Determinants of Foreign Direct Investment to Developing Countries

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Determinants of Foreign Direct Investment to Developing Countries

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Abstract
In this paper we explored different factors responsible for variation in foreign direct investment to developing countries. We used macro panel data of 57 low and lower middle income countries for last ten years (2000-2009) to empirically address this question. We used instrumental variable technique to correct for reverse causation and omitted variable bias in our estimates. In addition, we also controlled for country specific and time specific fixed effects to obtain unbiased estimates. This study found that market size is the most important determinant of foreign direct investment to developing countries. Further, stable macroeconomic environment, global integration, availability of skilled labor force and developed financial sector also promote foreign direct investment in developing countries.

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1. Introduction

Foreign direct investment has an increasingly important role in the development of capital deficient developing countries. This is because, it is not only a stable source of foreign inflow but it also helps in technological transfer and employment generation (Mottaleb and Kalirajan, 2010). Foreign direct investment also provides a viable way for developing countries to increase their savings and achieve economic growth. However, flows of foreign direct investment have varied across developing countries. While some of the developing countries have been successful in attracting considerable investment, capital inflows still elude most low income countries.

Why is this so? Why have some countries succeeded in attracting foreign direct investment while others have not? This study is an attempt to answer these questions. Specifically, this study examines what characteristics of a country are likely to be a magnet for multinational companies and what policies implemented in the country promote foreign capital inflows. Some of the plausible attractions for investors may include the potential market for their goods and services. This may be due to the fact that a foreign investor may find it more cost effective to produce and sell in the same area rather than incur transportation costs as well as tariffs on importing their products. Another attraction for corporations is an area with natural resources where they can set up their production process close to the raw materials and save the cost of transporting their inputs. Yet other corporations seek more efficiency, a strategically situated location which will allow them to reduce their production costs.

The study uses panel data for 57 low and lower middle income countries from different regions of the world; Sub-Saharan Africa, Eastern Europe, Asia, and Latin America. Compared to most studies on determinants of foreign direct investment, this study looks at a broader set of countries. This paper is interested in looking at characteristics common to the poorer regions that have succeeded in attracting more capital inflows. It would be important to find out how much of these characteristics are due to good policy and can be implemented in the countries with lower FDI flows. Thus it would be interesting to explore the reasons behind this difference.

The study plan to use a model based on previous empirical papers that have been done on the determinants of foreign investment. The relevant factors will include market size, global integration and business friendly environment of the host country. We used GDP per capita as a measure for market size and purchasing power while average tariff on imports are used as a proxy for global integration. Regarding business friendly environment, we used different indicators such as inflation rate for macroeconomic environment, secondary school enrolment rate for availability of skilled labor and M2 to GDP ratio for financial sector depth.

2. Background and literature review

As per the recent data of United Nations Conference on Trade and Developments (UNCTAD), global foreign direct investment trends suggest that almost one fifth of the total world foreign direct investment inflows are destined to the developing world. Moreover, they have not been able to increase their share in the last fifteen years. For instance, their share in world total foreign direct investment inflows had slightly declined from 25.1 percent in 1995 to 23.5 percent in 2007. However, this share has slightly increased to 27.6 percent in 2009, probably because the recent financial crisis has affected the investment inflows to developed world more severely than to the developing world.

Within the developing countries, low and lower middle income countries are attracting more than 40 percent of the total foreign direct investment in the developing countries. Moreover, Figure 1b suggests that these countries are not catching up with the upper middle income countries. It appears that as the low income countries were less integrated with the rest of the world, they were relatively less affected by the global financial crises (UNCTAD). Moreover, World Bank data set of World Development Indicators suggests that within low and lower middle income countries foreign direct investment inflows are concentrated in a

Figure1a: Foreign Direct Investment Trends (US$ billion)

Figure 1b: Foreign Direct Investment Trends in Developing countries (US$ billion)
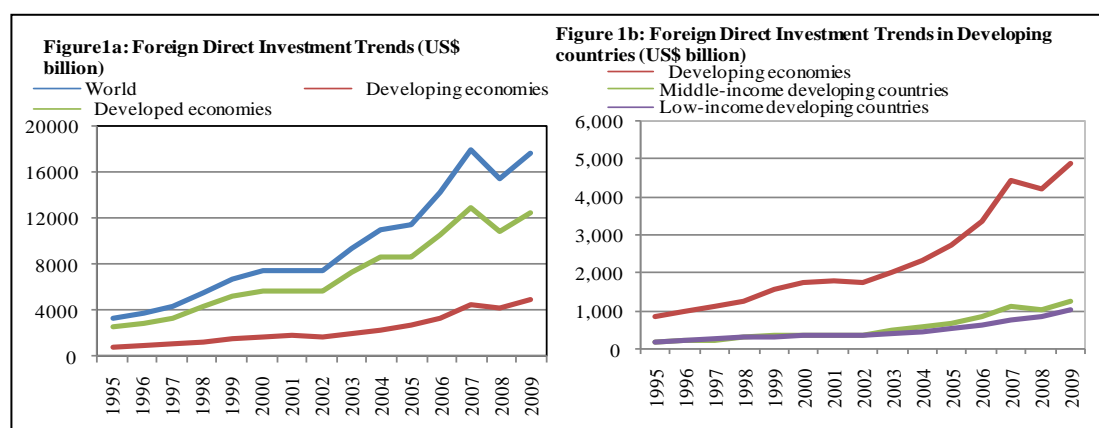
small number of countries. For instance, more than 80 percent of the foreign direct investment inflows to the low and lower middle income countries were concentrated in only 10 out of 96 countries. Likewise, some of the countries are experiencing increase in foreign direct investment while others are witnessing a decline. Specifically, compared with 2000, FDI inflows to China and Thailand declined in 2009 while FDI inflows to the rest of top ten countries have increased during the same period. This increase in FDI was more pronounced in case of India that has been able to triple it in the last ten years while China has witnessed the largest decline in these inflows during the period.

Table 1. Main Recipients of FDI amongst low and lower middle income countries

percent share in total low and lower middle income countries

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average 2000-09
China	66.6	66.1	63.4	59.1	58.9	54.8	43.9	52.5	49.9	41.2	55.6
India	6.2	8.2	7.2	5.4	6.2	5.3	11.4	9.5	13.9	18.2	9.2
Thailand	5.8	7.6	4.3	6.6	6.3	5.6	5.3	4.3	2.9	3.1	5.2
Egypt, Arab Rep.	2.1	0.8	0.8	0.3	1.3	3.7	5.6	4.4	3.2	3.5	2.6
Ukraine	1.0	1.2	0.9	1.8	1.8	5.4	3.2	3.8	3.7	2.5	2.5
Nigeria	2.0	1.8	2.4	2.5	2.0	3.4	5.0	2.3	1.6	3.0	2.6
Vietnam	2.3	1.9	1.8	1.8	1.7	1.4	1.3	2.5	3.2	4.0	2.2
Indonesia	-7.9	-4.4	0.2	-0.7	2.0	5.8	2.8	2.6	3.1	2.6	0.6
Pakistan	0.5	0.6	1.1	0.7	1.2	1.5	2.4	2.1	1.8	1.3	1.3
Sudan	0.7	0.9	0.9	1.7	1.6	1.6	2.0	0.9	0.9	1.5	1.3

Source: World Development Indicators, World Bank

The cross country varying trends of foreign direct investment inflows raise the question of why some countries are attracting more investment than others. There may be different possible reasons behind this variation. For example, higher investment inflows to China and India may suggest that market size is important. Moreover, considerable increase in foreign

direct investment to India and persistent fall in share of China in overall foreign direct investment inflows in the last ten years may also suggest improvement in institutional quality.

Different studies have tried to answer this question. Some of the studies and their findings are reviewed here. Hasen and Gianluigi (2007) find that for the countries in the Arab Maghreb Union (AMU), trade openness and the presence of foreign market are not significant while growth in the market size and existing stock of FDI are crucial. For the AMU countries, the authors find that the bigger market is important, while measures of government mismanagement such as inflation and high fiscal deficit act as disincentives for FDI inflows.

Mottaleb and Kalirajan (2010) look at several variables among them include the GDP growth rate, trade openness, internet users per 100 people, inflation and business friendliness indices. They find that among them the most economically and statistically significant variables are those that measure the trade policy and the business environment.

Other studies have examined the role of highly skilled labor force in attracting investment in a country. Noorbakhsh, Paloni and Youssef (2001) study the role of human capital in attracting multinational corporations to a particular location and find it to be a relevant factor in the decision to invest in a country. The study finds that countries with low cost and unskilled labour find it difficult to attract multinational corporations with high value-added to their economies.

Frenkel, Funke, and Stadtmann (2004) use a panel of bilateral FDI flows to analyze the factors that determine the level and destination of FDI flows for potential investors. They use a panel analysis that includes variables among them on trade openness, inflation, country risk. Host country risk is found to be crucial in the level of investment that is attracted to a country.

3. Empirical strategy

To empirically address the question of why some countries attract more foreign direct investment than others, it will be useful to discuss the major considerations behind the investor's decisions. The prime objective of the foreign investors is to maximize their profit. Therefore, they will be making investment in those economies where they have higher return on their investment. They can maximize their profit by either producing more or by lowering their costs of production. In the former case, the investors must be looking at market size while in the latter case they will be curious to know about the input costs and business friendly environment of the economy. Moreover, the investors can also maximize the profit by producing more if the host economy is well integrated with the rest of the world. In this case, the investor can realize economies of scale by exporting to the rest of the world.

In view of the above, we can broadly specify the determinants of foreign direct investment as:

FDI = f (market size, global integration, business friendly environment)

In this study we use gross domestic product per capita on purchasing power parity basis as the proxy for market size and purchasing power of the people. Global trade integration is proxied by the tariff rate on imports. Business friendly environment is captured by a number of indicators. For instance, inflation rate is used as a proxy for overall macroeconomic environment where stable and moderate inflation indicates economic stability and vice versa; secondary school enrolment is used for the availability of skilled labor while M2 to GDP ratio

is used to measure the financial sector depth which reduces the costs of financial transactions. Moreover, foreign direct investment is measured as percent of GDP.

In estimating the effect of these factors on foreign direct investment, Ordinary Least Squares strategy may suffer from bias. This is because of the two reasons. First, there is two-way causality between GDP per capita and foreign direct investment. Specifically, an increase in foreign direct investment not only increases the GDP per capita through factor accumulation (increase in physical capital) but also through increase in total factor productivity emanating from transfer of technology.

Second, there may be some measurement error in the GDP per capita on purchasing power parity basis. In particular, purchasing power parity exchange rate is calculated by using world average ratio of tradable to non-tradable. As tradable to non-tradable ratio varies from country to country, there are fair chances of measurement error in purchasing power parity exchange rate and resultantly in the measurement of GDP per capita on purchasing power parity basis. As measurement error makes the estimates too small, it will cause attenuation bias in the OLS results.

To avoid the bias inherent in OLS estimation, in this study we use an instrumental variable approach, using military expenditure as percent of GDP as the instrumental variable. Military expenditure is a good instrument as it is strongly correlated with GDP per capita and it affects foreign direct investment only through GDP per capita. Moreover, foreign direct investment does not appear to affect military expenditure.

In order to eliminate other potential sources of bias, particularly those arising from country specific unobserved characteristics which may not only affect FDI but may also be correlated with the independent variables, we use a fixed effects strategy. For instance, cross country differences in geographic location and marginal propensities to consume not only affect foreign direct investment but are also correlated with the GDP per capita. Similarly, common external shocks (e.g. global business cycles) not only affect the foreign investment inflows but are also correlated with other independent variables. In this situation, the estimates become biased. In order to control for these factors, we have introduced entity fixed and time fixed effects in our model.

Specifically, the model to be estimated looks as follows:

$$FDI_{it} = \beta_0 + \beta_1 marketsize_{it} + \beta_2 \inf_{it} + \beta_3 tariff_{it} + \beta_4 educ_{it} + \beta_5 (M2/GDP)_{it} + \lambda_1 S_i + \lambda_2 T_t + \varepsilon_{it}$$

Where FDI_{it} is the foreign direct investment as percent of GDP in country i at year t.

$marketsize_{it}$ is the GDP per capita on purchasing power parity basis of country i at year t.

$\inf_{it}$ is the inflation rate of country i at year t.

$tariff_{it}$ is the tariff rate on imports of country i at year t.

$educ_{it}$ is the higher secondary enrollment rate of country i at year t.

$(M2/GDP)_{it}$ is the broad money supply to GDP ratio of country i at year t.

S_i and T_t are the country specific and time specific dummies respectively.

4. Preliminary data analysis

This study is based on data collected from 57 low income and lower middle income countries from 2000 to 2009. All the data is compiled from World Bank dataset of World Development Indicators. Likewise the definition of low income and lower middle income countries is taken from World Bank classification of countries as per their income. It may be pointed out that initially, we planned to collect the data of all the 97 low and lower middle income countries as defined by World Bank. However, because of data unavailability of some of the countries we have to restrict our sample to 57. Importantly, this sample is still representative of almost all the regions of low and lower middle income countries (see Appendix A).

Preliminary data analysis is shown in the scatter plots. Theses scatter plots suggest that FDI relationship with the GDP per capita, secondary school enrolment rate and trade openness is in line with economic theory. However, its relationship with inflation rate and broad money to GDP ratio is counter intuitive (see Figure 2).

This may be because this is a simple correlation where we are not controlling for other factors. Further if we adjust for outliers (colored red) then relationship with inflation and broad money appears in line with economic intuition.

It may also be pointed out that we also looked at the other important variables for physical infrastructure and quality of institutions. Although we could not include these variables in the final regression because of limited availability of data, the scatter plots of all these variables also make economic sense (see Figure 2).

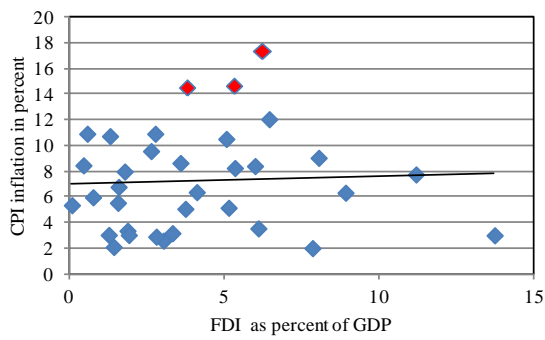Figure 2: Scatter Plots of FDI with Different Indicators
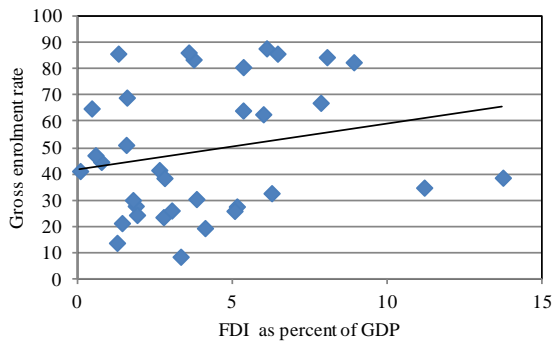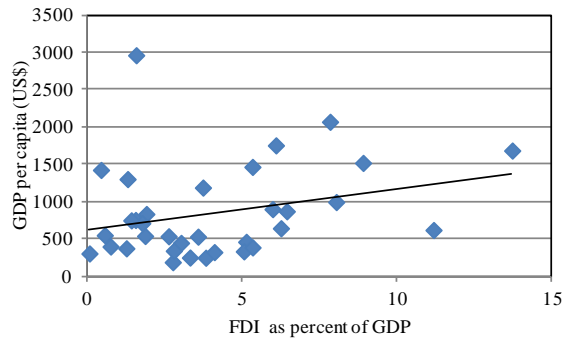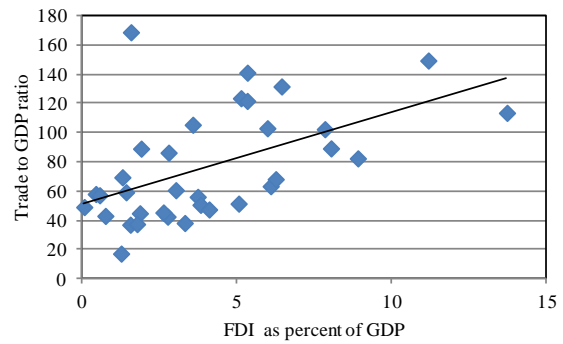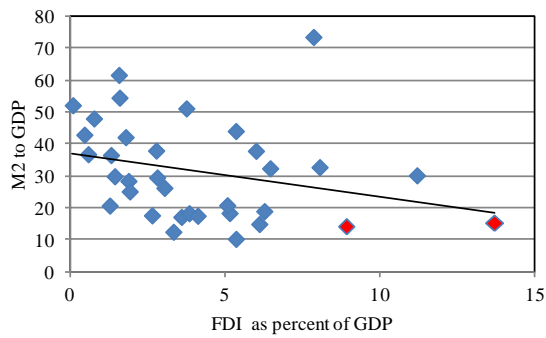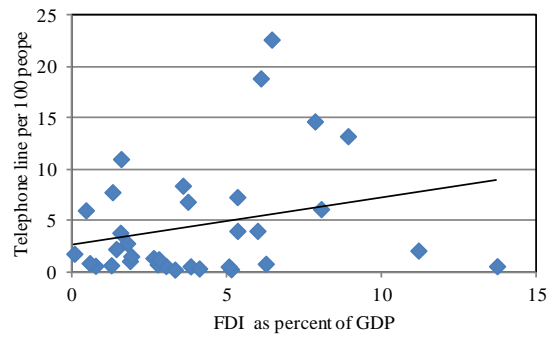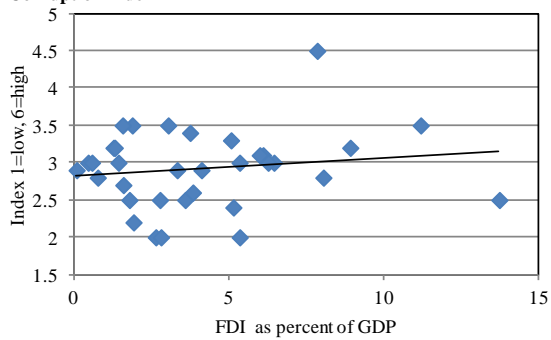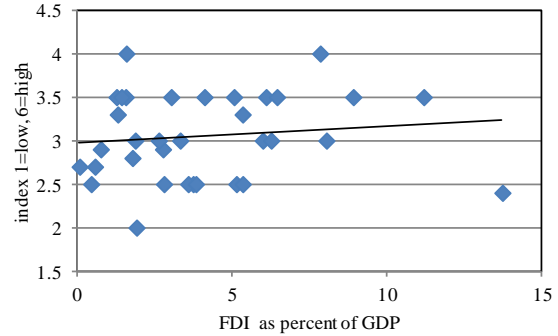
5. Results

Table 2 shows the results of the first stage regression. The estimates suggest that the instrumental variable is statistically significant. Likewise, on the basis of F-statistics being greater than 10 percent level of significance it may be argued that our instrument is statistically and economically significant.

Table 3 shows the results obtained from both OLS as well as 2SLS. In both the regressions all the variables have signs in accordance with economic theory. However, compared with OLS, the impact of most of the variables is higher when the instrument is used. This suggests that OLS estimates are too small because of attenuation bias (measurement error). Furthermore, all the variables (except financial deepening) become statistically significant when instrument is used.

TSLS estimates suggest that market size (GDP per capita) and global integration (tariff)[1] have FDI enhancing effects while an unstable macro environment (high inflation) hampers foreign direct investment inflows to developing countries. Moreover, availability of skilled labor (secondary school enrolment rate) and developed financial sector promote foreign direct investment inflows (Table 3). The latter (financial sector development), however, is not statistically significant.

Table 2. First Stage Results

	Dependent Variable log (gdp)
Military expenditure	0.022
	(0.01)
Inflation	-0.0002
	(0.001)
Financial System Depth	0.002
	(0.002)
Tariff rate on import	-0.003
	(0.003)
Secondary school enrolment rate	-0.003
	(0.004)
Country/Time fixed effects	Yes
Robust standard errors	Yes
Clustered standard errors	Yes
R^2	0.9

Standard errors are in parentheses

Specifically, TSLS regression shows that on average one percent increase in GDP per capita will increase the foreign direct investment net inflows as percent of GDP by 2.75 percent. Similarly one percentage point increase in secondary school enrolment rate and M2 to GDP ratio will increase the FDI as percent of GDP on average by 1.5 percent and 0.1 percent respectively. On the other hand, one percentage point increase in inflation rate and tariff rate on imports will decrease the FDI as percent of GDP by one percent and 0.4 percent respectively.

Importantly, we also allowed for serial correlation by using standard errors that are clustered by countries as well as robust to heteroskedasticity. Column 1 of the table depicts the results with robust standard errors. In this regression, most of the variables (except financial sector development) are significant at the conventional level of significance. However, in column II when we allowed for serial correlation by using standard errors that are clustered by countries as well as robust to heteroskedasticity, GDP per capita and tariff rate remained significant at 5 percent level of significance while inflation rate and secondary school enrolment became insignificant at a 10 percent level of significance. Thus with the exception of financial sector

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[1] Decrease in tariff means increase in global integration.

development, all the determinants of foreign direct investment are statistically significant at 10 percent level of significance even after we allowed for serial correlation and heteroskedasticity in the standard errors. This shows the robustness of our estimates.

Table 3. Determinants of Foreign Direct Investment

	Dependent Variable log (fdi)			
	OLS		2SLS	
	I	II	I	II
log(gdp)	0.422	0.422	2.754	2.754
	(0.467)	(0.649)	(1.300)	(1.400)
Inflation	-0.009	-0.009	-0.010	-0.010
	(0.011)	(0.011)	(0.005)	(0.006)
Financial System Depth	0.003	0.003	0.001	0.001
	(0.014)	(0.016)	(0.016)	(0.020)
Tariff rate on import	-0.009	-0.009	-0.004	-0.004
	(0.009)	(0.010)	(0.001)	(0.001)
Secondary school enrolment rate	0.011	0.011	0.015	0.015
	(0.014)	(0.020)	(0.007)	(0.009)
Country/Time fixed effects	Yes	Yes	Yes	Yes
Robust standard errors	Yes	Yes	Yes	Yes
Clustered standard errors	No	Yes	No	Yes
Observations	247	247	215	215
R^2	0.82	0.82	0.81	0.81

Standard errors are in parentheses

The results also suggest that country specific characteristics play a statistically significant role in attracting foreign direct investment. Likewise, common shocks to foreign direct investment across the countries over time (as depicted by time fixed effects) are also crucial for affecting foreign direct investment to low and lower middle income countries.

It may also be insightful to compare our findings with the reviewed literature on the subject. In line with study of Hasen and Gianluigi (2007) for Arab Maghreb Union (AMU), we found that host country market size is a significant determinant of FDI. Unlike Hasen and Gianluigi finding of insignificant role of trade openness, however, our results are more in agreement with the results of Mottaleb and Kalirajan (2010) who showed that trade policy is statistically important determinant of FDI.

Likewise, our results on the significant role of stable business environment for attracting FDI inflows is similar to that of Mottaleb and Kalirajan (2010) and Frenkel, Funke, and Stadtmann (2004). Further, like Noorbakhsh, Paloni and Youssef (2001) we also found that availability of skilled labor force is important for attracting FDI.

On the flip side, it may be pointed out that data availability is one of the major limitations of our study. In particular, we had the possibility of a total of 570 observations as we collected

data on 57 countries for ten years. However, our regression uses only 215 observations, which mean 355 observations had some missing data. With better availability of data, we might have been able to reduce the size of our standard errors even further.

Moreover, we could not find data on political stability indicators for our set of countries. As political instability may possibly affect both military expenditure as well as foreign direct investment, it may not allow the instrumental variable to meet the exclusion restriction. Controlling for political stability is also likely to improve the results.

6. Conclusion

In this study we address the question of why some developing countries have been able to attract foreign direct investment while others could not. We empirically evaluate this question using panel data on 57 low income and lower middle income countries for ten years, i.e. 2000-2009.

To address the reverse causality and omitted variable problems we use an instrumental variable technique. In particular, we use military expenditure as an instrument for the GDP per capita. We find that amongst all the indicators, market size is the most important determinant of the foreign direct investment. Moreover, global integration, availability of skilled labor force and better financial institutions also promote FDI. Likewise, stable macro-economic environment as depicted by low and stable inflation also encourage foreign direct investment inflows. However, affect of better financial institution of foreign direct investment is not statistically significant.

Thus we may conclude that developing countries may be able to attract FDI by focusing on either increasing their market size or following more liberal trade regimes. Moreover, increasing the skilled labor and developing financial institutions with moderate and stable inflation may also enable them to attract foreign direct investment.

However, unavailability of data on the other important determinants like institutions, labor costs and physical infrastructure may be considered as limitation of our study. Likewise, finding data on political stability may also be another improvement. Controlling for political stability may make the instrumental variable work even better. Thus these are the initial results which can be improved further by availability of data on these important indicators.

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Appendix A
Table 1. Countries used in the regression

Country	years	Country	years	Country	years
Armenia	6	Georgia	6	Nicaragua	7
Bangladesh	6	Ghana	4	Niger	3
Belize	4	Guatemala	6	Nigeria	4
Benin	4	Honduras	2	Pakistan	4
Bolivia	4	India	7	Paraguay	4
Burkina Faso	4	Indonesia	3	Philippines	6
Burundi	1	Jordan	5	Rwanda	4
Cambodia	2	Kenya	1	Senegal	8
Cameroon	1	Kyrgyz Republic	3	Sierra Leone	1
Cape Verde	1	Lao PDR	5	Sri Lanka	1
Central African Republic	1	Lesotho	6	Sudan	4
China	3	Malawi	5	Swaziland	5
Congo, Rep	2	Mali	4	Syrian Arab Republic	8
Djibouti	2	Mauritania	4	Tajikistan	2
Ecuador	1	Moldova	2	Thailand	5
Egypt, Arab Rep.	4	Mongolia	5	Tunisia	5
El Salvador	5	Morocco	5	Uganda	3
Ethiopia	5	Mozambique	5	Ukraine	2
Gambia, The	1	Nepal	3	Yemen, Rep.	1