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Continuity of FDI: Determinants and Effects on Growth

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Continuity of FDI: Determinants and Effects on Growth

Economics Honors Thesis

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ABSTRACT:

The literature on foreign direct investment (FDI) provides evidence on the relation from FDI to growth in the presence of some absorptive qualities such as existing level of development, financial market depth, trade policies and human capital thresholds. The analysis of FDI inflows in the literature so far does not include an investigation of discontinuity, or of lack of steady positive flows. Discontinuities are expected to depend on development levels and risk factors in the host country as they proxy for attractiveness of the target to the foreign investor. This paper investigates the continuity of FDI with its determinants and includes it in the list of factors that influence growth. Discontinuities are measured as a dummy variable based on a percent threshold for FDI as a percent of GDP. I use panel data for 121 developing and developed countries between 1980 and 2007. The results show the persistence of FDI flows and the effects of different determinants on the discontinuity of FDI. Among these, the most significant are openness and political stability. Panel regressions from the same period of time show that growth is negatively affected by FDI discontinuities and as the regressions control for more variables, the discontinuities variables are more significant than the FDI size measures used in previous literature. Separating OECD and non-OECD countries shows that the discontinuities robustly negatively affect growth in the non-OECD case, but are not significant for OECD countries.

I. Introduction

There is substantial empirical literature on the importance of absorptive qualities that a country must possess in order to benefit from foreign direct investment (FDI¹). Previous empirical studies have shown that factors such as human capital or financial market development play a significant role in the capacity of FDI to make an impact in a certain host country (Noorbakhsh et al, 2001; Borensztein and Lee, 1998; Alfaro et al, 2004). Blomström, Lipsey and Zejan (1996) show the importance of development of the host economy by demonstrating FDI has a stronger positive impact on growth in high-income host countries. Studies on openness have shown that it is a necessary condition for host economies to benefit from FDI (Nair-Reichert and Weinhold, 2001), and more specifically, that export promoting countries are more successful in reaping the growth benefits of FDI than import substituting ones (Balasubramanyam et al., 1996). Thus, there is significant evidence that FDI has a positive impact on growth given certain preconditions, that is, if a host country is to benefit from FDI it must have a minimum threshold set of characteristics reflecting its absorptive capacity (Durham, 2002). If FDI itself does positively affect growth, then there is the question of what type of FDI inflows are more likely to do so. This paper is an investigation into what factors are significant in determining whether FDI flows are steadily positive or not, and whether the continuity of FDI net inflows affects growth, more specifically, hypothesizes that more FDI discontinuities will hinder growth.

¹ According to the OECD (OECD, 1999) foreign direct investment “reflects the objective of obtaining a lasting interest by a resident entity in one economy (“direct investor”) in an entity resident in an economy other than that of the investor (“direct investment enterprise”). Also, the OECD “recommends that a direct investment enterprise be defined as an incorporated or unincorporated enterprise in which a foreign investor owns 10 per cent or more of the ordinary shares or voting power of an incorporated enterprise or the equivalent of an unincorporated enterprise.”

In order to address the hypotheses, a series of panel regressions with fixed country effects are employed. First, macroeconomic stability and other development factors are tested for significance in determining the variation in the discontinuities of FDI inflows. Second, I test the significance of FDI discontinuities in determining long run growth and compare it to the effect of FDI discontinuities to that of the FDI level.

The findings are that measures such as openness and political stability are significant in determining discontinuities. Growth regressions suggest that FDI discontinuities are significantly correlated with lower growth in the case of non-OECD countries and also that measures of FDI discontinuities are relatively more significant than size measures (FDI as % of GDP), and even significant when the size measures are not.

The remainder of the paper is organized as follows. The next section discusses the nature of FDI flows, looking at persistence and volatility, gives an overview of the literature on FDI determinants and growth. After that I describe the methodology employed, regression models, and expectations of model coefficient signs. That is followed by a section discussing the nature and sources of the data and constructed variables along with a summary of the data used in the regressions. The Results section summarizes the empirical findings and the Conclusion discusses the findings.

1.1. The Nature and Characteristics of FDI Inflows

1.1.A. Persistence, continuity, and the importance of lagged FDI flows

When speaking about the nature as opposed to the level of FDI inflows, or the properties of inflows into a country as a function there are several obvious statistics and questions that come

to mind. First is the amplitude, or the volatility, second, the pattern in a recipient country, and in this category we can place the relation between current and lagged FDI and whether flows are continuous or not. Below I discuss volatility and the self-reinforcing aspect of FDI, which have been previously discussed in the literature, but are essential for introducing the nature of FDI flows and the economic rationale behind it.

The paper places discontinuities in the list of characteristics of FDI; it investigates its determinants and aims to add FDI discontinuity to the list of determinants of growth. Comparing and analyzing aspects and factors that influence FDI inflow is important for understanding the general context of FDI inflows but also to highlight the relative importance of a characteristic such as continuity in the context of the entire set.

One of the most important characteristics of FDI is that it has persistence, or that previous flows have a positive effect on future flows. The topic of persistence of FDI has been examined in previous literature, as a complement to the analysis of other factors which were the focus of the empirical investigation. For example, Wheeler and Mody (1992) analyze the decision of US multinational enterprises to engage in outward FDI and, using the existing stock of foreign investment as a proxy for agglomeration factors, they find a positive link between FDI flows and already existing stock. However, the research suggests that the self-reinforcing aspect only appears after a certain development threshold, thus rejecting the hypothesis that developing countries with very low or negative flows are in a vicious cycle and cannot attract FDI only because the FDI accumulated in the past is not sufficient. Hence Wheeler and Mody (1992) make a strong argument that a country's level of development would have a larger impact on inflows than the presence of FDI.

Noorbakhsh et al. (2001) use the lagged change in the dependent variable (FDI inflows over a three year period) in a panel data fixed effects regression arguing that it proxies for information the investor has about the target country. This is a somewhat different explanation than Wheeler and Mody's (1992) as it emphasizes the factors that determine FDI entry more than the dynamic of existing FDI projects. The lagged variable is significant, suggesting the importance of either the hypothesis of familiarity of investors with a target suggested by Noorbakhsh et al, or a direct consequence of the nature of FDI, as mentioned above.

In order to discuss the potential reasons behind the persistence of FDI it is useful for the following hypothetical examples to make the distinction between the two types of FDI: Mergers and Acquisitions (M&A) and greenfield.² Suppose a firm sets up a greenfield operation or has just acquired a foreign target in a certain period. By the definition of FDI this will be a more long term interest, such as suppose a Greenfield project that involves building a new plant or a research facility. Thus the firm will most likely not invest all the capital it intends to immediately because of both timing and risk issues or because of the nature of the relationship between the affiliate and the parent firm. This means that for example, as a rational economic agent, the parent firm takes into consideration natural, political and economic risks that may cause the project to either not be viable or have a lower return than the expected value. The potential cost can be diminished by expanding in a staggered fashion and this can include not producing as much, or even acquiring a subsidiary and lending it relatively less capital. The nature of the parent-affiliate relationship refers to the fact that one would expect the parent to

² Greenfield FDI is new investment made by setting up a new foreign affiliate, while cross-border M&As involve a change in the control of assets and operations of the merged or acquired firm. According to the OECD, M&A "includes equity acquisition of private companies and privatization of public enterprises, the latter being quite popular in developing countries. Greenfield investments involve new capital investments by MNEs via establishing overseas subsidiaries (or affiliates) that serve as part of the global production/distribution network." (OECD, 2003)

have an affiliate in the host country for multiple periods, thus capital will flow from or to the same investor over multiple periods. This explains why flows in the current period would depend heavily on previous ones and thus why a lagged variable is important in the empirical part of the paper.

The persistence hypothesis is intuitively supported by the idea of potential advantages of countries with more significant previous FDI inflows from the point of view of decision to invest, or engaging in Greenfield or an initial acquisition of new assets. Positive externalities of areas with industry concentration, as discussed by Wheeler and Mody (1992) motivate investing in a country with relatively stronger previous FDI inflows. To this we can add the idea that the possibility of investing being considered in the first place depends on a mix of information about past foreign presence, prospects and comparative advantage. While the existing foreign presence does not affect the cost-benefit or net present value analysis, it may affect whether a firm considers a target or not, and may be reflected in higher inflows at the aggregate level. This can be summarized as the information the investor holds in Noorbakhsh et al (2001). For firms that already have projects in a host country, the existing stock and even the flows from recent previous years will not matter as much presumably, and, assuming constant home country and firm conditions, the drop in their flows may be a consequence of events or exogenous characteristics of the country.

The idea of adjustment costs can also help rationalize a type of stickiness of FDI. Especially in the manufacturing case, a plant is a long-term investment as most FDI projects are, and it is this quality that enables the firm to consider the adjustment cost of withdrawing or reducing the size of operations. For example, asset retirement obligations or the opportunity cost of sales lost while relocating production are to be taken into account. This hypothesis is important in the

continuity context because it points to the fact that potential discontinuities in FDI inflows intuitively depend on country unexpected changes that allow a firm that already has a presence to disinvest or cease investment despite the adjustment cost.

This discussion of persistence suggests that, if positive, FDI should exhibit a relatively steady pattern over time, meaning that it should be relatively less volatile than other forms of investment but also should exhibit some type of stickiness or continuity. Some reasons that could break the pattern of positive flows could be the fact that the affiliate has grown sufficiently that no more capital from abroad is required and the earnings are being repatriated, an internal change in the parent or affiliate company has occurred, or that external conditions in the host country have changed in a manner unforeseen by the parent company, which has to disinvest or reduce flows. It is the latter type of change that this paper is concerned with, or the changes in the host country economy that could be disruptive to FDI net inflows, and if there are such country-specific factors, in what magnitudes and directions they affect FDI.

1.1.B. Defining Discontinuity

In the absence of literature on such a measure, this paper explores various possible definitions and tests them empirically against potential determinants.

Discontinuity can be defined as the lack of positive FDI inflows. While, in the strictly mathematical sense one would assume zero investment to be a discontinuity there are reasons to include the negative values of FDI inflows as well. Since FDI is a relatively broad measure of cross border transactions in that its reporting has to include share purchases and divestitures, loans and borrowing to and from an affiliate in the host country, retained earnings etc, it becomes clear why it would be possible that countries may have a net foreign direct

disinvestment, or negative flows, over a certain period. This would be a reflection of the fact that, on average, parent firms are perhaps divesting some of their assets, borrowing more than they are lending, or transferring a large portion of earnings to the home country. Hence, it would be expected that disinvestment would have the same type and perhaps an even larger impact on the host economy, and may be a reflection of some firms' decision to restrict operations despite the above mentioned adjustment cost. I expand the definition of discontinuity to small positive flows, their impact is limited and they likely do not reflect the set up of new operations or significant production changes.

Given the above justified starting point of negative, zero or very low flows, I use several different binary variables. Intuitively, such a binary variable should take into account whether both the lag-year and current year flows were in the same category (i.e. above or below a threshold) so as to emphasize the conditional aspect of discontinuity, that is, if, for example, a country has had flows below threshold for three years, under this variable, the second and third year would not be considered a discontinuity. Thus there are two variables; the first is a simple binary check of whether FDI inflows as % of GDP is less than a small positive threshold but takes into account the growth rate of FDI inflows over time. The second checks whether current year is below threshold and is 1 as long as this is a change from the previous year.

For a detailed explanation of the value and choice of threshold, growth rate of FDI and calculation of Discontinuities measures please see the Methodology Section.

1.1.C. Previous studies on the nature of FDI flows – FDI and Volatility

The topic of variability of FDI inflows is studied by Lensink and Morrissey (2006), who test whether FDI volatility affects growth. Their hypothesis is that volatility of FDI negatively affects growth and their findings, although not entirely robust, confirm it. In this article it is assumed, in light of cited previous literature, that FDI flows positively affect growth by decreasing the costs of R&D through stimulating innovation. Thus, their hypothesis is derived from the idea that a more volatile flow reduces the incentives for innovation. A second channel through which volatility could be harmful for growth would be the fact that it acts as a proxy for uncertainty in the host country, be it political or otherwise. Thus, the results are a reflection of either channel and not necessarily proof that it is the quality of FDI itself that is the driver, but at the same time, showing that there is a significant correlation between the two.

The topic of volatility is often regarded comparatively with respect to portfolio investment³. Data from UNCTAD (UNCTAD, 2008) shows that FDI flows are indeed less volatile than portfolio investment which is intuitive as FDI is a longer term commitment. Perhaps for these reasons, the two types of investment have different growth impacts; Bosworth and Collins (1999) find that FDI inflows have a stronger positive effect on domestic investment than other types of capital flows. In the context of comparative analysis to portfolio investment, Goldstein and Razin (2003) develop a model that suggests another channel that provides at least relative stability of FDI. They suggest that FDI investors have information asymmetry in their favor

³ “investment that provides the investor with a return, but not control over the company, generally is considered portfolio investment” (UNCTAD, 1999)

“The most important characteristic of FDI, which distinguishes it from foreign portfolio investment, is that it is undertaken with the intention of exercising control over an enterprise.”(UNCTAD, 2002)

relative to portfolio investors and will therefore have a comparative advantage relative to portfolio investors.

The discontinuities approach is different from volatility in that it attempts to explain the link between growth and FDI from a slightly different point of view. While discontinuity does not have the same information as volatility itself, it does incorporate well the concept of uncertainty and proxies for it in the same way volatility would, but also the concept of a steady positive flow and its potential effects; discontinuity would essentially imply volatility, while volatility would not necessarily imply discontinuity. These effects are expected to reinforce the incentive and risk channels mentioned by Lensink and Morrissey (2006). For a summary of the Lensink and Morrissey article and its measure of volatility see the table in Growth and Volatility Literature Overview. This paper is adding to the volatility question, by attempting to measure whether and why there is significant positive direct investment or not, rather than how that flow fluctuates in either direction, revealing a new angle on the qualitative aspects of FDI flows.

II. FDI and Growth

II.1. Theoretical Channels and Evidence

Unlike volatility of FDI, the topic of growth and FDI has been studied much more extensively in previous literature.

One of the recent seminal articles on FDI and growth is that of Borensztein et al (1998). They find that FDI does have a positive impact on growth, however, only as long as the host country has a minimum threshold of human capital. As previously mentioned, the significance of other thresholds has been studied extensively and yielded significant results. Choe (2003) finds that there is some causality from FDI to growth.

Previous papers have named a few channels of the link from FDI to growth such as increase in capital stock, competition and imitation or spillovers. The argument behind the capital stock increase comes from growth models describing long run output as an increasing function of capital stock. Supporters of the capital accumulation argument find that the effects also depend on the complementarity/substitution relationship between foreign and domestic investment (de Mello, 1999).

Other channels include: spillovers, technological or of managerial practices etc, which are present in studies that are more empirical in nature. Wang and Blomström (1992) show how the technology spillover process is accelerated by competitiveness in the industry and greater investment in imitation by host country firms. Evidence from Indonesia (Lipsey and Sjöholm 2004) shows how the presence of foreign firms increases wages in an industry. The case of Japan and the US (Branstetter and Lee, 2006) shows bilateral spillovers, especially from greenfield investment in the case of the US. In this context of growth determinants, this paper aims to add the discontinuity of FDI variable to the list of determinants, showing that it is not only measures such as volatility that influence the positive relation between FDI and growth.

The competition argument in support of spillovers suggests that MNEs entering a market because of a comparative advantage will have competitive products that will force domestic firms to make products or services comparable to those of the MNE. Other spillover arguments are more process-related; managerial skills, methods and other optimizing lessons can be learned from a more efficient company either through observation or through transfer of know-how through employee mobility.

II.2 Growth and Volatility Literature Overview

The table below presents main growth literature findings in a systematic manner, in order to put together previously used methods and underline the key ideas and differences in the methods and data.

	Authors, year	Data (year, country)	Methods	Main Findings	Main Idea(s)
1	Balasubramanyam et al, 1996	1970-1985, 46 developing countries	Cross sectional OLS	FDI has a positive effect on growth if the country is export promoting (as opposed to import substituting)	Trade regime affects the FDI-growth interaction
2	Borensztein et al, 1998	1970-1989; 69 mostly developing countries	Seemingly Unrelated Regressions on two panel sets	Gross FDI inflows have a positive effect on growth but human capital thresholds affect the	Human Capital levels affect the magnitude of the effect of FDI and Growth
3	de Mello, 1999	1970-1990; 32 developed and developing countries	Panel Regressions, fixed effects	Some evidence of effects of FDI on Growth	Technology transfer causes growth Capital Accumulation and Knowledge transfer requires some degree of complementarity between foreign and domestic investment Using Panels solves some econometric difficulties
4	Bosworth and Collins, 1999	1978-1995; 58	Panel Regressions	FDI has the largest positive effect on	Foreign investment and other capital flows can affect domestic

		developing countries		investment and saving in the host country, the effect is even higher on investment in emerging markets (by comparison with Portfolio Investment and Bank Loans	investment and savings
5	Carcovic and Levine, 2002	1960-1995; 72 countries, developed and developing	OLS and Dynamic Panel (General Method of Moments, GMM)	There is correlation but not robust causality between the exogenous component of FDI and Growth	Other studies do not control for simultaneity bias, country specific effects, so employ GMM method
6	Durham, 2002	1979-1998; 80 countries, developing	Use Extreme Bound Analysis (EBA) and Cross Sectional OLS	FDI and Portfolio investment do not have direct effects on growth, but depend on absorptive capacities of host countries	Few robust absorptive capacities, finds institutional and financial development variables that exert an influence on growth in FDI regressions
7	Alfaro et al, 2003	1975-1995; 20 OECD and 51 non-OECD countries	Cross sectional OLS	FDI alone has an ambiguous role in determining growth, however, when interacted with financial market development variables (credit market and other financial market depth variables) FDI has a positive effect on growth	Financial market development causes better diffusion of FDI spillovers and hence growth
8	Choe, 2003	1971-1995; 80	Panel, Vector Auto-	FDI-Granger causes economic growth and	Two way causality between growth and FDI, higher growth

		countries, developed and developing	Regression (VAR) model	vice versa, causality is stronger in the growth-FDI direction	country more attractive for return and thus for FDI, also, higher FDI causes higher growth through technology transfers
9	Johnson, 2006	1980-2002; 90 countries, developed and developing	Cross Sectional and Panel Regressions,	FDI flows enhance growth in developing countries but not developed ones	Effect of FDI depends on whether the country is developed or developing and also on whether FDI is Greenfield or Brownfield (M&A) – the latter is not directly studied in this paper however
10	Lensink and Morrisey, 2006	1975-1997; 20 developed, 67 developing countries	Cross Sectional and Panel Regressions, Instrumental Variables	Volatility of FDI negatively influences growth but not as much as the level of FDI or initial income; Volatility measured as the standard deviation of standard errors from the autoregressive equations for FDI values with 3 year lags	Not only level of FDI matters in terms of growth, but also the volatility

III. Methodology

The choice of FDI inflows as a ratio of GDP rather than the absolute measure of FDI controls for the size of the economy. In all above-mentioned articles the measure of FDI is FDI Inflows (net or gross) as a % of GDP, given that this is the standard measure in the literature, net FDI/GDP(%) is the measure this paper will consider.

III.1. Empirical Models for FDI Discontinuity Determinants

The model equations used for this part of the paper will be:

$$\text{FDIDGR}_i^j = \beta_0 + (\text{FDI_LAG_DISC} * \beta_1)^4 + \beta_2 \text{Development}_i + \beta_3 \text{Macro}_i^j + \beta_4 \text{HumanCapital}_i + \beta_5 \text{Openness}_i + \beta_6 \text{Pol_Confl}_i + \beta_7 \text{Infrastr}_i^j + \beta_8 \text{Fin_Mkt}_i + \varepsilon_i \quad (1)$$

and

$$\text{FDIDCOND}_i^j = \beta_0 + \beta_1 \text{Development}_i + \beta_2 \text{Macro}_i^j + \beta_3 \text{HumanCapital}_i + \beta_4 \text{Openness}_i + \beta_5 \text{Pol_Confl}_i + \beta_6 \text{Infrastr}_i^j + \beta_7 \text{Fin_Mkt}_i + \varepsilon_i \quad (2)$$

III.1.A First Discontinuity measure: FDIDGR (binary)

A brief discussion of the nature of the data illustrates the need for the type of measure that has been chosen for this paper. First, there are zero values which would make it impossible to calculate a percent change between the year with the zero value and the following one, i. e. the denominator of $\text{FDI}_i^t / \text{FDI}_i^{t-1} * 100$ could be zero in many cases. Second, the flows switch from negative to positive and this makes a percent change measure not reflective of the actual information (i. e. with the usual percent change formula, a switch from negative to positive will

⁴ FDID_LAG_DISC is used only in some regressions; see Results section and tables for details.

have the wrong sign). For an illustration of the nature of the data please see the summary of the data (Table in Appendix 1).

First, I create FDIDGR (for FDI discontinuity which accounts for growth of FDI inflows over time), a dummy variable indicating whether a discontinuity exists or not. I define the existence of a discontinuity as an FDI inflow in year t that is negative, zero or very small compared to an increasing threshold.

The reason why this measure does not include only zero values is because there would be insufficient variation in the dependent variable if that were the case. Moreover, very small inflows are unlikely to constitute a significant fraction of total investment and are thus likely to have similar effects to no foreign investment. In practice, they often represent small additions to existing investments or setting up of sales rather than production facilities.

I expand the definition of discontinuity to negative flows as well, since this paper uses a net measure. This allows accounting for 'disinvestment' at an aggregate level and to small positive flows, less than 0.3% (FDI as % of GDP). The 0.3% threshold is chosen because it is well below the average for all countries in the dataset for all years (0.8%) and below the lowest median (0.45%). Moreover, the panel data refer to 28 years (1980-2007), (refer to Appendices 1-3 for the exact period where data was available for the different regressions) and these minimum values are encountered at the beginning of the time series in which both average and median increase every year with very few exceptions, thus minimizing the possibility of an overestimate.

Over the period in question there is a trend of increasing FDI as % of GDP, and the discontinuity measure would ideally account for that. To capture that trend and prevent for example too few small flows being captured in the latter part of the period, the initial 0.3

threshold is multiplied every year with the average yearly growth rate of FDI/GDP during this period (which is approximately 10% or 0.1) While it is true that in some years on average FDI does not increase and there may be the issue of increasing the threshold in a period of regional recession, this will not be a severe distortion because the quantity of increments is very small and the periods in which the global growth rate of FDI/GDP is negative are never longer than 1 year, with one exception when it lasts for two years.

There are two types of panel regressions: based on yearly data from 1980-2007 and based on 4-year averages of this data. The choice is justified by the fact that 4 years is sufficiently long to smooth some of the cyclicalities but not long enough that it will create a panel with too few observations (with 4-year averages there is a maximum of 7 groups in the chosen period). The mechanism for calculating the yearly threshold was described above. The calculation of the averaged-data threshold essentially compounds the above-mentioned 0.1 yearly growth rate. Applying a different measure such as increasing the threshold by the actual growth rate in each period, yields results that are minimally different. Please see the results section for the types of regressions and the panel time variable distinction.

It is this increasing threshold that is used to obtain a dummy variable which is 1 if the respective value of FDI/GDP (%) is less than the growing threshold and 0 otherwise.

*Auxiliary Measure: **FDID_LAG_DISC** (binary)*

FDID_LAG_DISC is an auxiliary dummy variable, which essentially does the same binary check as **FDIDGR**, but for year $t-1$, or the lag year of an observation in year t . This variable is included as one of the explanatory variables for **FDIDGR** in several regressions. The motivation for this is twofold. First, the persistent nature of FDI discussed in the introduction, and second,

the fact that including the lag check creates an additional condition to the discontinuity measure below.

III.1.B Second Discontinuity Measure: FDIDCOND (binary)

If the condition of having an FDI/GDP level higher than the threshold in the lag year and one below in the current year is applied, a new variable that defines discontinuity in a more mathematical sense is created: **FDIDCOND**. Essentially the way FDIDCOND is constructed is: it is 1 if FDIDGR is 1 and if the lag variable, FDI_LAG_DISC, is 0. Thus, FDID checks whether the fact that flows are very small, zero or negative is a change from the previous period, or a discontinuity in the pattern.

III.2 The empirical model - Discussion

Clearly, since FDI_LAG_DISC variable is used to construct FDIDCOND, it will not be included in equation (2) above.

The coefficients for political and macro instability are expected to be positive, as they proxy for good institutional and development framework, which is expected to attract more FDI. This assumption is in line with previous literature.

The first control variable is infrastructure (INFRASTR), proxied by electricity imports; the expected coefficient for this term is negative, as a country that develops its infrastructure is expected to have a steadier stream of FDI inflow. This is because infrastructure proxies for essential inputs such as electricity and means of distribution such as reliable roads or communications and thus is an essential need for a business.

MACRO is a control for macroeconomic stability, and it can be measured by using the GDP Deflator in period j . Other controls include other development proxies for financial markets, human capital and also a political conflict proxy. For all development measures, a negative sign is expected, while for the macroeconomic and political instability measures the coefficient is expected to be positive as uncertainty about the state of the economy and implicitly policy should make a target less attractive to risk-averse investors and should therefore cause more discontinuity.

The expectations are in line with previous literature on FDI and assuming that they will have the opposite effect on FDI discontinuities than on the FDI variables in the literature. Addison, T. and Heshmati, A. (2003) find that openness to trade affects FDI flows positively and levels of risk affect it negatively with a developing countries dataset. More broadly, Frankel, J. and Cavallo, E. (2004) find causality between the lack of openness to trade and the instability of cross border financial flows, which is even stronger when controlling for potential endogeneity.

Investigations into the role of infrastructure are done in previous literature, as the main focus in some cases like the Mollick et al. (2006) paper, which finds that infrastructure positively affects FDI inflows, and in particular what they call international (telephone lines) rather than national infrastructure (roads). Others (Noorbakhsh et al., 2000) include other measures of infrastructure such as energy imports as % of total use in their growth regressions and find that they are highly significant in determining FDI inflows.

III.3. The impact of FDI Discontinuities on Growth

This part of the paper presents the empirical check of the hypothesis that FDI inflows with fewer discontinuities, as defined above, have a positive impact on growth. To summarize the methodology, the model has growth as a function of the discontinuities variable (FDID), expecting a negative coefficient for $FDID_i^j$, and other factors which have been shown to have an effect on growth in previous literature.

$$G_i^j = \beta_0 + \beta_1 \text{Ln}(\text{Lagged}(\text{GDP}))_i + \beta_2 \text{Popgr}_i^j + \beta_3 \text{Macro}_i^j + \beta_4 \text{HumanCapital}_i + \beta_5 \text{Openness}_i + \beta_6 \text{Pol_Confl}_i + \beta_7 \text{Govt_Expenditure}_i^j + \beta_8 \text{Fin_Mkt}_i + \varepsilon_i \quad (3)$$

In (3) G is real growth of GDP per capita. The controls include lagged real GDP (log scale), financial market development, political risk, macro instability (MACRO), other infrastructure, development, and human capital proxies. This model and the types of variables it uses make up a commonly used set up in the literature (Levine, R., Carkovic, M., 1999; Borensztein et al., 1998; Alfaro et al., 2004).

IV. Data Description and Sources

The data on annual net FDI inflows as a % of GDP is available from the World Bank (World Development Indicators (WDI), 2009). Data on GDP deflator values is available from 1980-2007 from WDI, as is the control variable data in Regressions Series 1 and 2, except for development of financial markets, which is available from Financial Structure Database of the

World Bank (World Bank, 2000). The growth data that will be used for Regressions 3 is available from the World Bank, from 1980-2007.

The proxy chosen for macroeconomic instability is annual inflation (GDP Deflator, *gdpd*). It is expected that this variable will have a negative impact on both FDI/GDP (%) and Growth and conversely a positive effect on FDID. This is because, as inflation increases, the distortion in prices and discount factors will be higher and the resulting uncertainty will have a negative impact on investment. Also, inflation is a proxy for macro policy and more specifically monetary policy, thus implicitly measuring the quality of central bank actions, which should be positively correlated with growth and FDI.

The financial market development proxy (*llgdp*) is the ratio of Liquid Liabilities to GDP⁵ which has been shown to have a significant impact on the positive relation between FDI and growth (Alfaro et al., 2004). This indicator serves as a rough measure of depth of financial markets and is expected to have negative coefficients in both FDI and growth regressions. Literature on determinants of FDI confirms these expectations. The second financial market development proxy is private credit⁶, also from the Financial Structure Database of the World Bank (World Bank, 2000). This is used only in the growth regressions, as it proxies for both the financial market development and the general level of indebtedness better than liquid liabilities. Given that, the sign expectation on this variable is ambiguous.

The proxy chosen for infrastructure is energy imports as a share of total energy usage, which highlights the country's ability to sustain its own energy consumption and describes the evolution of a crucial input for almost all types of business.

⁵ Calculated using the following deflation method: $\{(0.5) * [F_t/P_{et} + F_{t-1}/P_{et-1}]\} / [GDP_t/P_{at}]$ where F is liquid liabilities, P_e is end-of period CPI, and P_a is average annual CPI (World Bank, 2000)

⁶ Private credit by deposit money banks and other financial institutions to GDP, calculated using the following deflation method: $\{(0.5) * [F_t/P_{et} + F_{t-1}/P_{et-1}]\} / [GDP_t/P_{at}]$ where F is credit to the private sector, P_e is end-of period CPI, and P_a is average annual CPI

The human capital proxy is the number of average years of schooling from Barro and Lee (2000). Because this data is only available every 5 years, the missing values have been linearly extrapolated.

The regressions also use data on real GDP ($\ln\text{rgdp}$), which is the natural logarithm of annual real GDP in constant 2000 USD (WDI, 2008), which is expected to have a positive coefficient in regression series 1 and negative in 2.

The political conflict proxy is a 3-value proxy called `political_confl`, obtained from the Armed Conflict Dataset of the International Peace Research Institute in Oslo. This proxy is 0 if there is no conflict in a certain year, 1 if the conflict is small (between 25 and 999 deaths per year) and 2 if it is a major conflict or war (more than 1000 deaths per year), and it includes both internal, external and multi-party conflicts (Gleditsch et al., 2002). The openness proxy is the commonly used trade-to-GDP ratio (`trade/gdp`) which is expected to have a negative impact on FDI discontinuities.

Many of the same proxies are used in the growth regression (inflation, average years of schooling, political conflict, and trade). To this set I add government expenditure and private credit, discussed above, and also population growth, available from the World Bank to control for some of the effects that may have on domestic production, the expected sign on this variable being ambiguous. It could be that government expenditure has a negative effect on growth, as the public sector investment can be less efficient.

V. Results and Discussion

For each of the models described in the Methodology section there is a corresponding series of panel data fixed effects regressions, or probit with fixed effects when the dependent variable is binary. Performing a Hausman test indicates that it is preferable to use fixed rather than random country effects regressions.

All regressions in the results tables below are panel regressions from 1980-2007. For each of these there are at least four observations per country (i.e. at least four years of complete data per country).

V.1. FDI Determinants Discontinuities Regressions

Table 1 below show the results of panel fixed effects regressions when FDID is defined as the first dummy variable discussed in Methodology, or as the increasing threshold dummy (FDIDGR).

The panel probit regressions with country fixed effects results are summarized below. The lagged discontinuity dummy `FDI_LAG_DISC` exerts a significant influence on `FDIDGR` and this illustrates the persistent nature of FDI inflows discussed above. Thus, if FDI inflows were insignificant or negative in the previous year, it is more likely that they are below the threshold in the following year as well.

Most of the variable coefficients have the expected sign, however only three are significant, although not robustly so. First, openness influences FDI discontinuities negatively, as expected; hence a country that trades more will be more likely to have fewer discontinuities in FDI. A potential channel for this, in the case of manufacturing, is the need for trade of an intermediate

good in order to produce the final good. The second, but less robustly significant variable is political conflict. This variable has a positive sign indicating that a country with less political stability or more military conflict will have a more discontinuous flow. This is explained by uncertainty; investment in a environment with more uncertainty caused by conflict, from government actions to the state of the economy, evolution of domestic industries as a response to conflict, and even changes in areas where economic activity is not dangerous, depending on the scale of the conflict. Essentially this suggests that the costs imposed by war or a smaller scale political conflict reflect negatively on the pattern of FDI inflows. Third, the financial market depth proxy is significant but with the unexpected sign; this could be perhaps because there are unobserved factors that play into the size of liquid liabilities that affect FDI flows negatively, or because there is another interaction between variables that is not observed. The same tests were run for FDIDCOND, but no variables are significant. This is potentially the case because of the low variation in the dependent variable, because, as it is defined it will only be 1 if a below threshold FDI value is preceded by one that is above threshold (Table 1 That construction significantly reduces variability, but it is however necessary to capture the dual condition that needs to be satisfied in order for discontinuity to exist.

Table 1 - Fixed Effects Panel Probit; Dependent Variable: FDI Discontinuities (FDIDGR and FDIDCOND)

		1.1	1.2	2.1	2.2	3.1	3.2
		FDIDGR	FDIDGR	FDIDGR	FDIDGR	FDIDCOND	FDIDCOND
	lag_disc			1.084 *** (0.0975)	1.096 *** (0.1284)		
Lagged ln(gdp)	lnrgdp	0.010 (0.0124)	0.013 (0.0160)	0.014 (0.0129)	0.017 (0.0165)	-0.015 (0.0155)	-0.014 (0.0196)
Macro Instability	gdpd	0.000 ** (0.0001)	0.000 (0.0002)	0.000 (0.0002)	0.000 (0.0002)	-0.001 (0.0012)	-0.005 (0.0038)
Human Capital	edutrend	-0.028 (0.0480)	-0.036 (0.0552)	-0.057 (0.0500)	-0.064 (0.0569)	0.047 (0.0586)	0.040 (0.0656)
Openness	tradevgdp	-0.009 *** (0.0021)	-0.009 *** (0.0031)	-0.005 ** (0.0023)	-0.005 (0.0032)	-0.001 (0.0026)	0.000 (0.0036)
Political Instability	pol_confl	0.339 *** (0.0949)	0.054 (0.1287)	0.303 *** (0.1012)	0.020 (0.1325)	0.142 (0.1188)	0.175 (0.1485)
Energy Imports	energim		0.000 (0.0007)		0.000 (0.0008)		0.000 (0.0009)
Financial Market Depth	llgdp		1.141 *** (0.4268)		1.061 ** (0.4392)		0.206 (0.5120)
	Countries	121	85	119	85	121	86
	Obs	2059	1332	2034	1332	2095	1367
	Pseudo R-Sq	0.2281	-0.1951	0.3267	0.3319	0.14587	0.16148

Note: This table shows results from running Model Equations (1) and (2) described in the Methodology section. Statistical significance is indicated by *** for the 99% level of confidence, ** for 95% and * for 90%. For each explanatory variable the table includes the coefficient (above) and the standard error (below), in parentheses. The last three lines are: the number of observations, the pseudo R-Squared⁷ of the probit model, and the number of countries included in each regression.

⁷ Pseudo R-Squared is calculated as: $(LL_c - LL_f)/LL_c$, where LL_c is the log likelihood of the constant-only panel probit and LL_f is the log likelihood of the full model, or of the regression with all the control variables included.

V.2. Growth Regressions

To test for the effects of FDI discontinuities on growth I employ a series of panel regressions, also with country fixed effects. In all cases the dependent variable is the % growth in real GDP per capita.

The regressions are grouped as follows:

1. FDIDGR
2. FDIDCOND
3. FDI/GDP

There are thus 3 series of each regression (1.1, 1.2, 1.3 and 2.1, 2.2 etc) in order to capture not only the effect of discontinuities on growth but also to reflect how different measures of discontinuity affect growth and compare them to each other and to the measure used so far in the literature which is simply FDI/GDP or FDI net inflows as a share of GDP. Thus the third regression of each series (x.3, where x is the series number) will serve as a quantitative threshold for comparison of the effects of FDI/GDP with FDI discontinuities measures suggested in this paper.

First, for the set of all countries, developed and developing (Table 2), the effect of FDIDGR is robustly significant in all regressions and as I control for more variables affecting growth the coefficient of FDIDGR is, in absolute value, quite large showing that a jump from below to above threshold in FDI causes an increase in average growth over four years of 0.7% . When the maximum set of controls is employed, FDI/GDP is no longer significant (Regression series 4) but FDIDGR is. FDIDGR has a negative impact on growth, as expected, or a discontinuity in the flow of FDI will adversely affect growth. Although FDIDCOND has a consistently negative sign, which is consistent with the expectation, it is not significant.

Population growth has a positive coefficient which is not entirely robust, but when more control variables are added, it becomes negative and more highly significant. Political conflict is negative, as expected and highly significant except in the last regression when I control for government expenditure. The link between the presence of conflict and lower growth is intuitive, either through decreased economic activity due to forced migration, destruction of assets, hostile environment due to physical danger of doing business or investment being riskier.

Trade exerts a robust positive effect on growth, while macro instability, measured by the size of the GDP deflator has a negative impact on growth. Other highly significant variables are the financial market development, which is here proxied by a private credit measure (PRIVCR). However this variable does not have the expected positive sign. A possible reason why the measure has a negative effect is because it proxies for a general level of private sector indebtedness which could have a negative impact on growth. Government expenditure has a negative sign, showing that it could indeed be the case that the relatively lower efficiency of government projects as opposed to private ones is adversely affecting growth.

From the results concerning the variables of interest, FDI discontinuities, we can observe not only the large impact on growth (the large coefficients) but also that discontinuities are, when controlling for more variables, more significant than a simple size measure of inflows, when FDIDGR is used.

In the following regressions, I have separated the dataset into OECD⁸ and non-OECD countries. I have made a further dichotomy between using fixed country effects and random effects. In the random effects regressions, the initial GDP variable (in this case the log of GDP

⁸ OECD countries in this paper include all members with the exception of Mexico, South Korea and the Czech Republic. See Appendix 2 for full list of countries used in regressions.

in 1980) is added to the set of independent variables. This is because a potential source of variation is cross-sectional, which is eliminated in the country fixed effects. In order to eliminate some of the effects of cyclicalities in the relatively large time-span the panel covers, another series of regressions includes data that is averaged over 4-year periods, thus yielding 7 year groups over 1980-2007.

For OECD countries, in the fixed effects panel, FDI variables, FDI as % of GDP and FDIGR, respectively are only significant with the maximum set of controls, and it is the same with the random effects regression. When the data is averaged over 4-year periods, the effects of FDI variables, size or discontinuity, are no longer significant, this is not true for non-OECD countries. Significant controls in the OECD case are: inflation (macro stability), private credit, with consistently negative coefficients (financial market depth), population growth, and trade (openness).

In contrast, non-OECD countries have strong, significant correlation between FDI variables and growth. Specifically the effect of FDIDGR is robust to variations in fixed vs random effects (**Error! Reference source not found.**and **Error! Reference source not found.**) and also even more significant when the data is averaged over 4-year periods. Unlike the OECD regression series, the conditional variable FDIDCOND is also significant, especially in the case of the collapsed (averaged) data, not robust in the yearly case though. In addition to the high significance of both these variables there is also the fact that, when employing the maximum set of controls, the discontinuity variables are always at least as significant as the size variables, and in the collapsed data case (**Error! Reference source not found.** and **Error! Reference source not found.**), they are significant while the size measure (FDI as % of

GDP) is not. This is similar to the result for the entire country dataset, where FDI/GDP (%) is no longer significant when adding all the controls.

Even in terms of controls, there is higher significance in the non-OECD dataset. Measures such as trade as a share of GDP are especially significant in the fixed effects cases; initial GDP has a negative coefficient and is significant, relative to a complete lack of significance in the OECD case. The same is true for the political stability variable, which is highly significant in the non-OECD case. Some of the common aspects between OECD and non-OECD are the significance of financial market depth variables, inflation and of population growth (on the yearly time variable regressions). The human capital proxy, edutrend is not robustly significant, but completely insignificant in the OECD case.

Table 2 - Dependent Variable: Real GDP per Capita Growth (%), all countries (developed + developing) panel

		1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
		FDIDGR	FDIDCOND	FDI/GDP	FDIDGR	FDIDCOND	FDI/GDP	FDIDGR	FDIDCOND	FDI/GDP	FDIDGR	FDIDCOND	FDI/GDP
FDI Discontinuity		-0.565 ** (0.244)	-0.391 (0.336)	0.059 *** (0.015)	-0.527 ** (0.238)	-0.447 (0.325)	0.063 *** (0.015)	-0.504 ** (0.211)	-0.339 (0.285)	0.031 ** (0.014)	-0.706 ** (0.326)	-0.269 (0.407)	0.008 (0.012)
Human Capital	edutrend	-0.021 (0.129)	-0.033 (0.128)	-0.032 (0.129)	-0.024 (0.128)	-0.035 (0.127)	-0.034 (0.127)	0.007 (0.109)	0.015 (0.109)	0.009 (0.109)	0.080 (0.151)	0.090 (0.152)	0.088 (0.152)
Population Growth	popgr	0.547 *** (0.126)	0.494 *** (0.125)	0.554 *** (0.126)	0.175 (0.132)	0.125 (0.130)	0.178 (0.131)	-0.558 *** (0.125)	-0.582 *** (0.124)	-0.536 *** (0.125)	-0.930 ** (0.386)	-1.019 *** (0.386)	-0.996 *** (0.386)
Political Stability	pol_confl	-2.147 *** (0.264)	-2.220 *** (0.264)	-2.207 *** (0.262)	-1.702 *** (0.257)	-1.788 *** (0.258)	-1.765 *** (0.256)	-1.268 *** (0.240)	-1.293 *** (0.239)	-1.301 *** (0.239)	0.041 (0.420)	0.104 (0.420)	0.112 (0.420)
Openness	trade/gdp				0.040 *** (0.006)	0.036 *** (0.006)	0.037 *** (0.006)	0.043 *** (0.006)	0.040 *** (0.005)	0.043 *** (0.006)	0.049 *** (0.012)	0.049 *** (0.012)	0.049 *** (0.012)
Macro Stability	gdpd							-0.001 *** (0.000)	-0.001 *** (0.000)	-0.001 *** (0.000)	-0.001 ** (0.000)	-0.001 ** (0.000)	-0.001 *** (0.000)
Financial Market Depth	privcr							-2.477 *** (0.494)	-2.452 *** (0.490)	-2.646 *** (0.495)	-2.506 *** (0.769)	-2.671 *** (0.770)	-2.640 *** (0.771)
Government Expenditure	govtexp										-0.097 ** (0.048)	-0.101 ** (0.049)	-0.096 ** (0.049)
Constant	const	1.388 (0.642)	1.294 ** (0.617)	0.955 ** (0.627)	-0.959 (0.803)	-0.794 (0.758)	-1.140 (0.782)	1.025 (0.745)	1.030 (0.721)	0.756 (0.732)	3.681 (2.099)	3.543 * (2.105)	3.306 * (2.106)
	Countries	120	121	120	120	121	120	113	113	113	74	74	74
	Obs	2528	2583	2588	2464	2517	2464	2170	2190	2170	650	650	650
	Rsq	0.041	0.015	0.04	0.013	0.013	0.012	0.026	0.029	0.023	0.038	0.039	0.036

Note: This table shows results from running Model Equation (3) described in the Methodology section. The top line states which measure of FDI is used in the regression summarized in its column. Statistical significance is indicated by *** for the 99% level of confidence, ** for 95% and * for 90%. For each explanatory variable the table includes the coefficient (above) and the standard error (below). The last three lines are: the number of observations, the overall R Squared of the model, and the number of countries included in each regression.

Table 3– Dependent Variable: Real GDP per Capita Growth (%), Panel – OECD Countries, Fixed Effects in series 1 and 2, Random effects with initial GDP as explanatory variable in series 3 and 4. (series 1 and 3, yearly data, series 2 and 4, four-year averages)

		OECD											
		Fixed Effects						Random Effects, with initial GDP					
		Yearly Data			4-Year-Average Data			Yearly Data			4-Year-Average Data		
		1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
		FDIDGR	FDIDCOND	FDI/GDP	FDIDGR	FDIDCOND	FDI/GDP	FDIDGR	FDIDCOND	FDI/GDP	FDIDGR	FDIDCOND	FDI/GDP
FDI Discontinuity Measure		-0.519 ** (0.239)	-0.737 ** (0.283)	0.002 (0.006)	0.305 (0.716)	-0.326 (0.911)	0.059 (0.050)	-0.575 ** (0.239)	-0.893 *** (0.298)	-0.005 (0.004)	-0.553 (0.631)	-0.771 (0.906)	0.086 * (0.048)
Initial gdp	lngdp80							-1.032 ** (0.462)	-1.009 ** (0.454)	-0.807 (0.495)	-0.535 (0.534)	-0.543 (0.534)	-0.531 (0.523)
Human Capital	edutrend	-0.023 (0.162)	-0.006 (0.165)	0.005 (0.164)	-0.122 (0.334)	-0.121 (0.335)	-0.100 (0.327)	0.097 (0.094)	0.089 (0.093)	0.047 (0.108)	-0.073 (0.130)	-0.076 (0.131)	-0.069 (0.127)
Population Growth	popgr	-1.981 *** (0.411)	-2.019 *** (0.419)	-2.106 *** (0.415)	-1.644 ** (0.607)	-1.535 ** (0.600)	-1.591 *** (0.579)	-1.039 *** (0.354)	-0.986 *** (0.353)	-1.072 *** (0.354)	0.271 (0.400)	0.311 (0.409)	0.240 (0.388)
Political Instability	pol_confl	-0.550 (0.756)	-0.278 (0.778)	-0.522 (0.767)	-4.494 (3.703)	-4.341 (3.710)	-4.495 (3.646)	0.072 (0.653)	0.287 (0.655)	0.188 (0.665)	1.338 (3.539)	1.499 (3.538)	1.110 (3.468)
Openness	trade/gdp	0.049 *** (0.012)	0.047 *** (0.012)	0.051 *** (0.012)	0.012 (0.023)	0.012 (0.023)	-0.003 (0.026)	0.018 *** (0.004)	0.020 *** (0.004)	0.023 *** (0.005)	0.027 *** (0.006)	0.028 *** (0.006)	0.022 *** (0.006)
Macro Instability	gdpd	0.003 (0.053)	-0.012 (0.054)	0.017 (0.053)	-0.097 (0.090)	-0.102 (0.090)	-0.119 (0.090)	-0.047 (0.053)	-0.064 (0.053)	-0.035 (0.054)	-0.099 (0.075)	-0.100 (0.075)	-0.112 (0.074)
Financial Market Dept	privcr	-0.486 (0.438)	-0.635 (0.445)	-0.600 (0.442)	-0.519 (0.641)	-0.493 (0.646)	-0.518 (0.632)	-0.831 ** (0.390)	-0.950 ** (0.389)	-0.947 ** (0.392)	-1.594 *** (0.489)	-1.585 *** (0.489)	-1.695 *** (0.484)
Government Expenditu	govtexp	-0.013 (0.043)	-0.024 (0.044)	-0.010 (0.044)	-0.110 * (0.064)	-0.101 (0.063)	-0.114 * (0.062)	-0.054 ** (0.027)	-0.053 ** (0.027)	-0.056 ** (0.027)	-0.036 (0.027)	-0.035 (0.027)	-0.038 (0.026)
Constant	const	0.889 2.659	1.341 2.723	0.266 2.702	8.134 4.774	7.768 4.702	9.061 * 4.757	13.723 *** 4.656	13.346 *** 4.560	11.525 4.811	8.904 4.716	8.916 * 4.717	9.152 ** 4.617
	Countries	21	21	21	18	18	18	21	21	21	18	18	18
	Obs	191	190	191	66	66	66	191	190	191	66	66	66
	Rsqr	0.169	0.205	0.160	0.066	0.069	0.005	0.265	0.302	0.265	0.458	0.458	0.480

Note: This table shows results from running Model Equation (3) described in the Methodology section. The top line states which of the 3 measures of FDI is used in the regression summarized in its column. Statistical significance is indicated by *** for the 99% level of confidence, ** for 95% and * for 90%. For each explanatory variable the table includes the coefficient (above) and the standard error (below). The last three lines are: the number of observations, the overall R Squared of the model, and the number of countries considered for each regression.

Table 4– Dependent Variable: Real GDP per Capita Growth (%), Panel – non-OECD Countries, Fixed Effects in series 1 and 2, Random effects with initial GDP as explanatory variable in series 3 and 4. (Series 1 and 3, yearly data, series 2 and 4, four-year averages)

		Non-OECD											
		Fixed Effects						Random Effects, with initial GDP					
		Yearly Data			4-Year-Average Data			Yearly Data			4-Year-Average Data		
		1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
		FDIDGR	FDIDCOND	FDI/GDP	FDIDGR	FDIDCOND	FDI/GDP	FDIDGR	FDIDCOND	FDI/GDP	FDIDGR	FDIDCOND	FDI/GDP
FDI Discontinuity Measure		-0.821 *	-0.082	0.100 *	-4.281 ***	-5.382 ***	0.167	-2.826 ***	-4.881 ***	0.078	-2.826 ***	-4.881 ***	0.078
		(0.473)	(0.612)	(0.056)	(0.953)	(1.479)	(0.103)	(0.753)	(1.341)	(0.087)	(0.753)	(1.341)	(0.087)
Initial gdp	lngdp80							-0.263	-0.319	-0.241	-0.263	-0.319	-0.241
								(0.306)	(0.312)	(0.315)	(0.306)	(0.312)	(0.315)
Human Capital	edutrend	0.022	0.023	0.038	-0.474	-0.649	-0.465	0.233	0.271	0.297	0.233	0.271	0.297
		(0.197)	(0.197)	(0.197)	(0.489)	(0.506)	(0.531)	(0.180)	(0.182)	(0.184)	(0.180)	(0.182)	(0.184)
Population Growth	popgr	-1.258 **	-1.301 **	-1.211 **	-0.752	-0.390	-1.029 *	-0.336	-0.389	-0.650 *	-0.336	-0.389	-0.650 *
		(0.537)	(0.540)	(0.538)	(0.508)	(0.553)	(0.547)	(0.334)	(0.334)	(0.335)	(0.334)	(0.334)	(0.335)
Political Instability	pol_confl	-0.011	0.069	0.064	-0.722	-0.922	-1.370	0.040	-0.231	-0.130	0.040	-0.231	-0.130
		(0.502)	(0.500)	(0.499)	(0.969)	(0.996)	(1.039)	(0.644)	(0.647)	(0.668)	(0.644)	(0.647)	(0.668)
Openness	trade/gdp	0.055 ***	0.055 ***	0.052 ***	0.024	0.035	0.029	0.008	0.016	0.014	0.008	0.016	0.014
		(0.016)	(0.016)	(0.016)	(0.024)	(0.024)	(0.026)	(0.010)	(0.010)	(0.011)	(0.010)	(0.010)	(0.011)
Macro Instability	gdspd	-0.001 **	-0.001 **	-0.001 **	-0.003 **	-0.004 ***	-0.004 ***	-0.003 ***	-0.004 ***	-0.004 ***	-0.003 ***	-0.004 ***	-0.004 ***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Financial Market Depth	privcr	-6.853 ***	-6.683 ***	-7.066 ***	-7.175 **	-5.355 *	-7.233 **	-0.882	-1.410	-1.322	-0.882	-1.410	-1.322
		(2.200)	(2.216)	(2.208)	(2.752)	(2.842)	(3.034)	(1.580)	(1.590)	(1.629)	(1.580)	(1.590)	(1.629)
Government Expenditure	govtexp	-0.109	-0.108	-0.114 *	-0.058	-0.022	-0.086	-0.004	-0.023	-0.045	-0.004	-0.023	-0.045
		(0.068)	(0.068)	(0.068)	(0.061)	(0.065)	(0.066)	(0.037)	(0.036)	(0.036)	(0.037)	(0.036)	(0.036)
Constant	const	5.564 **	5.101 *	5.059 *	8.592 **	5.787	8.370 *	3.992	4.083	4.122	3.992	4.083	4.122
		2.707	2.716	2.693	3.908	4.122	4.253	2.529	2.565	2.617	2.529	2.565	2.617
	Countries	52	52	52	31	31	31	30	30	30	30	30	30
	Obs	443	444	443	136	136	136	133	133	133	133	133	133
	Rsqr	0.016	0.015	0.016	0.078	0.057	0.024	0.227	0.233	0.165	0.227	0.233	0.165

Note: This table shows results from running Model Equation (3) described in the Methodology section. The top line states which of the 3 measures of FDI is used in the regression summarized in its column. Statistical significance is indicated by *** for the 99% level of confidence, ** for 95% and * for 90%. For each explanatory variable the table includes the coefficient (above) and the standard error (below). The last three lines are: the number of observations, the overall R Squared of the model, and the number of countries considered for each regression.

VI. Conclusion

This paper is an investigation into the characteristics that make a host country receive steadier positive flows of FDI and into how much the steady profile of inflows affects economic growth.

The analysis provides support for the fact that some of the factors that have been shown to affect FDI/GDP in previous literature affect its discontinuities in the same way. Significant, but not entirely robust factors determining discontinuities are openness and political conflict indicators. Political instability seems to increase the likelihood that FDI flows are negative or zero, while openness would cause steadier FDI flows. This would suggest FDI inflows would be steadier in the context of trade encouraging policies and more stable governments and peaceful periods.

The results show that more continuous FDI flows are significantly positively correlated with higher growth in non-OECD countries. By comparing the effect of discontinuities variables with that of a simple size measure we see an illustration of some of the problems in previous literature in showing the effects of FDI on growth (Alfaro et al, 2004); the more variables the model controls for, the less significant the size measure of FDI is, and in most cases it becomes insignificant. In this case we can see that FDI discontinuities do have a more significant effect as they are still significant even after the size measure is not. Besides the relative advantage to the size measure, the result is in itself one of the main findings of this paper and shows how the nature of FDI inflows can be a significant factor for development.

The fact that non-OECD countries are not as shielded from discontinuities is in itself an important observation. This means non-OECD countries are more likely to have lower growth associated with discontinuous FDI, while OECD countries are somehow hedged against that. This is similar to previous findings in the growth literature; Johnson (2006) finds that the effect

of FDI on growth is significant in developing countries, but not in developed ones. Another important result is the relative importance of the discontinuities measure and the possible reasons behind that. A potential reason for that could be that while decreasing flows in absolute terms may cause some reduction in growth or vice versa, it is a sudden, significant drop in inflows that causes a more significant impact on growth, because it may mean that a large project is being closed down, or that the host country factors have changed in such a way that makes the lasting interest of the foreign direct investor to be compromised.

The theory on FDI suggests that the channels of growth are capital and knowledge transfer, and the results of this paper show that it is not only these channels that matter (measured essentially by how much FDI inflows a country receives) but also the degree to which country-specific or other conditions favor a consistent and significant positive inflow of FDI.

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Appendix 1– Data Description – Growth Regressions

Table 5 – Full Country Dataset (Table 2 Regressions) – Data Summary Statistics

Variable Name	Variable	Observations	Mean	Standard Deviation	Min	Max
energim	Energy Imports (% of Total)	1941	-42.488	205.590	-1936.944	100.000
rgdpcapgr	Real GDP per Capita Growth	2583	1.484	5.208	-50.047	90.140
edutrend	Average Years of Secondary Schooling	2583	4.426	3.361	0	12.298
popgr	Population Growth	2583	1.857	1.289	-8.271	10.043
pol_confl	Political Conflict	2583	0.245	0.541	0	2
militexp	Military Expenditure (% of Total)	1656	2.555	2.520	0.001	29.728
militlab	Military Labor (% of Total)	1824	1.461	1.873	0	29.172
govtexpofgdp	Gov't expenditure	776	25.209	10.070	7.562	65.227
llgdp	Liquid Liabilities/ GDP	2193	0.495	0.396	0.002	3.937
prcrdbofgdp	Private Credit	2247	0.459	0.413	0.001	2.698
gdpd	GDP Deflator	2580	46.903	460.308	-29.173	13611.630
tradevgdp	Trade/ GDP	2517	74.826	48.332	6.320	456.646
fdipgdp	FDI / GDP (%)	2514	3.169	14.758	-54.358	380.348
fdidgr	FDI Discontinuities (Growing Threshold)	2514	0.499	0.500	0	1
fdi lag	FDI_Lag_Check (See Methodology)	2583	0.254	0.435	0	1
fdidcond	FDICOND (See Methodology)	2583	0.096	0.295	0.000	1.000

Table 6 – List of Countries Used in Regressions from Table 2

Algeria	China	Grenada	Kuwait	Pakistan	Syrian Arab Republic
Angola	Colombia	Guatemala	Lesotho	Panama	Tanzania
Argentina	Congo, Dem. Rep.	Guinea	Liberia	Papua New Guinea	Thailand
Australia	Congo, Rep.	Guinea-Bissau	Luxembourg	Paraguay	Togo
Austria	Costa Rica	Guyana	Madagascar	Peru	Trinidad and Tobago
Bahamas, The	Cote d'Ivoire	Haiti	Malawi	Philippines	Tunisia
Bahrain	Cyprus	Honduras	Malaysia	Poland	Turkey
Bangladesh	Denmark	Hong Kong, China	Mali	Portugal	Uganda
Barbados	Dominica	Hungary	Malta	Rwanda	United Arab Emirates
Benin	Dominican Republic	Iceland	Mauritania	Saudi Arabia	United Kingdom
Bolivia	Ecuador	India	Mauritius	Senegal	United States
Botswana	Egypt, Arab Rep.	Indonesia	Mexico	Sierra Leone	Uruguay
Brazil	El Salvador	Iran, Islamic Rep.	Mozambique	Singapore	Venezuela, RB
Burkina Faso	Ethiopia	Ireland	Nepal	South Africa	Yemen, Rep.
Burundi	Finland	Israel	Netherlands	Spain	Zambia
Cameroon	France	Italy	New Zealand	Sri Lanka	Zimbabwe
Canada	Gabon	Jamaica	Nicaragua	Sudan	
Cape Verde	Gambia, The	Japan	Niger	Suriname	
Central African Republic	Germany	Jordan	Nigeria	Swaziland	
Chad	Ghana	Kenya	Norway	Sweden	
Chile	Greece	Korea, Rep.	Oman	Switzerland	

Table 7 – OECD Countries (maximum data set) – Regressions in Table 3, Error! Reference source not found., Error! Reference source not found., Error! Reference source not found.

1	Australia
2	Austria
3	Canada
4	Denmark
5	Finland
6	France
7	Germany
8	Greece
9	Hungary
10	Iceland
11	Ireland
12	Italy
13	Japan
14	Luxembourg
15	Netherlands
16	New Zealand
17	Norway
18	Portugal
19	Spain
20	Sweden
21	Switzerland
22	United Kingdom
23	United States

Table 8 – Non-OECD countries (maximum data set) – Regressions in Error! Reference source not found., Error! Reference source not found., Error! Reference source not found., Error! Reference source not found.

Algeria	Cote d'Ivoire	Jamaica	Paraguay	Uruguay
Angola	Cyprus	Jordan	Peru	Venezuela, RB
Argentina	Dominica	Kenya	Philippines	Yemen, Rep.
Bahamas, The	Dominican Republic	Kuwait	Poland	Zambia
Bahrain	Ecuador	Lesotho	Rwanda	Zimbabwe
Bangladesh	Egypt, Arab Rep.	Liberia	Saudi Arabia	
Barbados	El Salvador	Madagascar	Senegal	
Benin	Ethiopia	Malawi	Sierra Leone	
Bolivia	Gabon	Malaysia	Singapore	
Botswana	Gambia, The	Mali	South Africa	
Brazil	Ghana	Malta	Sri Lanka	
Burkina Faso	Grenada	Mauritania	Sudan	
Burundi	Guatemala	Mauritius	Suriname	
Cameroon	Guinea	Mexico	Swaziland	
Cape Verde	Guinea-Bissau	Mozambique	Syrian Arab Republic	
Central African Republic	Guyana	Nepal	Tanzania	
Chad	Haiti	Nicaragua	Thailand	
Chile	Honduras	Niger	Togo	
China	Hong Kong, China	Nigeria	Trinidad and Tobago	
Colombia	India	Oman	Tunisia	
Congo, Dem. Rep.	Indonesia	Pakistan	Turkey	
Congo, Rep.	Iran, Islamic Rep.	Panama	Uganda	
Costa Rica	Israel	Papua New Guinea	United Arab Emirates	

Appendix 2 – Data Description – FDI Discontinuity Determinants

Table 9 – Regression Series 1 (Table 1 Regressions) – Data Summary Statistics

Variable		Number of Observations	Mean	Standard Deviation	Min	Max
fdipgdp	FDI /GDP	1332	3.329	21.509	-15.103	524.880
popgr	Population Growth	1329	1.739	1.090	-0.602	6.017
gdpd	GDP Deflator	1332	39.364	437.840	-23.479	12338.660
energim	Energy Imports (%Total)	1332	-27.826	160.054	-1292.042	100.000
militexp	Military Expenditure (% of total)	899	2.588	2.297	0.001	17.471
tradepgdp	Trade/GDP	1332	68.778	45.913	6.320	456.646
militlab	Military Labor (% of total)	974	1.601	2.114	0.000	29.172
netuser	Internet users (of 1000 people)	828	11.114	18.995	0.000	85.365
edutrend	Average Years of Secondary Education	1332	5.462	3.212	0.000	12.298
rgdpcap	Real GDP per Capita	1330	8057.477	9997.441	102.286	54629.020
lnlrgdp	Lagged Log(Real GDP)	1332	23.403	2.768	17.025	31.112
llgdp	Liquid Liabilities / GDP	1332	0.516	0.376	0.045	3.619
growth	Real GDP per Capita Growth	1329	0.016	0.041	-0.233	0.204
fdidgr	FDI Discontinuities (Growing Threshold)	1332	0.511	0.500	0	1
fdid	FDI Lagged Discontinuity Check (FDI_LAG_CHECK)	1332	0.256	0.437	0	1
fdid	FDIDCOND (See Methodology)	1330	0.101	0.301	0	1
pol_confl	Political Conflict	1332	0.277	0.572	0	2
govtexpofgdp	Government Expenditure	457	25.431	9.974	7.562	55.157
prcrdbofgdp	Private Credit	1332	0.496	0.415	0.013	2.698

Table 10 – List of Countries Used in Regressions Table 1

Algeria	Costa Rica	Greece	Jordan	Panama	Syrian Arab Republic
Angola	Cote d'Ivoire	Guatemala	Kenya	Paraguay	Tanzania
Argentina	Denmark	Haiti	Korea, Rep.	Peru	Thailand
Australia	Dominican Republic	Honduras	Kuwait	Philippines	Togo
Austria	Ecuador	Hong Kong, China	Luxembourg	Poland	Trinidad and Tobago
Bahrain	Egypt, Arab Rep.	Hungary	Malaysia	Portugal	Tunisia
Bangladesh	El Salvador	Iceland	Mexico	Saudi Arabia	Turkey
Benin	Ethiopia	India	Mozambique	Senegal	United Kingdom
Bolivia	Finland	Indonesia	Nepal	Singapore	United States
Botswana	Ethiopia	Iran, Islamic Rep.	Netherlands	South Africa	Uruguay
Brazil	Finland	Ireland	New Zealand	Spain	Venezuela, RB
Cameroon	France	Israel	Nigeria	Sri Lanka	Zambia
Canada	Gabon	Italy	Norway	Sudan	
Chile	Germany	Jamaica	Oman	Sweden	
Colombia	Ghana	Japan	Pakistan	Switzerland	