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**Luis C. Nunes, José Oscategui y
Juan Peschiera**

Octubre, 2006

DOCUMENTO DE TRABAJO 252
<http://www.pucp.edu.pe/economia/pdf/DDD252.pdf>

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RESUMEN

En este documento estudiamos cuáles son los determinantes de los flujos de capital extranjero en los países de América Latina. Nosotros consideramos los factores incluidos en otros estudios, entre estos, el tamaño del mercado, el nivel de desarrollo de la infraestructura, y los salarios. Con la finalidad de obtener una mejor medida del tamaño del mercado ajustamos el PBI con un factor de pobreza. Además, consideramos indicadores de apertura de la economía, la estabilidad macroeconómica, el capital humano y la importancia de los recursos naturales. También tenemos en cuenta los efectos de las privatizaciones. Los resultados obtenidos proporcionan importantes indicaciones sobre cómo puede un país atraer más inversión directa extranjera.

ABSTRACT

In this paper we study the determinants of inflows of foreign capital in Latin American countries. We consider the usual factors included in other studies in the literature: market size, infrastructure development, and wages. To obtain a improved measure of market size we adjust GDP by a poverty factor. In addition, we consider indicators of openness of the economy, macroeconomic stability, human capital and the importance of natural resources. We also studied the effects of privatizations. The results obtained provide important guidelines on how a country can attract more foreign direct investment.

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1. INTRODUCTION

A crucial problem for developing countries, and in particular for Latin American countries, is that domestically generated resources are not sufficient to satisfy the growing needs of investments in education, infrastructure, exploitation of natural resources, etc. This is due to their inability to generate internal savings in accordance with their investment needs.

The internationalisation of financial markets around the world after the abandonment of the agreements from the Bretton Woods Conference since mid 70's gathered momentum only after 1989 in Latin America, and suffered an external shock after 1997-1998 when the Asian, Russian and Brazilian crises struck Latin America and most of the countries in the world.

The opening of the financial markets created the possibility for all these emergent market economies to finance economic growth beyond the limits imposed by their domestic saving capacity by attracting foreign capital in the form of investment. Therefore, it is very important to understand what attracts foreign direct investment (FDI) capitals into the host countries.

In this paper we attempt to identify the main factors that influenced the flows for the emergent market economies in Latin America, and to measure its specific importance. This study is based on a sample of fifteen Latin American Countries for the period 1991-1998. We consider panel data regressions in order to capture the determinants of the distribution of these flows over time and across countries. We consider variables related to market size,

* Universidad de Nova de Lisboa

** Pontificia Universidad Católica de Perú . Corresponding author's email: joscate@pucp.edu.pe.

*** Pontificia Universidad Católica de Perú

openness of the economy, infrastructure, macroeconomic stability, wages, human capital, and natural resources.

The paper is organized as follows. In Section 2 we give an overview of the literature on the determinants of FDI. We provide an overview of the empirical research for Latin American countries in Section 3, and for other countries in Section 4. Some main facts regarding FDI in Latin American countries and Peru in particular, are established in Section 5. The data used in this paper is described in Section 6 and the estimation results are presented Section 7. Finally, some conclusions are presented in Section 8.

We thank the anonymous referee who had the task to read and comment our paper. He considered that we had made use of excessive econometric tools. In the following of this paper we will make our best effort to level off this imbalance.

2. A REVIEW OF THE LITERATURE

The work by Dunning (1973, 1976) presents the most widely accepted view on the motivations that foreign firms have to move production into countries and markets different from their own. The acronym OLI (ownership, location, and internalisation) summarizes these motivations. The first, the use of ownership, points to the fact that the firm must have a certain advantage due to its property of a productive process, a patent, or any other unique feature it possesses. The second, the decision on location, refers to the advantages that certain characteristics of the recipient country has, like the existence of tariff protection or comparative advantages, that the foreign firm is interested to use to its advantage. The third, internalisation, refers to the need that the firm has to protect its property rights of non tangible assets, like production secrets, because the existence of market failures prevent its protection unless that knowledge is kept inside the firm. Otherwise, it would license the productive process.

The firm must find that the costs of producing in a foreign host country, including transportation costs, are inferior to the benefits obtained from the OLI. Once it has been found out, the investment can be directed to obtain access to natural resources, to access to the domestic market in the host country, in which case the FDI is called horizontal. Or, it can profit from the differential in production factors' prices with respect to those at home, by

establishing some processes in countries that can offer those advantages. In this case it is called vertical FDI (see for example Venables, 2001)

All these motivations suggest that both external factors to the host countries such as changes in international rates of return, changes in the level of activity of the main capital exporting countries, and internal factors specific to the host countries such as the size of its market (domestic and/or exports, depending on its current conditions), the quality, abundance and cost of factors, say, educational level of the labour force, real wages, infrastructure in the forms of roads, sea ports, etc., the existence of tariffs on trade and other internal conditions, influence foreign investors' decisions on where to invest.

In a recent work, Carr, Markusen, Maskus (2002) find that long run IDE is not attracted to places where real wages are too low. In another recent paper from the Working Group of the Capital Markets Consultative Group in the IMF¹ the authors indicate that the size of the market, the existence of infrastructure (roads, water, electricity, telecommunications), the existence of specialized labour force, wages in line with productivity, stability of the tax system are the most influential factors to attract foreign investment into a country.

3. EMPIRICAL LITERATURE ON LATIN AMERICA

A number of studies have attempted to identify the factors affecting IDE worldwide without considering the importance of regional influences (Esquivel and Larrain, 2001). This approach does not seem correct to us since it has been demonstrated that phenomena like the "contagion effect", in relation to capital outflows related to regional vicinity, do exist.

In a study for the Andean countries (Bolivia, Colombia, Ecuador, Peru), Vial (2002) points to some important features of FDI. He finds that FDI inflows tend to be proportional to a country's size (as measured by GDP). Secondly, the primary sector is the major attractor of foreign investment. Thirdly, the services sector also has a strong weight. He also points that for all Latin America there has been an increase in FDI flows. The reasons behind this increase in flows are, first, the change in the political climate and the

¹ "Foreign Direct Investment in Emerging Market Countries", IMF, September 2003.

greater receptivity towards foreign capital. Second, the process of reforms through which these countries have gone through. A third explanation is the new business climate in natural resource sectors. As for what factors mobilize FDI at the international level he finds that the gravitational model, i.e. the distance from corporate headquarters to the host country, and that the size of the market in the host country dominates all other hypothesis. With respect to the distance it should be noted that this notion is economic. It can be "reduced" by better transportation, reduced costs of transport, transport facilities, etc. Also, market size can be affected by trade agreements. Some of these results are consistent with the empirical evidence that in Latin America the countries that received the largest share of FDI were those with a larger size and some of the other requisites like better infrastructure: Brazil, Argentina, Mexico, Chile. These four countries alone received around 80% of total FDI to Latin America during the period 1995-2000.

The Peruvian experience up until the last decade shows that foreign investment flowed in limited amounts. According to Abugattas (1999), the stock of foreign investment until 1998 was US\$ 7,524 millions. In 1990 the stock was US\$ 1,300 of which around 33% was in mining and a similar percentage in industry. Around 13% was in the commerce sector, and about 8% in the finance sector. Since 1990 large investments were directed to energy and telecommunications. This composition of investment in Peru can be thought of as oriented to where there already exists a market of a large size, relative to the size of the economy. The investment in the Peruvian industry, according to Shatz (2001) is basically oriented to produce for the domestic market. In another work on the Peruvian experience by Rojas (1999), and following the analysis by Calvo et. al. (1993), it is found that the major macroeconomic determinants of foreign investment flows to Peru during 1990-98 were, first, the international context of huge capital flows to emerging market economies due to slow growth in some of the main industrial economies and to the fall in the international interest rates. Secondly, the wave of reforms in financial and exchange markets. And thirdly, the explicit guarantees given to foreign investors.

4. EMPIRICAL LITERATURE ON OTHER COUNTRIES

There have also been a number of studies for other countries or regions in the world. For instance, Asiedu (2002) assesses the factors that determine FDI in Africa and finds that Sub Saharan African countries are different in the sense that there is a strong regional

component that discourages capital inflows even though she contends the return on FDI to Africa is higher than to other regions. As explanatory variables, she uses an indicator of returns to investment, infrastructure development (measured by the number of telephones per capita), openness of the host country (the indicator is (exports + imports)/GDP), and political risk. These are some of the standard explanatory variables used when explaining FDI. However, Asiedu does not consider the size of the market as an explanatory variable even though it is considered an important variable in the literature.

However, the literature does not explicitly mention that no country, in particular small emergent economies, can digest any large amount of capital. It should be acknowledged that beyond a reasonably friendly environment for foreign investment and substantive economic base like infrastructure, whatever else the policymakers do will not increase substantially the flow of capital a country could receive.

Some studies (such as Lucas, 1993) also consider as an additional explanatory variable the real wage. This choice makes sense especially if it is measured as real wage in dollar terms, since this variable could then measure comparative productivity of the labour force.

5. MAIN FACTS

The particular case of Peru provides some interesting features. The data from the IFS from the IMF, presented in Figure 1, shows that the FDI flows to Peru were negligible during the 80's but notably increase since 1990 and decrease after 1998, however, remaining above the 1990 levels.

After 1990 among the main macroeconomic developments in most of the countries included in our study, we have the drastic reduction of trade protection, the opening of their small financial sector, the adoption in varying degrees of the dirty floating exchange rate system, the establishing of explicit guarantees to foreign investment, and particularly the privatisation of public firms and property which were already in operation. The expansion of FDI in Peru and most of Latin American countries since the 80's responds to these evolving facts, particularly to the financial openness of the economy and to the privatisation process initiated after 1991. And, the decline can be attributed in part to the exhaustion of

privatisation since most public property was sold, and to the triggering of the various international financial crises aforementioned. This latter event for the Latin American economies under consideration represented a non-economic event that affected their appeal for international capital flows due to events in other parts of the world. These events affected in a quite similar way all Latin American countries.

6. DATA

The sample includes fifteen Latin American countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, México, Nicaragua, Panamá, Paraguay, Perú, Dominican Republic, Uruguay, Venezuela, with data for the period 1991-1998. All the information comes from the World Bank's World Development Indicators and the ECLA's (Economic Commission for Latin America) Statistical Annual 2003.

The dependent variable used in the analysis is FDI: Foreign Direct Investment net inflows of investment to acquire assets (10% or more of total stock) from a local firm with a durable administrative interest. It is the sum of assets capital, reinvestment of profits, long-term investments, and short-term capitals as it is shown in the Balance of Payments. It is measured in constant 1995 US\$ (World Bank, World Development Indicators, WDI).

We initially considered the standard model considered in the literature. It included the variable GDP as an indicator of market size, an indicator of infrastructure quality (INFRA), and an indicator of human capital. The results from this model specification (not presented) were poor. Only GDP was statistically significant and had the expected sign. The total explanatory value of the regression was very low.

As a solution, instead of using GDP as a measure of the size of the market, we used a variable called SIZE that takes into account the degree of poverty.

We also considered an education variable as an indicator of human capital. However, due to a large number of missing values for this variable, by including it in a model always leads to a large reduction in the number of usable observations. In fact, the estimation results obtained when this variable was included were very poor. This is also a frequent result in

many other studies on economic growth. Therefore, as explained below, we did not include this variable in the models presented in this paper.

We did not consider qualitative variables like political stability or judiciary impartiality because these effects are difficult to capture and we have no data on them.

According to the discussion above, we considered the following explanatory variables capturing several determinants of FDI:

INFLATION: Inflation rate as an indicator of macroeconomic instability.

INFRA: Public expenditure on capital to acquire fixed capital assets, land, non-tangible assets, and non-financial non-military assets (WDI).

NATRES: Measure of natural resources.

OPEN: Calculated as the ratio $(\text{Exports} + \text{Imports}) / \text{GDP}$ as a proxy to the degree of openness of the economy, which is more or less standard in the literature.

PRIV: It is measured as a dummy variable equal to one or zero to distinguish between the pre- and post-structural reform periods. The value is 1 for the after reform period.

SIZE: It is calculated as $(1 - \text{Poverty}) * \text{GDP}$, where Poverty is the percentage of households below the poverty level (Economic Commission for Latin America, ECLA). This is a departure from usual considerations of GDP, or GDP per capita, to capture the market size effect. The reason is that it is easy to find two countries (say Brazil and Peru) with similar GDP per capita but with large differences in market size.

WAGES: Mean wages of the employed population.

We note that, due to missing data in some of the variables, we have an unbalanced sample.

7. ESTIMATION RESULTS

In order to capture the distribution of FDI across countries and over the period considered, we consider panel data linear regression methods.

To explain the differences in FDI across countries that cannot be captured by the explanatory variables included in our models, we have estimated models with fixed effects and with random effects. Given the similarity of the productive structure of Latin American

countries, we assume that their homogeneity is sufficient enough to justify the assumption of common parameters for all the explanatory variables.

The result of the Hausman test for each of the models estimated always suggests that it is more appropriate to use fixed effects rather than random effects. This can also be interpreted as a sign that there are country specific factors not captured by the set of explanatory variables but correlated with them. Therefore, in what follows, we only report the results for the fixed effects estimator.

Table 1 presents the results of different model specifications estimated by OLS. All the variables are expressed in logarithms except for the privatisation dummy variable.

In the first specification (model 1 in Table 1) we included SIZE as an indicator of market size, INFRA as an indicator of infrastructure quality, and INFLATION as an indicator of macroeconomic instability. Contrary to the case when GDP was included, all variables are now significant at the 5% significance level. The explanatory power of this equation grew up to yield an R-squared close to 60%. Also, all the estimated coefficients have the signs consistent with economic theory. It is to note the relatively high elasticity of SIZE estimated close to 3. The estimated elasticities of INFLATION and INFRA are lower, though it would be interesting to explore the non linearity of INFLATION i.e. if during the 80's the relation between macroeconomic stability and capital flows was different from that observed during the 90's. However, we do not pursue this investigation here due to the lack of data.

In model 2 in Table 1 we added a dummy variable denominated PRIV with the purpose of capturing the effect that the policies to reform the state had on the flows of capital, in particular, those oriented to reduce the size of the public sector productive activity. However, equation 2 shows that PRIV does not add any explanatory power to the previous specification, even though it has the expected sign. The estimated coefficients for the other variables remain almost unchanged. It is to be noted that in general the specification shows robustness to the inclusion of additional variables.

With the purpose to obtain another specification with greater explanatory power we also added the variable NATRES as measure of the level of natural resources (results not

reported). With respect to NATRES this showed the expected sign but it was not significant at the standard significance levels. Therefore, we concluded that the level of natural resources has no important effects on FDI.

Better results were obtained by using WAGES (model 3 in Table 1). The estimated coefficient has a negative sign and is statistically significant at 10%. This indicates that this variable is capturing a relative cost effect on FDI instead of a productivity effect.

Finally, in model 4, we included the variable OPEN. Although the estimated positive sign accords to economic theory, it was not significant.

A limitation of the results in Table 1 is that they assume cross-country homoskedasticity. Even though in theory the OLS estimator is consistent, it is no longer efficient and the estimated standard errors are not adequate. A possible solution is to use FGLS where observations are weighted by the first-stage OLS standard errors for each country. The results appear in Table 2. For all the four models considered, the LR test of heteroskedasticity strongly rejects the null hypothesis of homoskedasticity.

Using FGLS does not change the conclusion that PRIV is not significant. On the other hand, all variables in model 4, and in particular OPEN, are now significant at 5%.

8. CONCLUSIONS

In this paper we studied the determinants of FDI in Latin America. Based on several panel data regression estimates we were able to infer about their importance. By choosing an alternative and more appropriate definition of market size, we were able to obtain regressions with good explanatory power. In the preferred model specification, all estimated coefficients have the expected signs and are statistically significant. In particular, the larger is a country's market, as measured by the variable SIZE, the higher is the level of foreign capital that the country receives. Since for all the countries considered the level of exports, as a share of their GDP, is not high, the variable SIZE may also indicate the country's capacity to absorb foreign capital, because not any amount of capital can be digested by any given economy. The variable INFRA (infrastructure) also intends to capture the capacity of the country to absorb foreign capital in the understanding that foreign capital is attracted to countries where

business is facilitated by good infrastructure in the form of roads, port facilities, etc. The estimated sign is positive, as expected. The variable INFLATION intended to capture the quality of macroeconomic policy. Assuming that bad macroeconomic policy will be reflected in high levels of inflation, and vice-versa, the sign obtained is negative as expected. The variable OPEN captures the degree of openness of an economy. The estimated sign is positive, so that more open economies are more attractive to foreign capital flows, as expected. The estimated negative sign on the variable WAGES captures the effect of the relative cost of the labour force on FDI. The privatisation variable (PRIV) was not significant suggesting that such factor does not play a role in attracting foreign investments. Overall, the results reveal a number of factors under the control of a country's government, such as macroeconomic stability and openness of the economy, which can be used to attract foreign investments. It is plausible that other variables are also important, such as political stability or judiciary impartiality. However, because these effects are difficult to measure, we have not included any variable to capture them.

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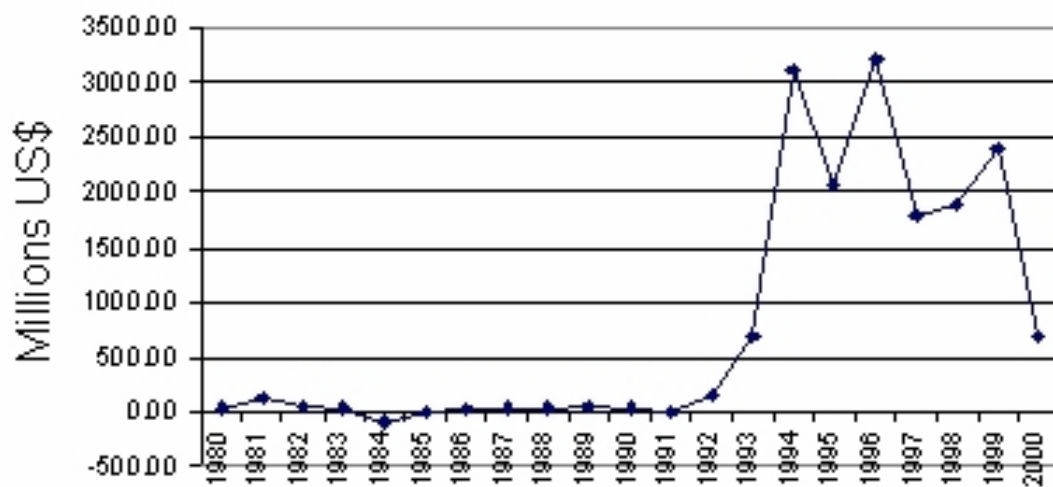


Figure 1. Evolution of FDI in Peru

Table 1. Fixed effects OLS estimation results

Variable	Model (1)	Model (2)	Model (3)	Model (4)
SIZE	2.85** (0.50)	2.77** (0.51)	2.73** (0.55)	2.54** (0.56)
INFRA	0.58** (0.28)	0.59** (0.28)	1.02** (0.35)	0.97** (0.35)
INFLATION	-0.21** (0.09)	-0.21** (0.09)	-0.21** (0.10)	-0.24** (0.11)
PRIV		0.13 (0.19)		
WAGES			-1.38* (0.78)	-1.42* (0.62)
OPEN				0.62 (0.40)
R ²	0,63	0,63	0,67	0,68
No. Obs.	105	105	90	90

Note: Standard errors appear in parentheses. A **(*) denotes significance at the 5% (10%) level.

Table 2. Fixed effects FGLS estimation results

Variable	Model (1)	Model (2)	Model (3)	Model (4)
SIZE	2.85** (0.50)	2.77** (0.51)	2.33** (0.49)	2.12** (0.48)
INFRA	0.58** (0.28)	0.59** (0.28)	1.23** (0.32)	1.23** (0.31)
INFLATION	-0.21** (0.09)	-0.21** (0.09)	-0.16** (0.07)	-0.19** (0.08)
PRIV		0.13 (0.19)		
WAGES			-1.38* (0.78)	-1.93** (0.81)
OPEN				0.74** (0.30)
R ²	0,62	0,63	0,67	0,67
No. Obs.	105	105	90	90

Note: Standard errors appear in parentheses. A **(*) denotes significance at the 5% (10%) level.