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### How Does Corruption Influence the Effect of Foreign Direct Investment on Economic Growth?

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# How Does Corruption Influence the Effect of Foreign Direct Investment on Economic Growth?

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**ABSTRACT** *We investigate the effect of foreign direct investment (FDI) on economic growth in 130 countries from 1995 to 2008, considering the role of corruption in each country as an absorptive factor. The estimation results indicate that although FDI alone does not promote economic growth, it has a significant effect on economic growth if the interaction term between FDI and corruption is considered. Specifically, FDI has a positive impact on economic growth when corruption is severe, but a negative impact if corruption is below a certain threshold.*

**KEY WORDS:** Economic growth; foreign direct investment; corruption

**JEL CLASSIFICATION:** D73, F23, F43

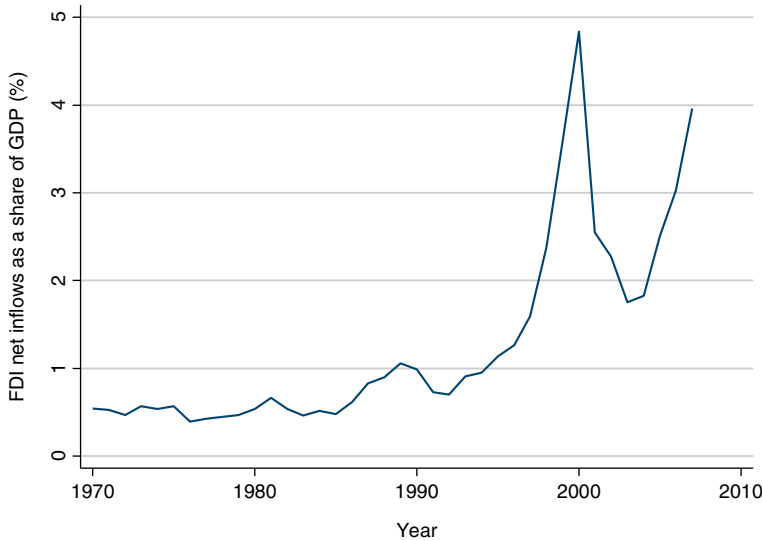
## 1. Introduction

This paper empirically examines the effect of foreign direct investment (FDI) on economic growth, taking into account the corruption level in each of the 130 countries surveyed. Since the late 1990s, FDI flows among countries have risen dramatically alongside economic globalization (see [Figure 1](#)). As FDI is thought to be a potential source of economic growth, especially for developing countries, their governments initiate policies to actively attract FDI. As a direct effect, FDI-based capital flows enhance the accumulation of capital in a host country, and as an indirect effect, FDI flows contribute to economic growth in a host country by promoting productivity growth through technology transfer. In addition, FDI is an attractive source of capital because it is not a borrowing fund, so that host countries need not be concerned about debt accumulation.

Expectations to earn profits through market expansion, and to take advantage of relatively low factor prices in host countries, serve as incentives for multinational enterprises (MNEs) to implement FDI. This is particularly the case for FDI flows from developed to developing countries. Endogenous growth theory suggests that knowledge

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**Figure 1.** FDI net inflows as a share of GDP (World, 1970–2007).  
*Source:* The data are obtained from the World Bank (2009)

and technology are necessities for improving productivity (e.g. Grossman & Helpman, 1991; Barro & Sala-i-Martin, 2004). Technology diffusion by FDI improves productivity and, as a result, enhances economic growth in host countries.

However, previous studies, using country-level data, show that FDI alone does not necessarily have a significant impact on economic growth (e.g. Borensztein *et al.*, 1998; Alfaro *et al.*, 2004). Furthermore, most previous research at the firm level has found that FDI has an insignificant or a small effect on productivity and efficiency. These results are confirmed in the works of Haddad and Harrison (1993) for Morocco, Kokko (1994) for Mexico and Aitken and Harrison (1999) for Venezuela.

Another strand of literature points out that FDI flows have a positive impact on economic growth if a host country possesses an appropriate absorptive capacity. For example, Borensztein *et al.* (1998) show that FDI promotes economic growth in a country in which human capital is above a certain level. Bengoa and Sanchez-Robles (2003) analyze the case of Latin American countries and indicate that FDI induces economic growth, depending on human capital, economic stability and liberalized markets. Balasubramanyam *et al.* (1996) confirm that FDI enhances economic growth more strongly in countries with export-oriented trade policies. Alfaro *et al.* (2004) show that financial development plays an important role as an absorptive factor in host countries, complementing the FDI impact on economic growth.

This paper differs from those aforementioned in that it focuses on institutions as an absorptive factor in host countries.<sup>1</sup> Institutional factors include various aspects of a country's social development, such as corruption, democracy and racial and religious diversity. Among these, we focus especially on the role of corruption for several reasons. First, while international organizations such as the World Bank and the

International Monetary Fund (IMF) require an elimination of, or at least a reduction in, corruption in a host country as a condition for financial support or foreign aid, profit-seeking firms engaging in FDI may invest in those countries where regulations are loose or poorly enforced. Second, some countries with high levels of both corruption and FDI inflows also achieve high levels of economic growth. For example, the FDI net inflow into Cambodia in 2007 was 10.38% as a share of gross domestic product (GDP), which is higher than the world average. While Cambodian FDI net inflows were very high, the country is also ranked as one of the most corrupt in the world. With a corruption perception index of 2.0 out of 10 in 2007, Cambodia is ranked 162 among 179 countries by Transparency International, a non-governmental organization that monitors political corruption in international development. However, despite its high corruption level, Cambodia has achieved a remarkable rate of economic growth over the last few years. Its per capita GDP growth rate in 2007 was 8.3%. The achievement of these high growth rates can be attributed to several factors, among which FDI is undoubtedly significant.<sup>2</sup>

Therefore, from the above discussion, we test the hypothesis that corruption serves as an important channel through which FDI affects economic growth. To investigate this hypothesis, we use annual data of 130 countries between 1995 and 2008 for estimation. Consistent with Borensztein *et al.* (1998) and Alfaro *et al.* (2004), the estimation results show that FDI alone does not necessarily promote economic growth. However, when its interaction term with corruption is added, we find that FDI inhibits economic growth in countries with low corruption, and promotes economic growth in those with high corruption levels. Therefore, corruption works as a “positive” absorptive factor. The threshold level of corruption, separating the negative and positive impacts of FDI on economic growth, is low – approximately in the 10th percentile from the least corrupt countries. A possible explanation for this result is that corruption works as an incentive for FDI. In host countries, corruption can weaken the enforcement of, for instance, labour and environmental regulations, and as a result, MNEs engaging in FDI can operate in a more advantageous environment, thereby promoting growth.

As a robustness check, we conduct the instrumental variables (IV) regression to address endogeneity problems, and we perform the same regression with another corruption index. The results show that our main findings are robust, implying that reducing corruption levels may lessen the effect of FDI on economic growth. However, it is important to recognize that because corruption can have various negative impacts on the society of the host country, our findings do not imply that corruption should be encouraged to promote economic development.

The rest of this paper is organized as follows. We explain the estimation methodology and data in Section 2, provide the empirical results in Section 3 and make concluding remarks in Section 4.

## **2. Estimation methodology and data**

As discussed above, the main purpose of this paper is to investigate the effect of FDI on economic growth by taking into account the role of corruption in each country. In addition to FDI and corruption, some other determinants that may influence economic growth are also included in the estimation equation as independent

variables, in line with standard growth regression literature. Our basic specification is expressed as follows:

$$\text{Growth}_i = \beta_0 + \beta_1 \log(\text{initial GDP per capita}_i) + \beta_2 \text{FDI}_i + \beta_3 \text{Corruption}_i + \beta_4 X_i + u_i, \quad (1)$$

where Growth is the average growth rate of per capita GDP from 1995 to 2008; FDI is the share of net FDI inflows in GDP; Corruption is the corruption perception index published by Transparency International;  $X$  is a set of control variables that may influence economic growth and  $u$  is an error term.

The inclusion of natural logarithm of initial GDP per capita in the estimation equation for capturing a convergence effect is motivated by the seminal work of Barro (1991). In order to minimize possible omitted variable bias on the coefficients of focused variables, we include a number of control variables in the basic estimation equation that are standard in growth regression.  $X$  includes variables such as population growth, education, Sub-Saharan African dummy, Latin American dummy, domestic investment, inflation, government expenditure and trade openness. The rationale underlying our selection of these variables is based on preeminent previous studies for growth regression, including Mankiw *et al.* (1992), Barro and Lee (1994), Easterly and Levine (1997) and Levine *et al.* (2000). The relationships between these variables and economic growth are as follows. Higher population growth and inflation are expected to have negative effects on growth. Education and domestic investment, factors enhancing the accumulation of human and physical capitals, respectively, are expected to have positive effects on growth. Trade openness may have a positive effect on growth through its positive effect on productivity. Furthermore, higher government expenditure may cause a higher government budget deficit, thereby negatively affecting growth. Two regional dummies, Sub-Saharan Africa and Latin America, are also considered to capture the specific characteristics of these regions. Specifically, it is widely known that, compared to other regions, Sub-Saharan Africa has relatively adverse geographical conditions and Latin America has relatively high income inequality. Because adverse geographical conditions and high inequality have negative effects on economic growth, the estimated coefficients of Sub-Saharan African and Latin American dummies are expected to be negative. The detailed definitions and sources of each variable are provided in Table A1 in the Appendix.

Next, to capture the role of corruption in the nexus of FDI and economic growth, our basic specification is extended to include the interaction term between FDI and corruption. This inclusion enables us to examine how corruption influences the effect of FDI on economic growth, which is the main purpose of our study. The estimation equation incorporating the interaction term between FDI and corruption is written as follows:

$$\text{Growth}_i = \beta_0 + \beta_1 \log(\text{initial GDP per capita}_i) + \beta_2 \text{FDI}_i + \beta_3 \text{Corruption}_i + \beta_4 \text{FDI}_i \times \text{Corruption}_i + \beta_5 X_i + u_i. \quad (2)$$

Particularly, we pay attention to the partial effect of FDI on economic growth, which varies with the level of corruption, namely:

$$\partial \text{Growth}_i / \partial \text{FDI}_i = \beta_2 + \beta_4 \text{Corruption}_i. \quad (3)$$

For estimation, we use averaged data over the period 1995–2008 from 130 countries. The full list of countries is presented in [Table A2](#) in the [Appendix](#). In line with growth regression literature, we use averaged data over this period in order to mitigate short-term economic fluctuations. Descriptive statistics of each variable are provided in [Table A3](#) in the [Appendix](#).

We report the ordinary least squares (OLS) estimation results as a benchmark case. It is worth noting that the OLS estimators may suffer from endogeneity problems due to the reverse causality, measurement errors and/or omitted variables. Regarding corruption, there is a possibility of the reverse causality running from economic growth to corruption, and/or of a measurement error.<sup>3</sup> To address the endogeneity issue, we employ the IV estimation, in which the choice of appropriate instruments is important; instruments must be highly correlated with an endogenous variable and must not directly influence the dependent variable. In this analysis, we use legal origins provided by La Porta *et al.* (1999) as the instruments for corruption. This is because, as indicated by La Porta *et al.* (1999), Treisman (2000) and Billger and Goel (2009), economic, political and cultural factors are thought to be the main determinants of corruption. Specifically, La Porta *et al.* (1999) show that legal origins have significant effects on corruption. Similarly, using the extreme-bounds analysis, Serra (2006) comprehensively examines the determinants of corruption and points out that English legal origin is a crucial determinant of corruption. Given these findings, legal origins highly influence current level of corruption, but may not directly affect current economic growth. In other words, legal origins dictate the quality of the current institutions, and then the current institutions influence economic growth. This channel is confirmed in some previous studies (e.g. Acemoglu *et al.*, 2001, 2002).

### 3. Empirical results

Our estimations start with the benchmark OLS regression, using the corruption index from Transparency International. [Table 1](#) shows the results of this benchmark case. Columns (1) and (2) show the results without the interaction between FDI and corruption. Although FDI has a significant impact on economic growth in column (1), this significant effect disappears in column (2) where we control for some additional factors such as investment and inflation. This result is in line with that of Borensztein *et al.* (1998) and Alfaro *et al.* (2004), suggesting that FDI alone does not necessarily promote economic growth. For additional control variables, in column (2), the coefficients of population growth and two regional dummies are significant and have the expected signs, while education, domestic investment, inflation, government expenditure and trade openness do not have significant impact. Next, to investigate how corruption influences the effect of FDI on economic growth, we add the interaction term between FDI and corruption in column (3). The estimated coefficients of FDI and the interaction term between FDI and corruption are significantly negative and positive, respectively, and are robust among alternative specifications through columns (4) to (7).

As discussed above, the OLS estimators may suffer from endogeneity problems. [Table 2](#) presents the results using the IV estimation where English and Scandinavian legal origins are used as the instrument for corruption. Specifications in [Table 2](#) are

**Table 1.** FDI, corruption and economic growth (OLS estimation)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log of initial GDP per capita	-0.008*** (0.003)	-0.007*** (0.003)	-0.006** (0.002)	-0.007** (0.003)	-0.007** (0.003)	-0.006** (0.003)	-0.005** (0.003)
FDI	0.005** (0.002)	0.002 (0.002)	-0.047** (0.020)	-0.044** (0.020)	-0.043* (0.022)	-0.052** (0.022)	-0.054** (0.023)
Corruption	-0.001 (0.001)	-0.001 (0.001)	-0.002* (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.002* (0.001)	-0.002* (0.001)
FDI × Corruption			0.032** (0.013)	0.030** (0.013)	0.029** (0.014)	0.035** (0.014)	0.036** (0.015)
Population growth	-0.549** (0.229)	-0.553*** (0.206)	-0.480** (0.201)	-0.447** (0.200)	-0.452** (0.194)	-0.491** (0.194)	-0.483** (0.198)
Education	0.000 (0.002)	0.000 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.000 (0.001)	-0.000 (0.001)
Sub-Saharan African dummy	-0.015*** (0.005)	-0.011** (0.005)	-0.017*** (0.005)	-0.016*** (0.005)	-0.016*** (0.005)	-0.014*** (0.005)	-0.014*** (0.005)
Latin American dummy	-0.009** (0.004)	-0.010** (0.004)	-0.011*** (0.004)	-0.012*** (0.004)	-0.012*** (0.004)	-0.014*** (0.004)	-0.014*** (0.004)
Investment		0.037 (0.024)		0.021 (0.025)	0.021 (0.026)	0.023 (0.024)	0.024 (0.024)
Inflation		0.008 (0.013)			0.001 (0.010)	-0.000 (0.010)	-0.001 (0.010)
Government expenditure		-0.054 (0.037)				-0.084** (0.038)	-0.084** (0.039)
Trade		0.002 (0.003)					-0.001 (0.003)
Constant	0.113*** (0.029)	0.101*** (0.026)	0.101*** (0.026)	0.097*** (0.026)	0.096*** (0.025)	0.102*** (0.025)	0.103*** (0.025)
Observations	130	130	130	130	130	130	130

*Note:* The dependent variable is growth rate in GDP per capita. The numbers in parentheses are heteroscedasticity-robust standard errors. The asterisks \*\*\*, \*\* and \* indicate 1%, 5% and 10% of significance levels, respectively.



**Table 2.** FDI, corruption and economic growth (IV estimation)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log of initial GDP per capita	-0.006* (0.003)	-0.006** (0.003)	-0.004 (0.003)	-0.005* (0.003)	-0.005* (0.003)	-0.005* (0.003)	-0.005* (0.003)
FDI	0.005** (0.002)	0.002 (0.002)	-0.044** (0.021)	-0.040* (0.022)	-0.038* (0.023)	-0.051** (0.024)	-0.052** (0.024)
Corruption	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	-0.002 (0.002)	-0.002 (0.002)
FDI × Corruption			0.031** (0.014)	0.028** (0.014)	0.027* (0.015)	0.034** (0.015)	0.035** (0.016)
Population growth	-0.520** (0.222)	-0.531*** (0.198)	-0.450** (0.197)	-0.406** (0.195)	-0.414** (0.185)	-0.482*** (0.184)	-0.473** (0.187)
Education	0.000 (0.002)	0.000 (0.002)	-0.001 (0.002)	-0.000 (0.002)	-0.000 (0.002)	-0.000 (0.001)	-0.000 (0.001)
Sub-Saharan African dummy	-0.014*** (0.005)	-0.010** (0.005)	-0.016*** (0.005)	-0.014*** (0.006)	-0.014** (0.006)	-0.014** (0.005)	-0.014** (0.005)
Latin American dummy	-0.010** (0.004)	-0.011** (0.004)	-0.013*** (0.004)	-0.013*** (0.004)	-0.013*** (0.004)	-0.014*** (0.004)	-0.014*** (0.004)
Investment		0.040* (0.023)		0.028 (0.024)	0.029 (0.025)	0.024 (0.025)	0.026 (0.024)
Inflation		0.008 (0.012)			0.002 (0.010)	-0.000 (0.010)	-0.000 (0.010)
Government expenditure		-0.051 (0.036)				-0.082** (0.039)	-0.082** (0.039)
Trade		0.002 (0.002)					-0.001 (0.003)
Constant	0.089*** (0.035)	0.087*** (0.031)	0.076** (0.031)	0.071** (0.029)	0.069** (0.030)	0.096*** (0.031)	0.096*** (0.031)
First stage <i>F</i> statistic	33.05	26.03	29.91	26.32	25.96	22.30	22.75
Hansen test ( <i>p</i> -value)	0.70	0.98	0.99	0.75	0.77	0.85	0.88
Observations	130	130	130	130	130	130	130

*Note:* The dependent variable is growth rate in GDP per capita. The numbers in parentheses are heteroscedasticity-robust standard errors. The instruments for corruption are dummy variables for English and Scandinavian legal origins.

The asterisks \*\*\*, \*\* and \* indicate 1%, 5% and 10% of significance levels, respectively.

the same as those in Table 1. To test for the statistical validity of the instruments, we follow the “rule of thumb” proposed by Staiger and Stock (1997). They suggested that the *F*-statistic in the first stage should exceed 10. *F*-statistics in the first stage regression in our analysis are well above this value. In addition, the Hansen test of overidentification cannot reject the orthogonality conditions even at the 10% significance level. As in Table 1, the results indicate that FDI does not promote economic growth in column (2), in which the interaction term between FDI and corruption is not included. In columns (3) to (7), we include the interaction between FDI and corruption and control for a set of additional explanatory variables to check for robustness. The coefficients of FDI and its interaction with corruption become statistically significant. Furthermore, although the coefficient of corruption is not significant, the null hypothesis that both coefficients of corruption and its interaction term with FDI are simultaneously zero is rejected at the 5% significance level in the *F*-test.

As in Table 1, Table 2 shows that the coefficients of FDI and its interaction with corruption are significantly negative and positive, respectively. From the estimated coefficients of FDI and the interaction term, we can calculate the threshold of corruption that separates the negative and positive partial effects of FDI on economic growth. The effect of FDI on economic growth is negative if the corruption level is below the threshold; it is positive if the corruption level is above the threshold. In column (7), the partial effect of FDI is  $(-0.052 + 0.035 \times \text{Corruption})$ , which provides the threshold value of corruption, 1.47. This threshold value of corruption is in approximately the 10th percentile from the least. Given this result, FDI promotes economic growth in most countries and its impact increases with corruption. Although this finding is counter-intuitive, it has profound implications and may be explained as follows. As a condition for financial support or aid, while international organizations such as the World Bank and the IMF require an elimination of or reduction in corruption, profit-seeking firms engaging in FDI may not be concerned about corruption. They may rather see corruption as an opportunity to exploit the weak governance or institutions in host countries, to smooth their business activities and to gain an advantage over their business competitors in expanding their investments, thereby enhancing economic growth in host countries.

We conduct three types of robustness checks for our results.<sup>4</sup> First, since the measurement of corruption levels has been debated, we use another corruption index, namely the control of corruption provided in the Worldwide Governance Indicators developed by the World Bank.<sup>5</sup> We obtain almost identical results when using this corruption index, and therefore our main results are robust to the change of corruption indices. Second, we examine whether a country’s development level affects our main results by conducting statistical tests on the coefficients of FDI, corruption and their interaction in different income groups. We follow the World Bank’s income-based country classification: high-, upper-middle-, lower-middle- and low-income countries.<sup>6</sup> We test whether the coefficients are statistically different between the whole sample and the following three categories: (1) upper- and lower-middle- and low-income countries, (2) lower-middle- and low-income countries and (3) low-income countries. In all cases, the coefficients of the interaction between FDI and corruption are not statistically different between the whole sample and these three categories, implying that our main results apply not only to developing

countries. In addition, corruption is not simply a developing country problem, as indicated by Daniel Kaufmann, the World Bank Institute's former director for Governance and Anti-Corruption.<sup>7</sup> Therefore, this paper emphasizes the results in the whole sample. Third, we confirm the validity of our specification as a further robustness check by testing for a non-linear relationship between FDI, corruption and economic growth. Specifically, we conduct estimations by adding an interaction term between FDI and corruption squared or between FDI squared and corruption. The results show that the estimated coefficients of both terms are not significant. Therefore, it is reasonable to conclude that our specification is valid.

Finally, we discuss the issues resulting from corruption and refer to the limitations of this paper. We confirm that corruption can be a positive factor enhancing the effects of FDI on economic growth. However, there are some limitations regarding the interpretation of these results. First, because of the availability of corruption data, as previously mentioned, the dataset used in this study is a 14-year average of each variable between 1995 and 2008, indicating a fairly short sample. Thus, our analysis may not be able to capture the long-run effects of corruption on the efficiency of FDI and on growth as a whole. Given this, when data become more available, our study should be revisited with a longer sample estimation. Second, the use of time-invariant variables (i.e. legal origins) as instruments for corruption causes difficulty for the panel IV estimation, which may be more appropriate in examining the effects of corruption over the long run. When the literature on corruption becomes more abundant and sophisticated, reconsidering the choice of instruments for corruption for a panel analysis may be required as future research.

#### **4. Conclusion**

By employing the data of 130 countries over the period from 1995 to 2008, we investigate the effect of FDI on economic growth, taking into account the role of corruption in each country. The estimation results indicate that, while FDI alone does not necessarily promote economic growth, it has a significant effect on economic growth when its interaction term with corruption is considered. The threshold level of corruption separating the negative and positive effects of FDI on economic growth is approximately in the 10th percentile. The existence of the threshold implies that FDI inhibits economic growth in countries where corruption is below the threshold, and promotes economic growth in countries where corruption is above it. To address endogeneity problems, the IV estimation is also conducted. The results indicate that our main implications are robust. Furthermore, even if a corruption index from a different source is used, our main implications do not alter.

Although this paper contributes to the literature on FDI and economic growth, some caveats have to be borne in mind. First, our estimation sample spans from 1995 to 2008, based on data availability. This sample may not be sufficient to identify the long-run relationship between FDI, corruption and economic growth. An investigation using a longer panel data may be a promising future study. Second, our treatment of the endogeneity problem may not be sufficient. For example, economic growth can influence FDI. While this paper adopts the cross-country analysis following Alfaro *et al.* (2004), the panel data approaches can address other endogeneity channels. Despite these few caveats, our results should have important

implications for policy-makers in dealing with FDI and corruption, and provide guidance for future research into the relationship between FDI and economic growth.

Interestingly, the results of our study imply that reducing corruption may weaken the contribution effect of FDI on economic growth. However, it is important to bear in mind that, because corruption negatively affects the society in many ways beyond just economic growth, our findings should be interpreted with caution; they do not imply that corruption should be encouraged.

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### Notes

1. In an earlier study, Khamfula (2007) considers the role of corruption in examining the effect of FDI on economic growth and finds that the level of corruption has a negative impact on the effect of FDI on economic growth. However, the estimation results of this study may be biased due to endogeneity problems, as IV estimation is not conducted. Moreover, because Khamfula (2007) used few countries, there may be a problem of sample selection bias. In addition, studies on the effect of institutions on economic growth are widely conducted as follows. Hall and Jones (1999) show the negative effects of low quality of institutions on economic development. Mauro (1995) argues that corruption inhibits economic growth. By considering the role of democracy, Méndez and Sepúlveda (2006) note that the level of corruption that maximizes economic growth is not necessarily zero in the case of countries with sufficient democracy, and that there exists an inverted U-shaped relationship between corruption and economic growth. For theoretical studies examining the relationship between corruption and economic growth, see Ehrlich and Lui (1999), Barreto (2000) and Ellis and Fender (2006), among others.
2. The following studies, among others, investigate whether corruption promotes or hinders FDI inflows. Wei (2000) indicates that if firms need to pay bribes in a country in which they are engaging in FDI, bribery may function as extra taxes, and corruption then hinders FDI. Alfaro *et al.* (2008) show that low institutional quality, including corruption, is a main factor hindering capital flows from rich to poor countries. In contrast, some studies, such as Egger and Winner (2005), provide evidence that corruption can be a factor promoting FDI inflows, as corruption may help to hasten bureaucratic procedure.
3. This paper focuses on causality running from corruption to economic growth, whereas recent studies, such as Bai *et al.* (2013), investigate reverse causality and find, using survey data at the firm level in Vietnam, that economic growth reduces corruption. We conduct an IV estimation to mitigate the problems resulting from this reverse causality. Because it is also interesting to investigate the causality running from economic growth to corruption, we leave this question for future research.
4. We do not report the estimation results to save space. The detailed results can be provided upon request.
5. The World Bank provides data on the control level of corruption for 1996, 1998, 2000 and 2002 through 2008. We use the averaged data as in our main analysis.
6. The World Bank classifies countries into different income groups based on gross national income (GNI) per capita. The ranges of GNI per capita for this classification are reported every year (for details, see the World Bank's website: <http://data.worldbank.org/about/country-classifications>). We categorize countries in our sample into different income groups by comparing their averaged GNI per capita from 1995 to 2008 with the averages of GNI per capita ranges suggested by the World Bank over the same period.
7. See the News & Broadcast article of the World Bank at <http://go.worldbank.org/LJA29GHA80>. According to this article, one trillion dollars were paid worldwide in 2001–2002 as bribes in both

developed and developing countries. Daniel Kaufmann says, "It is important to emphasize that this is not simply a developing country problem. Fighting corruption is a global challenge."

## References

- Acemoglu, D., Johnson, S. and Robinson, J. A. (2001) The colonial origins of comparative development: An empirical investigation, *American Economic Review*, 91(5), pp. 1369–1401.
- Acemoglu, D., Johnson, S. and Robinson, J. A. (2002) Reversal of fortune: Geography and institutions in the making of the modern world income distribution, *Quarterly Journal of Economics*, 117(4), pp. 1231–1294.
- Aitken, B. J. and Harrison, A. E. (1999) Do domestic firms benefit from direct foreign investment? Evidence from Venezuela, *American Economic Review*, 89(3), pp. 605–618.
- Alfaro, L., Chanda, A., Kalemli-Ozcan, S. and Sayek, S. (2004) FDI and economic growth: The role of local financial markets, *Journal of International Economics*, 64(1), pp. 89–112.
- Alfaro, L., Kalemli-Ozcan, S. and Volosovych, V. (2008) Why doesn't capital flow from rich to poor countries? An empirical investigation, *Review of Economics and Statistics*, 90(2), pp. 347–368.
- Bai, J., Jayachandran, S., Malesky, E. J. and Olken, B. A. (2013) Does economic growth reduce corruption? Theory and evidence from Vietnam, NBER Working Paper No. 19483, National Bureau of Economic Research, Cambridge, MA.
- Balasubramanyam, V. N., Salisu, M. and Sapsford, D. (1996) Foreign direct investment and growth in EP and IS countries, *Economic Journal*, 106(434), pp. 92–105.
- Barreto, R. A. (2000) Endogenous corruption in a neoclassical growth model, *European Economic Review*, 44(1), pp. 35–60.
- Barro, R. J. (1991) Economic growth in a cross section of countries, *Quarterly Journal of Economics*, 106(2), pp. 407–443.
- Barro, R. J. and Lee, J.-W. (1994) Sources of economic growth, *Carnegie-Rochester Conference Series on Public Policy*, 40, pp. 1–46.
- Barro, R. J. and Lee, J.-W. (1996) International measures of schooling years and schooling quality, *American Economic Review*, 86(2), pp. 218–223.
- Barro, R. J. and Sala-i-Martin, X. (2004) *Economic Growth*, 2nd edn (Cambridge, MA: MIT Press).
- Bengoa, M. and Sanchez-Robles, B. (2003) Foreign direct investment, economic freedom and growth: New evidence from Latin America, *European Journal of Political Economy*, 19(3), pp. 529–545.
- Billger, S. M. and Goel, R. K. (2009) Do existing corruption levels matter in controlling corruption? Cross-country quantile regression estimates, *Journal of Development Economics*, 90(2), pp. 299–305.
- Borensztein, E., De Gregorio, J. and Lee, J.-W. (1998) How does foreign direct investment affect economic growth? *Journal of International Economics*, 45(1), pp. 115–135.
- Easterly, W. and Levine, R. (1997) Africa's growth tragedy: Policies and ethnic divisions, *Quarterly Journal of Economics*, 112(4), pp. 1203–1250.
- Egger, P. and Winner, H. (2005) Evidence on corruption as an incentive for foreign direct investment, *European Journal of Political Economy*, 21(4), pp. 932–952.
- Ehrlich, I. and Lui, F. T. (1999) Bureaucratic corruption and endogenous economic growth, *Journal of Political Economy*, 107(S6), pp. S270–S293.
- Ellis, C. J. and Fender, J. (2006) Corruption and transparency in a growth model, *International Tax and Public Finance*, 13(2–3), pp. 115–149.
- Grossman, G. M. and Helpman, E. (1991) *Innovation and Growth in the Global Economy* (Cambridge, MA: MIT Press).
- Haddad, M. and Harrison, A. (1993) Are there positive spillovers from direct foreign investment? Evidence from panel data for Morocco, *Journal of Development Economics*, 42(1), pp. 51–74.
- Hall, R. E. and Jones, C. I. (1999) Why do some countries produce so much more output per worker than others? *Quarterly Journal of Economics*, 114(1), pp. 83–116.
- Heston, A., Summers, R. and Aten, B. (2009) *Penn World Table Version 6.3* (Philadelphia, PA: Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania).
- Khamfula, Y. (2007) Foreign direct investment and economic growth in EP and IS countries: The role of corruption, *World Economy*, 30(12), pp. 1843–1854.
- Kokko, A. (1994) Technology, market characteristics, and spillovers, *Journal of Development Economics*, 43(2), pp. 279–293.

- La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R. (1999) The quality of government, *Journal of Law, Economics, and Organization*, 15(1), pp. 222–279.
- Levine, R., Loayza, N. and Beck, T. (2000) Financial intermediation and growth: Causality and causes, *Journal of Monetary Economics*, 46(1), pp. 31–77.
- Mankiw, N. G., Romer, D. and Weil, D. N. (1992) A contribution to the empirics of economic growth, *Quarterly Journal of Economics*, 107(2), pp. 407–437.
- Mauro, P. (1995) Corruption and growth, *Quarterly Journal of Economics*, 110(3), pp. 681–712.
- Méndez, F. and Sepúlveda, F. (2006) Corruption, growth and political regimes: Cross country evidence, *European Journal of Political Economy*, 22(1), pp. 82–98.
- Serra, D. (2006) Empirical determinants of corruption: A sensitivity analysis, *Public Choice*, 126(1–2), pp. 225–256.
- Staiger, D. and Stock, J. H. (1997) Instrumental variables regression with weak instruments, *Econometrica*, 65(3), pp. 557–586.
- Treisman, D. (2000) The causes of corruption: A cross-national study, *Journal of Public Economics*, 76(3), pp. 399–457.
- Wei, S.-J. (2000) How taxing is corruption on international investors? *Review of Economics and Statistics*, 82(1), pp. 1–11.
- World Bank. (2009) World Development Indicators (Washington, DC: World Bank).

## Appendix. Data description

Table A1. Data definitions and sources

Variable	Description	Source
Economic growth and initial GDP per capita	Initial GDP per capita is a value at the beginning of the sample period. GDP per capita is the real GDP per capita at purchasing power parity in 2005 international dollars. It is also used to calculate economic growth rates.	World Bank (2009)
FDI	FDI is measured as the share of GDP of the net values of investment inflows to acquire a lasting management interest (10% or more of voting stock) in an enterprise operating in a country other than that of the investor. It is calculated as the total value of equity capital, reinvestment of earnings, other long-term capital and short-term capital, as shown in the balance of payments. Note that the data are available from 1995 to 2007.	World Bank (2009)
Corruption	Corruption is the corruption perception index released by Transparency International. The variable is rescaled so that a larger value indicates more corruption.	Transparency International
Population growth	Population growth is the annual population growth rate.	World Bank (2009)
Education	Education is measured as the average years of secondary schooling of the population aged more than 15 years. We take the natural logarithm of this variable in the estimations.	Barro and Lee (1996)
Investment	Investment is measured as the share of investment in real GDP.	Heston <i>et al.</i> (2009)
Inflation	Inflation is calculated based on the GDP deflator.	World Bank (2009)
Government expenditure	Government expenditure is calculated as general government final consumption expenditure divided by GDP. It includes current government expenditure such as purchases of goods and services (including compensation of employees), and expenditure on national defence and security, which are not part of capital formation.	World Bank (2009)
Trade	Trade openness is calculated as the sum of exports and imports of goods and services, divided by GDP.	World Bank (2009)
Legal origin	Legal origins are dummy variables for legal system origin, classified into Anglo-Saxon Common Law (UK), French Civil Law (FR), German Civil Law (GE), Socialist Law (SO) or Scandinavian Law (SC).	La Porta <i>et al.</i> (1999)

**Table A2.** List of countries

Albania	Fiji	Malaysia	South Africa
Algeria	Finland	Maldives	Spain
Argentina	France	Mali	Sri Lanka
Armenia	Gabon	Malta	Sudan
Australia	Gambia	Mauritania	Swaziland
Austria	Germany	Mauritius	Sweden
Bahrain	Ghana	Mexico	Switzerland
Bangladesh	Greece	Moldova	Syrian Arab Rep.
Belgium	Guatemala	Mongolia	Tajikistan
Belize	Guyana	Morocco	Tanzania
Benin	Haiti	Mozambique	Thailand
Bolivia	Honduras	Namibia	Togo
Botswana	Hungary	Nepal	Tonga
Brazil	Iceland	Netherlands	Trinidad and Tobago
Bulgaria	India	New Zealand	Tunisia
Burundi	Indonesia	Nicaragua	Turkey
Cambodia	Iran	Niger	Uganda
Cameroon	Ireland	Norway	Ukraine
Canada	Israel	Pakistan	United Kingdom
Central African Rep.	Italy	Panama	United States
Chile	Jamaica	Papua New Guinea	Uruguay
China	Japan	Paraguay	Venezuela
Colombia	Jordan	Peru	Vietnam
Congo, Dem. Rep.	Kazakhstan	Philippines	Yemen, Rep.
Congo, Rep.	Kenya	Poland	Zambia
Costa Rica	Korea, Rep.	Portugal	
Cote d'Ivoire	Kuwait	Romania	
Croatia	Kyrgyz Rep.	Russia	
Cyprus	Lao PDR	Rwanda	
Czech Republic	Latvia	Saudi Arabia	
Denmark	Lesotho	Senegal	
Dominican Rep.	Liberia	Sierra Leone	
Ecuador	Lithuania	Singapore	
Egypt	Luxembourg	Slovak Rep.	
El Salvador	Malawi	Slovenia	

**Table A3.** Descriptive statistics

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
Economic growth	130	0.028	0.019	-0.013	0.096
Log of initial GDP per capita	130	8.440	1.300	5.016	10.773
FDI	130	0.065	0.299	-0.006	3.420
Corruption	130	5.835	2.183	0.422	8.390
Population growth	130	0.014	0.011	-0.013	0.049
Education	130	2.430	1.369	0.120	6.082
Investment	130	0.199	0.094	0.040	0.453
Inflation	130	0.137	0.313	-0.009	2.774
Government expenditure	130	0.151	0.051	0.049	0.277
Trade	130	0.862	0.502	0.219	4.171