What Determines Foreign Direct Investment?
An Empirical Investigation

Preliminary Draft, Please do not quote

Felipe Larraín B.[*]

May 2004

Abstract

Foreign Direct Investment has become an important source of long-term capital inflows for less developed countries in the last two decades. As documented in previous literature, FDI flows may increase permanently domestic output and represent an important source of technological spillovers for national firms. This linkage makes the FDI attraction research as well as the study of its determinants an important subject for policy makers. This paper studies FDI determinants on both a theoretical and an empirical level: a theoretical model of monopolistic competition is presented, from which testable hypothesis on the determinants of FDI are studied through a panel data for a large group of countries between the years 1980 and 2000. Although the estimated econometric models are simple, we find that they can satisfactorily explain both static distribution of FDI flows across countries as well as through time, leaving less than 20% of variation in the dependent variable unexplained. By using political and institutional explanatory variables, we are also able to explain which policy factors seem to attract more FDI.

[*] Department of Economics, Pontificia Universidad Católica de Chile. I acknowledge the insightful comments of Gerardo Esquivel and Pablo Mendieta, as well as the financial support of FONDECYT (Grant no. 1030950). Se Kyu Choi provided able research assistance. Email: flarrainb@puc.cl. Address: Instituto de Economía, Pontificia Universidad Católica de Chile, Vicuña Mackena 4860. The usual disclaimer applies.

1. Introduction

In the last couple of decades, foreign direct investment (FDI) flows have become an important source of external resources for developing countries. In a meaningful way, long-term capital inflows represent sources of new technologies and know-how that can spur growth and change dramatically the productive structure of a country. This is of special relevance for low and middle income countries, where net FDI inflows have increased in the last twenty years as a fraction of gross capital formation (see tables 1 and 2). Table 1 shows the relative importance that FDI flows have acquired through time, in terms of net inflows as well as in the world distribution. On the other hand, as seen in table 2, FDI flows as a fraction of gross domestic investment have risen in the last two decades. These simple statistics show an important trend towards economic openness and the internationalization of the firm throughout the world. Also, it should be noted that FDI substitutes partly the necessities of increased levels of national savings and diversification for developing countries.

Table 1: Foreign Direct Investment (Millions of current US$)					
zone	1990	2000	Average growth rate	% Distribution 1990	% Distribution 2000
Low Income Countries	2,367	6,836	11.2	1.2	0.6
Middle Income Countries	19,376	152,749	22.9	9.8	13.1
Low-Middle Income Countries	21,743	159,585	22.1	11.0	13.6
East Asia and Pacific	10,347	42,847	15.3	5.2	3.7
Europe and Central Asia	1,051	28,395	39.0	0.5	2.4
Latin America and the Caribbean	8,203	75,107	24.8	4.1	6.4
Middle East and North Africa	784	3,467	16.0	0.4	0.3
South Asia	464	3,093	20.9	0.2	0.3
Sub-Saharan Africa	894	6,676	22.3	0.5	0.6
High Income Countries	176,566	1,009,929	19.1	89.0	86.4
World	198,309	1,169,514	19.4	100.0	100.0

Source: World Development Indicators, World Bank

Table 2: Foreign Direct Investment (% of Gross Domestic)		
zone	1980	2000
Low Income Countries	0.2	2.5
Middle Income Countries	2.7	13.1
Low and Middle Income Countries	2.1	11.5
East Asia and Pacific	1.5	8.5
Europe and Central Asia	0.3	13.8
Latin America and the Caribbean	3.2	18.7
Middle East and North Africa	..	4.3
South Asia	0.4	2.3
Sub-Saharan Africa	..	11.8
High Income Countries	2.9	14.1*
World	2.7	14.1*
* 1999		

Source: World Development Indicators, World Bank

In this context and given recent evidence of the beneficial effects of FDI flows to the development of countries[1], an important question regarding FDI is which factors seem to attract it and consequently shape the distribution of flows through time and across countries. This paper tries to answer that question using a panel data of more than 100 countries for a span of 30 years to test the predictions of a simple model of monopolistic competition and bilateral capital flows. The findings in this paper seem to be in line with previous literature, in which size, labor quality, overall trade openness, respect of the rule of law and low levels of regulatory burden of the recipient country are important in determining net FDI inflows. Moreover, the econometric exercise finds that those variables can explain up to 80% of the cross country differences and up to 55% of the dynamics of FDI inflows.

The structure of the paper is as follows: the next section presents a simple theoretical model of FDI flows which provides testable predictions using international data. The third section discusses actual and explicit forms of attraction that several governments have implemented around the world, in terms of efficiency and results. The fourth section presents a discussion of the datasets

[1] See Larraín, López-Calva and Rodríguez-Clare (2001), Dunning (1997), Blomström and Kokko (1997), Chuhan et al (1996) and Haussman and Fernández-Arias (2000), among others.

used in the estimations and the different methodologies considered. The fifth section presents the main results. The last section concludes.

2. FDI flows: a Simple Model

This model is a simplification of early works by Helpman, Melitz and Yeaple (2003) and Larraín and Choi (2004), and seeks to establish a formal relationship between FDI flows and several exogenous variables, such as country size, overall rule of law and regulatory burdens. This is a monopolistic competence model, in which a "love for diversity" utility function is used, a la Dixit and Stiglits.

Suppose the existence of 2 countries (*i,j*), with 2 sectors each: a homogenous good sector (produced in both countries) and a differentiated sector producing *v* varieties. In this model, labor is the only production factor and its productivity is heterogenous across countries and firms.

2.1 Utility Function

In each economy there exists a continuum of consumers with a utility function separable between the homogenous and the differentiated good. The specification for the latter good is a CES, which allows for homotheticity in the demand function for each variety:

$$u = (1 - ?)logz + \frac{?}{?}log\left(\int_{? \in V} x^?_{(?)}d?\right) \tag{1}$$

On the other hand, the budget restriction takes the form

$$E = p_z z + \int_{? \in V} p_{(?)}x_{(?)}d? \tag{2}$$

where *E* represents total expenditure, *z* is the homogeneous good and p_z is its price, $x_{(v)}$ is variety "*v*" of the differentiated good "*x*" and $p_{(v)}$ is its price, *V* is the set of all possible varieties of the differentiated good and *?*, *?* are constants in *[0,1]*.

Solving the static problem for the individual, we find that the demand function for a particular brand of the differentiated good is:

$$x_{(1)} = A p_{(1)}^{-?} \qquad (3)$$

where

$$A = \frac{? E}{\int_0^n p_{(?)}^{\frac{?}{?-1}} d?} \qquad = \text{demand factor}$$

$$? E = \int_0^n p_{(?)} x_{(?)} d? \qquad = \text{fraction of total income spent in the differentiatied}$$

good

and

$$? = \frac{1}{1-?} \qquad = \text{elasticity of subsititution between any two varieties,}$$

with $? > 1$

2.2 Firms

In this framework, firms in the differentiated sector compete monopolistically, meaning that the producer of each variety establishes a markup of $1/?$ above marginal costs. Since labor is the only factor of production and its inmobile between countries, we can assume (in order to simplify notation) that wages are equalized across countries and that they are normalized to one.

This model allows for heterogeneity between firms, in terms on how productive is labor in them. As in Helpman et. al. (2003), the model introduces a labor coefficient "a", which differs for each firm and represents output per unit of product requirements. Before enterning the market, a firm draws a random value of "a" from a country-specific distribution - $?(a)$ - and decides whether to produce or to shut down operations. Also, as it is defined, higher levels of "a" represent lower levels of labor productivity. Given this discussion, prices of the diferent varieties take the form $a/?$, where more productive firms can charge lower prices.

Since the goal of this section is to study the decisions that each particular firm faces -in particular, the decision of serving the foreign market as FDI or not- we will focus on marginal profit conditions. Given that the demand for a particular variety of the heterogeneous good takes the form $Ap^{-\sigma}$ and assuming that the elasticity of substitution between varieties ($\sigma = 1/(1-\rho) > 1$) is the same in both countries, we can define an entry condition for firms (in country i) considering the FDI serving option:

$$a_j^{1-\sigma} \frac{(1-\rho)A_j}{\sigma^{1-\sigma}} - C_I > 0 \tag{4}$$

Where C_I represents aggregate costs of entering the foreign market as FDI and

$$A_j = \frac{\rho E_j}{\int_0^{n_j} p_{(\rho),j}^{1-\sigma} d\rho} \tag{5}$$

In other words, in the margin, the decision of whether to serve the foreign market as FDI or not depends on the demand factor of the other country.

Equation (4) can be rearranged in order to introduce contract enforceability costs (i.e. the probability of investment expropriation) and regulatory burden costs:

$$C_I = \left(1 - \pi_j\right) a_j^{1-\sigma} \frac{(1-\rho)A_j}{\sigma^{1-\sigma}} + c_F^{ij} \tag{6}$$

In (6), $1-\pi_j$ represents the probability of investment expropriation by government in j -state of nature that reduces the value of the investment to zero- and c_F^{ij} is a measure of fixed and legal costs that any foreign firm must overcome in order to start production.

From the setup of this model, we can infer a productivity cut-off point a^* from (6), that will determine which firms in country i choose local production vs. the FDI serving option for the foreign market. Given that lower levels of "a" imply higher labor productivity levels, from the same equation we can derive a minimum productivity level that assures a profitable FDI option.

Making $B_j = (1-?)A_j / ?^{1-?}$ (only for simplicity), the maximum productivity coefficient in country j should be:

$$a_j^* < ? \left[\frac{?_j E_j}{c_F^{ij}} \right]^{\frac{1}{?-1}} \tag{7}$$

where

$$? = \left[\frac{(1-?)?}{?^{1-\varepsilon} \int_0^{n_j} p_{(?)}^{1-?} d?} \right]^{\frac{1}{?-1}} > 0 \tag{8}$$

Given the set up of the model, the maximum "a" (or minimum productivity $1/a$) in country j that entails positive profits for a firm based in i as FDI depends on four basic exogenous variables: rule of law (probability of investment expropriation in j), phisical and legal costs of entry, market size and labor productivity. In order to provide a closure to this model and to asure zero economic profits in the long run for all the entrant firms, the model needs an aditional fixed entrance cost.

FDI inflows to country j are simply the number of firms in country i that are productive enough to gain positive profits serving the foreign market as FDI. In short, the different equations could be rearranged in order to obtain a simplified and testable generic function of FDI inflows. Making $a_j^* = a(?)$, where $?$ is the set of parameters $?_i = \{?_j, c_F^{ij}, E_j\}$, the next relationship holds

$$sign \left\langle \frac{\partial ?(a(?))}{\partial ?_i} \right\rangle = sign \left\langle \frac{\partial a(?)}{\partial ?_i} \right\rangle \tag{9}$$

Since the cumulative distribution function of "a" is increasing and monotonic in the different implicit variables of a_j^*. Hence, the above equation states that:

$$FDI_{i \to j} = f \left(\underset{+}{?_j}, \underset{-}{c_F^{ij}}, \underset{+}{E_j} \right) \tag{10}$$

The first two exogenous variables (rule of law and country-specific entrance costs) impact directly FDI flows by imposing minimum productivity requirements for entrant firms to country j (the higher the expropriation probabilities along fixed

legal and phisical costs, the more productive the firm must be). On the other hand, E_j represents the size of the target market: given the assumption of fixed endowments of labor and equalized wages in both countries, it must be true that $E_j = L_j$. Thus, bigger countries in term of population attract more FDI inflows.

2.2.2 The effect of different labor productivities

The overall effect of heterogeneous labor productivities in FDI inflows depends on the country-specific distribution of the parameter "a". Since "a" represents labor requirements per unit of output, the country with more qualified workers presents, on average, lower values of "a" than the country with less qualified workers (See figure 1). Intuitively, the country with qualified workers should attract more levels of FDI, since their existence determines lower costs and increased profitability. Hence, the next relationship must hold:

$$? _I\left(a_j^*\right) > ? _{II}\left(a_j^*\right) \tag{11}$$

i.e., first order stochastic dominance of $? _{II}$ over $? _I$, where I is a country with more qualified workers than the country labeled as II. This simple result shows that the causal effect between overall labor productivity in a country and the quality of its
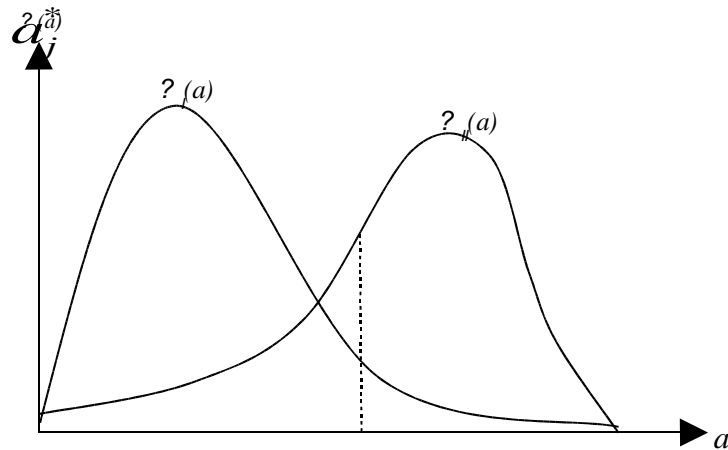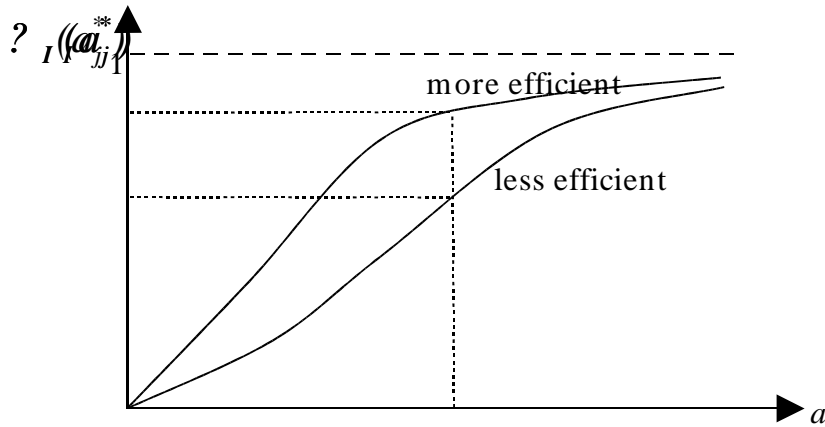

labor force is direct and positive (Figure 2). Finally, we get:

$$IED_{i\to j}^* = IED\left(? _j, c_F^{ij}, E_j, 1/\overline{a}_j \right) \tag{12}$$
$$\quad\quad\quad\quad\quad + \quad - \quad + \quad +$$

where $1/\bar{a}_j$ is the mean labor productivity coefficient in country j.

Figure 1: cut-off level of the minimum labor productivity coefficient under different distributions

Figure 2: number of firms with positive profits as FDI under different labor productivity distributions

2.2.3 Natural advantages and Trade Openness

The simple model from the last section is quite useful in terms of showing probable directions of FDI flows across two countries. It also has the advantage of allowing bilateral trade flows, since heterogeneity in labor productivity coefficients provides feasibility of FDI in both directions. However, to make a clear assessment on the effects of overal trade openness over FDI flows we must extend this model to include $M \geq 3$ countries; specifically and given previous results by Esquivel and Larraín (2001) in which trade openness was positively correlated with FDI inflows,

this section will study the case of an individual firm (based in country I) that seeks to establish an export base platform in contry j, in order to serve by exports a target group of countries (countries $i \neq I,j$). In this particular case, the marginal profit condition for the firm is:

$$a_j^{1-?}B_j - C_{Ij} + \sum_{i \neq Ij}\left(a_j?_{ji}\right)^{1-?}B_i - c_x^{ji} > 0 \tag{13}$$

Where τ_{ji} is an iceberg-type transport cost and c_x^{ji} represents tariff costs of exporting goods from j to i. The first part of the left hand side of equation (13) reflects the FDI related profits, i.e., profits that the firm is receiving due to its FDI sales in market j. Additionally, equation (13) considers the extra profits of using the plant constructed in j as a export platform for the rest of the world.

Similarly to the preceeding section, a minimum labor productivity coefficient can be derived, taking into account the new proposed structure for this international firm:

$$a_j^{**} < \left[\frac{\pi_j E_j \lambda_j^{\varepsilon-1} + \sum_{i \neq I,j}\tau_{ji}^{1-\varepsilon}E_i\lambda_i^{\varepsilon-1}}{c_F^{Ij} + \sum_{i \neq I,j}c_x^{ji}}\right]^{\frac{1}{\varepsilon-1}} \tag{15}$$

Notice that we are calculating an inflexion point for labor productivity in country j, the country where all production takes place. As in the previous section, here we can derive a simple testable link between FDI inflows and the exogenous variables just introduced into the analysis:

$$FDI_{i \to j}^{**} = FDI\left(\underset{+}{?}_j, \underset{-}{c_F^{Ij}}, \underset{+}{E_j}, \underset{+}{1/\overline{a}_j}, \underset{-}{\tau_{j}}, \underset{-}{C_x}\right) \tag{16}$$

with $C_x = \sum_{i \neq I,j}c_x^{ji}$

In this particular case, in which a firm seeks to establish herself in a foreign country in order to create an export base for a target region, we find that overall trade openness (in the sense of low tariffs and natural advantages for trade) is positively correlated with FDI inflows. This result contradicts the notion of tariff-jumping FDI, where firms engage in FDI in order to avoid the variable costs of international trade. It should be noted that we lack a complete theory of the international firm,

since several different structures can coexist and compete between each other and that our sole purpose was to find a simple framework in which a positive correlation between trade openness and FDI inflows could be explained.

3. Incentive Policies to Attract FDI[2]

Our focus will change now to address a more pragmatical question: that is, which incentive policies have been usually implemented in the real world to attract FDI inflows? There exists three basic incentive policies available to recipient countries: fiscal incentives, financial incentives and promotion policies. The first two are related directly with fiscal costs, in terms of less taxation or direct subsidies to foreign firms. Clearly, these type of policies are distortionary and may produce inefficiencies in the overall economy: they may induce corruption given the discretional factor inherent to these policies. The third type of incentive relates to a less expensive and more neutral policy.

Fiscal Incentives.

For fiscal incentive we should understand those practices that privilege firms establishing in the country as FDI. Fiscal privileges may take several forms, being the most important: permanent or temporary reductions in the corporate tax rate, periods of tax exemptions (federal taxes, state or local government taxes), accelerated depreciation rates (as a way to acknowledge high initial investment costs), exemptions on the payment of import rights, exemptions and deductions of social security payments, special regimes of taxing, among others.

Financial Incentives:

---

[2] Interesting case studies can be found in Esquivel and Larraín (2001)

Financial incentives usually take the form of subsidies and/or direct financial support to the production of foreign entrant firms, as may be the case of a government who gives away land or production facilities to firms entering as FDI into the local market. Other examples of financial incentives are subsidized loans, warranties for credit market access, wage subsidies, water and electricity subsidies, special subsidies for certain types of activities (research and investigation for example) and the creation of exclusive infrastructure dedicated to FDI endeavours.

Promotion Policies.

These policies presume that local governments play important roles as FDI facilitators. Moreover, promotion policies state that local governments should engage in diffusion policies in order to deliver important information to potential foreign investors: road-shows, international tours for investment promotion, etc.

It should be noted that some policies combine institutional aspects as well as incentives. This is the case of Export Processing Zones (EPZ), an experience well documented for Central America.[3]

In table 3 actual incentive policies are depicted along their operational form and the conditions in which they may spur investment without distorting the rest of the economy

Table 3: Incentives Policies to Attract FDI

	Fiscal Incentives	Financial Incentives	Promotion Policies

---

[3] See Larraín (ed) "Central America Competitiveness... etc."

Operational Form:	• Reduced corporate tax rates • Exemption of import rights payments • Overall payments exemption periods • Special regimes of taxation	• Direct subsidies to production • Creation of new and exclusive infrastructure for new firms • Subsidized wages	• Media publicity • Roadshows and special seminars • Creation of exclusive offices to assist interested foreign investors
More Efficient when:	• There are recognizable market failures (asymetric information, externalities, high levels of market concentration) • Stable social and macroeconomic environments		
More Efficient when (specific issues)	• There exists basic infrastructure for new firms • The orientation of foreign entrant firms is outward • Corporate tax rates are too restrictive	• Production factors used by the multinational firms have an elastic supply • There are no major concentrations in productive factors markets • Spill overs from the multinational firm to local firms is considerable • Gains of consumer welfare in domestic markets are neglible	• There exists basic infrastructure for new firms • The orientation of foreign entrant firms is outward • There are high initial wages in the recipient country • There are frictions in labor markets and full employment cannot be achieved
Pros			• Is less expensive than the other policies when the above mentioned conditions hold
Cons	• Decrease in tax revenues • Mya produce rent seeking equilibria • Critically depends on the tax system of the recipient country and the tax system of the home base country of the multinational firm • May produce high efficiency and administrative costs		

Other Characteristics	• The overall effect depends on the composition of the industry (number of new FDI firms, number of old firms) • Basically, its major impact is on medium to small firms • Its a clear determinant of the location of investment, everything else equal	• Usually, these type of incentives are determined on a case to case basis
Estimated effect on FDI	Unitary elasticity between FDI flows and after tax profits (Hines 1996)	Elasticity of 0.3 (Wells and Wint, 2000)

Sources: Hines (1996), Oman (1999), Morisset and Pirnia (2000), Well and Wint (2000) and Hanson (2001).

To complete the discussion on incentives policies, table 4 shows summarizes which type of fiscal incentives are actually used by a set of countries to attract FDI inflows. As seen in the table, most of the considered countries promote tax exemption periods as well exemptions in import rights payments. Very few countries use direct tax credits, since the important administrative cost of monitoring as well as the distortions (eventually, an overinvestment equilibrium) associated with them. An interesting case arises from the experience of Western Europe, where accelerated depreciation rates have been widely used disregarding other forms of incentives.

Table 4- Incentive Policies used around the world to attract FDI

Country	Africa	Asia	LAC	Eastern and Central Europe	Western Europe	Others	Total
(countries)	(23)	(17)	(12)	(25)	(20)	(6)	(103)
Exemption periods	16	13	8	19	7	4	67
Accelerated Depreciation	12	8	6	6	10	5	47
Tax Credits	4	5	9	3	5		26
Exemption of import rights payments	14	13	11	13	7	4	63
Repayment of import rights	10	8	10	12	6	3	49

Source: Morisset and Pirnia (2000)

An important question arises here: how may the different incentive policies be rationalized inside the static model presented in the previous section? Even though most policies take the form of dynamic processes (tax exemption periods, accelerated depreciation rates), they can all be recalculated as to be included in the simple static model from lines above. As it will be discussed in the next section, the testable implications of the simple static model are useful to determine the directions of FDI flows across countries as well as the dynamics of capital flows through time.

4. Estimations

This sections explains the datasets and the methodology used to test the implications of equation (16) from the theoretical model. The approach in this section is simple, since standard cross section and panel data regressions were estimated, using annual information for 202 countries between the years 1980 and

2000. The annual data was comprised into 6 periods of non-overlapping 5 year averages, to avoid excessive volatility of the dependent variable (log of FDI net inflows in constant US$). The choice for the dependent variable follows from Esquivel and Larraín (2001) and it is the appropriate dependent variable in order to avoid endogeneity problems when the ratio of FDI to GDP or gross domestic investment is used. Next, a short description of the considered explanatory variables is presented.

Explanatory Variables (expected coefficients)

Population (positive). As discussed in section 2, the number of inhabitants in a country may be a very good proxy of its market size and the overall demand level present in that country.

Landlocked countries (negative). This is a dummy variable that takes the value of 1 when the country doesn't have sovereign access to the sea and zero otherwise. As in previous literature (see Gallup, Sachs and Mellinger 1999), this variable has proven to be an important determinant of the levels of overall trade of a country.

Percentage of population of aged 15 or over with no schooling (negative). This is a proxy variable for the quality of the labor force in a country. According to previous literature the expected sign of this coefficient may be ambiguous rather than being negative (as derived in the theoretical section): if FDI seeks unprepared and cheap labor then a positive correlation would arise between FDI inflows and this educational variable. Nevertheless, as pointed out by the theoretical model labor productivity in the recipient country plays a fundamental role allowing for cheaper production in a heterogeneous firm setting. Some evidence on the idea that efficient labor is positively correlated with FDI flows is present in Borensztein and de Gregorio (1998).

Trade Openness of the Economy (ambiguous). This variable represents the degree in which a country is inserted in the world economy and is measured as the ratio between total exports plus total imports and GDP. As exposed in the last part of section 2, a positive coefficient of this variable in a FDI regression would imply that long-term capital flows are complements rather than substitutes of trade in goods.[4]

Quality of Government and Institutions (positive). To assess the importance of governance and institutional factors, several variables were used to control our FDI regressions. Additionally, while incorporating these variables we can control directly for the rule of law and the regulatory burden that FDI faces in each country, thus the implications of the theoretical model can be tested directly.

One major setback experienced with the inclusion of political and governance variables is that it is hard to measure such things as regulatory burdens and respect to the law in a way both comparable across countries and through different periods of time. Hence, the estimations were conducted using a variety of alternative variable from different sources and methodologies of construction.

1) *Regulatory Burden*.

- The first alternative to proxy the regulatory burdens FDI faces across countries, was the index constructed by Kaufmann, Kraay and Zoido-Lobaton (1999) (Henceforth KKZL). This index reflects the quality and effectiveness of public policies in different countries and measures practicies such as price and/or wage controls, excessive trade regulations, excessive financial regulations, exchange rate controls, etc. The index also acknowledges the presence of controls to the redrawal of profits from the

---

[4] See the last paragraph of section 2.

country and the overall efficiency of regulations. The index is measured in an increasing manner; hence, we should expect a positive correlation between this variable and FDI flows.

- Even though the index constructed by KKZL is of a very complete nature, it lacks a temporal dimension that inhibits more complete estimations (i.e. panel data regressions): the index is only available for the last period of our sample (years 1995 and 2000), so by using it we loose valuable information. To overcome this problem, the index of Economic Freedom constructed by the *Fraser Institute* was used. This index is less complete than the one constructed by KKZL but has the advantage of its periodicity. It includes information on government size and intrusion, taxes, public enterprises, excessive regulations and prohibitions on overall international trade. The index is presented as point estimates every five years starting on 1980. Thus, to comply with the format of our dataset those point estimates were averaged for the required time periods.[5] Finally, the index is increasing in economic freedom and range from 0 to 10; hence, the expected coefficient of this variable in a regression is positive.

2) *Rule of Law*.

- As well as a regulatory burden index, the dataset by KKZL contains a rule of law index that tries to measure the level up to which the law and social rules are respected. The index incorporates information on crime, the judicial system and contract enforceability. Just as the regulatory burden index, an increase in this index is correlated with better compliance of the law in a country; hence, the expected sign of this coefficient in a regression is positive.

---

[5] For example: to obtain the data for the period between 1980 and 1984, the economic freedom index for the years 1980 and 1985 was averaged.

- An alternative Rule of Law index from the International Country Risk Guide was used in order to exploit the time series properties of the dataset that were being lost by using the above mentioned variable. This alternative rule of law index was obtained from Dollar and Kraay's (2002) dataset and consists of decadal averages per country.

<u>Volatility of the Economy (negative).</u> The last explanatory variable tries to control for overall economic volatility and the effect of uncertainty on the decision to invest abroad. It was constructed as the standard deviation of the annual GDP growth rate, in a moving sample of 5 years.

To end this section, we present the summary statistics of the included variables for the whole sample:

Table 5: Summary Statistics of Variables (stacked variables)

Variable	Obs	Mean	Std. Dev.	Min	Max
Log(FDI)	731	18.10	2.61	9.90	25.98
Log(Population)	1156	15.13	2.16	9.85	20.99
Landlocked Country Dummy	1194	0.19	0.39	0.00	1.00
Population above 15 with no schooling	504	36.78	30.16	0.00	98.90
Trade Openness	743	74.88	47.33	3.71	380.31
Rule of Law (DK)	489	3.49	1.45	0.87	6.00
Regulatory Burden Index (EFI)	623	5.49	1.22	2.07	8.92
Rule of Law (KKZL)	160	0.005	0.93	- 2.15	1.99
Regulatory Burden (KKZL)	160	0.011	0.83	- 3.14	1.24

5. Results

After the summary description of the data in the last section, here are presented the most important results from the various econometric exercises. As a first approach, a simple cross-section OLS estimation (using white's Heterokedasticity-consistent standard errors) between FDI net inflows and the rest of the explanatory variables was run. This information is presented in table 6.

The first column in table 6 shows a benchmark estimation in which the main explanatory variables were introduced (population, locked country dummy, trade, education and the KKZL index for rule of law and regulatory burden)[6]. The second column presents the results of performing the same regression restricted to those countries in which the average GDP per capita between the years 1995 and 2000 was less than US$10.000. In this way, we can assess robustness and see if there are significant differences of our estimated coefficients between the whole sample and the reduced sample. [7]

As seen in the first column, the regression including the whole sample of countries presents global as well as individual statistical significance for all the coefficients and is able to explain 88% of the variance of FDI inflows across countries, as measured by the R-squared. Given that this first exercise is over a cross-section of countries, the level of adjustment is quite remarkable.

Table 6: OLS cross-section regressions

	Dependent Variable: Log (FDI)	
	I	II
Log(population)	0.9084***	0.8357***
	(12.86)	(8.59)
Landlocked country dummy	- 0.4113*	- 0.4209
	(- 1.91)	(- 1.57)
Population above 15 with no schooling	- 0.2704***	- 0.2884***
	(- 5.67)	(- 4.87)

---

[6] As noted in the previous section, this choice of variables results in a cross-country regression with the consequent loss of information due to the characteristics of the KKZL data.

[7] Blonigen and Wang (2004) argument that experiences of less developed countries with FDI may be systematically different from those of the industrialized economies.

Trade openness	0.0371**	0.0225
	(2.13)	(0.63)
Regulatory Burden	1.4496***	1.4088***
	(6.92)	(5.79)
Rule of Law	0.7241***	0.4705**
	(5.09)	(2.23)
Number of Obs (countries)	94	61
R-squared	0.88	0.84
F-statistic	161.96	55.89
Prob>F	0.0000	0.0000

Notes: t- stats in parenthesis. Standard errors calculated with Huber- White estimator of variance. Constants included but not presented.
*, ** and *** denote statistical significance at the 10, 5 and 1% levels respectively.

For the restricted sample of less developed countries (column II), the landlocked country dummy as well as the trade openness variable seem to lose statistical significance. However, the overall adjustment (R-squared) and global significance of the regression is similar to those in column I. Moreover, the value of the point estimates for each individual coefficients is not radically dissimilar between samples, indicating that the experience of different groups of countries with FDI is not systematically different. The differences between both regressions may be rationalized in terms of the theoretical discussion presented in section 2. Since trade openness was set to be complement of FDI flows in a country where export platforms were a dominant type of organization, then results in the second column in table 6 may imply that the experience of less developed countries with FDI are of the tariff-jumping type. Nevertheless, this is not conclusive evidence, since the sign of the different coefficients is maintained across equations and the overall quality of the regression holds.

The results for the political variables (rule of law and regulatory burden) is not surprising and stays in line with what was expected a priori. Since both indexes were created by KKZL, their comparability –in terms of orders of magnitude- is straightforward: thus, their coefficients reveal the importance of an efficient regulatory apparatus and the respect of the law in each country as

important sources of FDI attraction. Also, in line with the predictions of the theoretical model, both variables are positively correlated with higher FDI inflows, showing that foreign investors seek countries where the overall uncertainty and political risks of unlawfulness are reduced.

As noted before, this first exercise was useful in terms of describing the conditional distribution of FDI across the world in a given period, but discards useful information on the dynamics of FDI inflows to specific countries through time. Also, one important question in the literature is that of the effects of global integration in FDI flows and which factors seem to explain the overall increased importance of FDI in the world. In order to address these questions, we now present panel data estimations for the same number of countries for the period between 1980 and 2000 in table 6.

Five different approaches are presented in the different columns of table 7. In order to exploit the time series properties of the dataset, notice that the KKZL indexes were replaced by their proxies described in the last section. The five alternative estimation procedures were: simple OLS (pooled data), random effects, between effects, maximum likelihood random effects and population averaged GLM estimators. Fixed effect estimators were discarded to avoid multicollinearity problems with the landlocked dummy variable. The four procedures give similar results in terms of overall significance of the regression and take into account the dual characteristics of the data: the cross-sectional and the time series dimensions.

Table 7: Regressions for Panel Data (non overlapping 5 year averages, 1970-2000)

Dependent Variable: Log(FDI)	Estimation Method				
	OLS (pooled data)	random	between (on group means)	ML random	pop. avg.
Log(population)	0.8061***	0.8034***	0.8099***	0.8028***	0.8024***
	(13.39)	(9.08)	(8.94)	(9.39)	(9.54)
Locked country dummy	- 0.6236**	- 0.5966*	- 0.5987*	- 0.5968*	- 0.5971*
	(- 2.59)	(- 1.66)	(- 1.71)	(- 1.73)	(- 1.76)

Population above 15 with no schooling	- 0.3471***	- 0.3145***	- 0.3883***	- 0.3165***	- 0.3185***
	(- 8.47)	(- 5.64)	(- 6.13)	(- 5.82)	(- 5.96)
Trade openness	0.0631***	0.0559**	0.0753**	0.0559**	0.0559**
	(3.15)	(2.00)	(2.35)	(2.06)	(2.09)
Rule of Law (DK)	0.3699***	0.3056***	0.4577***	0.3085***	0.3115***
	(4.81)	(3.32)	(3.58)	(3.41)	(3.47)
Economic Freedom Index	0.6212***	0.8464***	0.4041**	0.8374***	0.8280***
	(6.40)	(8.51)	(2.25)	(8.25)	(8.4)
Number of observations	286	286	286	286	286
Number of countries	79	79	79	79	79
R-square within	- -	0.51	0.46	- -	- -
R-square between	- -	0.80	0.82	- -	- -
R-square	0.75	0.74	0.74	- -	- -
Prob. of all coefs=0 hypothesis	0.0000	0.0000	0.0000	0.0000	0.0000

z- statistics between parenthesis in all columns, except columns 1 and 3, where significance was estimated through t- statistics
*, ** and *** denote statistical significance at the 10, 5 and 1% levels respectively.

As shown by the table, we obtain similar results to those in the benchmark regression, in terms of signs of the coefficients and overall statistical joint significance. Moreover, columns 1, 2 and 3 show that the benchmark regression of table 6 fares adequately when the dynamics of the dataset is considered. In terms of adjustment, we see that the total R-square statistic maintains high levels, while the adjustment within countries is lower (mainly, due to a reduced number of 5 year non-overlapping periods). Despite of the parsimony of the model and the lack of more time periods in order to produce a better adjustment, the within goodness of fit is quite satisfactory in comparison to usual panel data estimations for large groups of countries. This simple result points out that the econometric model is of great power to explain both FDI allocation across countries and FDI dynamics in a given country or region. Furthermore, the increase in the absolute importance of FDI through the years seems to be explained satisfactorily by the same variables that explain its distribution across the world.

The results in table 7 also maintain the intuition of the cross-sectional equations, in terms of expected signs and statistical relevance of the explanatory variables. As before, the landlocked country dummy as well as the percentage of

the population above 15 years old with no schooling years resulted significantly and negatively correlated with the log of FDI net inflows. The rest of the variables maintained their positive expected sign, showing an important degree of robustness for the benchmark equation.

In relation to the proxy variables for the quality of the government policies, the alternative to the KKZL indexes proved to be a good choice, both in the sense of periodicity and explanatory ability. The rule of law index –Rule of Law (DK)— compiled by the International Country Risk Guide and taken from the Dollar and Kraay (2002) dataset, maintained the statistical significance as well as the sign of the KKZL index, despite the differences in variable definition and construction. Similar results are provided by the Regulatory burden index (EFI stands for Economic Freedom index). Both variables emulate with no difficulties the results in table 6. Surprisingly, the relative difference between both point estimates holds in the majority of regressions of table 7, i.e. the coefficient associated to the EFI is systematically bigger to the one associated with the Rule of Law index. Besides suggesting that an efficient regulatory context may be most preferable for a foreign investor than the overall rule of law in a country, this results shows how robust and stable the estimations are and how both time series as well as cross-section features of the dataset can be acknowledge by the econometric model at hand.

Another feature of the results presented in this section, is the goodness of fit of all the regressions despite the absence of international common explanatory variables as proxies of global factors (i.e. financial market deregulation's, globalization, etc.). Recent relevant literature[8] claims that FDI flows are related to global economic integration and tries to estimate the relative importance of external vs. internal factors attracting FDI to any given country or region. Notice that estimations presented in this section account for both domestic and global factors in only one variable, the trade openness proxy: this variable stands as a perfect mixture of both factors since it considers the overall effort of a country to

---

[8] See Albuquerque, Loayza and Servén (2003) and Carrieri, Errunza and Hogan (2002).

expand its outward orientation while at the same time it is certainly influenced by global exogenous factors. The rest of the considered explanatory variables may be treated as exogenous, so in this simple setup, domestic variables seem to account for a large part in FDI net inflows variation in our sample. That doesn't mean that our picture of FDI inflows determinants around the world is complete, but just points out that the domestic variables discussed above (rule of law, regulatory burden, educational achievements, trade openness) are able to explain a large fraction of dependent variable variation without the need of globalization measures for the last 2 decades.

One final exercise of this section, is the study of the effect of economic volatility on FDI flows. Results are presented in table 8 below.

Table 8: Regressions for Panel Data (non overlapping 5 year averages, 1970-2000), effect of economic volatility on FDI

Dependent Variable: Log(FDI)	Estimation Method				
	pool	random	between (on group means)	ML random	pop. avg.
Log(population)	0.7944***	0.7876***	0.7993***	0.7872***	0.7868***
	(13.2)	(8.89)	(8.60)	(9.24)	(9.39)
Locked country dummy	- 0.6283***	- 0.6113*	- 0.6071*	- 0.6110*	- 0.6109*
	(- 2.63)	(- 1.71)	(- 1.72)	(- 1.78)	(- 1.81)
Population above 15 with no schooling	- 0.3402***	- 0.3035***	- 0.3801***	- 0.3060***	- 0.3082***
	(- 8.32)	(- 5.45)	(- 5.82)	(- 5.64)	(- 5.79)
Trade openness	0.0655***	0.0595**	0.0752**	0.0594**	0.0594**
	(3.29)	(2.13)	(2.34)	(2.21)	(2.23)
Rule of Law (DK)	0.3809***	0.3294***	0.4608***	0.3321***	0.3345***
	(4.97)	(3.58)	(3.59)	(3.69)	(3.73)
Economic Freedom Index	0.5734***	0.7799***	0.39153**	0.7706***	0.7619***
	(5.78)	(7.59)	(2.16)	(7.43)	(7.50)
Volatility	- 0.0750**	- 0.0811**	- 0.0426	- 0.0811**	- 0.0810**
	(- 2.03)	(- 2.41)	(- 0.56)	(- 2.44)	(- 2.41)
Number of observations	286	286	286	286	286
Number of countries	79	79	79	79	79
R-square within	- -	0.52	0.48	- -	- -
R-square between	- -	0.81	0.82	- -	- -

R-square		0.75	0.75	0.75	- -	- -
prob. of all coefs=0 hypothesis		0.0000	0.0000	0.0000	0.0000	0.0000

z- statistics between parenthesis in all columns, except columns 1 and 3, where significance was estimated through t- statistics
*, ** and *** denote statistical significance at the 10, 5 and 1% levels respectively.

Table 8 shows that all the coefficients and conclusions from the past estimations hold under the inclusion of the new explanatory variable. Also, the coefficient and statististical significance of the overall economic volatility indicator are as expected, although under the between effects estimation procedure the coefficient resulted non-significant. Nonetheless, the evidence seems to be conclusive on the idea that growth volatility, measured as the standard deviation of the GDP growth rates in a 5 year period window, significantly reduces FDI net inflows to an economy. This effect may also be showing the direction of the overall uncertainty effect on general investments.

6. Concluding Remarks

This paper studied the economic determinants of foreign direct investment (FDI) net inflows in a simple way, thus extracting simple policy lessons. Given our estimations and data, FDI seems to be bound more to internal factors than to global ones; moreover, internal factors account for a large part of the variation of flows across countries, as well as the dynamics of flows through different periods of time. This result is interesting when compared to relevant related literature, which stresses globalization variables as well as external common factors as the main drivers of FDI.

Given our estimations, large and open countries, with educated labor force and natural advantages for overall trade in goods seem to attract more FDI flows, everything else equal. On the institutional side, and following the implications of the theoretical model presented in section 2 of this paper, the rule of law (as a proxy of contract enforceability laws) and the overall regulatory burden (as a proxy of entering and operational costs for FDI firms) that foreign investors face

when entering a foreign market, represent robust indicators of institutional quality and are highly correlated with increased FDI flows. In this paper, alternative variable definitions were accounted for, but all of them seem to fare well explaining differences of net inflows across countries and through time. Our results also proved to be robust to changes in methodologies; namely OLS, random effects, between effects, maximum likelihood and population averaged models were tested giving similar results in each step.

7. References

Aggarwal, J. (1980) "Determinants of Foreign Direct Investment: A Survey". *Weltwirtschaftliches Archiv*, 116(4), 1980, pp. 739-73.

Albuquerque, R., Loayza, N. And Servén, L. (2003) "World Market Integration Through the Lens of Foreign Direct Investors". University of Rochester, Simon School of Business Working Paper FR03-02.

Aitken, B. and Harrison, A. (1994) "Do domestic firms benefit from foreign direct investment? Evidence from panel data" World Bank Policy Research Working Paper Nº 1248. February.

Aitken, B., Harrison, A. and Lipsey, R. E. (1996) "Wages and Foreign Ownership: A Comparative Study of Mexico, Venezuela, and the United States", *Journal of International Economics*, 40(3-4), May 1996, pp. 345-71.

Blomström, M., Fors, G. and Lipsey, R. E. (1997) "FDI and Employment: Home Country Experience in the United States and Sweden". *Economic Journal*, 107(445), November 1997, pp. 1787-97.

Blomström, M. and Kokko A. (1994) "Home Country Effects of Foreign Direct Investment: Evidence from Sweden." NBER Working Paper no. 4639, February.

Blomström, M. and Kokko, A. (1997) "Regional Integration and Foreign Direct Investment". NBER Working Paper no. 6019, April.

Blonigen, B. and Wang, M. (2004) "Inappropriate Pooling of Wealthy and Poor Countries in Empirical FDI Studies". NBER Working Paper no. 10378. March.

Borensztein, E. and de Gregorio, J. (1998) "How Does Foreign Direct Investment Affect Economic Growth?". *Journal of International Economics*, 45(1), June 1998, pp. 115-35.

Bruno, M. and Easterly, W. (1998) "Inflation Crises and Long-Run Growth," *Journal of Monetary Economics*, 41 (1) 3-26. 1998.

Carrieri, F., Errunza, V. and Hogan, K. (2002) "Characterizing World Market Integration Through Time". MacGill University working paper.

Caves, R. E. (1996) "Multinational Enterprise and Economic Analysis". 2nd ed. Cambridge University Press.

Chuhan, P., Pérez-Quiroz, G. and Popper, H. (1996) "International Capital Flows: Do Short-term Investment and Direct Investment Differ?" Policy Research Working Paper 1669. Washington, DC: World Bank. October.

Dollar, D. and Kraay, A. (2002) "Institutions, Trade and Growth". Carnegie-Rochester Conference Series on Public Policy.

Dunning, J. H. (1997) "Re-evaluating the Benefits of Foreign Direct Investment". In *Alliance capitalism and global business. Studies in International Business and the World Economy*, vol. 7. London and New York: Routledge, 1997, pp. 209-34.

Eaton, J. and Tamura, A. (1996) "Japanese and U.S. Exports and Investment as Conduits of Growth" in Ito Takatoshi and Anne O. Krueger (eds.) *Financial Deregulation and Integration in East Asia*. NBER-East Asia Seminar on Economics, vol. 5. University of Chicago Press, 1996, pp. 51-72.

Edwards, S. (1996) "Why Are Latin America's Savings Rates So Low? An International Comparative Analysis". *Journal of Development Economics*, 51(1), October 1996, pages 5-44.

Esquivel, G. and Larraín, F. (2001) "How to Attract Foreign Direct Investment". *Mimeo*, Harvard Institute for International Development.

Gallup, J. L., Sachs, J. and Mellinger, A. (1999) "Geography and Economic Development". Annual World Bank Conference on Development Economics 1998. Washington, D.C.

Gropp, R. and Kostial, K. (2000) "The Disappearing Tax Base: Is Foreign Direct Investment (FDI) Eroding Corporate Income Taxes" IMF Working Paper 00/173 (October).

Hanson, G. (2001) "Should countries promote Foreign Direct Investment" G-24 Discussion paper Nº 9: February.

Haussman, R. and Fernández-Arias, E. (2000) "Foreign Direct Investment: Good Cholesterol?". Inter-American Development Bank, Research Department Working Paper No. 417.

Helpman, H., Melitz, M. and Yeaple, S. (2003) "Exports vs. FDI". NBER working paper no. 9439. January.

Hines, J. (1996) "Tax Policy and the activities of multinational corporations" NBER Working Paper no. 5589. May.

Jenkins, M., Esquivel, G. and Larraín, F. (2001) "Export Processing Zones in Central America", In F. Larraín (ed.) *Economic Development in Central America, Vol. I: Growth and Internationalization*, Harvard University Press.

Kaufmann, D., Kraay, A. and Zoido-Lobaton, P. (1999a) "Governance Matters". Policy Research Working Paper no. 2196. October.

Kaufmann, D., Kraay, A. and Zoido-Lobaton, P. (1999b) "Aggregating Governance Indicators". Policy Research Working Paper no. 2196. October.

Larraín, F. and Choi, S. K. (2004) "FDI Flows, Labor Productivity and Pulling Factors". *Mimeo*, Pontificia Universidad Católica de Chile.

Larraín F., López-Calva, L. F. and Rodríguez-Clare, A. (2001) "Intel: A Case Study of Foreign Direct Investment in Central America", In F. Larraín (ed.) *Economic Development in Central America, Vol. I: Growth and Internationalization*, Harvard University Press.

Morisset, J. and Pirnia, N. (2000) "How Tax Policy and Incentives affect Foreign Direct Investment" World Bank Working Paper no. 2509.

OECD (1994) "Ireland". OECD Reviews of Foreign Direct Investment. Organization for Economic Co-operation and Development, 1994.

Oman, C. (2000) "Policy Competition for Foreign Direct Investment. A Study of Competition among Governments to Attract FDI". OECD. Development Centre Studies.

Radelet, S. (1998) "Manufactured Exports. Export Platforms, and Economic Growth". *Mimeo*, Harvard Institute for International Development.

Sarno, L. and Taylor, M. (1999) "Hot Money, Accounting Labels and the Permanence of Capital Flows to Developing Countries: An Empirical Investigation." *Journal of Development Economics.* Vol. 59 (2). p 337-64. August.

Spar D. (1998) "Attracting High Technology Investment: Intel's Costa Rican Plant" Foreign Investment Advisory Service, Occasional Paper 11, The World Bank.

Shatz, H. (2000) "The Location of U.S. Multinational Affiliates", PhD Thesis in Public Policy, Harvard University, May.

Spar, D. (1998) "Attracting High Technology Investment: Intel's Costa Rica Plant", Foreign Investment Advisory Service Occasional Paper 11. Washington, D.C.

Tornell, A. and Esquivel, G. (1997) "The Political Economy of México's Entry into NAFTA" In Ito Takatoshi and Anne O. Krueger (eds.) *Regionalism versus multilateral trade arrangements*. NBER-East Asia Seminar on Economics, vol. 6. University of Chicago Press, 1997, pp. 25-55.

Torrisi, C. R. (1985) "The Determinants of Direct Foreign Investment in a Small LDC". *Journal of Economic Development*, 10(1), July 1985, pp. 29-45.

Wei, S. J. (1997). "How Taxing is Corruption on International Investors?" NBER, Working Paper no. 6030. May.

Well, L. and Wint, A. (2000) "Marketing a Country: Promotion as a tool for attracting Foreign Investment" Occasional paper N° 13, FIAS.