

Title: Impact of local conditions on the FDI-growth relationship

Author name: Rinchen Dorji

Correspondence

Rinchen Dorji

Graduate School of Economics, Nagoya University
Press-Inn Yamate, Aichi-Ken, Nagoya-shi

Postal code: 466-0804

Phone contact: 08037111410

Email address: jalamjalamgi@gmail.com

Impact of local market conditions on the FDI-growth relationship

Abstract

Empirical puzzle regarding FDI-growth relationship has recently been explained in terms of host country's absorptive capacities. Countries with good absorptive capacity tend to harness benefits while others experience negative impacts from FDI. Nonetheless, extant literature fails to identify a variable that measures local market conditions comprehensively, which may have biased their estimates in explaining the growth productivity of foreign capitals. This paper, therefore, uses two variables (level of domestic investment and productive capacity) as a measure of local conditions, and examine if they affect the relationship between growth and FDI inflows using panel data approaches. It is unveiled that the positive effects of FDI diminishes with every increase in local market conditions. This may be interpreted as crowding-out effect or weak impact of FDIs on growth in strong and competitive domestic markets. We propose that national leaders must carefully assess MNC's impact on the local economy before making any decisions regarding FDI and related policies.

Keywords: economic growth, foreign investment, domestic investment, fixed effects, developing countries.

1. Introduction

The influx of foreign capital into developing countries is believed to bring in not only advanced technologies, knowledge, and managerial skills but also cause spillover effects. These spillover effects can be either positive or negative, largely depending on the home market's absorptive capacity; that is its ability to take advantage of foreign capital. Empirical evidence reports that countries will grow with foreign investment if they can maintain a higher level of human capital, advanced physical infrastructures and financial services, liberal trade policies, and stable macroeconomic conditions. For instance, Borensztein et al. (1998) find foreign direct investment (FDI) to impact growth positively but the magnitude of which depends on the stock of human capital available in the host economy, suggesting that FDIs are growth productive only with the interaction with human capital. Similar recognition of human capital in the FDI-growth relationship has also been offered by Su and Liu (2016) where they discovered human capital as a facilitator for technology transfer. These findings imply that countries performing poorly in terms of human capital will not be able to reap benefits from FDI. Similarly, researchers accord equal importance to infrastructural facilities, financial systems, and legal institutions in the host countries for FDI productivity. Alfaro et al. (2002) claim that emerging economies must maintain a minimum level of financial development to leverage technology diffusion. In specific terms, they estimate an annual growth rate of 0.6 percent higher for the countries with better financial markets.

Empirical evidence thus far measures absorptive capacity of host economies in terms of specific conditions such as stock of human capital, level of financial sector development, access to quality infrastructures, macroeconomic variables, policy instruments among others in the local market. For instance, while explaining the importance of local conditions, Borensztein et al. (1998) defined local conditions by the level of human capital stock in the host countries. Although other impacts are appropriately controlled in their models, the coefficient of interaction term "FDI-human capital" does not fully capture the intended interaction effect of local conditions. This results in underestimation of the interaction effect. The same issue persists in the studies that use one or few specific variables to define local conditions. This paper therefore, reinvestigates the impact of local market conditions in the host economies to explain the

relationship between FDI and economic growth by redefining local conditions by a more holistic variable.

Theoretically, countries that can offer adequate favorable business and economic conditions generally will have a large and persistent domestic investment. In other words, high level of domestic investment can mean that an economy is attractive with low business risks and abundant opportunities. Another interpretation can be such that in countries where there exist large domestic investments, there will be better infrastructures, institutions, health and education, market systems among others, altogether defining a highly competitive/efficient market economy. Thus, level of domestic investments in the host economies can be regarded as a true indicator of local market conditions. Similarly, UNCTAD publishes data on productive capacities of 193 economies. Productive capacity, in their definition measures a country's ability to produce goods and services and grow over time.

Therefore, this paper considers domestic investments and productive capacity of host countries as better indicators of overall local conditions and examines how it influences the relationship between FDI and growth in developing countries. While growth theories posit foreign investments as a source of capital, the ultimate reality is not always that simple. In the words of Agosin and Machado (2005), the growth effect of FDI is not always the same, varying from country to country, depending on domestic policy, the kind of FDI the country receives, and the strength of domestic enterprises.

In fact, literature is not silent on the significance of domestic investment on economic growth. Alfaro et al. (2002) use domestic investment as a regressor in the growth regression along with various other variables. Marc Lautier & Francois Moreaub (2012) evaluates relationship between domestic and foreign investments for a panel of 68 countries in which domestic investment is found to serve as a catalyst for FDI attraction. Our study deviates from the existing ones by examining impact of domestic investments on growth but via its moderation effect. By doing so, we investigate the impact of domestic conditions and foreign investments on growth independently and by their interaction. In specific terms, this study examines if the level of domestic investments/productive capacity of host countries influence the growth productivity of foreign capital. Based on the data of 102 countries for the period 1996–2020, we find growth

productivity of FDI in developing countries to decrease with every increase in domestic conditions. It implies – foreign capital inflows either displaces local enterprises or its impact becomes negligible as local economy develops.

The next section offers a brief description of the data used for the study followed by the presentation of methodology in section III. Section IV contains a detailed presentation of the results obtained from several econometric approaches. Finally, section V presents a brief conclusion along with a discussion.

2. Data

This study is based on a dataset consisting of a cross-section of underdeveloped and developing countries for the period 1996–2020. According to the World Bank database, there are 137 countries in the list of low-income, lower-middle, and upper-middle-income categories. However, data on some of these countries are limited because of which only 102 countries have been included in this study. In short, the choice of countries is primarily based on data availability. Information on the FDI flows suggests that developing and underdeveloped countries received an increasing amount of foreign investments only from the later part of the 20th century, especially after 1990s. Therefore, the period before 1990s has been excluded. There are several sources of data. Information on GDP per-capita, net FDI inflows, gross fixed capital formation, inflation, broad money supply, trade, real exchange rate and gross school enrollment ratios are extracted from the World Development Indicators, DataBank (2021). Data on productive capacity is obtained from UNCTAD database.

The output growth rate is measured as the growth of per capita GDP in constant dollars (2000) obtained from World Development Indicators, DataBank (2021). Inflation, measured by the annual consumer price index proxies macroeconomic stability. Openness to international market is measured by the ratio of the sum of exports and imports to GDP. The secondary (tertiary) school enrollment ratio is calculated by dividing the total number of students enrolled into secondary (tertiary) levels by the total population in that age category. Secondary education enrollment rate has also been considered to measure human capital by Borensztein et al. (1998). In addition, to capture the country differences in terms of financial sector development, the

M2/GDP ratio is included in the model. For the lack of multi-year cross-country data on domestic investment especially of the developing countries, we use information on gross fixed capital formation as does Alfaro et al. (2002) and Marc Lautier & Francois Moreaub (2012).

Brief statistics of the data in Table 5 show that the countries included in the sample are varied in terms of almost all variables. Concerning average growth during the 25 years from 1996 to 2020, Eritrea experienced the lowest (-1.00%) growth while China had the highest (8.48%) growth in per-capita GDP. Foreign investment inflows into the developing countries have risen sharply over the years, increasing from USD 345 billion in 1995 to USD 1530 billion in 2019 (Marc Lautier & Francois Moreaub, 2012). During the same period, net FDI inflows as a ratio to GDP were highest in Liberia and lowest in Iraq. Bhutan tops in terms of capital accumulation while the Solomon Islands experienced the slowest growth in capital during the period. Countries also differ vastly in terms of human capital accumulation measured by both secondary and tertiary school enrolment rates.

3. Methodology

The main purpose of this paper is to estimate the impact of foreign capital on growth and examine if the local conditions play any role in explaining the FDI-growth relationship in developing countries. While researchers in the past such as Alfaro et al. (2002), Borensztein et al. (1998) among others examine the same problem, their estimates suffer from incomplete moderation effect of local conditions. This is likely because they measure local conditions using some specific indicator variables such as financial institutions, trade regimes, human capital, availability of natural resources and so on. When done so, the estimates of the effect of local conditions on the relationship between FDI and economic growth can be biased.

We first adopt a model similar to that of Alfaro et al. (2002).

$$y_{it} = \beta_0 + \beta_1 y_{initial} + \beta_2 FDI_{it} + \beta_3 LC_{it} + \beta_4 (FDI_{it} * LC_{it}) + \sum \beta_j X_{it} + e_{it} - (1)$$

where y_{it} represents per capita GDP for country i in period t , FDI_{it} and LC_{it} measure net foreign capital inflows and local conditions respectively. Their inclusion in the growth regression independently helps test if they affect growth by themselves. X_{it} comprises various control and

policy variables that are frequently included in growth regressions of cross-country nature. Following existing literature, human capital, financial development, inflation rate, and trade openness have been included to control for country differences. Also, lagged values of the dependent variable (y_{it-1}) are included in the model to capture convergence effects. Finally, e_{it} is the error term capturing unobserved country and time-variant effects in the data.

Cross-country estimates of this nature most often are affected by a presence of unobservable fixed effects. Inability to properly account for these effects would bias the estimates. Hence, we implement fixed effect estimates of equation (2) which includes individual-specific (λ_i) and time-specific (θ_t) effects respectively.

$$y_{it} = \beta_0 + \beta_1 FDI_{it} + \beta_2 LC_{it} + \beta_3 (FDI_{it} * LC_{it}) + \lambda_i + \theta_t + e_{it} - (2)$$

To eliminate the country fixed effects, this study employs fixed effect (first difference) estimator approach. Each variable is subtracted by its own value of the previous year and we obtain equation (2).

$$\dot{y}_{it} = \beta_1 \ddot{a}_{1it} + \beta_2 \ddot{a}_{2it} + \beta_3 (\ddot{a}_{1it} * \ddot{a}_{2it}) + \ddot{u}_i - (3)$$

where double dots above the variables indicate their values in first differences, \ddot{a}_{1it} and \ddot{a}_{2it} are first differences of FDI and local condition variable, and \ddot{u}_i error term. Following literature, we include a set of regressors to control if any, omitted variable biases in the model. Variables such as human capital, financial development, inflation rate, and trade openness have been included in the model.

4. Estimation Results

This paper empirically examines the impact of FDI on economic growth and then assesses if the effectiveness of FDI in enhancing growth depends on the local conditions of developing host economies.

We begin by implementing a simple panel data approach by grouping the sample period into five five-year periods (1996–2000, 2001 – 20005, ... , 2016–2020) and construct the variables for

each period separately. The dependent variable is the growth rate of GDP per-capita during each sub-period and independent variables are the averages of the same variables for each group. We treat level of domestic investment to define local conditions. The results are presented in Table 1 with standard errors in parenthesis. The estimated coefficients of the variables of interest appear as expected. Growth is positively influenced by foreign capital inflows and domestic investment. In specific terms, a unit increase in net FDI inflows-to-GDP ratio causes per-capita GDP to grow by 0.006–0.009 percent.

In column (2) through (4), additional covariates are added in the model for robustness test and results do not show significant variation from the results in column (1). It is worth mentioning that the coefficient for FDI is positive and statistically significant throughout these models, suggesting a positive direct impact of FDI inflows on the growth of developing economies. While the other results are as expected, trade openness appears negative. It is surprising that the countries that are more liberal/open to international markets seem to register lower growth contrasting with the existing literature.

Table 1: Panel Regression Results

Models	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial GDPPC	-.273*** (.033)	-.199*** (.035)	-.152*** (.033)	-.167*** (.035)	-.278*** (.033)	-.205*** (.035)	-.153*** (.034)	-.162** * (.035)
Pop-growth	-.001 (.014)	-.001 (.013)	-.022* (.012)	-.049*** (.013)	00 (.014)	.001 (.013)	-.021* (.012)	-.052** * (.013)
DI	.007*** (.002)	.006*** (.002)	.004*** (.001)	.003** (.001)	.009*** (.002)	.008*** (.002)	.004*** (.002)	.002 (.002)
HK	.003*** (.001)	.004*** (.001)	.002*** (.001)	00 (.001)	.003*** (.001)	.004*** (.001)	.002*** (.001)	00 (.001)
FDI	.008*** (.002)	.006*** (.002)	.006*** (.002)	.009*** (.002)	.029*** (.008)	.022*** (.008)	.008 (.007)	-.004 (.008)
Interaction					-.001*** (.00)	-.001** (.00)	-.00 (.00)	-.00* (.00)
Money		-.002*** (.001)	-.002*** (.001)	-0.00 (.001)		-.002*** (.001)	-.002*** (.001)	00 (.001)
Trade Open		.001** (.00)	.001* (.00)	.001*** (.00)		.001* (.00)	.001* (.00)	.001*** (.00)
Inflation			-.00*** (.00)	-.001*** (.00)			0*** (.00)	-.001** * (.00)

Constant	1.887*** (.234)	1.374*** (.244)	1.122*** (.236)	1.271*** (.242)	1.857*** (.232)	1.364*** (.242)	1.122*** (.236)	1.265** * (.241)
R-squared	0.232	0.263	0.307	0.367	0.245	0.272	0.307	0.374
Number of obs	491	470	440	357	491	470	440	357
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*** $p < .01$, ** $p < .05$, * $p < .1$

To examine if the impact of FDI on growth depends on local conditions, we include an interaction term between FDI and domestic investment in model (5) through (8). The interaction term appears surprisingly negative and statistically significant. This result is in contrast to the findings of Le and Suruga (2006), Borensztein et al. (1998), Alfaro et al. (2002), among others where they find local conditions to intensify positive externalities associated with FDI. Our results show that foreign investment plays an important role in the growth of developing economies via the transfer of limited resources. However, the positive impact of foreign investment on growth falls as the local conditions in the host economy increases. This possibly suggest that the indirect effect of FDI is negative for developing countries. It may be that a large influx of foreign investments is displacing domestic enterprises which is known as crowding-out phenomenon. Primarily, foreign multinationals are not only technologically advanced but also substantially large making domestic firms incomparable and impossible to compete with them in the market. Inclusion of additional explanatory variables in the model does not lead to noticeable change in the estimates shown in models (5) through (8) in Table 1.

Any presence of country-specific fixed effects in the model can be eliminated by using fixed effect estimators. We run fixed effect first difference estimator given in equation (3), the results from which are given in Table 2. The abundance of domestic investment in the host economy negatively affects the growth effect of FDI. In other words, better the host economy is in terms of its local conditions, FDI is less likely to be productive in enhancing growth in developing countries. It seems like domestic circumstances are the dominant determinants of economic growth in developing countries with large domestic conditions. Indeed, the coefficient estimates of FDI and DI explain this.

Table 2: First Difference Estimates

Models	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FDI	.012*** (.0024)	.014*** (.0024)	.014*** (.0024)	.011*** (.0022)	.012*** (.0024)	.015*** (.0023)	.015*** (.0024)	.012*** (.0023)
DI	.334*** (.0088)	.339*** (.0087)	.323*** (.0094)	.414*** (.0104)	.338*** (.0091)	.344*** (.0089)	.326*** (.0094)	.419*** (.0104)
Interaction					-.015** (.0069)	-.014** (.0067)	-.023** (.0072)	-.035** (.0098)
Trade Open		-.003*** (.0003)	-.002*** (.0003)	-.002*** (.0003)		-.003*** (.0003)	-.002*** (.0003)	-.002*** (.0003)
Financial			.001* (.0004)	.0001 (.0005)			.001 (.0004)	.001 (.0004)
Inflation				-.0002** (.0021)				-.0002** (.0001)
Constant	.023*** (.0022)	.022*** (.0022)	.023*** (.0022)	.019*** (.0021)	.023*** (.0022)	.023*** (.0022)	.023*** (.0022)	.019*** (.0022)
R-squared	0.428	0.455	0.404	0.491	0.429	0.456	0.407	0.493
Number of obs	2158	2143	2032	1905	2158	2143	2032	1905
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*** $p < .01$, ** $p < .05$, * $p < .1$

Is the indirect effect of FDI same for all countries? To answer this, we perform subsample analyses for different groups of countries based on income level and location. Results are interesting – the negative interaction effect is persistent only for upper-middle income countries. Intuitively, this can be true because low-income countries may not have sufficient domestic investments for crowding-out effect to happen. It is important however to note that the interaction effect is neither positive for the low-income countries. When analyzed by country location, the negative indirect effect is apparent in European and Oceania and Middle-Eastern countries. While the same effect is inconclusive in Sub-Saharan African and Latin American countries, Asian countries seem to experience differently. In the Asian developing countries, the local conditions seem to be positively moderating the impact of FDI on growth. In other words, the Asian countries that offer better business and economic climate reap higher benefits from FDI. The results of Asian, European and Oceania, and Middle Eastern country groups are given in Table 5.

Endogeneity Issues

While the main intention is to assess the direction of effect from FDI and local conditions on growth, it is plausible that higher growth would attract more FDI and foster DI or create better local conditions in the developing countries. This would lead to endogeneity problem and

produce biased estimates. To deal with this problem, we adopt two different approaches – (1) instrumental variable approach and (2) a five-year forward-moving average method proposed by Le & Suruga (2005). In the latter approach, dependent variable is the average of five-years forward values per-capita income.

First, we construct instrumental variable approach for which identification of valid instruments becomes a necessity. As per Wheeler & Mody (1992), current investment decisions in the foreign markets are largely dependent on the previous decisions. It implies – larger the investment in the previous period, more it will be in the current period. Similar intuition can be applied to argue that current domestic investment will be high in countries where previous period domestic investments are large. Thus, we use lagged values of the FDI and domestic investment as instruments. Alternatively, as Froot & Stein (1991) suggest, FDI can also be instrumented by real exchange rate since variation in real exchange rate affect the relative wealth of firms and their investment decisions in the foreign markets. We use the two instruments alternatively and present results in Table 3. Models (1) through (3) offer results from lagged values of FDI and DI as instruments, models (4) and (5) considers real exchange rate as instrument for FDI and Models (6) through (8) presents findings from forward moving average approach.

Table 3: Endogeneity controlled estimates

Models	Lagged values as instruments			RER as instrument		5-year Forward Moving Average		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FDI	.008** (.0034)	.008** (.0034)	.005 (.0041)			.046*** (.0064)	.028*** (.005)	.025** (.008)
DI	.066*** (.0126)	.086*** (.0149)	.112*** (.0211)			.032*** (.0023)	.023*** (.002)	.017*** (.002)
Real Ex. Rate								
Interaction	-.021** (.0095)	-.070*** (.0126)	.029 (.019)			-.001*** (.0001)	-.001*** (.0001)	-.001** (.0002)
Trade Open		-.000 (.0004)	-.001 (.0004)				-.001 (.0007)	-.001 (.0007)
Inflation		-.000 (.000)	-.000 (.000)				.019*** (.0007)	.016*** (.001)
HK			-.002* (.0013)					-.002*** (.0003)
Financial development			.000 (.001)					.019*** (.001)
Constant	.0425** (.0095)	.045*** (.0031)	.049*** (.0044)			6.75*** (.0518)	6.244*** (.0641)	5.389*** (.0833)
R-squared	0.023	0.036	0.051			0.497	0.126	0.121
Number of obs	2073	1902	1074			1183	1823	1029
Prob > F	0.000	0.000	0.000			0.000	0.000	0.000

*** $p < .01$, ** $p < .05$, * $p < .1$

Note: FDI and DI are in their lag forms in IV models.

The second approach is the one suggested by Le and Suruga (2005) in which five-year forward moving average growth in per-capita income is regressed with the following model:

$$income_{i(t+1,t+5)} = \beta_0 + \beta_1 FDI_{it} + \beta_2 LC_{it} + \beta_3 (FDI_{it} * LC_{it}) + \sum \beta_j X_{it} + e_{it} \quad - (2)$$

where $t = 1996, 1997, \dots, 2020$, $growth_{i(t+1,t+5)}$ is the five years forward moving average of per-capita GDP for country i , while the rest are same as in equation (1). Local condition is still defined by the level of domestic investments. The number of observations for each country reduces by five years (1996 – 2015) in this model. Fixed effect regression of this model produces results very similar to those from previous models. The interaction term is negative and statistically significant as shown in models (6) through (8) in Table 3.

All results above confirm that in contrast to the previous findings in literature, growth effect of FDI is negatively moderated by business and economic conditions in the local market. Host countries with better or efficient local conditions seem to derive lower growth effects from foreign investments. Some plausible explanations are (1) crowding-out effect – where inflow of foreign investments displaces domestic enterprises and (2) countries with efficient local markets experience growth more from its own means than from foreign investments. Our results partly conform to the findings of Agosin & Machado (2005) and Adams (2009).

Given these findings, we posit that developing countries must be extra careful while framing policies related to foreign investments. While there are certainly some direct benefits from FDI to growth, its magnitude of impact is far from the widespread belief. Transfer of technology and related resources may be occurring with FDI but it comes at the cost of local enterprises. Our analysis confirms that there are negative indirect impacts from FDI to developing economies. Hence, countries planning for liberal FDI policies and most importantly the countries that use distortionary policy instruments in favor of foreign investments must rethink and carefully weigh the impact of MNCs on the local economy.

5. Conclusion and Discussion

The existing literature suggests that developing countries must offer adequate local conditions so as to leverage the increasing inflows of foreign capital. In a similar vein, measuring the local conditions by the level of domestic investments and productive capacity of host countries, we examine the impact of local conditions on the FDI-growth relationship. Based on the data from 1996 to 2020 for 102 countries, panel data estimates confirm that a large influx of foreign capital generally leads to a growth in per-capita income in developing economies, however, this positive impact disappears with increase in local conditions. In specific terms, the positive externalities associated with FDI decreases with host country local conditions.

Overall, the results suggest that to fully reap benefits from FDI, developing countries must adopt screening policies to ensure that FDI doesn't displace domestic firms. There are a few possibilities to realize this – (i) allow foreign investments in areas/sectors in which domestic investment is scarce, (ii) ensure that foreign investment leads to the production of new goods that complement the existing domestic investment, (iii) study its local economic opportunities and challenges, and then go after specific foreign companies that fit well in its growth process as suggested by Agosin & Machado (2005). Alternatively, developing countries may emphasize on its own local market since FDI's impact is smaller in comparison to the impact of its own local conditions. Moreover, this study finds that the impact of FDI is decreasing as the local economy progresses in its own domestic terms.

NOTE: This is an incomplete report. I could not complete examining two approaches mentioned in the report – (1) treating productive capacity as an indicator of domestic market conditions and (2) considering real exchange rate as an instrument for FDI. However, these results will also be reported on 4th June during the presentation. Thank you for your kind consideration.

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Appendices

Table 4: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Growth rate	98	.829	1.157	-1	8.477
initial gdppc	97	2304.973	1898.743	221.386	9061.76
DI	102	21.997	6.234	7.727	48.399
fdi	102	3.683	3.494	-.124	25.044
Pop growth	102	1.705	1.047	-.736	3.661
money	102	43.167	29.497	10.745	198.624
sec	102	58.972	26.529	10.942	102.917
infla	99	29.025	62.557	2.132	381.429
Trade Open	102	75.068	32.473	23.456	202.167

Table 5: Country-group differences

Models	Asia		Europe and Oceania		Middle East	
FDI	.020*** (.005)	.014** (.005)	.009* (.0055)	.011** (.0056)	.008 (.0116)	.016 (.0111)
DI	.416*** (.021)	.443*** (.021)	.484*** (.021)	.464*** (.0225)	.342*** (.0369)	.381*** (.0349)
Interaction	.006 (.0218)	.038* (.022)	-.069** (.0253)	-.062** (.0258)	-.225*** (.0614)	-.187** (.0623)
Trade Open		-.001** (.0005)		-.002** (.0005)		-.001 (.0011)
Financial		-.0001 (.0007)		.002** (.001)		-.002* (.0013)
Inflation		.002** (.0006)		-.0002** (.000)		-.002* (.0007)
Constant	.031*** (.0041)	.029*** (.0042)	.022*** (.0047)	.026*** (.0052)	.035*** (.0088)	.034*** (.0082)
R-squared	0.557	0.613	0.560	0.569	0.459	0.659
Number of obs	388	367	462	400	128	104
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

*** $p < .01$, ** $p < .05$, * $p < .1$