Foreign direct investment, economic freedom and growth: new evidence from Latin America

Marta Bengoa, Blanca Sanchez-Robles*

Department of Economics, University of Cantabria, Avd. de los Castros s/n, 39005 Santander, Spain

Abstract

This paper explores the interplay between economic freedom, foreign direct investment (FDI) and economic growth using panel data analysis for a sample of 18 Latin American countries for 1970–1999. We find that economic freedom in the host country is a positive determinant of FDI inflows. Our results also suggest that foreign direct investment is positively correlated with economic growth in the host countries. The host country requires, however, adequate human capital, economic stability and liberalized markets to benefit from long-term capital flows.
© 2003 Elsevier B.V. All rights reserved.

1. Introduction

The study of economic growth has experienced a revival in the last decades, due to the seminal contribution of Romer (1986). In contrast to the dismal predictions of the neo-classical model of economic growth (Solow, 1956), the new models envisage a positive growth rate of real GDP per capita that arises endogenously in the economy.

The new contributions within this framework refer to different mechanisms to explain endogenous growth. Main examples of these mechanisms are human capital (Lucas, 1988), public infrastructure (Barro, 1990), incentives to innovate (Romer, 1990), constant returns to scale in the production function (Rebelo, 1991), and technological diffusion (Barro and Sala-i-Martín, 1997) among others.

---

* Corresponding author. Tel.: +34-942-201631; fax: +34-942-201603.
E-mail address: sanchezb@unican.es (B. Sanchez-Robles).

At the same time, the institutional background is also crucial in explaining why countries grow or stagnate (Olson, 1996; Landes, 1998; Easterly, 2001). Fischer (1993) has stressed the importance of macroeconomic stability for development. These studies suggest the relevance of economic freedom in the process of development. The development of indicators of economic freedom by the Heritage Foundation and the Fraser Institute has allowed more precise testing of the correlation between economic freedom—as measured by these indicators—and growth. This correlation has proved to be positive and significant (see De Haan and Sturm, 2000, and references therein). Countries that enjoy higher levels of economic freedom have greater factor efficiency and higher rates of growth.

Although there is broad consensus that technological progress—considered in a wide sense—is a crucial determinant of growth, access to inventions and new designs is not uniform among countries. In some countries, innovation takes place and new technologies are developed. Elsewhere, the necessary skills to develop and implement new discoveries in the productive process are lacking. In the latter cases, producers have to benefit from the diffusion of new technology from other countries. A particular channel whereby technology spills over from advanced to lagging countries is foreign direct investment (FDI).

While there have been explorations of the role of FDI in the development process of host countries (see, for instance, De Mello, 1999), in our view the empirical evidence available is still insufficient for reaching definitive conclusions, especially as regards poorer countries, which are the countries where the potential impact of FDI is greatest. In addition, research is lacking on the relation between economic freedom (as measured by indexes such as the ones provided by the Heritage Foundation or the Fraser Institute) and FDI. On a priori grounds, countries that enjoy higher levels of economic freedom should be more attractive for foreign investors. The link between economic freedom and growth is then strengthened, since economic freedom affects growth through two channels: directly (as shown, for example, by De Haan and Sturm, 2000) and indirectly (i.e. by facilitating of FDI that, in turn, fosters economic growth).

This study investigates the relation between economic freedom, FDI and growth for Latin America over the period 1970–1999. The structure of the paper is as follows. Section 2 presents basic ideas about the relation between economic freedom, FDI and growth, together with a brief summary of recent contributions on this issue. Section 3 describes the data set used and Section 4 discusses the main empirical results. Section 5 presents concluding remarks.

2. The basic conceptual framework

Within the framework of the neo-classical models that follow Solow (1956), the impact of FDI on the growth rate of output was constrained by diminishing returns to physical capital. Therefore, FDI could only exert a *level effect* on the output per capita, but not a *rate effect*. In other words, FDI could not alter the growth rate of output in the long run. With this as the framework, FDI could not be considered seriously as an engine of growth.

In the context of the new theory of economic growth, however, FDI can affect not only the *level* of output per capita but also its *rate* of growth. This literature has posed various hypotheses that explain why FDI may potentially enhance the growth rate of per capita income in the host country.

First, FDI can be considered as one of the main transmission vehicles of advanced technology from leaders to developing countries (Borensztein et al., 1998). Generally speaking, LDCs lack the necessary background—in terms of educated population, infrastructure, liberalized markets, economic and social stability and so forth—in order to be able to innovate and generate new discoveries and designs. Accordingly, they will have to benefit from the diffusion of technology that originates elsewhere. The technological diffusion from the leader countries to LDCs can take place through FDI.[1] Technological advances implemented by multinationals may spill over to the rest of the economy, giving rise to beneficial externalities and encouraging domestic private activity.

FDI can have other beneficial effects on the host nation. It may facilitate the extraction and distribution of raw materials produced in the host country by improving the network of transport and communication. An example is the construction of a port by a multinational. FDI can also beneficially affect the productive efficiency of domestic enterprises. Local firms have an opportunity to improve their efficiency by learning and interacting with foreign firms. FDI can also raise the quality of domestic human capital and improve the know-how and managerial skills of local firms (the *learning by watching* effect).

Furthermore, FDI does not lead to the problems associated with alternative ways of raising funds in international markets and the need to cover current account deficits. Latin American countries are, generally speaking, net borrowers and experience indicates that a heavy burden of debt can jeopardize economic growth of the borrower. Regarding FDI, however, if a particular project is not successful, there is no obligation for the host country to pay interest or repay principal. A firm may not earn profits but the country is not led to bankruptcy.

Nevertheless, this point of view favorable to FDI was not widespread in the 1950s and 1960s. Some economists argued that multinationals were harmful for the host countries. These economists created a hostile environment to FDI, especially in the Latin American area. Development economists who exposited the core-periphery approach, including Rosenstein-Rodan (1943), Myrdal (1957) and Hirschman (1958),[2] advocated inward-oriented, import substitution policies and an activist role of the state in the economy for LDCs in general and for Latin American countries in particular. The diffusion of the Keynesian paradigm in those decades also helped develop a deep faith in strong states and demand policies as the proper way to foster growth.

The role of the state in the economy is a controversial issue among economists and politicians. A blind belief in the state as a wise benevolent agent is matched against a more skeptical approach towards government. An excessive role for the state in the economy can crowd out private activity, lead to corruption and rent seeking activities, and result in

---

[1] Another way to adopt recent technology is via the import of intermediate goods, as for example pointed out by Lee (1995).

[2] For an excellent review and criticism of these theories, see Krugman (1994).

large deficits or hyperinflation, especially in LDCs (see the experiences reported by Easterly, 2001). In a *market-oriented* approach, domestic investment and FDI (instead of the state) play the main role in the development process.

There are prerequisites for host countries to benefit from FDI. A minimal degree of social capacity is required (Abramovitz, 1986). Social capacity, in turn, is related to an adequate level of human capital, economic and political stability, liberalization of markets and sufficient infrastructure. In particular, Benhabib and Spiegel (1994) argue that the ability of an LDC to absorb and make sound use of the flows of foreign investment increases with the level of human capital of the host country.

Recent studies have addressed the impact of FDI on growth empirically (Borensztein et al., 1998; De Mello, 1999; Obwona, 2001). Generally speaking, these studies confirm the view that FDI fosters economic growth in the host country provided that the host country is able to take advantage of the spillovers of the inflows of capital through existence of minimum social capacity. These studies suggest that FDI is beneficial for growth in LDCs. The results contradict the views of the core-periphery economists of the 1950s mentioned above. These authors, argued, instead, that FDI exerted a deleterious effect on development in less advanced countries.

If we accept a positive link between FDI and growth, the next relevant question is what should a government in a LDC do in order to attract FDI? Hence, investigation of the determinants of FDI becomes crucial. A flourishing literature has dealt with this issue, by means of econometric analyses and survey studies of foreign investors' opinions. Although there is not yet a general consensus on this issue, the literature has identified factors that influence the capacity of countries in order to attract FDI. These determinants can be described as follows (for a more extensive review, see Marr, 1997).

The first determinant is the market size of the host country. According to the market size hypothesis, multinationals tend to invest in larger countries in order to exploit economies of scale. The sunk cost of FDI in a country, in terms of adapting the managerial skills to its idiosyncratic features, becoming familiarized with local regulations, learning the language and so forth, leads firms to confront scale economies.

Other determinants are economic policies in the host country. Taxes, macroeconomic stability, the extent of openness, the political climate, the degree of economic freedom and the absence (or not) of regulations in markets affect FDI. In the particular case of Latin America, debt overhang conditions in the host country also matter.

The capital stock in the host country is another issue confronting investors. Human capital will determine productivity of the labor force and attractiveness to foreign investors. Public capital is also relevant. Poor infrastructure facilities—especially in transport, communications and information technologies—are regarded as one of the main impediments for investment in lower income countries (see Obwona, 2001).

We now briefly summarize studies that explore the connections among the aforementioned variables and FDI.

First, market size has been shown to be a very robust determinant of FDI. Love and Lage-Hidalgo (2000) document that this variable positively affected investment flows from US to Mexico between 1967 and 1994. Chakrabarti (2001) considers this variable as a rather robust determinant of FDI. Lipsey (1999) concludes that market size is an important determinant of FDI flows to Asia for the case of those affiliates that sell mostly in the local market. Market

size has also influenced the location of FDI flows in Latin America according to Tuman and Emmert (1999).

There has also been research on the relation between economic policy indicators and FDI. Tung and Cho (2001) show that tax incentives in some areas of China have been an important factor in attracting FDI in the last decade. Exchange rate volatility was shown to be detrimental for FDI in a sample of developing countries (Benassy-Quere et al., 2001). Macroeconomic and institutional stability seem to have been crucial for Uganda's attractiveness for foreign investment (Obwona, 2001) and for Asian countries in attracting US investment (Lipsey, 1999). The same applies to Latin American countries for Japanese investment (Tuman and Emmert, 1999). Similar results are reported by McMillan (1999) and Barry and Bradley (1997). In particular, these authors document the importance of the export-oriented policies adopted by the Irish government in affecting FDI to the country. Nunnenkamp (1991) looks at how debt overhang and sovereign risk affect FDI in 35 developing countries. These two indicators appear relevant in explaining the decline in capacity to attract FDI in the 80s. In a subsequent paper, Nunnenkamp (1997) stresses the importance of host country conditions for the attraction of FDI by Latin American countries.

Studies of capital endowments as a determinant of FDI are sparser. Noorbakhsh et al. (2001) provide evidence that human capital attracts FDI.

The conclusions from previous studies are as follows: first, the main determinants of FDI appear to be market size, economic conditions and capital endowments in the host country. Second, research has focused on specific countries. Third, most studies conclude that macroeconomic liberalization and stability are crucial for attracting foreign investment. This latter idea has, however, not been tested using indicators on economic freedom. We carry out such an analysis for the Latin American countries.

3. Data and main results

In order to test the links among economic freedom, FDI and economic growth, we pursue a panel data analysis. Our sample consists of a group of 18 Latin American countries[3] and the period is 1970–1999. Data sources are described in Appendix A.

There are various reasons why we focus on Latin American countries. The nations in this area are developing countries but have already a minimum level of social capacity in terms of human capital, financial intermediaries and also a certain level of institutional stability as compared, for example, to Africa. Still, the sample offers sufficient variability to reflect different degrees of the aforementioned variables. The financial system in Peru, for example, is less developed than in Chile. Human capital is higher in Argentina than in Honduras, and so forth.

Second, the criticisms of FDI came in particular from Latin American economists. Although the hostility to multinationals extended to other countries, it was perhaps more acute in Latin America.

---

[3] The countries in the sample are Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Rep., Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela.

Finally, while a number of papers explore the impact of FDI on developing countries, the number of studies dealing explicitly with Latin America is limited. As far as we know, there are no studies that address the link between economic freedom and FDI either in general or for the particular case of Latin America.

The period has been chosen because of the availability of data. Thus, we have taken 1970 as our starting point, since data on FDI prior to that date are very poor. Economic
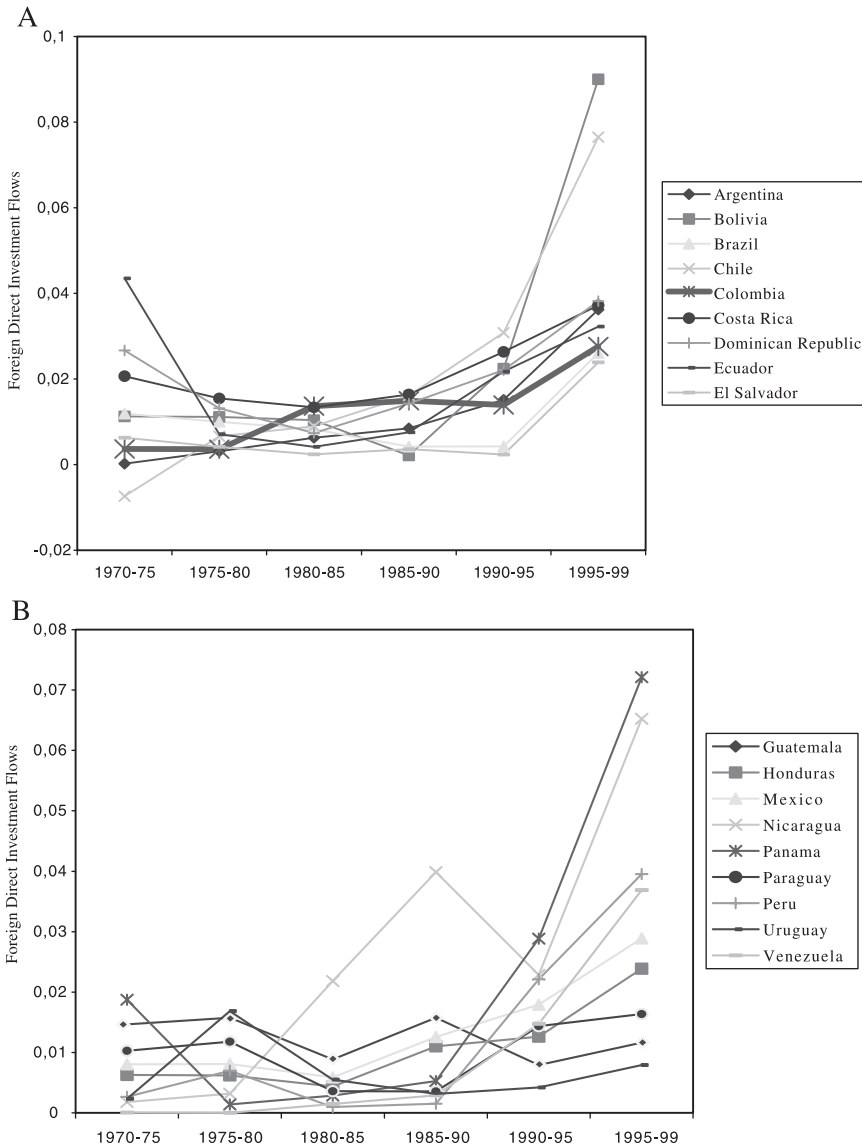

Fig. 1. Evolution of foreign direct investment.

growth is rather similar for the countries in the sample: high rates at the beginning of the 1970s, followed by a deep recession in the early 1980s, a recovery thereafter and another slackening of the economy that began around 1995.

Fig. 1 shows FDI (as a percentage of GDP). Data on FDI are taken from the IMF. The International Financial Statistics Yearbook (1995, p. xix) defines FDI as "the flows of direct investment into the reporting economy. It includes equity capital, reinvested earnings and other capital associated with various intercompany transactions between affiliated enterprises". Most countries show a steady path of increase of FDI over the period. In some cases (Panama, Ecuador, Costa Rica and Dominican Rep.) FDI decreased
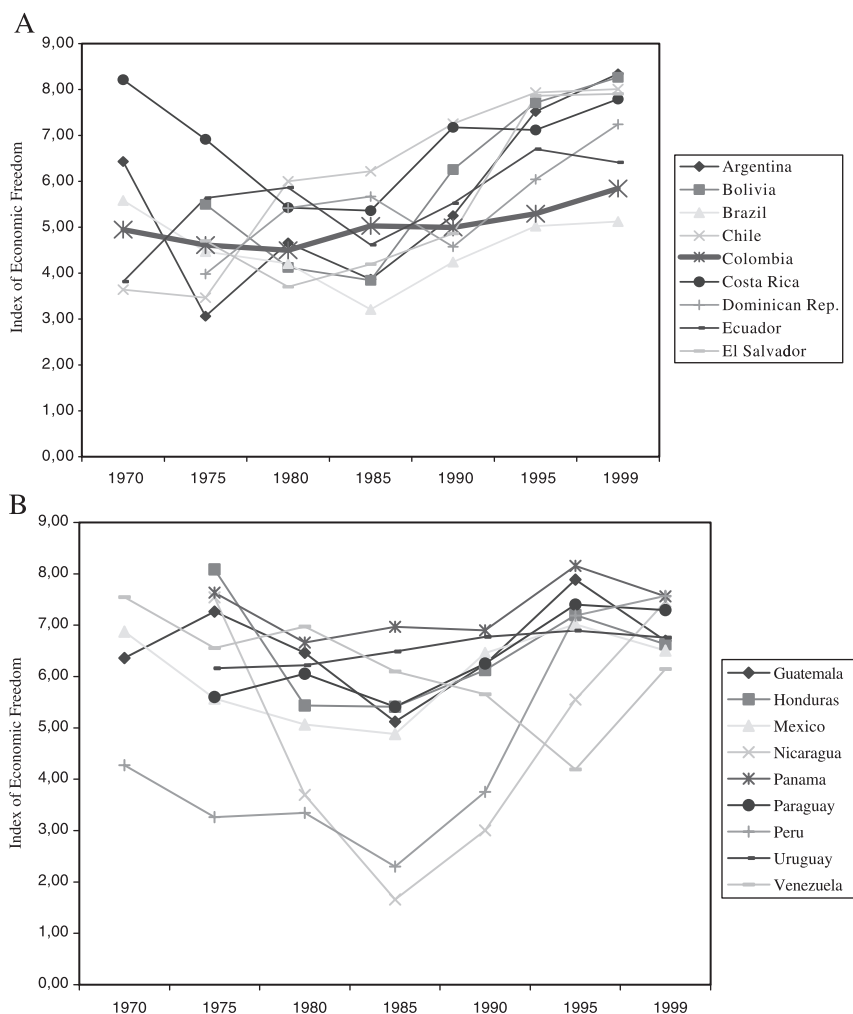

Fig. 2. Economic freedom in Latin America, 1970–1999.

slightly in the mid-1970s; in others (Panama, Nicaragua, Bolivia, Chile) there was a dramatic increase in the late 1980s and the 1990s.

Two indicators measure economic freedom. One is that of the Fraser Institute (see Gwartney et al., 1996), and the second is by the Heritage Foundation. Both quantify aspects such as the degree of openness, government intervention, distortions in the economy and corruption. In practical terms, the indexes yield similar results. We have employed the Fraser index since its coverage in terms of countries and years assessed is greater.

Fig. 2 describes the performance of the (overall) index of economic freedom constructed by the Fraser Institute in our sample. Table 1 shows the average and the standard deviation of the index for the Latin American countries over the period 1970–1990. A higher level of the index indicates a larger degree of economic freedom. Two main messages are apparent from the table. First, there is large variability in the value of the index among the Latin American countries. Peru, Brazil and Nicaragua exhibit average values below 5, whereas Panama, Costa Rica, Guatemala and Uruguay are in the range of 6.5–7. Second, the volatility of the index over time is rather large. The standard deviation is larger than 1 point in 11 cases, and is around 2 for Argentina, Bolivia, Chile, El Salvador, Nicaragua and Peru.

In general, in the sample the value of the index has declined in the mid-1970s and mid-1980s, growing thereafter. The deterioration in the value for Nicaragua is notably striking. In other countries, the index increases monotonically during the whole subperiod (Ecuador, Costa Rica and Uruguay). Venezuela displays a constant worsening in the value of the index. It is beyond the scope of this paper to explore in detail the evolution of the economic environment in Latin America in the period 1970–1999. However, we can tentatively conclude that the pro-market orientation that most countries adopted in the

Table 1
Economic freedom in Latin America, 1970–1999

	Average	Standard deviation
Argentina	5.45	1.93
Bolivia	5.95	1.82
Brazil	4.38	0.78
Chile	6.48	1.89
Colombia	5.05	0.45
Costa Rica	6.63	1.09
Dominican Rep.	5.49	1.14
Ecuador	5.79	1.00
El Salvador	5.54	1.86
Guatemala	6.61	0.87
Honduras	6.48	1.05
Mexico	5.92	0.87
Nicaragua	4.82	2.43
Panama	7.31	0.56
Paraguay	6.34	0.84
Peru	4.57	2.04
Uruguay	6.55	0.31
Venezuela	5.94	1.07

aftermath of the debt crisis of 1982 is reflected in the general increase in the index after 1985. Chile, Costa Rica, Panama, Uruguay and Paraguay are, according to conventional wisdom, more stable and liberalized countries, while the degree of intervention in Venezuela is known to have grown over time.

Two main techniques have been implemented to explore the data econometrically: cross country and panel data analysis. We only show the results for the second for several reasons. First, since our sample is small (18 countries), for the results to be robust, it was advisable to work with more degrees of freedom by exploiting the temporal dimension of the data. Second, and in accord with Islam (1995) and Fölster and Henrekson (2001), panel techniques consider explicitly the information on within-country variability and allow for differences in the production function of the various nations in the form of unobservable individual effects.

There are some problems, however, associated to the use of panel data analysis. As pointed out by Fölster and Henrekson (2001), if the panel is composed of annual data, it could be difficult to disentangle the long-run effects from the business cycles changes when interpreting the results. A solution to circumvent this problem is to employ averages over 5-year periods instead of yearly observations. This is the method we have used.

4. Results

We presume that a good proxy of the quality of the institutional background in the host country is the index of economic freedom. We have regressed the flows of FDI on a set of variables that could conceivably be related to the capacity of a particular nation to attract (or discourage) the entrance of foreign investment, one being the index of economic freedom. The underlying specification is a model of the form:

$$\text{FDI/GDP}_{i,t} = \gamma_0 \text{intercept} + \gamma_1 X_{i,t} + \varepsilon_{i,t} \tag{1}$$

where $\text{FDI/GDP}_{i,t}$ represents the inflows (as a percentage of GDP) accruing to country i in year t, X is a set of proxies of the determinants of FDI (market size, economic freedom, other economic conditions, human capital) detailed above, i indexes the 18 Latin American countries, and t captures the time dimension (in particular, averages over five years over the period 1970–1999).

The results of this analysis are shown in Table 2. According to the Hausman test, the model should be estimated with fixed effects. We have added the random effects results (in columns "b") to facilitate a sensitivity analysis that will be discussed later.

First, it should be stressed that the index of economic freedom seems to have a positive and very significant effect on capital flows. The point estimate is positive and significant in regressions 1, 2, 4 and 5. Ceteris paribus, those countries in which the institutional framework is sounder and less regulated were regarded as more attractive by investors.

We have included as regressors other variables that are traditionally considered as influencing FDI. The coefficient of the level of GDP (in PPP) is positive and significant in all regressions. This result is consistent with the market-size hypothesis, according to which multinationals will tend to favor larger countries to exploit economies of scale.

Table 2
Economic freedom and foreign direct investment in Latin America, 1970–1999

	1	1b	2	2b	3	3b	4	4b	5	5b
Intercept		− 0.025171		− 0.023466		− 0.0335		− 0.0439		− 0.0418
		− 1.9071*		− 1.7582*		− 2.2894**		− 2.9182***		− 2.8006***
Index of economic freedom	0.00433	0.004602	0.004134	0.00451			0.0037	0.0050	0.0039	0.0048
	3.2637***	4.2055***	3.2696***	4.1057***			2.8151***	4.5710***	2.8508***	4.2934***
GDP	0.010357	0.001353	0.01291	0.001244	1.3456	0.4410	0.1294	0.3278	0.9648	0.2698
	3.9224***	1.2794	4.8945***	1.1954	5.8021***	3.2008***	4.9120***	2.4357**	3.4613***	2.1094*
Debt service			− 0.040845	− 0.000227			− 0.0395	− 0.0137		
			3.1831***	− 0.0190			− 3.0770***	− 1.2035		
(log) Inflation					− 0.0035	− 0.0034				
					− 3.7503***	− 2.2823***				
Railways/ surface									0.1470	0.1932
									0.9216	1.6030
Dummy 1980–1985, 1990–1995					− 0.6395	− 0.0076	− 0.0038	− 0.0044	− 0.0046	− 0.0418
					− 1.9061*	− 2.2823***	− 1.1172	− 1.2931	− 1.2734	− 1.3293
Adjusted R^2	0.306	0.156	0.371	0.135	0.356	0.119	0.373	0.149	0.311	0.129
Hausman test	17.25	17.25	26.1	26.1	26.52	26.52	26.03	26.03	16.55	16.55
p value	0***	0***	0***	0***	0***	0***	0***	0***	0***	0***
Number of observations	108	108	108	108	108	108	108	108	108	108
Type of estimation	fixed effect	random effect	fixed effect	random effect	fixed effect	random effect	fixed effect	random effect	fixed effect	random effect

Dependent variable is foreign direct investment.
t statistics under coefficients (*: significant at 90%; **: significant at 95%; ***: significant at 99%).

An indicator of external debt (debt service/GDP) has also been included. The debt service is negatively and significantly correlated with FDI in regressions 2 and 4. This result is also intuitively appealing. Those countries in which the debt burden is more severe present a larger country risk and therefore are less attractive for foreign investors.

Inflation is negatively and significantly correlated with FDI, as expected (regression 3). A higher rate of inflation is a symptom of lack of commitment and discipline in monetary policy (Fischer, 1993).

Public investment, as proxied by physical units of railways, shows a positive correlation with FDI in regression 5 but is not significant. A temporal dummy has been included to capture the subperiods 1980–1985, in which the debt crisis was more acute, and 1990–1995, in which the area was harmed by the Tequila crisis.[4] The dummy is a cruder indicator than the debt variable referred to above, but the negative and significant correlation confirms the negative impact that excessive levels of external debt and financial crises have on the reputation of countries.

A practical issue when carrying out a panel analysis is to decide whether the panel estimation should be performed with fixed or random effects.[5] To make the correct choice, we used the Hausman (1978) test, which suggests that the appropriate procedure in all cases is the fixed effects estimation. Fixed effects estimators are always consistent although not fully efficient (Hausman and Taylor, 1981).

Nonetheless, we have displayed in Table 2 the results from random effects estimation (in columns 1b, 2b, 3b, 4b and 5b). The comparison of the outcomes of both estimations is a natural test of the robustness of the results. Unfortunately, other procedures that are appropriate for sensitivity analysis in a cross-section setting (as those employed by De Haan and Sturm, 2000, or Doppelhoffer et al., 2002) have not been developed for panel data yet. However, we can address the issue of sensitivity by means of the comparison of the results when estimating with fixed versus random effects. According to Hausman

---

[4] In December 1994, 2 weeks after the inauguration of president Ernesto Zedillo, Mexico faced a huge devaluation of its currency. This crisis precipitated fears that some other emerging markets might be susceptible to similar problems.

[5] The estimation of a panel under the hypothesis of fixed effects assumes that the differences among countries are captured by allowing a different intercept α_i for each of them. α_i may be estimated, so the specification with k regressors becomes:

$$y_{it} = \alpha_i + X_{it}\beta + \varepsilon_{i,t}, \qquad i = 1, \ldots, n, \qquad t = 1, \ldots, T$$

where i indexes countries and k indexes regressors. y is the dependent variable, X is an nT by k matrix of regressors, β is a k by 1 vector of parameters and $\varepsilon_{i,t}$ are the disturbances. Intuitively, the main assumption is that the economic model underlying the estimation is the same for all countries. The variation among countries is captured by the intercept α_i. The estimation is by OLS, which in this case is called Least Square Dummy Variables (LSDV) or *within-groups* estimation. Instead, random effects consider idiosyncratic features of the units as non-observable and randomly distributed. They are captured by the error terms that, in turn, have a constant (over time) part and a second component that varies over time. The specification in this case becomes:

$$y_{it} = \alpha + X_{it}\beta + u_i + v_{it}$$

where u_i is the random disturbance associated to the ith country, constant over time by assumption. The economic intuition associated with random effects is that the economic model underlying the estimation may change over time. The estimation in this case is performed by Generalized Least Squares.

(1978), if the model has been correctly specified and the null hypothesis of no correlation cannot be rejected, coefficients estimated by random effects should not differ much from those estimated by fixed effects.

It is interesting that the index of economic freedom remains positive and significant if the random effects model is estimated. In addition, the point estimate in both cases is very similar. Hence, it can be regarded as a *robust* determinant of FDI. The same holds for inflation. Other variables change sign or loose significance in the random effects estimation. Thus, GDP displays different values of the coefficient if random effects are pursued, and in some cases it looses significance. The same happens with the debt indicator and the dummy. Summing up, the index of economic freedom and inflation are robust, whereas GDP, the temporal dummy and the debt service appear more fragile.

The final part of our empirical analysis focuses on the link between FDI and economic growth. Our contribution is along the lines of De Gregorio (1992) and Sánchez-Robles (1998), but these authors use data until 1985 only, whereas the period we consider ends in 1999.

Again, we have employed different techniques but the discussion that follows will focus on the results of the panel data estimation. The baseline specification is now of the form:

$$\text{Rate of real per capita growth}_{i,t} = \gamma_0 \text{intercept} + \gamma_1 Z_{i,t} + \upsilon_{i,t} \tag{2}$$

where $Z_{i,t}$ is a set of variables that may affect economic growth. One of them is FDI/GDP, and the others have been included in accordance with the standard literature on growth. They proxy for factors that the mainstream contributions on economic growth identify as correlated with growth and, in particular, for the social capacity necessary for FDI to foster growth in the host countries. i indexes the 18 Latin American countries and t denotes the same time dimension as above (averages over 5 years from 1970 to 1999).

The results are presented in Table 3. The Hausman test indicates that the appropriate technique in these estimations is the random effects model. We have nonetheless added the outcomes from the fixed effects estimations in the columns headed "b" in order to pursue the sensitivity analysis. We shall first comment on the random effects results. FDI appears positively and significantly correlated with economic growth at the 99% level in all the estimations displayed. The coefficient is rather high (in the range of $0.5 - 0.6$ in most cases).

The index of economic freedom is also positively and significantly correlated with growth.

Columns $3 - 6$ of Table 3 examine the role of human capital (as proxied by the secondary and primary school enrolment ratio). The point estimate is again positive and significant for secondary schooling in one case (column 4) and marginally significant in the other (column 3). The primary schooling variable shows the same behavior (significant in regression 5 and marginally significant in regression 6). These outcomes can be attributed to the lack of quality of the data on human capital that are available.[6]

Inflation displays a negative and significant correlation with economic growth, as expected (estimations 2 and 3). This result is in accordance with other studies (as De

---

[6] For a discussion of the proxies of human capital that are usually employed and a proposal of an alternative for the US, see Mulligan and Sala-i-Martin (2000) and De la Fuente and Doménech (2001).

Table 3
Economic growth and foreign direct investment in Latin America, 1970–1999

	1	1b	2	2b	3	3b	4	4b	5	5b	6	6b
Intercept	− .04758 − 3.2219		− 0.03183 − 2.161**		− 0.04133 − 2.4868**		− 0.0295 − 2.2034**		− 0.0632 − 2.5931**		− 0.023 − 1.146	
FDI	0.5140 3.0911***	0.5917 3.3497***	0.5445 3.3819***	0.6024 3.4888***	0.5437 3.3817***	0.6118 3.5108***	0.5469 4.059***	0.5681 3.8756***	0.6169 3.739***	0.6462 3.5639***	0.537 3.8214***	0.538 3.4912***
Secondary enrolment					0.0211 1.3294	0.01981 0.5461	0.02975 2.1433**	0.01872 0.5403				
Primary enrolment									0.03821 2.1532**	0.01195 0.366	0.028 1.548	− 0.020 − 0.615
Index of economic freedom	0.005722 3.1126***	0.006733 3.1382***	0.003313 1.7583*	0.005114 2.3042**	0.003040 1.6239	0.005 2.1989**	0.003613 2.1433**	0.004330 1.9214*	0.004254 2.4398**	0.005146 2.2113**	0.004 2.4679**	0.005 2.319**
Inflation			− 0.001209 − 3.1069***	− 0.000916 2.2189**	− 0.001253 − 3.2216***	− 0.00093 − 2.2454**						
Public consumption							− 0.16661 − 3.2143***	− 0.1326 − 1.7855*	− 0.1606 − 3.1743***	− 0.13 1.7166*	− 0.170 − 3.2553***	− 0.139 1.7477*
Dummy 1980–1985											− 0.023 − 5.3667***	− 0.022 5.0002***
Adjusted R^2	0.355	0.466	0.380	0.491	0.375	0.487	0.371	0.479	0.361	0.473	0.290	0.414
Hausman test	2.840	2.840	6.070	6.070	6.510	6.510	0.893	0.893	2.072	2.072	3.784	3.784
p value	0.242	0.242	0.108	0.108	0.164	0.164	0.926	0.926	0.723	0.723	0.436	0.436
Number of observations	108	108	108	108	108	108	108	108	108	108	108	108
Type of estimation	random effect	fixed effect	random effect	fixed effect	random effect	fixed effect	random effect	fixed effect	random effect	fixed effect	random effect	fixed effect

Dependent variable is GDP per capita in real terms.
t statistics under coefficients (*: significant at 90%; **: significant at 95%; ***: significant at 99%).

Gregorio, 1992). The intuition for this finding is simple: a high inflation rate jeopardizes competitiveness and hence exports, and may be a symptom of the existence of distortions in the markets, lack of fiscal discipline or poor macroeconomic stability (as argued by Fischer, 1993).

Debt conditions (and, in particular, the debt crisis that began in Latin America in 1982) have been captured by two alternative methods. First, by including the ratio debt/GDP, but this variable was not significant at conventional levels. Second, we included a temporal dummy that takes the value 1 in the subperiod 1980–1985 and 0 elsewhere. This dummy is negative and significant (estimation 6).

Public consumption as a percentage of GDP displays a negative and significant impact on economic growth (see columns 4–6). This finding can be interpreted as an indication of the crowding out effect that excessively interventionist governments exert on development.

Finally, it should be added that private investment has not been introduced in the equations to avoid endogeneity since the data on FDI are already included in the category *private investment*.

According to the Hausman test, these models should be estimated with random effects. Nevertheless, we have performed some robustness analysis by comparing the random effects with the fixed effects estimations, displayed also in the table.

The most remarkable features of this analysis are the following: FDI is always significantly and positively correlated with economic growth. Neither the magnitude of the coefficient nor the degree of significance vary much when alternative techniques area applied. It can be regarded, therefore, as a *robust* variable. The same happens with the index of economic freedom, although with a caveat. In those equations in which both the index and inflation are included (columns 2 and 3), the index becomes less significant. Since inflation is one of the aspects included in the index (in the case of the Fraser Institute, in terms of its variation), it is more difficult to claim that the null hypothesis of no covariance between the regressors and the error term holds in these cases. Instead, public consumption as a share of GDP does not alter the point estimates much nor the degree of significance of the index. On a priori grounds, this phenomenon can be attributed to the fact that the weight of public consumption as a share of GDP in the index is lower than that of the inflation rate. If we observe the different components of the index, we see that the category "government intervention" encompasses not only public consumption but also other items, such as subsidies and transfers and the presence of state operated firms. The particular effect of public consumption is therefore more diluted in the final value of the index. The category "monetary policy and inflation" is made up of two items: volatility of inflation and the monetary growth rate. Both are correlated with inflation in Latin American countries. Therefore, the way in which the index is constructed explains why it is more fragile to the introduction of inflation than to public consumption.

Finally, we performed a further robustness test by employing an alternative technique of estimation, the Two-Stage Generalized Methods of Moments, following Arellano and Bover (1990). Results (available upon request) show a positive and significant impact of FDI on growth, therefore providing further evidence beyond the panel data analysis.

5. Concluding remarks

This paper has examined the relations among economic freedom, FDI and economic growth in Latin America. The policy implications of our analysis are clear: to spur and to finance growth policymakers should encourage FDI. Our investigation indicates that this means that governments should strive to achieve a sound degree of political and economic stability, together with a market-oriented environment. Economic freedom enhances growth in LDC by two channels: directly, as it has already been shown in the literature, and indirectly, by increasing the FDI that a country attracts. Increasing economic freedom should therefore be a key priority of policy makers.

Acknowledgements

Appendix A. Data and variables description

Variables (in dollars unless otherwise stated)	Sources
(1) Real GDP$_{p/c}$ in constant dollars of 1985	Summers and Heston (1994) (5.6 version) and Global Development Finance and World Development Indicators
(2) Nominal GDP$_{p/c}$	World Tables (1995) and Global Development Finance and World Development Indicators
(3) Foreign direct investment	International Financial Statistics (International Monetary Fund)
(4) Gross capital formation as a percentage of GDP (1985 prices)	International Financial Statistics (International Monetary Fund)
(5) Debt as percentage of GDP and as a percentage of exports	Global Development Finance and World Development Indicators
(6) Inflation	Global Development Finance and World Development Indicators
(7) Literacy rate	World Tables (1995) and Global Development Finance and World Development Indicators
(8) Primary school enrollment rate	World Development Indicators
(9) Black market premium	World Development Indicators
(10) Index of economic freedom	Fraser Institute
(11) Openness	Global Development Finance and World Development Indicators

Source: own elaboration.

References

Abramovitz, M., 1986. Catching up, forging ahead and falling behind. The Journal of Economic History 46, 385–406.

Arellano, M., Bover, O., 1990. La econometría de datos de panel. Investigaciones Económicas 14, 3–45.

Barro, R.J., 1990. Government spending in a simple model of endogenous growth. Journal of Political Economy 98 (5), 407–443.

Barro, R.J., Sala-i-Martín, X., 1997. Technological diffusion, convergence and growth. Journal of Economic Growth 2, 1–26.

Barry, F., Bradley, J., 1997. FDI and trade: the Irish host-country experience. Economic Journal 107, 1798–1811.

Benassy-Quere, A., Fontagne, L., Lahreche-Revil, A., 2001. Exchange-rate strategies in the competition for attracting foreign direct investment. Journal of the Japanese and International Economies 15, 178–198.

Benhabib, J., Spiegel, M., 1994. The role of human capital in economic development: evidence for cross-country data. Journal of Monetary Economics 34, 143–173.

Borensztein, E., De Gregorio, J., Lee, J.W., 1998. How does foreign direct investment affect economic growth? Journal of International Economics 45, 115–135.

Chakrabarti, A., 2001. The determinants of foreign direct investment: sensitivity analyses of cross-country regressions. Kyklos 54, 89–113.

De Gregorio, J., 1992. Economic growth in Latin America. Journal of Development Economics 39, 59–83.

De Haan, J., Sturm, J.E., 2000. On the relationship between economic freedom and economic growth. European Journal of Political Economy 16, 215–241.

De la Fuente, A., Doménech, R., 2001. Schooling data, technological diffusion and the neoclassical model. American Economic Review 91, 323–327.

De Mello, L., 1999. Foreign direct investment led growth: evidence from time series and panel data. Oxford Economic Papers 51, 133–151.

Doppelhoffer, G., Miller, R., Sala-i-Martin, X., 2002. The determinants of economic growth: a Bayesian averaging of classical estimates (BACE) approach. NBER Working Paper 7750, June.

Easterly, W., 2001. The Elusive Quest for Growth: Economists' Adventures and Misadventures in the Tropics. MIT Press, Cambridge, MA.

Fischer, S., 1993. The role of macroeconomic factors in growth. Journal of Monetary Economics 32, 485–512.

Fölster, S., Henrekson, M., 2001. Growth effects of government expenditure and taxation in rich countries. European Economic Review 45, 1501–1520.

Gwartney, J., Lawson, R., Block, W., 1996. Economic Freedom in the World, 1975–95. Fraser Institute, Vancouver.

Hausman, J.A., 1978. Specification tests in econometrics. Econometrica 46, 1251–1272.

Hausman, J.A., Taylor, W.E., 1981. Panel data and unobservable individual effects. Econometrica 49, 1377–1398.

Hirschman, A., 1958. The Strategy of Economic Development. Yale Univ. Press, New Haven.

International Monetary Fund, several issues. International Financial Statistics Yearbook. Washington, DC.

Islam, N., 1995. Growth empirics: a panel data approach. Quarterly Journal of Economics 110, 1127–1170.

Krugman, P., 1994. The fall and rise of development economics. In: Rodwin, L., Schőn, D.A. (Eds.), Rethinking the Development Experience. The Brookings Institution and The Lincoln Institute of Land Policy, pp. 39–59.

Landes, D.S., 1998. The Wealth and Poverty of Nations. Norton, New York.

Lee, J.W., 1995. Capital goods imports and long run growth. Journal of Development Economics 48, 91–110.

Lipsey, R., 1999. The location and characteristics of U.S. affiliates in Asia. NBER Working Paper No. 6876. Cambridge, MA.

Love, J., Lage-Hidalgo, F., 2000. Analysing the determinants of US direct investment in Mexico. Applied Economics 32, 1259–1267.

Lucas, R., 1988. On the mechanics of economic development. Journal of Monetary Economics 22, 3–42.

Marr, A., 1997. FDI flows to low income countries: a review of the evidence. Briefing Paper. Overseas Development Institute, London.

McMillan, S., 1999. Foreign Direct Investment in Three Regions of the South at the End of the Twentieth Century. Macmillan Press, London.

Mulligan, C., Sala-i-Martin, X., 2000. Measuring aggregate human capital. Journal of Economic Growth 5, 215–252.

Myrdal, G., 1957. Economic Theory and Under-Developed Regions. G. Duckworth, London.

Noorbakhsh, F., Paloni, A., Youssef, A., 2001. Human capital and FDI inflows to developing countries: new empirical evidence. World Development 29, 1593–1610.

Nunnenkamp, P., 1991. Developing countries' attractiveness for FDI, debt overhang and sovereign risk as major impediments? Pakistan Development Review 30, 1145–1154.

Nunnenkamp, P., 1997. FDI in Latin America in the era of globalized production. Transnational Corporations 6, 51–81.

Obwona, M., 2001. Determinants of FDI and their impact on economic growth in Uganda. African Development Review 13, 46–81.

Olson, M., 1996. Big bills left on the sidewalk: why some nations are rich and others poor. Journal of Economic Perspectives 10, 3–24.

Rebelo, S., 1991. Long run policy analysis and long run growth. Journal of Political Economy 99, 500–521.

Romer, P., 1986. Increasing returns and long run growth. Journal of Political Economy 94, 1002–1037.

Romer, P., 1990. Endogenous technological change. Journal of Political Economy 98 (Part II), S71–S102.

Rosenstein-Rodan, P., 1943. Problems of industrialization of Eastern and South Eastern Europe. Economic Journal 53, 202–211.

Sánchez-Robles, B., 1998. Infrastructure investment and growth: some empirical evidence. Contemporary Economic Policy 16, 98–109.

Solow, R., 1956. A contribution to the theory of economic growth. Quarterly Journal of Economics 70, 65–94.

Summers, R., Heston, A., 1994. The Penn World Table (Mark 5.6). Electronic Database.

Tuman, J.P., Emmert, C.F., 1999. Explaining Japanese foreign investment in Latin America, 1979–1992. Social Science Quarterly 80, 539–555.

Tung, S., Cho, S., 2001. Determinants of regional investment decisions in China: an econometric model of tax incentive policy. Review of Quantitative Finance and Accounting 17, 167–185.

World Bank, several issues. World Tables. Washington, DC.

World Bank, several issues. Global Development Finance and World Development Indicators. Washington, DC.