



Relationship between Corruption and FDI Inflow: A Casualty Test

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Abstract: This study examines the relationship between the inflow of foreign direct investment and corruption. By using 2006 – 2015 time series data from 19 developed countries and 18 developing countries, it starts by testing the Granger causality between these two variables. It finds that causality direction goes from corruption to foreign direct investment. After making the time series data stationary, the study runs regression analysis for each country group separately. Significant and strong impact of corruption on foreign direct investment is found for each group, and the impact is even stronger for the developed countries. Data from each group could not support the hypothesis of 'greasing the wheels of business', which is used for justifying soft treatment of corruption in some countries. Policy implication is to stand strong against corruption in order to promote the inflow of foreign direct investment.

Keywords: corruption; foreign direct investment; Granger causality.

JEL Classification: D73, F21, P45.

Razmerje med korupcijo in prilivom tujih neposrednih investicij: test vzročnosti

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Povzetek: Ta študija preučuje razmerje med prilivom tujih neposrednih investicij in korupcijo. Z uporabo podatkov iz časovnih vrst 2006–2015 iz 19 razvitih držav in 18 držav v razvoju smo opravili testiranje Grangerjeve vzročnosti med tema dvema spremenljivkama. Ugotavljamo, da vzročna zveza prehaja iz korupcije v neposredne tuje naložbe. Po tem, ko podatke časovnih vrst stabiliziramo, opravimo regresijsko analizo za vsako skupino držav posebej. Za vsako skupino je značilen in močan vpliv korupcije na neposredne tuje investicije, vpliv pa je še močnejši za razvite države. Podatki iz vsake skupine niso podprli hipoteze o „podmazanem kolesu podjetij“, ki se uporablja za upravičevanje mehke obravnave korupcije v nekaterih državah. Posledice politik proti korupciji, da bi spodbudili pritok tujih neposrednih investicij, ostajajo močne.

Ključne besede: korupcija; neposredne tuje investicije; Grangerova vzročnost.

JEL klasifikacija: D73, F21, P45

1 Introduction

The foreign direct investment (FDI) is one of the vital factors that can cope with the low level of gross domestic investment, which is primarily responsible for accelerating economic growth. Developing economies are facing a serious economic challenge due to the lack of their domestic investment. From this point, came the importance of studying the FDI inflow as one crucial supplementary means of raising the economic growth of developing nations.

1.1. The research problem

The subject of FDI is fast growing, but the focus in this paper is on the relationship between FDI inflow and corruption. Corruption is being frequently reported as a crucial obstacle facing investors, and especially foreign investors. Therefore, the problem of this paper is to analyse and quantify the relationship between FDI and corruption in order to help policy makers design their policy tools for attracting foreign investors and hence for accelerating the economic growth.

1.2 The Related Literature

1.2.1 Definition of Corruption

Corruption, defined as the misuse of economic and/or political power to gain private benefits at the expense of the society's interest, may take different forms. This wide definition does not ascribe corruption to the public sector only, which may have the chance to misuse its political power (see for example Mishra, 2004), but it is applied to the private sector too. Big private enterprises also may misuse their economic power and connections. In either case, a private interest may be achieved at the expense of the society's interest, and in both cases, this is described as corruption.

The World Bank (2006) and The World Bank (2017) have mentioned corruption as a serious obstacle against development in general and particularly against productive investment. They mentioned the loss of incomes in bribery, the loss of trust in governments, and the loss of human capital as resulting outcomes of corruption. Corruption can take several forms, varying in how seriously it affects the economy. Since the 1970's when the economic explanation of the phenomenon emerged, theoretical and empirical researches continued and multiplied rapidly. A comprehensive survey on the economics of corruption may be found in Aidt (2003) and in Ades and Di Tella (1997). To summarize what was found there, one can say that in all cases of corruption, there exists a potential marginal benefit PMB, which is the motive to increase one's wealth, and a marginal cost MC, which is the extra cost that one may incur by committing the act of corruption. If $PMB > MC$, corruption occurs, and it does not occur otherwise. PMB always exists as a human basic motive, and it will be greater if the market conditions allow for some agents to extract some benefits at the expense of others, i.e. if some agents are able to close the market for their private interest. As for the MC, it tends to be lower when the legislative infrastructure that guarantees a quick and clear enforcement of the law is weak or when it does not even exist. Included in the MC is the corrupting person's efforts to avoid this cost. Corruption is the final result of this mix of economic and institutional factors.

1.2.2 Direction and Sign of Effect

Regardless of how one defines corruption and how one explains it, this paper is interested in the interaction between corruption and the inflow of foreign direct investment FDI. Looking into the previous literature, the researchers found that many past writings on the topic have focused on the (negative / positive) effects of corruption on FDI inflow. Corruption may have a negative impact on FDI through increasing the degree of uncertainty and the level of transaction costs. Those factors are expected to impede FDI. Corruption may also have a positive impact on FDI by "greasing" the wheels of business. That is, corruption could increase investment by acting as grease money that enables investors to avoid bureaucratic red tape and expedite the decision-making process. Money here refers to bribery payments. Obviously, this hypothesis applies under the conditions of a weak regulatory framework, and corruption may have a positive impact on FDI. Quazi (2014), for example has used 1995-2011 panel data and found that the impact of corruption on FDI is significantly negative and robust. Castro and Nunes (2013) have investigated the impact of corruption on FDI inflows in 73 countries, over the period 1998-2008 and found that the least corrupt countries may attract more foreign direct investment because they provide a more favourable climate for investors. Belgibayeva and Plekhanov (2015) have reached a similar result as Castro and Nunes (2013), i.e. the host countries with lower

corruption level attract more FDI from the countries with lower corruption level. Alemu (2012) has studied the effects of corruption on foreign direct investment (FDI) inflow, using 1995-2009 panel data from 17 Asian economies and applying OLS. The results suggest that a 1 percent increase in corruption level triggers an approximately 9.1 percentage point decrease in FDI inflow.

Mixed results were reported by Ardiyanto (2012), who has used a cross sectional data from a large sample of 82 countries; developed and developing. Using panel data, he found that corruption was deleterious for FDI inflows in developed countries but somewhat beneficial for attracting FDI inflows into developing countries.

On the other hand, some researches have studied the effect of FDI on the level of corruption. Larraín and Tavares (2004) have used a broad cross section of countries over the period 1970 to 1994 and applied a causality analysis. They found that FDI as a share of GDP is significantly associated with lower corruption levels. The quantitative impact of FDI on corruption appeared to be of the same order of magnitude as that of the impact of per capita GDP on corruption.

2 Research Design

Because of these variations in results in terms of the *direction of causality* between corruption and FDI and in terms of the *sign of this relationship*, the current paper attempts to investigate both issues. It does the job for two different groups of countries; developed and developing ones. Comparison can help intensify our understanding of this relationship since the two groups of countries do not share the same social, political and/or economic characteristics. The paper hypothesizes that there is no significant causal relationship between corruption and FDI inflow, and it tests this hypothesis. Granger causality test and multiple regression technique are being used.

After this introduction, section 2 describes the methodology of the research, including the econometric model, its variables and the data used along with their sources. Section 3 gives the results of the paper. Finally, section 4 gives the conclusions and discussion.

3 Methods

In order to test the research hypothesis, a sample of 37 countries is used; 19 OECD countries and 18 developing countries. The countries in each of these two groups were chosen by picking the ones with the highest GDP growth rates over the past three years. The idea is to compare higher growth countries in each group in terms of being attractive to FDI. As for the data, a time series data set (2006 – 2015) for each of the selected countries has been used.

The above literature review is not unambiguous about the direction of causality between foreign direct investment and corruption. Therefore, one figured out that there is a need to test this direction first. Using EVIEWS 9, a Granger causality test was run between the inflow of foreign direct investment as a percentage of gross domestic product (denoted as FDI_GDP) and the degree of corruption (denoted as CPI and measured by the published corruption perception index, the value of which is higher for lower corruption level). Before running this test, the researchers have checked the unit root test for the data and found that the data sets were non-stationary at the level, but they became stationary after taking the first difference. Therefore, the first difference transformation of the data was used in the Granger Causality test. The results, displayed in Appendix 1, show that the Granger causality takes one direction in OECD countries, i.e. CPI Granger causes FDI_GDP. However, in developing countries it takes two directions, i.e. CPI Granger causes FDI_GDP and FDI_GDP Granger causes CPI. Moreover, when the researchers ran the Granger causality test on the combined sample of 37 countries, they found that causality took one direction only from CPI to FDI_GDP. Therefore, the researchers have decided to apply this direction of causality in the next step, which is to estimate the functional relationship between these two variables.

The model that was estimated took the following form:

$$\text{FDI_GDP} = a + b_1 \text{CPI} + b_2 \text{GROWTH} + b_3 \text{OPENSS}$$

Where:

- **FDI_GDP** is the inflow of foreign direct investment FDI as a percentage of gross domestic product GDP (%).

- **CPI** is the corruption perception index as a measure for the degree of corruption. It runs from 0 to 100. A higher value means higher level of transparency and lower degree of corruption.
- **GROWTH** is the growth rate of GDP (%).
- **OPENSS** is total trade (imports + exports) / GDP, and it measures the economy's openness to international trade.
- The source of all data is the World Development Indicators Reports published by the World Bank.
- The data sets for all the variables are stationary after taking the first difference.

Although the main interest of this paper is in the relationship between CPI and FDI_GDP, the economic growth rate (GROWTH) and the openness to international trade (OPENSS) were included because the previous literature has frequently mentioned these variables as essential determinants of FDI inflow. Examples of this can be found in Abdul Mottaleb and Kalirajan (2010, pp. 387–390), Akpan et al. (2014, pp. 13–15), and Ardiyanto (2012, pp. 62–65).

4 Results

The following are the results of estimating the above regression model. See the list of details in Appendix 2.

Group A, OECD Countries

$$\text{FDI_GDP} = -0.1906 + 0.0018 \cdot \text{CPI} + 0.0007 \cdot \text{GROWTH} + .1423 \cdot \text{OPENSS}$$

P-values: (0.0006) (0.0155) (0.7768) (0.0000)

$R^2 = 0.443$ Prob(F) = 0.0000

Group B, Developing Countries

$$\text{FDI_GDP} = -0.0167 + 1.8701 \cdot \text{CPI} + 0.0005 \cdot \text{GROWTH} + 0.0509 \cdot \text{OPENSS}$$

P-values: (0.0000) (0.0000) (0.0303) (0.0000)

$R^2 = 0.719$ Prob(F) = 0.0000

For the OECD countries, we can see that CPI was significant and positive in its effect on FDI (as a percentage of GDP), at 0.05 significance level. Recall that a higher CPI indicates a higher transparency and hence a lower corruption. The increase in transparency index by one-unit results in an increase in FDI (as a percentage of GDP) by 0.0018. The growth rate of GDP is not significant in its effect on FDI (as a percentage of GDP). The openness to international trade is significant, and its increase by one unit increases FDI (as a percentage of GDP) by 0.14. The F test is very significant and $R^2 = 44\%$, which indicate a moderately accepted goodness of fit for the data.

For the developing countries, the R^2 is much higher, at 72%, and the F test is very significant. The goodness of fit for the data is high. The CPI is significant and positive in its effect on FDI (as a percentage of GDP). However, the coefficient of CPI is low in value. It takes a great increase in transparency index in order to increase FDI (as a percentage of GDP) by one point. This is different from the case of developed OECD countries, but it is a difference in 'magnitude' of effect and not in the 'sign' of effect. The hypothesis of "greasing the wheels of business", which was reported in literature review, does not seem to be supported in this research. The other two variables; economic growth and openness to trade, are significant and positive in their effect on FDI. An increase in economic growth by one percentage increases FDI (as a percentage of GDP) by 0.05. An increase in the openness to trade by one unit increases FDI (as a percentage of GDP) by 5.

5 Discussion

The methodology of this paper was more accurate, although it was kept simple and straightforward. Unlike some of the reported papers in the literature review, such as Quazi (2014), Castro and Nunes (2013), Belgibayeva and Plekhanov (2015) and Ardiyanto (2012), the time series data for each variable were not used before being sure they were stationary (by taking the first difference). Therefore, the spurious regression results are avoided.

The Granger causality test in this paper assured the one-direction causality from corruption to FDI. The opposite direction was rejected. This made our results clearer than the mixed results of Ardiyanto (2012), which ignored the unit root test for the stationarity of data.

This paper made a progress over Larraín and Tavares (2004), which used instrumental variables to test for the causality direction. The latter found the direction going from FDI to corruption. Our paper used the more widely accepted, and more trust-worthy, Granger test and we found the causality direction to be the opposite.

Given the data and methodology used in this paper, there is not enough empirical support for the claim that corruption can grease the business wheels, and thus can increase the foreign direct investment inflow. This conclusion holds for both developed and developing countries. On the contrary, the research supports the hypothesis that reducing corruption helps increase FDI inflow. The act of public policies in some countries to become soft with corruption for the alleged benefits of attracting FDI does not depend on a solid empirical evidence according to this paper.

In either developed or developing countries, the openness to international trade seems to have a significant positive effect on the inflow of FDI. Therefore, instead of being soft on corruption for encouraging investors, it is better to be more open for international trade.

Economic growth was found to be significantly affecting FDI inflow to developing countries. Therefore, the same recommendation, which was just mentioned above on international trade applies to economic growth as well.

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Appendix 1 Granger Causality Test

Group A. OECD Countries

Pairwise Granger Causality Tests

Date: 02/17/17 Time: 21:42

Sample: 2006S1 2015S2

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
FDI_GDP does not Granger Cause CPI	19	0.03706	0.963
CPI does not Granger Cause FDI_GDP		3.97585	0.044

- The probability of rejecting the null hypothesis (FDI_GDP does not Granger Cause CPI) whereas it is true is $0.963 > \text{the significance level } 0.05$. Therefore, this null hypothesis is not rejected at significance level 0.05, i.e. one cannot be, at least 95%, confident that FDI_GDP Granger Causes CPI.
- The probability of rejecting the null hypothesis (CPI does not Granger Cause FDI_GDP) whereas it is true is $0.044 \leq \text{the significance level } 0.05$. Therefore, this null hypothesis is rejected at significance level 0.05, i.e. one can be, at least 95%, confident that CPI does Granger Cause FDI_GDP.

Group B. Developing Countries

Pairwise Granger Causality Tests

Date: 02/17/17 Time: 22:59

Sample: 2006S1 2015S2

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
FDI_GDP does not Granger Cause CPI	18	3.83622	0.049
CPI does not Granger Cause FDI_GDP		3.60490	0.050

- The probability of rejecting the null hypothesis (FDI_GDP does not Granger Cause CPI) whereas it is true is $0.049 \leq \text{the significance level } 0.05$. Therefore, this null hypothesis is rejected at significance level 0.05, i.e. one can be, at least 95%, confident that FDI_GDP does Granger Cause CPI.
- The probability of rejecting the null hypothesis (CPI does not Granger Cause FDI_GDP) whereas it is true is $0.050 \leq \text{the significance level } 0.05$. Therefore, this null hypothesis is rejected at significance level 0.05, i.e. one can be, at least 95%, confident that CPI does Granger Cause FDI_GDP.

Appendix 2 Estimation of the Regression Model

Group A, OECD Countries

Dependent Variable: FDI_GDP

Method: Panel EGLS (Cross-section random effects)

Sample: 2006S1 2015S2

Periods included: 20

Cross-sections included: 19

Total panel (balanced) observations: 380

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPI	0.001836	0.000755	2.432748	0.0155
GROWTH	0.000712	0.002508	0.283726	0.7768
OPENSS	0.142297	0.018765	7.583065	0.0000
C	-0.190574	0.055245	-3.449598	0.0006

Weighted Statistics

R-squared	0.443133	Mean dependent var	0.057251
Adjusted R-squared	0.436297	S.D. dependent var	0.208776
F-statistic	20.93601	Durbin-Watson stat	1.806804
Prob(F-statistic)	0.000000		

Group B, Developing Countries

Dependent Variable: FDI_GDP

Method: Panel Least Squares

Sample (adjusted): 2006S2 2015S2

Periods included: 19

Cross-sections included: 18

Total panel (balanced) observations: 342

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPI	1.87E-11	5.22E-13	35.85656	0.0000
GROWTH	0.000541	0.000249	-2.175787	0.0303
OPNENSS	0.050862	0.007442	6.834597	0.0000
C	-0.016689	0.002554	-6.533529	0.0000

R-squared	0.719200	Mean dependent var	0.017808
Adjusted R-squared	0.718241	S.D. dependent var	0.012341
F-statistic	958.4537	Durbin-Watson stat	2.054742
Prob(F-statistic)	0.000000		