The determinants of foreign direct investment in developing countries

Kwang W. Jun and Harinder Singh*

This article analyses various determinants of foreign-direct-investment flows to developing countries, including political risk and business conditions, as well as macroeconomic variables. Particular emphasis is placed on qualitative factors. The findings indicate that a qualitative index of political risk is a significant determinant of foreign-direct-investment flows for countries that have attracted historically sizable investment flows. For countries that have not been very successful in attracting such investment, sociopolitical instability, proxied by work hours lost in industrial disputes, has a negative impact on investment flows. A general qualitative index of business operating conditions is an important factor determining foreign direct investment in countries that receive large investment flows. For these countries, there is a positive relationship between taxes on international transactions and investment flows, supporting the "tariff hopping" hypothesis. Exports in general, and manufacturing exports in particular, are a significant determinant for high investment recipients. Standard regression analysis and Granger causality tests indicate that the direction of causality is predominantly from exports to foreign direct investment. A general conclusion holds that export orientation ranks as the strongest explanatory variable for attracting investment flows, in line with the secular trend towards the growing complementarity between trade and foreign direct investment.

* Senior Financial Economist, International Economics Department, The World Bank, Washington, D.C., United States, and Chairperson, Economics Department, Grand Valley State University, Allendale, Michigan, United States. The findings, interpretations and conclusions of this article are the authors' own. They should not be attributed to the World Bank, its Board of Directors, its management, or any of its member countries.

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Introduction

This article seeks to answer empirically the following questions on the determinants of foreign direct investment (FDI) in developing countries:

- Does the perception of favourable business operating conditions affect positively FDI flows?
- Do taxes on international transactions impede FDI?
- What types of socio-political instability are detrimental to FDI flows?
- Do export-oriented economies attract FDI, with exports preceding investment, or does FDI precede exports?
- What export industries (in primary or manufacturing) are related to FDI?
- Are there structural differences between countries that attract large and small FDI flows?

These questions are particularly relevant because of the renewed interest in FDI for financing development. The resurgence of interest in FDI is primarily attributable to the changing composition of private capital flows during 1990-1994 towards non-debt creating flows, especially FDI and portfolio equity investments (World Bank, 1995, pp. 7-24). Average annual FDI flows to developing countries between 1987-1989 and 1990-1993 have more than doubled in nominal value. The increase in FDI flows during the past two years has been quite dramatic: 28 per cent between 1991 and 1992, followed by 42 per cent between 1992 and 1993. Moreover, developing countries at all income levels have harnessed FDI, although middle-income developing countries have been relatively more successful than low-income countries in doing so. And while volatility is an issue in portfolio investment, particularly because of its sensitivity to financial market conditions, FDI flows, driven by structural factors, tend to be more sustainable (World Bank, 1995). Furthermore, FDI has some inherent advantages for development: the transfer of technology, managerial expertise and other resources and access to markets. Recent trends show that FDI is an important and stable source of foreign private capital for developing economies, particularly to those that are able to create a hospitable environment for these investments (table 1).

Table 1. Annual and average real net FDI flows[a] (RFDI) as a percentage[b] of developing country GDP, 1990-1993

	Average RFDI[b]	Annual RFDI[b]			
Country	1970-1993	1990	1991	1992	1993
Argentina	.77	1.61	1.97	3.06	5.25
Bolivia	.20	.51	.93	1.57	2.89
Botswana	4.54	1.57	1.70	2.13	2.30
Brazil	.94	.27	.29	.44	.28
Chile	.50	.87	1.85	2.17	2.76
China	1.29	.84	.98	2.19	6.23
Colombia	1.07	1.08	.97	1.59	1.95
Costa Rica	2.48	2.79	2.99	3.39	4.88
Ecuador	1.83	.60	.59	.56	.89
Egypt	1.76	1.65	.56	.99	1.28
Ghana	.66	.22	.29	.31	.39
Greece	1.23	1.79	1.98	1.97	1.98
India	.05	5.04	.038	.039	.083
Indonesia	.87	1.04	1.32	1.47	1.87
Kenya	.61	.54	.18	.05	.02
Korea, Rep. of	.32	.37	.53	.25	.25
Madagascar	.33	.69	.45	.68	1.13
Malaysia	4.17	4.98	8.00	7.38	8.67
Mexico	1.49	1.50	2.64	2.85	3.12
Nigeria	2.15	1.54	1.78	2.12	2.48
Pakistan	.34	.55	.55	.53	.79
Panama	.65	-.33	-.69	-.01	-.73
Peru	.27	.17	-.03	.52	1.58
Philippines	.57	1.21	1.25	.52	2.02
Portugal	1.50	5.47	5.02	3.22	2.73
Singapore	9.93	19.89	16.43	20.60	19.06
Spain	1.25	4.25	3.25	2.28	1.45
Thailand	1.17	3.09	2.35	2.27	2.78
Turkey	.38	.77	.90	.88	.59
Uruguay	.76	0	0	.01	.98
Venezuela	.10	.80	3.09	.93	.68

Sources: International Monetary Fund, various issues and World Bank, 1995.

[a] Normalized by the import price deflator.

[b] Percentages are in whole numbers rather than in fractions.

The next section of this article reviews empirical studies of the determinants of FDI. The subsequent three sections describe the empirical analysis and present the findings. The final section discusses the policy implications.

Recent empirical findings

Empirical studies of the determinants of inward FDI are based on three approaches: micro-oriented econometric studies, survey data analyses and aggregate econometric analyses.[1] Because each approach has its limitations and advantages, methodological pluralism is not necessarily undesirable. Indeed, one way of checking the robustness of the results is to expose the same model of the determinants of FDI to different methodologies. The analysis here uses an aggregate econometric approach at the country level discerning only the macroeconomic determinants of FDI flows.[2]

Although many aggregate econometric studies have been conducted, a consensus on some of the determinants of FDI has often been elusive. This can be attributed partly to the lack of reliable and accurate data on FDI and these determinants, particularly at the sectoral level, and to the fact that most empirical work has analysed FDI determinants by pooling data for a group of countries that may be diverse structurally. Structural differences refer to substantial discrepancies in the basic macroeconomic variables that characterize an economy. The analysis here suggests that the empirical results may differ significantly for country groups that are structurally different.[3]

Apart from the traditional economic variables—GDP per capita, GDP growth, and wage costs—factors that may influence FDI flows include socio-political variables, business operating conditions and export orientation.

- ***Socio-political variables***

  Political risk is frequently thought to influence the decisions to invest in another country. Empirical results do not always support this assertion. Yair Aharoni (1966) revealed that executives rank political instability as the most important variable, apart from market potential. Peter D. Bennett and Robert T. Green (1972) found that United States FDI abroad is not affected by political instability in the recipient countries. M. Levis (1979), employing two proxies for political stabil-

[1] A comprehensive survey of the determinants of FDI based on the different methodologies is provided in UNCTC, 1992.

[2] Evaluations of empirical studies based on the aggregate econometric approach have been made by Agarwal, 1980, Schneider and Frey, 1985 and Hein, 1992.

[3] In the same vein, Wheeler and Mody, 1992, indicate that elasticity estimates differ markedly for countries at different stages of development.

ity, obtained mixed results. He found the absence of aggressive domestic behaviour within the political system against groups or officeholders to be a significant determinant of FDI for the current period, but not if a lag time is introduced. Another variable, the legitimacy of the regime, was found to be significant for a lagged period, but not for the current period.

Discriminant analysis of 58 developing countries by Franklin Root and A. Ahmed (1979) found that the number of regular (constitutional) changes in government leadership between 1956 and 1967 was significant. However, other political variables, such as the number of internal armed attacks, the degree of nationalism and colonial affiliation, were not significant.

Frederick Schneider and Bruno Frey (1985) found a negative relationship between the number of political strikes and riots in host countries and FDI inflows. D. Nigh (1985), using the COBDAB database—which constructs aggregate measures of intracountry and inter-country conflict and cooperation—found that, for developed countries, inter-country political events were more significant determinants of FDI than intracountry events. For developing countries, intracountry political events had a more robust relationship with FDI.

More recently, David Wheeler and A. Mody (1992) found a broad principal component measure of administrative efficiency and political risk to be statistically insignificant. Robert Lucas (1993) does not directly incorporate proxies for socio-political risk in his model of FDI determinants. Rather, he found episodic dummies for "good events", such as the Asian and Olympic games in the Republic of Korea, and President Aquino's accession in the Philippines, to be positively related to inward FDI. Conversely, "negative events", such as Sukarno's rule in Indonesia, Park's assassination in the Republic of Korea, and Ferdinand Marcos' martial law in the Philippines have had a negative effect on inward FDI.

Political instability is a complex phenomenon. More than ten years ago, Stephen Kobrin (1981, p. 71) observed:

> The term "political risk" thus appears constrained from both an analytical and operational viewpoint. What we are, or should be, concerned with is the impact of events which are political in the sense that they arise from power or authority relationships

and which affect (or have the potential to affect) the firm's operation. Not the events, *qua* events, but their potential manifestation as constraints upon foreign investors should be of concern.

The empirical evidence on the impact of political risk is not unequivocal, partly because it is difficult to obtain reliable quantitative estimates of this qualitative phenomenon for an extended period of time, particularly of those aspects of political risk that are viewed as a direct constraint by foreign investors. Most proxies that are available capture only some aspects of this determinant. Based on this discussion, the questions of what types of socio-political instability affect negatively FDI flows and whether or not there are structural differences between countries with high and low FDI flows are examined here.

- ***Business operating conditions***

As Gerry K. Helleiner (1988) and UNCTAD-DTCI (1996) have pointed out, investment incentives created by governments appear to play a limited role in FDI decisions. Most of the empirical literature supported the notion that specific incentives do not have a major impact, particularly when these incentives are thought to compensate for other comparative disadvantages. It is also believed that removing restrictions and providing good business operating conditions will affect positively FDI flows.

Within this context, there is a wide array of government policies that influence FDI flows (see the taxonomy provided in Brewer, 1993, as an illustration). It is difficult to quantify these policies in a single comprehensive explanatory variable. An alternative approach adopted here is to use a qualitative index of government policies representing the judgements of experts in the field.

Tariff barriers have received considerable attention as a factor influencing FDI. Protective tariff barriers, by stimulating import-substituting FDI, encourage "tariff hopping". Most of the available evidence supports this hypothesis, exemplified by United States FDI in the European Community. Given these findings, the hypothesis tested here explores the questions of whether or not favourable perception of business operating conditions in a host country affect positively FDI flows and the extent to which import tariffs lead to "tariff hopping" FDI.

- ***Export orientation***

  In addition to the size of the domestic market in a host country, export orientation may be important for encouraging FDI flows. Recently, Simeon Hein (1992) and David Dollar (1992) found that outward-oriented developing economies (i.e., those that rely on new export markets) have been successful in attracting FDI flows. Robert Lucas's (1993) investigation of South-East Asian countries shows that FDI is more elastic with respect to the demand for exports than with respect to the aggregate domestic demand. If outward-oriented economies are successful in attracting FDI, the size of the domestic market need not be a handicap. Even small host countries could influence global corporate decisions by adopting export-oriented policies.

  One caveat in the empirical literature is that it is not clear whether FDI flows are attracted by economies that are already export-oriented (i.e., exports precede FDI flows) or whether FDI leads to export increases (i.e., FDI precedes exports). Based on these considerations, the questions explored here are what types of exports are related to FDI flows and what is the direction of causality.

The model

A single equation model:

$$FDI^{d}_{t} = B_{0} + B_{1}PI_{t} + B_{2}(\boldsymbol{CV}_{t}) + E_{t} \qquad (1)$$

postulates that the desired FDI stock at time t (FDI^{d}_{t}) is based on political instability (PI) at time (t), a vector of control variables ($\boldsymbol{CV}_{t}$), discussed below, and a random error term E_{t}. To see how the speed of adjustment is incorporated in this model, consider the following equation:

$$FDI_{t} - FDI_{t-1} = A(FDI^{d}_{t} - FDI_{t-1}) \qquad (2)$$

Equation (2) shows that changes in actual FDI will respond only partially to the difference between the desired FDI and past values of that investment. In any given period, a desired level of FDI may not be realized fully (as actual FDI in the subsequent period) because of physical and procedural constraints. The parameter A captures the speed of adjustment to the

desired FDI level. By substituting FDI^d_t from equation (1) into equation (2) and rearranging equation (3) is obtained:

$$FDI_t = AB_0 + B_1A(PI_t) + B_2A(\underline{CV}_t) + (1\text{-}A)FDI_{t-1} + AE_t \quad (3)$$

In addition to the rationale given in a simple-stock adjustment model, using the lagged dependent variable as an explanatory variable also takes care of any residual autocorrelation that may exist and incorporates indirectly other "omitted" factors that may have influenced negatively FDI in the previous period. Thus, the lagged dependent variable is employed as a control variable (RFDI1). The fully specified model (model 4 in the tables) therefore is:

$$\begin{aligned} RFDI = {} & D_1(DASIA) + D_2(DLA) + D_3(DAFRICA) + D_4(DEUROPE) \\ & + B_1(PRI) + B_2(IPG7) + B_3(GDPCAP) + B_4(GDPGROW) \\ & - B_5(EARN) + B_6(DSWAP) - B_7(XRATE) + B_8(EXPORTS) \\ & + B_9(RFDI1) + E_t \end{aligned} \quad (4)$$

DASIA, DLA, DAFRICA and DEUROPE are the intercept dummies for Asia, Latin America, Africa and Europe, respectively. The dependent variable (RFDI) is FDI inflows in constant dollars as a ratio to real GDP.

Several control variables have been included in the model: market size, wage costs, exchange rates, home-country characteristics of the TNC, debt-equity swaps and private-sector restructuring, export orientation, past FDI levels and interregional characteristics.

- ***Market size.*** The size of the market, typically proxied by the level of GNP, appears to be an important determinant of FDI flows. V. N. Bandera and J. T. White (1968) found market size to be a significant determinant of United States FDI. A. Schmitz and Bieri (1972) found the GNP of the European Community to be a significant determinant in the demand for FDI. J. L. Lunn (1980) also found that determinant lagged by one period to be a significant explanatory variable for United States FDI in Europe. For developing countries, Root and Ahmed (1979), Richard C. Torrisi (1985), Schneider and Frey (1985), G. A. Petrochilas (1989) and Wheeler and Mody (1992) also found market size to be a significant determinant of inward FDI.

  A United Nations Centre on Transnational Corporations survey (1992) cited conflicting evidence for the growth rate of GNP as a determinant

of inward FDI once market size is taken into account. For example, while J. L. Lunn (1980) found the growth rate of domestic output to be statistically significant, the lagged growth rate was still significant in the second period, but had the wrong sign. Because the importance of market size as a determinant of FDI is well established, it is not the focus of this article. Since the dependent variable here is FDI relative to GDP, the relationship of FDI with other GDP-related variables on the right hand side of equation (4) may not be unequivocal. Hence, both per capita GDP (GDPCAP) and the growth rate of GDP (GDP%) are included to control for actual and potential market size.

- ***Wage costs***. The standard hypothesis postulates that lower wage costs will encourage "efficiency-seeking" FDI flows. But empirical studies do not offer clear supporting evidence. Extensive empirical investigations for Canada and the United States indicated that wage differentials are not a significant determinant for industrial countries. Robert F. Owen (1982), in analysing the inter-industry determinants of FDI for Canada's manufacturing sector, found labour-cost differentials between Canada and the United States to be statistically insignificant. O. Gupta (1983) found that wages of production workers in Canada (compared with those in the United States) were not a significant determinant in a comprehensive model of FDI determinants. This result held for both ordinary least squares (OLS) and two-stage least squares regressions. However, recent results for developing countries seem to indicate that wage costs are a significant determinant of FDI flows. Kenneth Flamm (1984), Schneider and Frey (1985), Lucas (1993) and Wheeler and Mody (1992) all found wage cost variables to be significant. Here, a real earnings index as a control variable for real wages (EARN) is included.

- ***Exchange rate***. S. R. Lucas (1993, p. 393) contended that the exchange rate may have "a residual role with respect to exchange rate risk, for example, in determining the value of repatriated profits or in threatening restrictions on such remittances". In order to control for this possibility, the real exchange rate (XRATE) is included as a control variable.

- ***Home country characteristics***. Claudy G. Culem (1988) analysed the bilateral flows of FDI for six industrial countries (Belgium, France, Germany, the Netherlands, the United Kingdom, and the United States). He found that the characteristics of the investing firm's home

country (such as growth rates and labour costs) did not improve the performance of the model. Because the dependent variable here is the global FDI flows to developing countries, the opportunity cost of investing abroad for a single host developing country is not discernible directly. One would expect a general increase in opportunity cost to influence the overall size of FDI flows to developing countries, but not its distribution among individual countries. In order to control home-country characteristics in the aggregate, the average industrial production index of the Group of 7 countries (IPG7) (computed from the International Monetary Fund, 1993) is included here as a control variable.

- ***Debt equity swaps and private-sector restructuring***. Since the late 1980s, several developing countries with large debt burdens have implemented debt-conversion programmes. Countries with sizable programmes include Argentina, Bolivia, Brazil, Chile, Mexico, the Philippines and Venezuela. Those components of debt conversions that relate to debt-equity swaps and restructuring of institutions are likely to be correlated with FDI flows. Debt-equity swaps and private sector restructuring programmes (performed by commercial banks) as a ratio of the total long-term debt of a host country are employed here as a control variable (DSWAP).[4]

- ***Export orientation***. There is a widespread perception that open economies receive more FDI; exports—one indicator of openness—should therefore be included as a control variable. There is also the belief that exports should be included as a control variable because of the higher export propensity of foreign affiliates (Chen, 1994). This issue has generated considerable controversy. For example, L. Westphal (1979) contended that exports may be correlated with FDI not because the foreign affiliates have a greater export propensity but because they may dominate the main export areas. However, as Edward Chen (1994) pointed out correctly, this distinction does not negate the overall contribution of foreign affiliates to exports. Note that, if export orientation is a host country's magnet for attracting FDI, exports would "Granger cause" FDI, whereas, if the entry of foreign firms leads to greater export orientation, FDI would "Granger cause"

[4] We are grateful to David Hedley of the Institute of International Finance for providing data on the different components of the debt-conversion programmes performed by commercial banks.

exports. Hence, exports in relation to GDP are included as a control variable (EXPORTS).[5]

- ***Interregional differences***. Because a pooled model is utilized, the analysis attempts to explain variations in FDI flows over time and across countries. The time-series portion of the data captures intra-country variations. In addition to the country-specific economic variables that vary over time, a time dummy variable is employed to control for other time-related factors.

  Intercountry variations present a methodological dilemma. The interesting cross-country variations (which are explained using qualitative variables) typically occur slowly, although the differences may be substantial. Country-specific dummy variables are not included here because they will remove this type of variations, leaving mostly variations within countries. But to impose some form of control without eliminating most of the interesting cross-country variations, four dummy variables have been employed to control for region-specific factors.[6] Regional differences may exist because FDI flows tend to follow certain discernible patterns (e.g., a Triad pattern). The regional dummies may also capture economies of agglomeration.

- ***Lagged dependent variable***. FDI flows are likely to require time to adjust to their desired levels, depending on the specific constraints facing TNCs. A simple partial adjustment process, included in this model, can incorporate the speed of adjustment (Pindyck and Rubenfeld, 1991, pp. 208-9).

The data

The analysis covers the period 1970-1993 for 31 countries.[7] The choice of countries is based on the availability of consistent data. For each model

[5] The direction of causality is explored later.

[6] Wheeler and Mody, 1992, developed a similar rationale for excluding country-specific dummies. Incorporating regional dummies is a traditional procedure for handling this dilemma. For example, Barro, 1991, estimated a pooled model with regional dummies to analyse the determinants of economic growth.

[7] Greece, Portugal and Spain, not classified as developing countries, are included in the sample so as to make the results comparable with the findings of other studies of FDI in developing countries.

specification, the choice of years and countries varies depending on the availability of data.[8] The empirical findings are based on a pooled cross country and time series model. One problem with such a model is that countries that are structurally different may exhibit identical coefficients. To resolve this problem, countries in the sample are classified into two groups over the entire sample period: countries with low average and countries with high average FDI flows. The rationale for employing the size of FDI flows for sub-sample analyses is that it allows an examination of the differences between "successful" countries (i.e., those that on average attract high FDI inflows) and "unsuccessful" countries (i.e., those with low average FDI inflows). Once all countries are ranked by the average level of FDI inflows, the question arises as to what the dividing line separating the "successful" from the "unsuccessful" countries should be. R. L. Brown *et al.* (1975) suggested a Quandt Log-Likelihood Ratio test to determine objectively where the split should be made.[9] Based on this test, a grid-search across the country sub-samples was conducted to find a point at which to the sample of countries could be divided into two parts. For Brazil, the grid search indicated that the log ratio reaches a minimum (combined log ratio of -316.81) at an average RFDI value of 0.94 per cent.[10] The country ranked immediately above Brazil is Colombia, with an average RFDI value of 1.07 per cent. Countries with an average RFDI of less than 1 per cent per year were therefore classified as "low FDI countries", while countries with an average RFDI of more than 1 per cent were classified as "high-FDI countries"; Colombia, Thailand, Greece, Spain, China, Mexico, Portugal, Egypt, Ecuador, Nigeria, Costa Rica, Malaysia, Botswana and Singapore. A few countries (e.g., Argentina, Chile, and Indonesia) that were classified as low FDI countries have attracted larger inflows in recent years (table 1). In general, most countries classified as recipients of high FDI flows have maintained a consistent performance throughout the time period examined here. A country's performance over the entire sample range is the relevant variable for the regression analysis.

Low FDI countries have an average RFDI of .50 per cent, whereas high FDI countries have an average RFDI of 2.37 per cent (table 2). As expected, countries that received high FDI flows combined together have an

[8] Details of the countries included for each model specification are provided in the notes to the relevant tables.

[9] The maximum change in the structure of the two sub-samples occurs at the point where the sum of the log-likelihood ratios of the sub-samples reaches a minimum.

[10] The grid-search specification employed PRI, RFDI1, TIME, GDPCAP, GDPGROW and DESWAP as explanatory variables.

Table 2. Descriptive statistics

Variable	Low FDI countries	High FDI countries	Source
Real FDI as a percentage of GDP (RFDI)	.50	2.37	World Debt Tables World Bank
Real GDP per capita (GDPCAP) (hundreds of dollars)	12.89 (.05)	23.76 (.45)	World Debt Tables World Bank
Annual GDP growth (per cent) (GDP%)	3.90 (.10)	5.22 (.21)	World Debt Tables World Bank
Real earnings per worker (1970 =100) (EARN)	132.19 (.06)	131.30 (.31)	World Debt Tables World Bank
Real exports as percentage of GDP (exports)	20.19 (.11)	35.00 (.82)	World Debt Tables World Bank
Manufacturing exports as percentage of GDP (MFEXP)	4.00 (.01)	11.51 (.80)	World Debt Tables World Bank
Primary exports as a percentage of GDP (PPEXP)	9.26 (0.05)	10.78 (0.34)	World Debt Tables World Bank
Debt-Equity swaps/restructuring as a percentage of long-term debt (DSWAP)	.25 (.18)	.20 (.01)	World Debt Tables World Bank
Political risk index (PRI)	43.54 (.15)	49.12 (.61)	BERI, S.A.
Work days lost as a percentage of GDP (WDL)	4.30 (-.22)	2.20 (-.12)	ILO Annual Report
Operation risk index (ORI)	43.62 (.05)	50.51 (.67)	BERI, S.A.
Tax on trade and international transactions as a percentage relative to tax revenue (ITAX)	17.06 (-.09)	16.51 (-.10)	Government Finance Statistics, IMF

Sources: Authors' estimates, based on BERI, S.A., unpublished date; International Labour Office, 1995; IMF, various issues and World Bank, 1995.

NOTE. Mean values of the country groupings are on the top line. The Pearson correlation coefficient with RFDI (based on annual observations) is in parenthesis. Percentages are expressed as whole numbers rather than fractions.

average per capita income that is almost twice the level of low FDI countries. More revealing is the fact that high FDI countries show a stronger correlation between average per capita income and RFDI compared with low FDI countries (coefficients of .45 and .05, respectively).[11] The same pattern holds for annual GDP growth rates: high FDI countries have higher growth rates and these growth rates are more strongly correlated with RFDI compared with low FDI countries (coefficients of .21 and .10, respectively). Although the average real earnings index is almost the same for both groups of countries, real earnings have a higher positive correlation in high FDI

[11] Simple correlation coefficients should be viewed with caution and are not a good substitute for controlled analysis, but they do bring out some salient features of the data set.

countries compared with low FDI countries (coefficients of .31 and .06, respectively). High FDI countries have a larger proportion of exports as a share of GDP than low income countries (35 per cent compared with 20 per cent). More importantly, the correlation coefficient between exports and RFDI is much higher for high FDI countries (.82) than for low-FDI countries (.11). In fact, exports are more strongly correlated with RFDI than any other explanatory variable.[12] This strong relationship dominates the controlled econometric analysis that follows. Table 2 also shows that this important difference between high and low FDI countries is driven by manufacturing exports rather than exports of primary products. Manufacturing exports have a much higher correlation with FDI flows in high FDI countries compared with low FDI countries (.80 compared with .01). For low FDI countries exports of primary products account for a higher share of GDP (9 per cent) than manufacturing exports (4 per cent). This implies that a substantial amount of FDI flowing into the low FDI countries is in the extractive sector.[13]

Not surprisingly, the share of long-term debt that has been converted into FDI through debt-equity swaps and restructuring (DSWAP) is positively and more strongly correlated with FDI flows in low FDI countries than in high FDI countries (.18 compared with .01).

Empirical findings

Based on E. Leamer's (1985) approach, a range of specifications are estimated to assess the sensitivity of the coefficients of the hypothesized variables. The hypothesis testing can be represented by a simple equation:

$$RFDI = F(HV, CV) \tag{5}$$

In addition to specifying the proxy for the hypothesized variable (*HV*), it is important to specify the vector of control variables (***CV***) to estimate correctly the equation. Previous empirical work has been used as a guide

[12] This is also evident in the combined sample results presented in the correlation matrix in table 3. For the combined sample, the Pearson correlation for RFDI and EXPORTS is .86. The second highest correlation comes from the political risk variables: for ORI and PRI the corresponding numbers are .60 and .58, respectively.

[13] Disaggregate studies at the industry level must be performed to pin down the precise differences between manufacturing and primary product exports for low and high FDI countries.

regarding the variables that should be included in the model (see previous sections). Additional control variables are added progressively to the model to determine how robust the results are to alternative specifications. The inclusion of additional variables can also reveal the extent of multicollinearity in the model to be estimated. All model specifications are estimated using ordinary least squares.[14] Because higher income countries may attract higher levels of FDI flows, all independent variables are represented in real and relative terms (table 3). All estimated results are provided in the tables.

Socio-political instability

To capture different aspects of political instability, two proxies are employed. Specific questions to be examined pertain to the types of socio-political instability that affect FDI flows negatively and structural differences between countries that belong to the high or low FDI groupings.

Political risk index (PRI). First, a political risk index (PRI) developed by Business Environment Risk Intelligence, S.A. (BERI) was employed. To derive that index, about sixty political specialists from around the world evaluate each country with respect to internal causes of political risk—fractionalization of the political spectrum; linguistic, ethnic, and religious fractionalization; and coercive political risk (dependence on and/or importance to a hostile power)—and two symptoms of political risk (societal conflict involving demonstrations and street violence).

The index generates ranges from 0 (prohibitive risk) to 100 (complete stability). The values determined by the political specialists are averaged annually for each country. The average political risk index for high-FDI countries is 49.12, compared with 43.54 for low FDI countries (see table 2). More importantly, the correlation coefficient between PRI and RFDI is more than four times higher in high FDI countries than in low FDI countries (.61 compared with .15).

In order to analyse the influence of PRI on FDI flows, a range of specifications are employed to test the robustness of the results. As additional control variables are included, the size of the sample changes based

[14] The economic structure of the sample countries is likely to be dynamic. Given the lack of knowledge about the specification of this structure, a simultaneous equations model (which is more sensitive to specification errors) was considered to be less desirable. A simultaneous bias test is performed for each hypothesized variable.

Table 3. Correlation matrix of the major variables

	RFDI	GDP%	GDPCAP	DSWP	EARN	XRATE	EXP	PRI	WDL	ORI	ITAX
RFDI	1										
GDP%	.17	1									
GDPCAP	.57	-.06	1								
DSWAP	-.02	.006	-.03	1							
EARN	.11	.20	.23	.02	1						
XRATE	-.11	.07	-.08	-.02	.33	1					
EXP	.86	.22	.58	-.03	.19	-.04	1				
PRI	.58	.11	.67	-.10	.18	.02	.72	1			
WDL	-.19	-.18	.01	-.06	-.11	-.07	-.31	-.24	1		
ORI	.60	.26	.60	-.13	.23	-.01	.71	.79	-.14	1	
ITAX	-.15	.31	-.58	-.08	-.13	-.21	-.22	-.41	.03	-.24	1

Source: Authors' estimates.

NOTE. Correlation estimates are sensitive to the sample period. The values provided are relevant for the combined model 3.

on the availability of data.[15] The data set suffers from missing observations. As a general rule, if data are not available for a specific variable and time period, the observation is excluded from the regression estimation.[16] The stability of the coefficient of the hypothesized variable can be assessed as the control variables and the sample size change for different specifications. All results are reported after conducting H. White's (1980) correction for heteroscedasticity.

Another issue that is addressed is the problem of autocorrelation. The inclusion of the lagged dependent variable reduces autocorrelation considerably. Because there is a lagged dependent variable on the right hand side of the equation, the Durbin-Watson statistic is not strictly applicable, although it does give some indication of the extent of autocorrelation. For each hypothesis, if the alternative Durbin statistic[17] for model specification 3 indi-

[15] Another reason for reporting a large number of regressions with different control variables is because of the trade off between the number of control variables and the availability of data. When less control variables are employed, the available data set becomes more extensive. As the set of control variables becomes bigger, data-availability constraints reduce the number of observations.

[16] As Pindyck and Rubenfeld, 1991, pp. 219-220, pointed out, if the missing observations dropped are random, the least squares estimator is still unbiased, although there is some loss of efficiency. Because the sample size is fairly large (ranging from 97 for the subsample analysis to 443 for some aggregate models), the loss in efficiency is not likely to be an issue.

[17] The Durbin alternative test involves regressing the error term of the primary equation with all the explanatory variables and the lagged error term. A significant t-value for the lagged error term indicates the presence of autocorrelation. This test is reported for model 3 in the relevant tables. The WDL proxy for the combined model had significant autocorrelation. Consequently, the results in table 7 are reported after correction.

cates potential autocorrelation, the results are reported after correction (see the footnotes of the tables for specific details). The results for each model specification are discussed below (see also table 4).

- **Model 1**. Initially, RFDI is regressed with PRI, GDP%, GDP per capita, a time dummy (to capture other time-related effects) and lagged FDI (RFDI1). PRI is significant at the 1 per cent level (with a t-value of 2.67). The time dummy, GDP per capita, and RFDI1 are also significant. The high t-value of RFDI1 (13.88) and the low value of the adjustment coefficient (ranging from .11 to .26 in table 5) indicate that the stock adjustment model should be used.

- **Model 2**. In this specification, real earnings (EARN) and debt-equity swaps (DSWAP) are included as control variables. As expected, the earning coefficient is negative and significant. The coefficient for DSWAP is statistically insignificant. PRI is significant at the 1 per cent level.

- **Model 3**. This specification includes the exchange rate (XRATE), the average industrial production of the Group of 7 countries (IPG7) and regional dummy variables. IPG7 is generally increasing over time (as manifested by a high correlation of .97 with the time dummy).[18] Consequently, the significance pattern for IPG7 is similar to that of the time dummy: positive and significant. The exchange rate has the expected negative sign and is significant at the 1 per cent level. The regional dummy variables are uniformly negative and significant. PRI continues to be significant at the 1 per cent level.

- **Model 4**. The inclusion of exports relative to GDP in the estimated equation weakens considerably the significance of the PRI coefficient (with a t-value of 1.40). Given that EXPORTS has the strongest correlation with RFDI (see table 4), this result is not surprising.[19]

- **Model 5**. R. Pindyck and D. Rubenfeld (1991, pp. 303-304) suggested a modified Hausman specification test to assess the simultaneity bias that may be present in the ordinary least squares estimates. The two-step procedure involves first estimating an auxiliary equation in which

[18] Because of the high correlation, only one of these variables is included in each regression.

[19] There is also a high correlation (0.72) between PRI and EXPORTS, indicating that multicollinearity could be driving down the t-value for PRI.

Table 4. FDI and political risk index (PRI)

	Model 1	Model 2	Model 3[a]	Model 4	Model 5
Dependent variable	RFDI	RFDI	RFDI	RFDI	RFDI
Constant	-1.52	-1.08			
	(-3.29)	(-2.65)			
PRI	.021	.019	.02	.012	.02
	(2.67)	(2.65)	(2.68)	(1.40)	(2.34)
Time	.039	.04			
	(3.00)	(2.50)			
GDP%	.018	.017	.017	.017	.015
	(1.36)	(1.91)	(1.39)	(1.49)	(1.19)
GDPCAP	.0059	.0000	.0006	.0017	.0005
	(1.41)	5	(.17)	(.52)	(.12)
		(.02)			
RFDI1	.89	.84	.81	.74	.81
	(13.88)	(10.73)	(10.26)	(9.06)	(11.18)
DSWAP		.015	.014	.016	.0067
		(.17)	(.15)	(.18)	(.07)
EARN		-.0017	-.0018	-.0018	-.002
		(-2.66)	(-2.36)	(-2.40)	(-2.61)
IPG7			.024	.017	.024
			(3.50)	(2.87)	(3.63)
XRATE			-	-	-
			.0001	.0001	.0001
			2	1	2
			(-2.46)	(-2.31)	(-2.29)
DASIA			-2.89	-2.09	-2.75
			(-3.59)	(-2.91)	(-3.61)
DLA			-3.01	-2.09	-2.90
			(-3.48)	(-2.74)	(-3.54)
DAFRICA			-2.77	-1.82	-2.64
			(-3.10)	(-2.45)	(-3.18)
DEUROPE			-2.96	-2.04	-2.88
			(-3.49)	(-2.72)	(-3.58)
EXPORTS				.015	
				(2.18)	
Resid. Model 3					.035
					(1.78)
F-value	402.83	105.38	61.72	56.45	54.94
D.W.	2.60	2.13	2.11	2.10	2.07
Adjusted R^2	.84	.72	.72	.72	.73
Number of observations	373	290	257	256	239

Source: Authors' estimates.

NOTE. T-values are in parenthesis.

[a] The Alternative Durbin test for model 3 indicates a t-statistic of -.84 for the lagged error term.

Table 5. FDI and political risk index (subsample analysis)

	Low-FDI countries[a]		High-FDI countries[b]	
	Model 2	Model 3	Model 2	Model 3
Dependent variable	RFDI	RFDI	RFDI	RFDI
Constant	-.38		2.34	
	(-1.50)		(-2.36)	
PRI	.0098	.01	.039	.051
	(1.83)	(1.70)	(2.29)	(2.48)
Time	.016		.07	
	(1.40)		(2.27)	
GDP%	-.0018	.0074	.03	.007
	(-.17)	(.46)	(1.72)	(.27)
GDPCAP	-.0031	-.01	-.004	.004
	(-.73)	(-1.36)	(-.97)	(.70)
RFDII	.58	.53	.78	.71
	(5.61)	(4.09)	(8.33)	(6.43)
DSWAP	5.43	3.49	.004	-.02
	(1.77)	(1.01)	(.04)	(-.24)
EARN	-	-		
	.0002	.0001	-.0011	-.0033
	5	6	(-.47)	(-1.35)
	(-.36)	(-.16)		
IPG7		.012		.04
		(2.25)		(3.12)
XRATE		.0000		-.0003
		1		(-.58)
		(.53)		
DASIA		-1.36		-5.47
		(-2.65)		(-3.26)
DLA		-1.13		-5.56
		(-2.24)		(-3.25)
DAFRICA		-1.38		-4.68
		(-2.59)		(-2.99)
DEUROPE		-1.40		-5.90
		(-2.61)		(-3.21)
F-Value	27.20	10.82	40.11	27.61
D.W.	1.95	1.95	2.13	2.03
Adjusted R^2	0.44	.45	0.68	.70
Number of observations	163	130	127	127

Source: Authors' estimates.

NOTE. Political risk index data for each country are for 1978-93, except Bolivia (1979-85), Kenya (1978-85) and China (1986-93).

[a] Low FDI countries are Argentina, Bolivia, Brazil, Chile, India, Indonesia, Kenya, the Republic of Korea, Pakistan, Peru, Philippines, Turkey and Venezuela.

[b] High FDI countries are China, Colombia, Ecuador, Egypt, Greece, Malaysia, Mexico, Portugal, Spain, and Thailand.

PRI is regressed against exogenous or predetermined variables (in this case, lagged PRI and a time trend). In the second step, the residuals of this auxiliary equation are included in the original equation as an additional explanatory variable. This test is performed on model 3. The results indicate that the bias is statistically significant at the 10 per cent level (with a t-value of 1.78). However, the PRI coefficient continues to be significant at the 1 per cent level.

In the next stage of the analysis, the model is estimated separately for low and high FDI countries (table 5).[20] The model is estimated for the two critical specifications (models 2 and 3).[21] In general, the models of the low FDI countries have a poor fit. The results indicate that PRI is statistically significant for high FDI countries at the 1 per cent level for both models but only at the 10 per cent level for the low FDI countries. Moreover, the size of the PRI coefficient is much higher for the high FDI countries (approximately by a magnitude of four or five). Thus, in high FDI countries where the stakes are higher, PRI is significantly related to FDI flows.

Note that the focus is on the coefficients of the hypothesized variable, to observe whether or not they are robust as different control variables are introduced. The coefficients of the control variables are not subjected to any systematic analysis and should therefore be interpreted with caution. Some general comments about the coefficients of the control variables across various specifications should be made. The real earnings variable (EARN) is negative overall, although it is significant in only some specifications of the combined model. The exchange rate variable is negative overall and sometimes significant. Exports and IPG7 are uniformally positive and significant. DSWAP is generally positive and sometimes significant. GDPCAP and GDP% are generally positive and sometimes significant in the combined sample and the high FDI subsamples. For the low FDI group, the GDPCAP and GDP% coefficients have mixed signs and are generally insignificant.[22]

Work days lost (WDL). Stephen Kobrin (1981) pointed out that elements of political risk that have a "potential manifestation as constraints upon

[20] An F-test score of 4.95 at the 1 per cent level indicates that the models should be estimated separately.

[21] It has already been established in model 4 that the inclusion of EXPORTS erode the significance of PRI.

[22] This uneven and contrary result for the low FDI countries is not surprising given the low correlation between RFDI and GDPCAP (0.05) and between RFDI and GDPGROW (0.10).

foreign investors'' may be more relevant in determining FDI. The annual reports of the International Labour Organisation provide aggregate country data on the number of work days lost due to industrial or civil strife. This proxy for socio-political instability may be directly relevant for FDI because it allows the estimation of the potential costs of disrupted production. Low FDI countries have a higher share of work days lost than high FDI countries (4.3 per cent compared with 2.2 per cent), (see table 6).

In order to evaluate the effect of this WDL on FDI, the same specifications employed for PRI are repeated[23] and several patterns emerge from this analysis (table 6). WDL is significant at the 10 per cent level for model 3 and model 5. But when exports are included as an explanatory variable in model 4, WDL becomes statistically insignificant (multicollinearity may be one reason; the correlation between WDL and exports is .31). The Hausman test for simultaneous equation bias (model 5) indicates that the relationship between RFDI and WDL is strengthened marginally after the test is implemented (using predetermined WDL_{t-1} and a time trend as explanatory variables in the auxiliary equation).

In contrast to PRI, the relationship between WDL and RFDI is more significant for the low-FDI countries (table 7). For these countries, WDL is significant at the 1 per cent level in model 2 and the 10 per cent level in model 3. Although PRI, incorporates indirectly WDL, if both variables are included in model 3, a t- statistic of 2.32 is obtained for PRI and -.56 for WDL.[24] The two coefficients jointly have an F-value of 5.27, which rejects the null hypothesis of zero coefficients for both variables at the 1 per cent level.

Two caveats about WDL must be mentioned. Almost every country of the International Labour Organisation has some missing observations which reduces the sample size (see the annual reports of the International Labour Organisation for details). Also, the data may suffer from a self-selection bias in that some countries may not report data when there are major interruptions in the production process. But this bias, if it exists, will make it more difficult to reject the null hypothesis of no relationship. The results should be interpreted with caution, particularly in view of the missing observations.

[23] For the WDL proxy, the Durbin alternative test indicates the presence of first order autocorrelation at the 5 per cent level. Consequently, all results in table 3 are reported after correcting for the first-order serial correlation.

[24] The Pearson correlation between PRI and WDL is -.24.

Table 6. FDI and work days lost (WDL)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Dependent variable	RFDI	RFDI	RFDI	RFDI	RFDI
Constant	-.07 (-.40)	-.07 (.39)			
WDL	-.0038 (-.94)	-.0072 (-1.32)	-.0097 (-1.56)	.0017 (.26)	-.012 (-1.7)
Time	.01 (1.86)	.016 (1.79)			
GDP%	.008 (.69)	.02 (1.49)	.014 (.91)	.01 (.61)	.011 (.70)
GDPCAP	.005 (2.85)	.011 (2.11)	.015 (2.57)	-.0036 (-.49)	.016 (2.67)
RFDI1	.82 (17.35)	.87 (13.29)	.84 (12.76)	.76 (11.57)	.83 (11.85)
DSWAP		.021 (2.27)	.025 (2.46)	.02 (2.51)	.02 (2.43)
EARN		-.0014 (-2.46)	-.0019 (-2.26)	-.0009 (-1.20)	-.0021 (-2.5)
IPG7			.013 (2.50)	.011 (2.51)	.015 (2.91)
XRATE			-.0000 6 (-.99)	-.0001 7 (-2.17)	-.0000 7 (-1.1)
DASIA			-1.06 (-1.86)	-1.44 (-2.67)	-1.32 (-2.14)
DLA			-1.35 (-2.16)	-1.59 (-2.70)	-1.68 (-2.49)
DAFRICA			-1.08 (-1.92)	-1.42 (-2.54)	-1.27 (-2.1)
DEUROPE			-1.22 (-2.18)	-1.21 (-2.39)	-1.49 (-2.52)
EXPORTS				.019 (2.55)	
Resid. Model 3					.18 (.12)
F-value	161.67	96.95	57.24	53.63	49.70
D.W.	2.22	2.08	2.11	2.10	2.04
Adjusted R^2	.69	.73	.72	.73	.72
Number of observations	368	248	238	237	225

Source: Authors' estimates.

NOTE. T-values are in parenthesis. Models are reported after first-order autocorrelation correction. Most countries have missing observations; data where available are for the period 1972-1992. See notes on table 7 for the list of countries.

Table 7. FDI and work-day-lost (sub-sample analysis)

	Low-FDI countries[a]		High-FDI countries[b]	
Variable	Model 2	Model 3	Model 2	Model 3
Dependent variable	RFDI	RFDI	RFDI	RFDI
Constant	-.23 (-1.42)		-.53 (-1.06)	
WDL	-.011 (-2.30)	-.0089 (-1.76)	-.07 (-1.11)	.024 (.33)
Time	.004 (.57)		.02 (1.27)	
GDP%	-.01 (-.72)	-.01 (-.61)	.072 (3.19)	.06 (2.38)
GDPCAP	-.005 (-.82)	-.009 (-1.69)	.026 (2.68)	.010 (2.80)
RFDI1	.51 (4.49)	.46 (4.06)	.82 (10.61)	.67 (6.65)
DSWAP	5.18 (1.64)	4.34 (1.08)	.024 (2.40)	.02 (1.88)
EARN	.0006 4 (.96)	.0009 (1.02)	-.0012 (-.51)	-.0014 (-.62)
IPG7		.0006 8 (.13)		.005 (.59)
XRATE		.0000 8 (1.68)		.0004 2 (.68)
DASIA		.14 (.27)		-1.48 (-1.44)
DLA		.39 (.69)		-2.22 (-2.00)
DAFRICA		.27 (.49)		-.92 (-.91)
DEUROPE		.16 .31		-4.27 (-2.94)
F-Value	12.71	7.20	35.59	23.71
D.W.	2.11	2.12	2.07	2.02
Adjusted R^2	.35	.32	.72	.72
Number of observations	151	141	97	97

Source: Authors' estimates.

NOTE. T-values are in parenthesis.

[a] Low FDI countries are Chile, India, Indonesia, Kenya, the Republic of Korea, Pakistan, Panama, Peru, the Philippines and Turkey.

[b] High FDI countries are Costa Rica, Ecuador, Egypt, Malaysia, Mexico, Portugal, and Thailand. Most countries have missing observations. Data availability varies by country, and, where available, data are for the period 1972-1992.

Another variable analysed as a proxy for socio-political instability (a political rights index) gave uneven results, possibly because of the narrow range of the index.[25] The relationship was initially positive, but became negative as additional control variables were included. The significance pattern was not robust for the sub-samples of high and low FDI countries.

Business operating conditions

Although, as G. K. Helleiner (1988) indicated, specific investment incentives established by a government appear to play a limited role in inter-country investment decisions, there is a general belief that conducive business operating conditions are necessary for attracting FDI. In order to evaluate this contention (Hypothesis II), two proxies for a hospitable business environment are analysed here.

Operation risk index (ORI). An interesting index developed by BERI is the operation risk index (ORI) which assesses a country's general business climate. A panel of 105 experts from around the world evaluate each country on the basis of two criteria: the extent to which nationals are given preferential treatment and the general quality of the business climate. A wide range of factors are evaluated, including political continuity, attitude towards foreign investors, balance-of-payments performance, economic growth, enforceability of contracts, currency convertibility, and infrastructure and local management. This qualitative index ranges from 0 (unacceptable business conditions) to 100 (superior operating conditions).

As expected, ORI is higher in the high than in the low FDI countries (table 2) (50.5 compared with 43.6). What is remarkable is the low correlation between RFDI and ORI in low FDI countries (.05) and the high, positive correlation in the high FDI countries (.67). The empirical analysis of ORI indicates that it is statistically significant in all specifications of the combined model (table 8). Note that GDP% is not employed as a control variable because it is part of the index evaluation criteria. The sub-sample analysis shows that the relationship between RFDI and ORI is less robust for the low FDI countries than for the high FDI countries (table 8). The size

[25] The political rights index, originally developed by Gastil and published by Freedom House (various issues of "Freedom in the World"), ranges from 7 (not free) to 1 (completely free).

Table 8. FDI and operation risk index (ORI)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Dependent variable	RFDI	RFDI	RFDI	RFDI	RFDI
Constant	-1.26	-.72			
	(-3.45)	(-2.81)			
ORI	.022	.019	.019	.007	.016
	(3.01)	(3.28)	(3.23)	(1.19)	(2.30)
Time	.028	.03			
	(2.93)	(2.76)			
GDPCAP	.009	.0017	.005	.0038	.0015
	(2.32)	(.81)	(1.17)	(.95)	(.35)
RFDI1	.83	.65	.61	.52	.76
	(12.83)	(6.32)	(5.82)	(5.17)	(9.30)
DSWAP		.047	.04	.039	.02
		(.60)	(.50)	(.51)	(.27)
EARN		-.0017	-.0018	-.0021	-.0014
		(-2.85)	(-2.55)	(-2.84)	(-2.0)
IPG7			.018	.013	.022
			(3.08)	(2.40)	(3.33)
XRATE			-.0001	-.00014	-.00012
			(-1.81)	(-2.17)	(-2.1)
DASIA			-1.89	-1.44	-2.38
			(-3.45)	(-2.82)	(-3.6)
DLA			-1.98	-1.40	-2.58
			(-3.33)	(-2.49)	(-3.44)
DAFRICA			-1.53	-.97	-2.12
			(-2.41)	(-1.66)	(-2.72)
DEUROPE			-1.99	-1.33	-2.37
			(-3.97)	(-2.82)	(-3.8)
EXPORTS				.027	
				(3.50)	
Residual Model 3					.014
					(.58)
F-value	451.39	76.09	41.77	43.53	52.08
D.W.[a]	2.30	1.82	1.80	1.82	1.96
Adjusted R^2	.80	.56	.57	.60	.66
Number of observations	443	351	308	307	290

Source: Authors' estimates.

NOTE. T-values are in parenthesis.

[a] The alternative Durbin statistic for model 3 indicates a t-statistic of 0.52 for the lagged error term. For list of countries and data availability, see the notes in table 9.

Table 9. FDI and operation risk index (sub-sample analysis)

Variable	Low-FDI countries[a]		High-FDI countries[b]	
	Model 2	Model 3	Model 2	Model 3
Dependent variable	RFDI	RFDI	RFDI	RFDI
Constant	.13 (.62)		-1.22 (-1.85)	
ORI	.0062 (1.19)	.008 (1.04)	.02 (1.84)	.018 (1.88)
Time	.003 (.24)		.045 (2.45)	
GDPCAP	-.0037 (-.77)	-.02 (-1.56)	-.0011 (-.39)	.002 (.28)
RFDII	.19 (1.72)	.12 (1.12)	.75 (7.86)	.68 (7.23)
DSWAP	7.77 (2.06)	5.71 (1.35)	.003 (.04)	-.03 (-.32)
EARN	.0000 2 (.03)	.0008 (.79)	.0005 (.22)	-.0023 (-1.09)
IPG7		.0057 (.71)		.03 (3.83)
XRATE		.0000 9 (2.15)		-.0011 (-2.14)
DASIA		-.59 (-.79)		-3.01 (-3.36)
DLA		-.12 (-.16)		-3.27 (-3.82)
DAFRICA		-.16 (-.21)		-2.73 (-2.74)
DEUROPE		-.63 (-.90)		-3.15 (-3.88)
F-value	4.94	3.60	49.78	32.71
D.W.	1.58	1.57	1.93	1.94
Adjusted R^2	.11	.14	.66	.68
Number of observations	200	157	151	151

Source: Authors' estimates.

NOTE. T-values are in parenthesis.

[a] Low FDI countries are Argentina, Bolivia, Brazil, Chile, India, Indonesia, Kenya, the Republic of Korea, Pakistan, Peru, Philippines, Turkey and Venezuela.

[b] High FDI countries are China, Colombia, Ecuador, Egypt, Greece, Malaysia, Mexico, Nigeria, Portugal, Singapore, Spain and Thailand. Operation risk index data for each country are for the period 1975-1993, except for Bolivia and Kenya (1975-1985) and China (1986-1993).

of the coefficients of ORI for the high FDI countries is approximately twice the size of the corresponding coefficients for the low FDI countries, implying that business operating conditions are more important for attracting FDI flows in the high FDI group.

Taxes on international trade and transactions (ITAX). Government Finance Statistics (*GFS*), published annually by the International Monetary Fund, reports the amount of revenues accruing to governments as taxes on international trade and transactions (table A, item 6). These tax revenues, obtained primarily from import and customs duties, are normalized by the total tax revenues to obtain the relative tax burden borne by the international sector (ITAX).[26]

The tax revenues from the trade sector are only marginally lower in the high than in the low FDI countries (table 11) (16.5 per cent compared with 17.1 per cent). In both high and low FDI countries, the simple correlation between RFDI and ITAX is small and negative. Thus, it is not surprising that regressing ITAX against RFDI in the absence of any control variables, the relationship is negative and insignificant (table 10).

However, in model 2, when control variables are introduced for market size (GDPCAP and GDP%), the relationship between ITAX and RFDI becomes positive and significant. Because higher tax revenues from the trade sector may simply reflect higher turnover, exports relative to GDP is employed as a control variable in all specifications (EXPORTS). ITAX continues to be significant in alternative specifications of model 3 and model 4. The simultaneous bias test erodes the significance of the relationship to the 10 per cent level (ITAX has a t-value of 1.81 in model 5). This result indicates "tariff hopping" behaviour in FDI flows to avoid trade-related taxes and take advantage of the size of the host country's market.

The separate regressions run for low and high FDI groups indicate that the positive relationship between ITAX and RFDI in the combined sample is driven by the high FDI group (table 11). For the low FDI countries, the relationship between ITAX and RFDI is negative and insignificant. In contrast, for high FDI countries the relationship is positive and significant for both

[26] One caveat about the ITAX proxy should be made: government finance statistics are only as good as the quality of the data provided by the respective agencies. As a result, there may be considerable variation in the accuracy of the revenue estimates across countries.

Table 10. FDI and taxes on international trade (ITAX)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Dependent variable	RFDI	RFDI	RFDI	RFDI	RFDI
Constant	.65	-.82			
	(2.04)	(-2.89)			
ITAX	-.02	.011	.015	.012	.01
	(-1.40)	(2.73)	(3.17)	(2.23)	(1.81)
Time	.09	.012	.013		
	(4.01)	(1.45)	(1.50)		
GDPCAP		.0078	.0053	.007	.006
		(2.93)	(1.79)	(2.13)	(1.98)
GDP%		.004	.007	.006	.0028
		(.24)	(.40)	(.28)	(.13)
EXPORTS		.019	.024	.024	.024
		(3.88)	(4.43)	(4.51)	(4.51)
RFDI1		.73	.71	.66	.67
		(10.91)	(10.11)	(8.66)	(8.80)
EARN				-.0015	-.002
				(-1.95)	(-1.99)
IPG7				.014	.014
				(2.63)	(2.61)
XRATE				-.0000 7	-.0000 8
				(-1.72)	(-1.8)
DASIA			-1.14	-2.12	-2.01
			(-3.56)	(-3.07)	(-2.95)
DLA			-.95	-2.09	-2.01
			(-3.05)	(-2.95)	(-2.88)
DAFRICA			-.52	-1.36	-1.23
			(-1.04)	(-1.59)	(-1.47)
DEUROPE			-.73	-1.84	-1.75
			(-2.91)	(-2.99)	(-2.88)
Residual Model 3					.02
					(1.37)
F-value	11.03	384.92	259.40	187.84	172.49
D.W.	.18	2.23	2.21	2.22	2.22
Adjusted R^2	.05	.86	.86	.86	.86
Number of observations	374	363	363	320	320

Source: Authors' estimates.

NOTE. T-values are in parenthesis. The models are corrected for first-order autocorrelation. See notes of table 9 for information about countries included in the sample.

Table 11. FDI and ITAX (sub-sample analysis)

Variable	Low-FDI countries[a]		High-FDI countries[b]	
	Model 3	Model 4	Model 3	Model 4
Dependent variable	RFDI	RFDI	RFDI	RFDI
ITAX	-.01	-.0068	.023	.03
	(-1.74)	(-1.06)	(2.10)	(2.11)
Time	.018		.04	
	(1.58)		(3.27)	
GDPCAP	-.008	-.01	.01	.011
	(-1.16)	(-.96)	(2.05)	(2.39)
GDPGROW	.012	.016	.05	.032
	(.64)	(.85)	(2.35)	(1.26)
RFDI1	.40	.35	.69	.67
	(3.29)	(3.00)	(7.87)	(6.77)
EARN		.0013		-.0025
		(1.06)		(-.74)
EXPORTS	.0002	-.0024	.023	.025
	(.02)	(-.19)	(4.42)	(4.57)
IPG7		.0035		.034
		(.39)		(3.80)
XRATE		.0000		-.0029
		5		(-2.16)
		(.69)		
DASIA	.23	-.27	-2.10	-5.00
	(.49)	(-.25)	(-3.74)	(-3.90)
DLA	.43	.23	-1.49	-4.25
	(.75)	(.17)	(-3.68)	(-3.93)
DAFRICA			-1.51	-4.24
			(-2.36)	(-3.13)
DEUROPE	.16	-.22	-1.53	-4.00
	(.65)	(-.22)	(-3.99)	(-4.13)
F-value	6.27	3.68	194.22	145.76
D.W.	2.19	2.20	2.11	2.15
Adjusted R^2	.05	.02	.90	.90
Number of observations	172	151	191	169

Source: Authors' estimates.

NOTE. T-values are in parenthesis.

[a] Low FDI countries are Chile, India, Indonesia, the Republic of Korea, Pakistan, Panama, Turkey and Uruguay.

[b] High FDI countries are Colombia, Costa Rica, Egypt, Greece, Malaysia, Mexico, Portugal, Spain, and Thailand. Most countries have missing observations. Available data spans from 1972-1993. The models are corrected for first-order autocorrelation.

model 3 and model 4, indicating that "tariff hopping" is prevalent in this group.[27]

Export orientation

When exports are employed as a control variable in the combined regressions (model 4), that variable is consistently a significant determinant of RFDI (see tables 4, 6 and 8). In fact, one statistical regularity that is robust in all the model specifications is that export orientation is the single most important determinant of FDI flows. This section analyses this crucial linkage, the types of exports that are related to FDI flows and the direction of causality between FDI and exports.

FDI and sectoral exports. The first two regressions indicate that exports in the high FDI countries are a significant determinant of FDI, whereas in low FDI countries exports do not play a significant role (table 12). When the model is estimated for manufacturing exports only (MFEXP), the results are similar. In the high FDI group the coefficient of MFEXP is almost twice the size of EXPORTS, indicating that for that group of countries, manufacturing exports are the driving force of all exports. This notion is corroborated by the results for the exports of primary products. In the primary export sector, the relationship between PPEXP and RFDI is statistically insignificant in both the high and low FDI countries. Exports in general and manufacturing exports in particular are significant determinants of FDI for high FDI countries.

Exports and FDI: causality. The previous analysis indicates that exports (particularly manufacturing exports) are a significant determinant of FDI flows in high FDI countries. But the question remains as to whether export-oriented economies attract FDI (i.e., exports precede FDI), or whether FDI encourages higher exports (i.e., FDI precede exports). To answer this question, Granger causality tests were performed for each country in the high FDI group. (As E. Leamer (1985) pointed out, Granger causality does not

[27] The per capita GDP of the high-FDI group is almost twice that of the low-FDI group (see table 3). In fact, if our entire sample is sorted by per capita GDP (high- and low-income groups) rather than by average FDI flows (high- and low-FDI groups), the results for the two groups correspond closely.

Table 12. Exports in low and high FDI countries

Variable	Exports		Manufacturing exports		Primary exports	
	High-FDI countries	Low-FDI countries	High-FDI countries	Low-FDI countries	High-FDI countries	Low-FDI countries
EXPORTS	.02	.0046				
	(4.62)	(.87)				
MFEXP[a]			.039	.009		
			(4.80)	(.82)		
PPEXP[a]					.019	.0053
					(1.34)	(.27)
GDPCAP	.013	-.009	.006	-.01	.033	-.008
	(2.78)	(-1.48)	(1.30)	(-1.43)	(2.45)	(-1.31)
GDP%	-.004	.008	.01	.009	-.0034	.01
	(-.17)	(.68)	(.44)	(.78)	(-.12)	(.79)
RFDI1	.63	.25	.63	.22	.74	.22
	(9.50)	(2.96)	(10.20)	(2.82)	(5.71)	(2.77)
EARN	.0002	.0011	-.0009	.001	.0013	.0012
	(.08)	(1.40)	(-.42)	(1.35)	(.42)	(1.55)
IPG7	.019	.0003	.02	.0014	.019	.0026
	(2.94)	(.05)	(4.23)	(.26)	(2.29)	(.50)
DASIA	-2.32	.01	-1.94	-.04	-1.94	-.16
	(-2.89)	(.04)	(-2.69)	(-.09)	(-2.63)	(-.35)
DEUROPE	-2.51	.36	-2.16	.39	-2.26	.14
	(-3.59)	(.77)	(-3.56)	(.69)	(-2.54)	(.26)
DAFRICA	-1.94	.06	-1.48	.19	-1.67	.01
	(-2.56)	(.15)	(-2.09)	(.37)	(-2.07)	(.02)
DLAMERICA	-2.95	.08	-2.41	.04	-3.28	-.12
	(-4.26)	(.21)	(-4.08)	(.10)	(-2.71)	(-.25)
D.W.	1.81	2.11	1.89	2.14	2.27	2.14
F-value	192.67	4.94	215.28	3.84	107.15	3.82
Adjusted R^2	.89	.10	.90	.08	.81	.08
Number of observations	203	305	202	290	213	290

Source: Authors' estimates.

NOTE. T-values are in parenthesis. The models for high-FDI countries (with EXPORTS and MFEXP) are reported after correcting for first-order autocorrelation.

[a] Share of GDP.

imply "causality" as defined in a lay person's terms, but rather "precedence" in a lead-lag relationship.)

In addition to the past values of the dependent variable, past values of GDP per capita, GDP growth and IPG7 were included before the additional explanatory power of the hypothesized variable was tested when conducting

"augmented" Granger causality tests. The results should be interpreted with caution because the estimates are likely to suffer from a small-sample bias (annual observations for each country range from 20-23 years). For the country-specific tests, three annual lags were employed in order to conserve the degrees of freedom. The purpose here is to observe the general direction of the results rather than rely on any single result.

The results indicate that for some countries (Thailand: 1 per cent significance; Ecuador and Portugal 5 per cent significance; and Greece and Singapore, 10 per cent significance) exports "Granger cause" FDI (table 13). The only country for which FDI "Granger causes" exports is Singapore (10 per cent significance level), suggesting a b-directional causality. For other countries the results are insignificant.[28] A combined test for the five countries that showed a significant feedback from exports to FDI indicates a stronger feedback from exports to FDI. The five countries that had significant feedback from exports to FDI also show significant feedback from manufacturing exports to FDI. Again, for Singapore, there is feedback from FDI to manufacturing exports. Although the dynamic relationship between FDI and EXPORTS is likely to be simultaneous, the results support the general notion that exports precede FDI.

Conclusions and policy implications

Without placing too much weight on any single regression, the following patterns emerge from the analysis:

- Because sociopolitical instability is a complex phenomenon, regression results differ substantially when different proxies are employed to capture the relationship. The significance of a broad-based qualitative political risk index is greater for the high FDI group.

- Work days lost in production, a variable that is more directly and immediately relevant for production efficiency, is more significant for low FDI countries.

[28] Singapore is the largest recipient of FDI in the sample. Consequently, it is conceivable that the feedback from FDI to exports is not statistically significant for other countries because FDI is not large enough to influence overall exports. Results for specific sectoral exports may be different.

Table 13. Causality tests for exports, high-FDI countries

Causality tests for general exports		
Country	F-test value (exports to FDI)	F-test value (FDI to exports)
Colombia	.71	1.03
Costa Rica	2.28	1.07
Ecuador	4.40[b]	1.01
Egypt	.85	1.38
Greece	2.73[a]	1.29
Malaysia	2.47	.96
Mexico	1.42	0.98
Nigeria	1.94	0.40
Portugal	4.53[b]	0.95
Singapore	2.86[a]	3.67[a]
Spain	0.28	0.26
Thailand	8.46[c]	1.33
Pooled model (Ecuador, Malaysia, Portugal, Thailand)	19.21[c]	4.16[b]
Causality tests for manufacturing exports		
Country	F-value Manufacturing exports to FDI	F-value FDI to Manufacturing exports
Ecuador	7.12[c]	1.17
Greece	2.80[a]	2.38
Portugal	9.10[c]	.93
Singapore	5.63[b]	3.61[a]
Thailand	2.30	0.17
Pooled model for five countries	26.46[c]	2.78[a]

Source: Authors' estimates.

NOTE. The individual country and combined tests include three lags. The individual country results should be interpreted with caution because of the small sample size. Botswana and China are high-FDI countries that could not be analysed because of incomplete data.

[a] Significant at 1 per cent level.

[b] Significant at 5 per cent level.

[c] Significant at 10 per cent level.

- Once the relative size of exports is introduced as a control variable, the influence of these proxies of political instability on FDI flows erodes substantially. This change may not be surprising given that EXPORTS has the strongest correlation with FDI flows, particularly in high FDI countries. On balance, the export orientation of a country seems to matter the most.

- A qualitative index of the general business conditions is a significant determinant of FDI flows particularly for the high FDI countries.

- Among the high FDI countries there is evidence of "tariff hopping", as tax revenues from international trade and transactions are positively related to FDI flows once market size and other economic variables are taken into consideration.

- Exports, particularly manufacturing exports, are a significant determinant of FDI flows for high FDI countries, but not for low FDI countries.

- Causality tests indicate that although the dynamic relationship between exports and FDI is likely to be simultaneous to some extent, there is stronger feedback from exports to FDI.

The results provide insight on another important issue: countries that have historically high or low FDI flows are structurally different (in terms of the characteristics discussed in table 3), and the tested hypotheses differ when the two groups are analysed separately. This finding may partly explain why tests on the determinants of FDI have been mixed and inconclusive in some past aggregate studies. Since these results may be sensitive to the way in which different groups are defined and the thresholds set for demarcating groups, more research on the importance of differences in the structure of country groups in determining FDI would be warranted. Maxwell Fry (1993), while analysing the impact of FDI flows, found a structural difference between country groups. For a control group of eleven developing countries, FDI is associated with reduced domestic investment. But in six Pacific Basin market economies, FDI raises domestic investment by the full extent of the flow. Viewed in this context, it should be understandable that the determinants of FDI flows are different for high and low FDI countries.

Several policy implications flow from the findings. First, for countries with relatively low FDI flows, sociopolitical instability manifested in work hours lost is a significant deterrent to FDI flows. Given that FDI operations in the low FDI group are likely to be labour intensive, a higher premium appears to be placed on labour relations.[29] A priority for these countries should be to stabilize labour relations and the working environment to

[29] This issue must be investigated more extensively by analysing FDI flows in industries with different capital-labour intensities, and labour relations variables.

attract FDI inflows. For countries that receive relatively high FDI flows, perceptions of overall political stability have a significant influence on FDI flows. In the high FDI group, FDI is likely to be capital intensive, requiring a relatively more substantive and long-term commitment.[30] Consequently, overall perceptions of political stability play a significant role in sustaining high level of FDI flows.

Second, a similar rationale can be applied for favourable business operating conditions. Operation risk index seems to be a more significant determinant in the high FDI group. This finding is consistent with the general notion that some developing countries are not seriously considered by foreign investors until they have achieved a reasonable level of corporate hospitality. A higher burden of revenues raised from international trade does not appear to be detrimental to FDI flows for the high FDI countries. But this does not mean that taxing international trade is an advisable policy option, as other costs, such as efficiency distortions and the opportunity costs of higher foregone trade, are likely to arise.

Third, the results support the notion that export orientation is a significant determinant of FDI flows for high FDI countries. In fact, the relative size of the export sector is the strongest explanatory variable for FDI flows. Manufacturing exports play a particularly critical role. This inference is strengthened by causality tests indicating that exports precede FDI flows. The sample data do not indicate a high feedback from FDI to exports. On balance, because exports are the strongest explanatory variable for FDI flows and there is little evidence on any feedback from FDI to exports, even fairly-well established developing countries should seek alternative ways to develop a vibrant export sector under a liberalized trade regime as a pragmatic way of encouraging FDI flows consistently. ■

[30] Again, only an analysis based on sectoral FDI data can pin down the relationship between capital intensive FDI and perceptions of overall political stability.

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