3524.42	28.78	8.50	201.57	0.39	115.74
	1999	0.593	3.80	97.58	6.14	3653.44	30.94	0.05	202.97	-1.29	121.31
	2000	1.688	3.80	100.00	8.86	3881.38	32.60	4.83	199.16	-2.80	124.41
	2001	-0.421	3.80	105.49	0.32	3806.65	30.42	-2.88	197.05	-0.47	116.40
	2002	-0.535	3.80	105.65	4.15	3882.61	30.52	3.83	190.40	-1.47	114.77

Source: US Department of Commerce and World Development Indicators 2004

Note: For the definitions, please see the Data and Econometric Framework section in the main text.

Appendix 5: Raw Data (continued)

Country	Year	FDI	FXD	REER	GGDP	PGDP	MNU	INF	TEL	POR	EXP
Pakistan	1990	0.007	21.71	114.72	4.46	461.40	17.41	6.45	7.50	0.22	15.54
	1991	0.003	23.80	113.44	5.06	472.61	17.13	13.06	9.64	0.20	17.00
	1992	0.058	25.08	111.81	7.71	496.43	16.86	10.06	10.43	0.76	17.36
	1993	0.010	28.11	111.42	1.76	492.65	16.67	8.70	12.45	0.57	16.31
	1994	0.134	30.57	108.91	3.74	498.40	16.78	12.89	14.47	2.84	16.28
	1995	0.036	31.64	108.20	4.96	510.42	16.31	13.87	16.69	0.01	16.71
	1996	0.072	36.08	106.07	4.85	522.21	16.05	8.37	18.50	0.41	16.90
	1997	0.051	41.11	109.34	1.01	515.00	15.88	13.38	19.75	0.45	16.08
	1998	-0.032	45.05	104.83	2.55	515.59	15.85	7.53	20.82	0.01	16.48
	1999	0.079	49.50	98.84	3.66	521.74	15.48	5.86	22.02	0.01	15.35
	2000	-0.120	53.65	100.00	4.26	531.00	15.31	2.73	21.97	0.02	16.34
	2001	0.047	61.93	93.05	1.86	527.99	15.85	6.06	22.83	0.01	17.98
	2002	0.327	59.72	96.73	3.22	532.01	16.11	3.07	25.04	-1.01	18.68
The Philippines	1990	0.248	24.31	93.42	3.04	921.20	24.83	12.97	10.05	-0.11	27.52
	1991	0.040	27.48	93.55	-0.58	895.41	25.32	16.53	10.42	0.24	29.60
	1992	0.271	25.51	103.51	0.34	878.36	24.18	7.93	10.36	0.08	29.13
	1993	0.287	27.12	103.16	2.12	876.90	23.71	6.83	13.16	-0.10	31.36
	1994	0.531	26.42	108.57	4.39	894.93	23.26	9.99	16.57	0.42	33.83
	1995	0.235	25.71	111.44	4.68	915.87	22.99	7.55	20.54	1.61	36.36
	1996	0.822	26.22	121.25	5.85	947.66	22.81	7.66	25.50	6.42	40.52
	1997	-0.322	29.47	120.59	5.19	974.34	22.26	6.22	28.69	0.72	48.96
	1998	0.712	40.89	98.65	-0.58	946.80	21.87	10.46	34.16	-1.42	52.15
	1999	-0.414	39.09	107.25	3.40	956.71	21.63	8.03	38.85	9.03	51.47
	2000	0.121	44.19	100.00	5.97	990.68	22.23	6.34	40.02	0.27	55.40
	2001	1.798	50.99	95.12	2.96	997.94	22.64	6.36	42.38	0.75	48.60
	2002	-0.794	51.60	95.49	4.43	1020.93	22.75	4.86	41.66	1.44	48.94

Source: US Department of Commerce and World Development Indicators 2004

Note: For the definitions, please see the Data and Econometric Framework section in the main text.

Appendix 5: Raw Data (continued)

Country	Year	FDI	FXD	REER	GGDP	PGDP	MNU	INF	TEL	POR	EXP
Thailand	1990	0.279	25.59	100.74	11.17	1427.46	27.20	5.77	24.28	-0.04	34.13
	1991	0.235	25.52	101.13	8.56	1526.05	28.24	5.75	28.17	-0.08	35.96
	1992	0.569	25.40	99.21	8.08	1628.19	27.52	4.49	32.13	0.83	36.97
	1993	0.349	25.32	99.11	8.25	1744.01	29.65	3.29	39.33	4.36	37.96
	1994	0.642	25.15	100.00	8.99	1885.27	29.55	5.21	48.35	1.72	38.87
	1995	0.698	24.92	99.70	9.24	2047.53	29.90	5.59	60.56	2.43	41.84
	1996	0.717	25.34	104.74	5.90	2154.90	29.72	4.01	71.59	1.95	39.25
	1997	-0.668	31.36	96.46	-1.37	2111.23	30.17	4.06	82.20	3.00	48.01
	1998	0.877	41.36	83.66	-10.51	1875.98	30.87	9.24	84.89	0.32	58.88
	1999	0.291	37.81	86.81	4.45	1944.70	32.65	-4.04	86.97	-0.09	58.30
	2000	0.324	40.11	83.42	4.75	2020.90	33.58	1.35	92.25	-0.58	66.77
	2001	0.352	44.43	79.56	2.17	2049.31	33.41	2.10	98.76	-0.77	65.96
	2002	1.432	42.96	81.79	5.33	2143.60	33.90	0.75	105.03	-1.27	64.68
Morocco	1990	0.015	8.24	81.94	4.03	1111.21	18.41	5.49	16.46	0.01	26.45
	1991	0.007	8.71	83.87	6.90	1164.56	17.22	6.53	19.86	0.01	24.11
	1992	0.020	8.54	84.43	-4.03	1096.36	18.13	4.44	25.60	0.01	25.08
	1993	0.004	9.30	86.79	-1.01	1065.27	18.00	3.65	31.72	0.09	26.07
	1994	0.012	9.20	89.53	10.36	1154.87	17.04	1.56	38.62	0.78	24.89
	1995	0.013	8.54	92.43	-6.58	1060.08	18.36	7.95	42.37	0.06	27.42
	1996	-0.004	8.72	93.19	12.22	1169.12	17.07	1.02	44.46	0.39	26.28
	1997	-0.019	9.53	94.02	-2.23	1123.74	17.66	1.96	47.26	0.11	28.46
	1998	-0.006	9.60	96.29	7.67	1189.72	16.98	0.36	50.32	0.07	27.84
	1999	0.015	9.80	97.28	-0.08	1169.28	17.24	0.54	52.79	0.02	30.14
	2000	-0.045	10.63	100.00	0.96	1161.26	17.57	1.52	49.64	0.05	31.36
	2001	-0.015	11.30	95.89	6.30	1214.71	16.93	1.77	40.84	-0.02	32.95
	2002	0.065	11.02	95.59	3.19	1233.56	16.81	0.60	38.03	-0.02	33.80

Source: US Department of Commerce and World Development Indicators 2004

Note: For the definitions, please see the Data and Econometric Framework section in the main text.

Appendix 5: Raw Data (continued)

Country	Year	FDI	FXD	REER	GGDP	PGDP	MNU	INF	TEL	POR	EXP
South Africa	1990	0.076	2.59	122.30	-0.32	3058.00	23.63	15.52	93.45	0.01	24.40
	1991	0.093	2.76	129.55	-1.02	2965.11	22.86	15.73	94.89	0.20	22.45
	1992	0.011	2.85	133.83	-2.14	2841.82	21.83	14.57	93.48	1.34	21.33
	1993	0.021	3.27	131.32	1.23	2816.76	21.14	13.09	95.07	0.57	21.49
	1994	0.232	3.55	125.70	3.23	2846.37	20.92	9.59	97.73	2.09	22.16
	1995	0.290	3.63	122.18	3.12	2872.27	21.22	10.25	101.38	1.65	22.96
	1996	0.073	4.30	112.67	4.31	2930.04	20.18	8.09	105.56	1.70	24.56
	1997	1.004	4.61	120.59	2.65	2939.56	19.87	8.11	112.67	4.49	24.56
	1998	-0.155	5.53	107.90	0.75	2892.93	19.15	6.95	120.47	3.21	25.74
	1999	1.130	6.11	102.07	2.03	2881.35	18.66	6.20	127.58	6.63	25.71
	2000	0.088	6.94	100.00	3.51	2909.60	18.58	7.19	113.58	-1.46	28.86
	2001	-0.492	8.61	88.35	2.68	2933.52	18.57	7.80	110.51	-7.27	31.00
	2002	0.296	10.54	75.48	3.56	3002.27	19.39	10.06	106.57	-0.39	33.77
Tunisia	1990	0.004	0.88	96.65	7.95	1502.92	16.89	4.48	37.14	0.02	43.56
	1991	0.004	0.92	100.17	3.90	1530.84	16.95	7.04	39.91	0.26	40.37
	1992	-0.016	0.88	102.26	7.80	1616.94	16.53	5.69	44.15	0.30	39.53
	1993	0.003	1.00	98.43	2.19	1620.42	17.07	4.69	48.67	0.12	40.45
	1994	0.070	1.01	99.17	3.30	1643.83	18.29	4.36	53.80	0.09	44.86
	1995	-0.033	0.95	101.38	2.32	1655.29	18.84	5.27	58.25	0.14	44.65
	1996	0.019	0.97	102.03	7.06	1746.38	18.33	4.60	64.35	0.31	42.12
	1997	0.060	1.11	101.94	5.44	1816.27	18.46	3.97	71.00	0.57	43.76
	1998	0.001	1.14	101.29	4.78	1879.04	18.47	3.01	80.59	0.17	43.05
	1999	-0.058	1.19	101.75	6.05	1966.97	18.12	3.11	89.93	0.05	42.56
	2000	-0.045	1.37	100.00	4.67	2035.70	18.17	3.34	99.87	-0.10	44.16
	2001	-0.015	1.44	97.57	4.86	2110.38	18.48	2.71	109.40	-0.07	47.17
	2002	0.065	1.42	96.70	1.68	2122.17	18.60	2.28	117.37	0.03	44.83

Source: US Department of Commerce and World Development Indicators 2004

Note: For the definitions, please see the Data and Econometric Framework section in the main text.