AKTUAR MOLIYA VA BUXGALTERIYA HISOBI ILMIY JURNALI

THE IMPACT OF CORRUPTION ON FOREIGN DIRECT INVESTMENT INFLOWS: EMPIRICAL EVIDENCE FROM 64 DEVELOPING COUNTRIES

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Abstract. The research project aims to test the impact of corruption on the net FDI (foreign direct investment) inflows across 64 developing countries between 2007 and 2023. The main hypothesis of this study is that the increase in corruption rate leads to a decline in FDI level. Moreover, corruption causes uncertainty by creating additional cost for business activities and hinders fair competition for possible foreign entrants. This empirical research project can assist countries pursuing to increase FDI and, thus, decrease poverty and stimulate growth.

Keywords: Corruption, foreign direct investments, empirical research.

Annotatsiya. Ushbu tadqiqot 2007-yildan 2023-yilgacha bo'lgan davrda 64 ta rivojlanayotgan mamlakatlarga sof TTXI (to'g'ridan-to'g'ri xorijiy investitsiyalar) oqimiga korrupsiyaning ta'sirini tekshirishga qaratilgan. Ushbu tadqiqotning asosiy gipotezasi shundan iboratki, korrupsiya darajasining oshishi to'g'ridan-to'g'ri xorijiy investitsiyalar darajasining pasayishiga olib keladi. Bundan tashqari, korrupsiya noaniqlikni keltirib chiqaradi, biznes yurituvchilarga qo'shimcha xarajatlarni keltirib chiqaradi va bozorda adolatli raqobatni cheklagan holda, chet ellik investorlar nazarida mamalakatning investitsion jozibadorligini kamaytiradi.

Kalit so'zlar: korrupsiya, to'g'ridan-to'g'ri xorijiy investitsiyalar, empirik tadqiqotlar.

Аннотация. Этот исследовательский проект направлен на проверку влияния коррупции на чистый приток ПИИ (прямых иностранных инвестиций) в 64 развивающихся странах в период с 2007 по 2023 год. Основная гипотеза этого исследования заключается в том, что рост уровня коррупции приводит к снижению уровня ПИИ. Более того, коррупция порождает неопределенность, создавая дополнительные затраты на предпринимательскую деятельность и препятствуя справедливой конкуренции для возможных иностранных участников. Этот эмпирический исследовательский проект может помочь странам, стремящимся увеличить ПИИ и, таким образом, стимулировать экономический рост.

Ключевые слова: коррупция, прямые иностранные инвестиции, эмпирические исследования.

Introduction

By and large, many researches have been conducted to explain what factors mostly hinder economic growth and prosperity. The aim is to investigate one particular factor – corruption. The World Bank Organization (WBO) has identified corruption as "*among the greatest obstacles to economic and social development. It undermines development by distorting the rule of law and weakening the institutional foundation on which economic growth depends.*" Thus, it is assumed that corruption has negative effect the well-being of the economy as well as FDI (foreign direct investment) attractiveness of the countries.

Literature Review

FDI. Many scholars, including Mauro, Bardhan, Anyanwu believe that FDI is beneficial for both parties by generating favorable returns for investors and benefiting the developing economy as a whole. Low and Middle-income countries (or, WBO defines them as "developing countries") can have businesses, more employment places, and increased living standards of people by receiving overseas financial subsidy, expertise and the latest forms of technology [10].

Besides, the WBO finds FDI beneficial as it lowers the political influence of supreme jurisdiction on the market. However, Krueger argues that proper performance and interventions of authorities has important role on economic development. Accordingly, the government must support and approve investment inflows only in a controllable pace. Mauro also suggested that although FDI is a positive parameter of the country, the government must not allow the overseas investors to own too much shares of important sectors of its economy. According to North, "*the polity and the economy are inextricably linked in any understanding of the performance of an economy and therefore we must develop a true political discipline*" [10].

Corruption. Ackerman was the first author defining the relationship between corruption and economic growth in his paper. Later on, Shleifer and Vishniy published their findings that corruption has substantial, negative impact on economic performance of the countries. We take ceteris paribus[1] condition: two particular countries with similar economic potential but one of them is assumed to have high corruption rate. According to Shleifer and Vishniy, three negative outcomes[2] of corruption exist to cause the selected corrupt country to have a lower economic performance. First, the living standards tend to be lower in the country with higher corruption level, where police require bribes, where government officials utilize public goods and controlling permits for private gain. Second, corrupt activities cause mistrust among individuals. Third, corruption may generate even more corruption – possibility of earning illegal money attracts other people.

If the corruption is economical destructive factor, why many nations mostly do not attempt to deal with corrupt officials and lessen corruption rate, rather than being stuck in previous paces of development? By cutting corruption base, these countries could achieve economic growth. Mauro provides an explanation to this question that cost of corruption is higher than it seems. Once corruption is commonplace, individuals will become so addictive to corrupt activities and bribes that they will lose desire to combat corruption,

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[1] Everything else is set to be constant condition, except for the variables that are being examined.
[2] This idea was also suggested by Ohlsson[2] [8].

even if it is for the sake of the whole nation. Tullock argued that governments commit market restrictions on advantage of large, corrupt firms. *"Generally, governments do not impose protective tariffs on their own. They have to be lobbied or pressured into doing so by the expenditure of resources in political activity".*

Nathanie suggested that corruption or distortions like smuggling and black market could result in effective recourse allocation in economy. He states, "*If the government has erred in its decision, the course made possible by corruption may well be the better one*" [3]. Furthermore, Huntington agreed that very honest society could hinder economic growth even more than purely corrupt one. The scholar believed that excessive honesty and perfect *zero-corruption* system is associated with over-bureaucratic approaches that deters economic efficiency and slows the growth down.

Corruption and FDI. Wei argues: *"corruption embeds arbitraries and creates uncertainty"* and the impact of corruption on investment returns can be greater than tariffs and taxes. To be more accurate, the cost of business can be much higher since a bribe is illegal and uncertain cost for invertors while taxes and tariffs are known. Similarly, many further publications [3, 6, 7, 9] on this topic confirm that corruption has significant adverse effects on FDI inflows. However, most of previous research papers only theoretically investigated the topic. Mauro wrote the first publication that defined the quantitative results with systematic and empirical model. He used data from Business International, corruption indexes of 68 countries, as well as other variables altering private investment level to calculate the how and to what extend corruption lowers the level of investment. Wei established model using the CPI to estimate relative FDI rates to different corruption levels. This model showed that if corruption rate in developing countries reduces by 1%, the level of FDI increases by 9%. Conversely, Bardhan believes that the corruption promotes larger FDI inflows. He states that bureaucracy is decreased by corruption and possibility of gaining privileges by a *single bribe* can attract rent-seeking investors. Bellos and Subasat confirms this idea that corruption encourages efficiency in economy and contributes to higher FDI rate.

Methodology 1 – Mathematical model

According to Akçay, the corruption is one of the main obstacles for potential foreign entrants. The scholar argues that corruption *creates cost* for business activities and *barriers fair competition* in the market. The negative impact of corruption on FDI attractiveness of countries can also be proved by the following mathematical positions:

The first proof encompasses the game-theoretic model of foreign firm and host country combination. This model represents the MNEs' *decision* to either enter the market engaging in FDI or by exporting goods. Regarding to the model, a frictional firm from country B perceives to enter the market of country A. The country A has m number of firms and has aggregate demand for particular homogenous good that is defined:

$$Q = A - P \qquad or \qquad P = A - Q$$

Q can be defined as the Cournot total output amount that is calculated by summing m existing competitor firms' total outputs and the output the foreign firm pursues to supply[3], $Q = \sum_{n=1}^{m+1} q_i$. The company can produce its products at constant C (marginal cost)

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[3] Assumption: the market is perfectly competitive and prices, output quantities of competitors are equal.

in both domestic and host countries. First, if the firm engages in FDI and starts production in country A, it must pay illegal entrance fee $F(\beta_i)$[4] to corrupt government agents. Second, if the firm decides to export goods to country A, it must pay T (fixed tariff) on each unit of products. We assume that $F(\beta_i)$ is perfectly determined for the potential entrants to country A's market and with higher corruption level (β_i), entrance fee gets larger:

$$\frac{dF}{d\beta_i} > 0; \quad \underline{\textit{(a)}} \quad \beta_1 < \beta_2 \quad \text{Where} \quad F(\beta_1) < F(\beta_2) \quad \text{and} \quad F(0) = 0$$

The firm will have two discrepant profits in terms of choices. First, if it engages into host country by *exporting*, then its profit (π_i^E) would be as following, according to typical Cournot output formula:

$$\pi_i^E = (A - Q)q_i - (C + T)q_i \qquad q_i = \frac{(A - C - T)}{2(m + 1)} \qquad \pi_i^E = \frac{(A - C - T)^2}{4(m + 1)}$$

For the exporting firm to have a positive profit, the country A's trade tariffs must be:

$$T < A - C$$

If the firm is planning to enter the country A as a ma manufacturer by engaging in *FDI*, it must pay entrance fee $F(\beta_i)$. However, the entrance fee is a single payment and is not considered while computing Cournot quantity equation (q_i) and marginal profit ($\frac{d\pi}{dq_i} = 0$). The resulting profit equation (π_i^F) would be:

$$\pi_i^F = (A - Q)q_i - C * q_i - F(\beta_i) \qquad q_i = \frac{(A - C)}{2(m + 1)} \qquad \pi_i^F = \frac{(A - C)^2}{4(m + 1)} - F(\beta_i)$$

In order for the entering firm to have a positive profit:

$$A > 2\sqrt{(m + 1) * F(\beta_i)} + C$$

The choice of foreign company whether to enter country A with the means of FDI or to fulfill the country's supply by exporting can be identified by comparing the profit equations of both outcomes. Obviously, the company chooses the option with higher profit. Here is the equation of the firm's preference of investing over exporting:

$$\pi^* = \pi_i^{FDI} - \pi_i^{Ex} = \left[\frac{(A - C)^2}{4(m + 1)} - F(\beta_i)\right] - \left[\frac{(A - C - T)^2}{4(m + 1)}\right] = \frac{(2T * (A - C) - T^2)}{4(m + 1)} - F(\beta_i)$$

Outcome: According to our earlier hypothesis, the higher corruption rate exists in country A, the larger entrance fee $F(\beta_i)$ will be set for foreign countries. The equation above shows that the higher corruption country A has, the less possibly the chosen company invests to this country and more likely choses exporting.

The second position represents how corruption influences level of FDI by hindering fair *competition*. The foreign firms are addressed as potential entrants to country A's market. Besides, investing firms invest in country A if it is possible for them to acquire profit, which leads to the hypothesis that the production profit must be greater than the bribe:

$$\pi_i(q_i, \beta_i) > F(\beta_i) \qquad or \qquad \pi_{NET}(q_i, \beta_i) = (A - Q - C)q_i - F(\beta_i) > 0$$

Combining the previous Cournot quantity equation of possible investor and entrance fee, equilibrium (*m*) number of potential foreign entrants in country A's market is found:

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[4] $F(\beta_i)$ – Entrance for the country A that any new entrant must pay while β_i is the corruption factor.

$$m(\boldsymbol{\beta_i}) = \frac{(A-C)^2}{4 * F(\boldsymbol{\beta_i})} - 1$$

Outcome: Due to the feature of equation ***(a)*** above it is obvious that $dm(\boldsymbol{\beta_i})/d\boldsymbol{\beta_i} < 0$, which means, higher *(lower)* level of corruption cuts *(boosts)* the number of possible foreign firms pursuing to invest subsidy or expertise into country A.

Figure 1. Equilibrium number of potential foreign entrants:
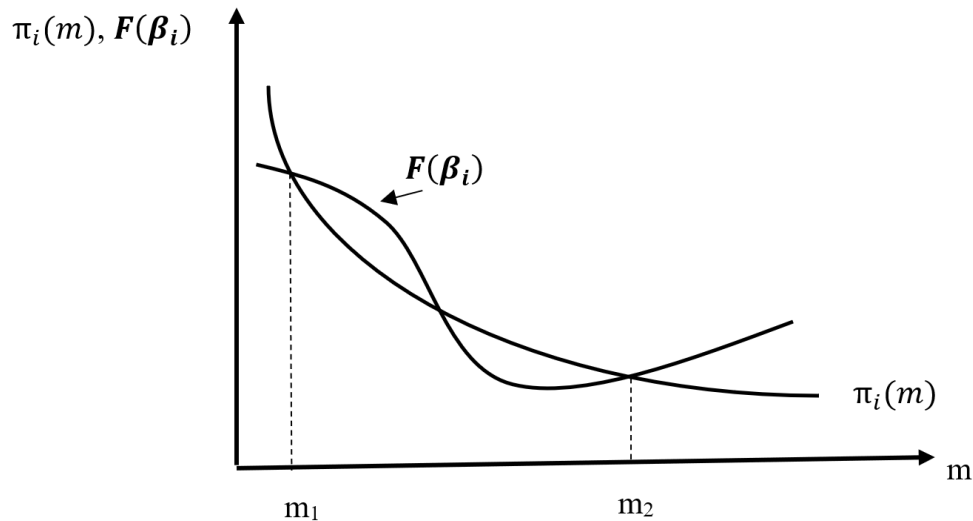
The illustration above can be an example of outcomes that derive equilibrium number of potential entrants to the market of country A. As per graph, there are two chief points where $\boldsymbol{F(\beta_i)}$ and $\pi_i(m)$ intersect, m1 and m2. Another medium intersection must not be taken as it has large possibility of entrance and exit of foreign firms. It can be seen from the graph that the number of foreign investors and corruption have inverse relations. To be more accurate, if the corruption is high, the number of foreign entrants will be minimum. The competition *(m)* in the market is hindered by the corruption $(\boldsymbol{\beta_i})$.

Mathematical approach to the research has concluded that corruption has significant negative impact on the investment decisions of foreign investors and thus on FDI inflows. However, the hypothesis must also be proved by empirical estimations and investigations.

Methodology 2 – Empirical Model

Ohlsson argues that because corruption is illegal, individuals try to keep their corrupt activities in secret. Thus, it is hard to measure actual corruption level. This paper relies on the corruption perception index (CPI) to conduct econometric analysis. In fact, many previous scholars, Epaphra, Bardhan, Mauro, Keefer and others used CPI as main regressing variable of the model measuring the effect of corruption on FDI attractiveness.

In this case, the countries are assessed based on the inverse indexes from **0** *(extremely high corruption)* to **10** *(no corruption)*. It is hypothesized that CPI is *positively* correlated to FDI, as the higher CPI level presents the lower corruption rate.

Regarding to previous literature and this research analysis, following systematic model [5] of measuring the impact of corruption on FDI is established. The model also includes the key factors influencing FDI attractiveness of the countries:

$$\log(FDI_{i,t}) = \alpha_0 + \alpha_1 CPI_{i,t} + \alpha_2 GDPG_{i,t} + a_3 POP_{i,t} + \alpha_4 \log GDPPC_{i,t} +$$
$$+ \alpha_5 Politic_{i,t} + \alpha_6 Govern_{i,t} + \alpha_7 RQ_{i,t} + \alpha_8 \pi_{i,t} + \alpha_9 OPEN_{i,t} + \alpha_{10} Indust_{i,t} +$$
$$+ \alpha_{11} CC_{i,t} + \eta_i + u_{i,t}$$

In this paper, the *FDI inflows* (*in log*) is dependent variable while *corruption, population in persons (in log), GDP growth, GDP per capita (in log), political stability, government effectiveness, regulatory quality, control of corruption, inflation rate, degree of openness (in log) and industrialization* are independent variables.

To derive empirical results, panel dataset from 64 developing counties ranging in the years between 2007 and 2023 is selected. The macroeconomic and governance indicators were taken from web sources such as WBO (The World Bank Organization), WDI (The World Developing Indicators) and TI (The Transparency International).

From the empirical model above, the underlying Hypothesis of this research project is:

H_0: Corruption **does not** cause decline in FDI inflows

H_1: Corruption **does** cause decline in FDI inflows

Table 1. Variable description:

Abb.	Variable	Definition	Source	Exp. Sign
FDI	Foreign Direct Investment	FDI in current US dollars ($)	WBO	+
CPI	Corruption Perception Index	Index from 0 to10: 0 – high corruption, 10 – low corruption rate	TI	+
POP	Population number	Total population in persons	WBO	+
GDPG	Economic Growth	Annual GDP growth, in percent (%)	WBO	+
GDPPC	Market size	Annual GDP per capita, in current US dollars ($)	WBO	+
Politic	Political stability	Political stability and no violence scale, -2,5 to 2,5	WDI	+
Govern	Government effectiveness	Scale of absence of political pressure, -2,5 to 2,5	WDI	+
RQ	Regulatory quality	Scale of performance of regulatory institutions, from -2.5 to 2.5	WDI	+
CC	Corruption control	The extent of public power exercised by corruption, scale from -2,5 to 2,5	WDI	+
π	Inflation	Annual rate of inflation, percent (%)	WBO	-
OPEN	Trade openness	Total of import added export, percent of	WDI	+

		GDP, (%)		
Indust	Industrialization	Industry share in GDP, (%)	WBO	+

To be more accurate, the paper consists of both macroeconomic and governing indicators. In order to get clearer estimations, nominal data is turned into percentage form by generating their log in Stata 14. These variables are FDI, GDP per capita, population number and degree of freedom[5].

Empirical Results and Discussion

The distribution of variables is quite normal, except for minor residuals in macroeconomic indicators caused by economic and political shocks. If not to consider several political and economic shocks that are exclusive only for certain countries, major global shocks like Global Crisis 2008 are eliminated. The regressions took 889 observations from 64 countries. The reliability of our estimations was confirmed by checking our panel data for *multicollinearity, endogeneity, heteroscedasticity and normality*.

The next step would be carrying out fixed effect regressions of variables. However, in order to avoid multicollinearity, variables suspected to have correlation must be dropped. This leads to the creation of six individual models, where highly collinear regressors are properly planned and included.

Fixed Effect Estimations. It is worth mentioning that all the fixed effect estimations were carried out with *cluster (id)[6]* command. This command, similar to *robust*, accommodates the heteroskedasticity and serial correlation problems in regressions.

Table 2. Results of Fixed-effects (within) regressions:

VARIABLES	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5	MODEL 6
corruption_per	0.219*	0.175	0.0971		0.317***	
	(1.77)	(1.28)	(0.73)		(2.66)	
gdp_growth	0.0209*	0.0246**	0.0277**	0.0222*	0.0246**	0.0147
	(1.70)	(2.04)	(2.38)	(1.92)	(2.03)	(1.16)
inflation_rate	0.0210**	0.0201**	0.0177*	0.0223**	0.0191**	0.0210**
	(2.16)	(2.12)	(1.94)	(2.63)	(2.08)	(2.22)
industrialisation	0.0144	0.0195**	0.0188**	0.0119	0.0200**	0.0252**
	(1.57)	(2.11)	(2.20)	(1.22)	(2.25)	(2.57)
ln_openness	0.604**	0.513*	0.571**	0.759**	0.433	0.571**
	(2.24)	(1.84)	(2.23)	(2.57)	(1.59)	(2.02)
political_stab	0.409***					
	(3.31)					
ln_population	5.642***	5.580***	5.867***	1.900**	5.458***	6.334***
	(6.81)	(6.45)	(6.83)	(2.41)	(7.18)	(7.79)
government_eff		0.704**				
		(2.39)				
regulatory_qual			1.262***			

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[5] Degree of freedom must be put in log because sum of exports and imports constitute more than 100% of GDP (for example 860.8%) in many selected countries.

[6] The data is strongly balanced by grouping variables in terms of countries. Thus, here *id=country_name*.

|						
				(4.63)		
control_corrupt				0.396**		0.896***
				(2.03)		(3.00)
ln_gdp_pc_cons				1.112***		
				(10.07)		
Constant	-77.99***	-76.60***	-81.30***	-23.41*	-74.99***	-88.75***
	(-5.48)	(-5.16)	(-5.56)	(12.86)	(-5.75)	(-6.43)
Observations Number of id	889 64	889 64	889 64	932 64	956 64	932 64
R-squared: within between overall	**0.253 0.3715 0.3175**	**0.248 0.38 0.3242**	**0.289 0.4042 0.3457**	**0.460 0.7298 0.651**	**0.261 0.343 0.291**	**0.282 0.379 0.323**
F-statistics Prob>F	12.88 0.000	12.02 0.000	18.11 0.000	42.86 0.000	15.10 0.000	15.06 0.000

*Note: t values in parentheses, significant at *** $p<0.01$, ** $p<0.05$, * $p<0.1$*

According to the outcome of estimations, corruption proxies (CPI and control of corruption) are quite significant and positively correlated to the level of FDI. For instance, CPI in the fifth model is very significant at 1% level (t-test: t=2.66 and p=0.01). Similarly, corruption control is found as a very significant regressor altering the dependent variable in the fourth (p=0.046) and sixth (p=0.004) models. This means that the less (more) corrupt are the developing countries, the more (less) they attract foreign direct investments. All of the remaining variables are also found to be significant, except for minor differences in outcomes of equations.

For detailed interpretation of t-test coefficients, the results of fourth model are selected. Regarding to the table, macro-indicators such as GDP growth, GDP per capita, industrialization, number of population and degree of openness (sum of export and imports) are positively correlated. For example, 1% increase (decrease) in GDP per capita leads to 1.112% more (less) FDI inflows on average. This outcome was expected because the previous literature suggests that the market with larger size, potential and open trade regulations end up with higher FDI inflows.

However, the table depicts that inflation rate also has a positive correlation with FDI. In this case, the results for inflation rates are not appropriate because it was assumed that inflation rate would bear negative correlation with the dependent variable. Indeed, Al-Sadig claimed that high inflation rate represents economic instability, and thus, discourages foreign investors creating investment risk. Additionally, the model has constant coefficient of -23.41, which means the log of FDI would be this amount when all of the independent variables equaled to zero.

Figure 2. FDI and CPI in 64 developing countries between 2007 and 2023:
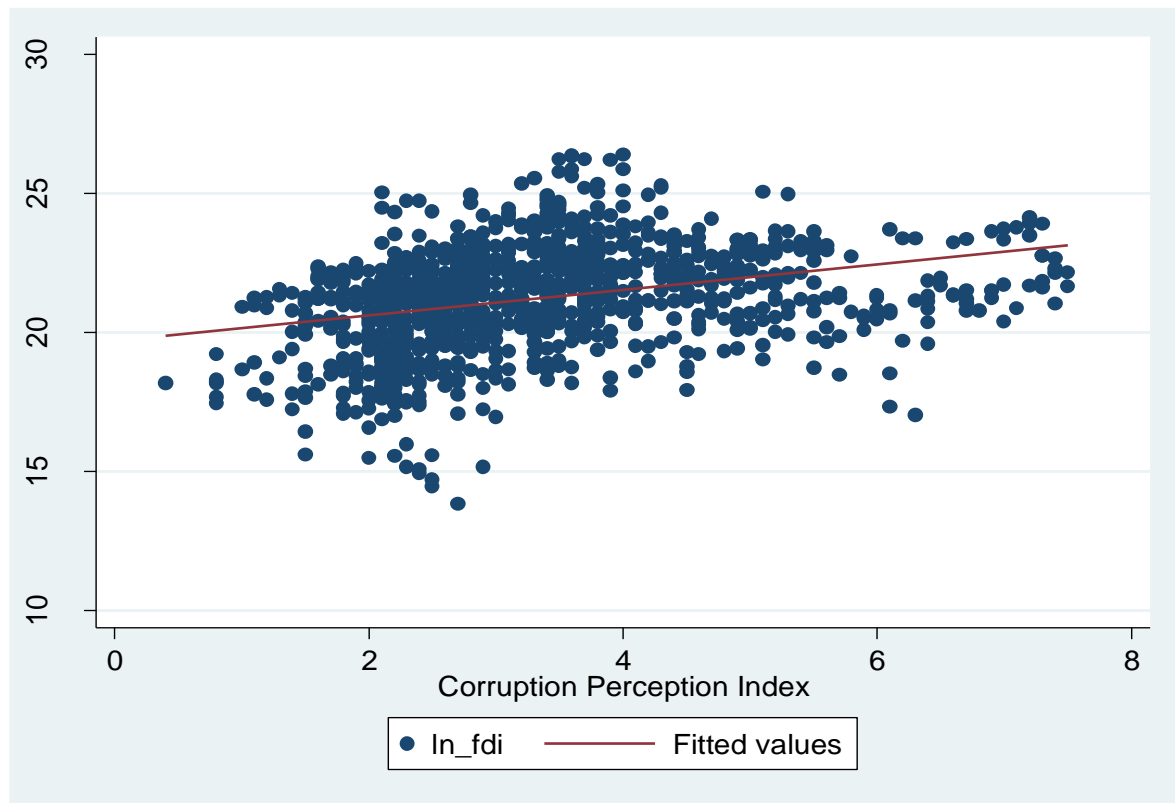
Moreover, it should be noted that all of the variables are jointly significant with the Prob>F (*F-test*) value 0.000. This indicates that this model is significant and has explanatory power at all levels. Within R-squared in model 4 equals to 0.460. Besides, overall R-squared is 0.651 (*significant*), which shows that the dependent variable is 65% explained by the independent variables and model itself. Therefore, these values are sufficient to conclude that our model is significant and corruption, similar to other variables, does have negative impact on FDI inflows.

Conclusion

It is worth stating that foreign direct investments are the most welcomed form of capital and expertise inflows. FDI is especially desirable for developing countries, since it is less vulnerable to economic shocks and crises. Nevertheless, many factors influencing the FDI exist. Corruption rate in host country can be a crucial example in this case, since it does negatively affect FDI in such a way that the illegal bribe required by government officials discourage foreign investors. To be more accurate, corruption causes uncertainty by creating additional cost for business activities. Besides, corruption hinders fair competition in the market by generating entrance fee for possible foreign entrants. In this sense, it is assumed that the higher corruption level is, the greater entrance fee is demanded by corrupt individuals.

The empirical results confirm the abovementioned relationship between corruption and FDI. According to outcomes, the corruption and FDI are negatively related which implies that the research hypothesis is supported by empirical evidence. Thus, it is beneficial for developing countries to implement policies to fight corruption in order to attract greater FDI inflows. The literature of the sphere suggests one possible policy recommendation: implementing government reforms of democratization. However, there

is a limitation of this assumption: democracy sometimes may not achieve low corruption rate. To sum, this research project can assist developing countries pursuing to increase FDI and, thus, decrease poverty and stimulate growth.

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