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The Impact of Perceived Corruption Index on Foreign Direct Investments in Africa

Author: Mikael Lagging

NEKP01

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Supervisor: Katariina Nilsson Hakkala

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Abstract

This thesis evaluates the impact of corruption perception index (CPI) on foreign direct investment (FDI) flows from China and 34 OECD source countries to 54 African host countries using the gravitational model. China is of particular interest as it has become Africa's largest trading partner as well as the greatest investor among the developing countries in Africa, in addition to Chinese firms having increased their presence in African countries rich in natural resources and poor infrastructure where the scope of corruption is considerable. The thesis's results indicate that higher perceived corruption in an African country negatively impacts FDI flows originating both from OECD countries and China, supporting the "sand in wheels" view that corruption is detrimental to economic growth. Whether countries that are more similar to Africa with regards to the level of corruption invest more was further analyzed as it could be hypothesized that an investor with experience of dealing with corruption at home might be less reluctant to invest in other countries with high levels of corruption. The results for the variable absolute difference in corruption levels, however, imply no statistically significant effect and thus no evidence supporting the notion that foreign firms investing more in African countries with similar corruption levels. The negative results between CPI and FDI flows suggest that implementation of preventive measures combating corruption should be made a top policymaking priority in Africa.

Key words: Corruption, Foreign direct investment, Gravity model, Africa, OECD, China

Contents

1. Introduction

Since the 1980s, the globalization of foreign direct investment (FDI) inflows has increased in developing countries (UNCTAD, 2020). Over the last 50 years, FDI has increasingly been discussed in economic literature and policymaking circles and is widely identified as a growth-enhancing factor (Moustafa, 2021). FDI promotes a country's economic growth, creates jobs, reduces poverty (World Bank Group, 2018), affects production, as well as increases exports and imports (Moustafa, 2021). In recognition of these benefits, developing countries have in general eased restriction on FDI. In 2012, developing countries received more than half of the global FDI inflows, i.e., $703 billion, and 9 of the 20 largest FDI recipients were developing countries (World Bank Group, 2018). Many factors can affect the company decision to engage and provide FDI inflows to a specific host country. One factor identified as being especially important is the level of corruption in the host country (Moustafa, 2021).

In 2008 Africa reached a peak of FDI inflows amounting to $72 billion, followed by decreased levels in three successive years and then rebounding in 2012 to $50 billion. The declining trend was caused by several factors, including the global financial crisis at the time, a drop-in price of commodities, and political unrest in North Africa. Despite the temporary setback, the forecast at the time was that investors still would be interested in investing in Africa, due to the relatively high profitability. According to U.S. Department of commerce data, U.S FDI inflows in Africa yielded an approximate 20% return in 2010, compared to 15% return in Asia and 14% in Latin America and the Caribbean (UNCTAD, 2013).

In recent years, China has become the largest trading partner in Africa and one of the most prominent sources of FDI in the continent (Quazi et. al, 2014). China plays a vital role in infrastructure development in Africa by investing in hydropower generations, roads and railways and up to 35 African countries are engaged in major infrastructure agreements with China (Zongwe, 2010). Furthermore, China has shown a particular interest in Sub-Saharan Africa, primarily to safeguard the access to abundant natural resources (e.g., oil, minerals and timber) in the region (Quazi et. al, 2014). Chinese firms are reported to be highly competitive, and were in 2008 awarded 50% of all new public projects in Africa. The political instability in many African countries is a well-known risk for foreign investors, but the Chinese government has developed a strategy of backing and insuring Chinese firms willing to invest in Africa.

Thus, Chinese firms often display a greater risk tolerance compared to other potential investors (Zongwe, 2010). Moreover, the African growth and opportunity act (AGOA) and the European Union's Everything but Arms (EBA) initiatives have facilitated export of African made products increased access to markets in developed countries, which further has encouraged investments from China and other emerging countries, and relocated operations to Africa (UNCTAD, 2013).

The role of corruption as a significant determinant of economic growth and FDI in developing countries, has been investigated in previous studies. Two major models of explanations can be found here, the "sand the wheels" and the "grease the wheels" view. The former, more widely accepted theory, suggests that corruption reduces FDI by introducing inefficiencies and distortions, in turn raising transaction costs for investors (Bardhan, 1997), favoring firms with good connections (Rose-Ackerman, 1997), etc. In contrast, the "grease the wheel" theory postulates that corruption serves as a form of "speed money" resolving issues such as slow bureaucratic processes (Huntington, 1968), allowing for avoidance of bad governmental regulations (Lui, 1985) and promoting the best price to firms with lowest production costs, hence creating a pareto optimal outcome (Rashid, 1981).

The aim of this master thesis, is to investigate the impact of corruption on FDI from 35 OECD source countries (China included) to 54 African countries. A gravitational model will be used to first analyze how the effect of perceived corruption in an African host country affects FDI, and how the effect of the difference in corruption levels between source and African host country subsequently affects FDI. The second part of the analysis will focus on how Chinese FDI (representing a more risk tolerated FDI) is affected by perceived corruption in an African host country, and how the effect of the difference in corruption levels between China and African host country in turn affects FDI. The estimated results indicate that higher corruption levels in an African country have a negative effect on FDI flows originating from OECD country and China with similar magnitude. This is in line with the "sand the wheel" hypothesis, where corruption is seen as a deterrer of FDI flows.

Following the introduction is chapter 2, where the theoretical framework as well as the empirical findings regarding FDI and corruption will be thoroughly discussed. Chapter 2 also includes the formulation of the hypothesis and ends with the gravity model for FDI. Chapter 3 concerns the empirical specification, where all variables included in the gravity model are

carefully explained as well as how the regression analysis has been tested. The same chapter ends with describing data and descriptive statistics used in the regression model. The various regression results are presented in chapter 4 and is followed by a discussion about the main findings in chapter 5. The last chapter concludes.

2. Literature review and theoretical framework

2.1 Theoretical views on corruption

There are two main opposing views on corruption in the theoretical literature, namely the "sand the wheels" view and the "grease the wheels" view (Zander, 2021). The former states that corruption has a negative impact on the economy and impedes positive economic growth in the long run (Habib and Zurawicki, 2002). In contrast, proponents of the "grease the wheels" theory argue that while corruption may not be positive for the economy, it may be a second-best option. According to this view, corruption could under certain circumstances improve the status quo in a country (Zander, 2021).

Méon and Sekkat (2005) summarizes the "grease the wheels" view that corruption could potentially solve issues arising when national administrations falter. Bribing corrupt officials might alleviate problems such as slow bureaucratic processes, helping to avoid the consequences of policies, and improve the quality of the initial investment. By using a queuing model, Francis T. Lui (1985) showed that bribery affects slowness positively by effectively speeding up service, reducing the time spent in ques. Moreover, Bayley (1966) showed that corruption can improve the quality of civil service when bribery works as an additional wage to attract talented individuals to poorly paid governmental jobs. Beck and Maher (1986) and Lien (1986) showed that comparing competitive bidding processes and bribery gave no efficiency loss. The firm with the least cost will in a corrupt environment pay the highest bribe, hence being presented with the reward of price resulting in a generation of desirable outcome (Beck and Maher, 1986; Lien 1986). Leff (1964) argues that entrepreneurs effectively could implement more favorable policies using corrupted measures such as bribes to not implement bad governmental policies harming the economy. He also points out that corruption may improve the quality of the investment, with the bribe consisting as an insurance against governmental expropriation or violence. In summary, the "grease the wheels" view states that corruption can lead to efficiency when faced with inefficient and convoluted governmental policies, by providing means to avoid such inefficiencies (Zander, 2021).

Boycko et al. (1995), backing the "sand the wheels" view, stresses that a bribe does not constitute a legal right that a court would protect, nor does a bribe represent a contract

enforceable in court. Kaufmann and Wei (1999) investigated the effect of "speed-money" and found evidence that entrepreneurs instead waste more time dealing with corrupted officials and administrations. Transaction costs are raised in a corrupt environment, and this has a negative national welfare effect (Zander, 2021). When it comes to the quality of civil servants, Méon and Sekkat (2005) argued that officials also have the incentive to preserve their additional income from bribes by limiting new and able officials to key positions. Regarding the efficiency argument of the bidding process, Kaufmann (1997) argues that there is no guarantee that the winner is the most cost-efficient firm. Rose Ackermann (1997) and Méon and Sekkat (2005) concur in this line of thought and argue that productive efficiency is not a requirement to win in such a bidding process. Corruption favors the part with less scruples and better connections (Rose-Ackermann, 1997) and it can also result into the winner's curse (Méon and Sekkat, 2005). When it comes to the aversion of bad policies, some policies should not be escaped using bribes, and as Kaufmann (1997) puts it, policies that are designed to protect the environment or air and water quality should not be avoided.

Regarding the argument that corruption may improve the quality of the investment, it can be said that corruption results in more public investment in unproductive sectors (Méon and Sekkat, 2005). Corrupt officials favor projects that are more complex and capital-intensive projects where illicit payments are easier to conceal (Kaufmann, 1997; Rose-Ackerman, 1997). Therefore, defense projects or large infrastructure projects are often preferred (Zander, 2021). Furthermore, as corruption is illegal, bribed officials have little or no incentive to truly commit to an agreement. Therefore, one cannot argue that bribes safeguards against bad policies. On the contrary, corruption can lead to an increased risk resulting from weak rule of law (Méon and Sekkat, 2005).

2.2 Corruption and its effect on FDI

Some of the earlier empirical studies were performed by Wei and Shleifer (2000) where results indicated that corruption distorts the composition of capital inflows towards foreign bank loans and FDI in a capital importing country (Wei and Shleifer, 2000). Wei (1997) further found that corruption-induced uncertainty has a negative impact on FDI and also, he pointed towards corruption reducing inward FDI stocks (Wei, 2000), acting comparably as an increase in taxation. Habib and Zurawicki (2002) found evidence that corruption as well as the difference

in corruption between the host and source country indeed have negative effects on FDI. For Japanese FDI, Voyer and Beamish (2004) also found evidence supporting the negative influence between corruption and FDI. Busse et al. (1996) looked at the relationship between FDI and the level of corruption being exposed by the local media. They hypothesized that FDI increased when investors believed that the government would curb corruption, but this was, however, never rigorously validated. Javorcik and Wei (2009) found that corruption decreases the likelihood of FDI taking place and instead increased the likelihood of a foreign investor teaming up with a local investor rather than establishing a fully owned subsidiary. Local partners may have an advantage in dealing with corrupt officials despite dilution of ownership and potential leakages of knowledge and technology entail substantial costs. Egger and Winner (2006) produced three different results where corruption, measured as Corruption Perception Index (CPI), has a negative effect on FDI. Secondly, corruption is an important factor for intra-OECD FDI but not for extra-OECD FDI. Thirdly, the impact of corruption on FDI has in general declined over the years. Authors argue over that for horizontal intra-OECD FDI, trade impediments and factor cost differences are low and that a change in perceived corruption could result in MNCs deciding to do trade instead of investing through horizontal FDI.

Al-Sadig (2009) found evidence that corruption level has a negative effect on FDI inflows, but this effect loses its significance once institutional quality is introduced in the regression analysis. The author underlines the importance of sound institutions being the driving factor when attracting FDI rather than corruption levels. Belgibayeva and Plekhanov (2015) found evidence suggesting that corruption deters FDI for EU countries, Turkey and FYR Macedonia. They also found that level of corruption affects the composition of FDI meaning that reducing corruption attracts source countries with less corruption.

Most of the earlier studies thus found evidence for the “sand the wheels” theory. However, in more recent studies evidence for corruption being a facilitator for FDI has also been found. Hines (1995) observed a non-significant relationship between corruption and FDI, and Wheeler and Mody (1992) did not detect a significant negative relationship between the host country risk factor (a composite measure including corruption) and FDI. Bellos and Subasat (2011), and their follow-up study Subasat and Bellos (2013) employed a gravity model to investigate the connection between corruption and FDI. Their results suggest a “grease the wheels” view, meaning that a decrease in corruption levels would lead to a reduction in FDI inflows. Stein and Daude (2001) found no effect of corruption on FDI in a sample of 18 source and 58 host

countries. Barassi and Zhou (2012) used both parametric and non-parametric analyses and found after controlling for MNCs, corruption to have a positive impact on FDI stocks. Furthermore, they found in their non-parametric design, the effect of corruption is heterogenous and depends on the level of FDI stock in the country. Finally, Blundell-Wignall and Roulet (2017) using a dyadic fixed ordinary least square (OLS) estimation and GMM estimators, noted that corruption has both an insignificant or a positive effect on FDI.

Even though all the above-mentioned studies vary in their scope, country selection, use of model, and estimation method, there is a preponderance of empirical data supporting the "sand the wheels" hypothesis. However, it is important to bear in mind that corruption can have ambiguous effects depending on the prevalent national characteristics chosen to be included in the analytical datasets (Zander, 2021).

2.3 FDI in Africa

Africa has the second greatest exponential growth of inward FDI flows among world regions over the period 2003-2016 and it is thus clear that Africa is an emerging global FDI destination (UN-Habitat and HIS-Erasmus University Rotterdam, 2018). The European Union dominates FDI flows in Africa (40% of the total FDI stock), with the United Kingdom and France as top investors. Quite far from the EU, the United States appears in second place (7% of total FDI stock) and China is getting closer (5% of the total FDI stock) as investments doubled from 2011 to 2016, up to 40,000 USD ($) million (UNCTAD, 2018).

Among the foreign investors in Africa, China is the largest developing country investor (de Jonge, 2016). China's outward foreign direct investment (OFDI) flow to the African continent has grown from 317.43 million USD in 2004 to 2,516 billion in 2012 (Ministry of Commerce of the People's Republic of China, 2013). According to Ernest Young (2014), the amount of FDI received from China accounted for 4.2 per cent of Africa's total FDI flows between 2007 and 2013. The extant literature on Chinese FDI in Africa is dominated by the perspective of the western developed countries (Amankwah-Amoah, 2016, 2017). As a result, the majority of studies are oriented towards Chinese investors being exploitative in Africa (Ado and Su, 2016; Gu, 2009). Previous empirical studies on the determinants of Chinese OFDI in general show inconsistent or contradictory results, particularly regarding the host country explanatory factors,

such as natural resources and institutional quality. Seeking natural resources is seen as the main motive for Chinese OFDI in less developed countries (Cai, 1999) due to the rapid growth of China's economy in the past 30 years (Ye, 1992; Zhan, 1995), and thus the resource-rich Africa is the perfect investment location according to Kaplinsky and Morris (2009). Ramasamy et al. (2012) and Kolstad and Wiig (2012) show that indeed natural resources was a significant factor for Chinese investment, whereas Blomkvist and Drogendijk (2013) and Cheung and Qian (2009) indicated that the link was not significant.

In Africa, cheaply available natural resources are often accompanied with poor institutional quality (Shan et al., 2018) and high corruption levels deterring FDI (Asiedu, 2006; Rogoff and Reinhart, 2003). In the case of China's OFDI flows to Africa, the results of empirical studies diverge considerably. Cheung et al. (2012) revealed a negative relationship between corruption and the Chinese inflow of FDI. Furthermore, in a study by Shan et al. (2017) the estimated results showed that Chinese investors are attracted by market size rather than natural resources and that different institutional factors of an African country show varying effects on attracting Chinese FDI. However, Gu (2009) indicated that Chinese investors are not particularly concerned with corruption in the African host country. Kolstad and Wiig (2012) explained further that Chinese investors have the same experience of dealing with corruption at home and hence tend to invest in countries with similar levels of corruption (Blomkvist and Dogendijk, 2013; Habib and Zurawicki 2002).

2.4 Hypothesis

The previous literature in Section 2.2 provides more empirical evidence for the "sand the wheels" view, where corruption is seen to be detrimental to FDI. Based on this evidence I therefore propose the following basic hypothesis:

1) Corruption has a negative effect on FDI.

As this study will employ multiple methods to try to capture these corruption effects, the basic hypothesis must be specified and adjusted accordingly:

A. Corruption levels are inversely associated with FDI inflows in African host countries.

B. The difference between corruption levels of the African host country and the source country is inversely associated with the overall FDI flows from the source country to the African host country.

Due to the increased presence of Chinese influence on the African continent, with China being the largest trading partner to Africa and one of its most important providers of FDI from the developing countries, and Chinese firms showing greater risk tolerance, this leads to an elaborated hypothesis based on A and B. A plausible assumption would be that the effect of corruption on Chinese FDI would be different, when China invests in resource-rich African countries with poor institutional quality, where the scope for corruption is large.

With regards to hypothesis B, one may argue that similar levels of corruption between an African host country and a source country represents a similarity in respective economic system which in turn reduces information costs abroad for investors. Therefore, a similar level of corruption should stimulate FDI flows.

2.5 Gravity model of foreign direct investment

A gravity model relates FDI flows to the measure of the market size of host and source countries (GDP and population), distance between source and host country, and various other measures that affect demand, and transaction and information costs (GDP per capita, common border, common language, or shared colonial past) (Belgibayeva and Plekhanov, 2015). Though the gravity model is reputed for its application on trade patterns (Head and Mayer, 2013), it has also been widely used to study the determinants of FDI (Bergstrand and Egger, 2011). Below, the theoretical foundations for a baseline gravity model of FDI will be further detailed.

Larger markets provide higher demand and allow for economies of scale. Market size is linked to the size of a country's GDP and can be decomposed into level of income (GDP per capita) and the size of the population (Chakrabati, 2001). It has also been assumed that economic growth is an important driver of FDI, and therefore, GDP growth is included as an independent variable (Encinas-Ferrer and Villegas-Zermeno, 2015). The associated cost variables are linked to the microfoundations of trade (Anderson and Van Wincoop, 2003, 2004) but in the context

of FDI they may be somewhat ambiguous. There are two multilateral resistance terms, one being the inward multilateral resistance coined by Anderson and van Wincoop (2003) representing importer's ease of market access, and the other being outward multilateral resistance (also coined by the same authors Anderson and van Wincoop) measuring exporter's ease of market access (Anderson and van Wincoop, 2003). Both multilateral resistance terms are theoretical constructs and is thus not directly observable by the researcher and/or by the policymaker (Yotov et al., 2016).

There seems to be two general motivations for FDI: horizontal FDI which aims to access markets in the face of trade frictions, and vertical FDI which aims to access lower wages for part of the production process (Blonigen, 2005). A longer distance between host and source country may translate into high transportation costs and thus encourage the incentive for FDI. For example, building a plant in the destination country may in the long run be cheaper than shipping goods from source country. However, in a model of vertical FDI, where a firm serves a domestic or international market but have some certain stages of production overseas, higher transportation cost would lower the incentive for FDI. In this case, an advantage of a low factor price abroad will be gradually eroded as the transportation cost rises (Ramondo et al., 2013). Building on these assumptions, in papers by Carr et al. (2001) as well as Bergstrand and Egger (2007), theoretical models have been developed that suggest additional explanatory variables for determining FDI patterns. The authors Blonigen and Piger (2014) point out that standard gravity variables capture horizontal FDI patterns, but when explaining vertical FDI patterns these additional control variables are indeed needed (Baltagi et al., 2008).

Variables that reflect information and communication costs such as common language or colonial relationship would have the same effect on FDI as it has on trade. Lower barriers (common language and common colonial ties) are expected to assert higher investment flows. Financial openness in terms of a less restrictive FDI regime or a more open capital account is expected to give lower investment costs for potential partners and hence higher FDI. Trade openness may in fact have an ambiguous effect, as higher openness increases vertical FDI, which in turn relies on trade in intermediate goods. In contrast, lower trade openness may encourage horizontal FDI by driving up the cost of cross-border trade (Belgibayeva and Plekhanov, 2015).

FDI patterns in host country may also be partly shaped by the endowment of natural resources. For instance, Bhaumik and Co (2011) argue that endowment of natural resources is important for determining China's incentive for overseas investment. Bellos and Subasat (2012) found a positive relationship between natural resources and FDI in a broad sample. In a study of the empirical literature regarding determinants of FDI, Blonigen (2005) identified exchange rate effects, taxes, institutions, trade protection and trade effects as main determinants of FDI. In the following chapter, I will present the data and the variables included in the gravity equation used in this study.

3. Empirical specification

3.1 Gravity model

A traditional gravity model with common gravity variables and additional control variables is used were inward FDI flows between source country and host country is the dependent variable. The regression model is specified as follows:

$$FDI_{ijt} = \lambda_t + \mu_i + \varphi_j + \beta_1 \ln(GDP_{it}) + \beta_2 \ln(GDP_{jt}) + \beta_3 \ln(D_{ij}) + \beta_4 lang_{ij} + \beta_5 col_{ij} + \beta_6 BIT_{ijt} + \beta_7 RTA_{ijt} + \beta_8 CPI_{it} + \beta_9 Abs.diff.CPI_{ijt} + \beta_{10} CPI_{jt} + \beta_{11} ICPI_{ijt} + \beta_{12} dchncpi_{jt} + \beta_{13} dchnabsdiffcpi_{ijt} + \beta_{14} open_{it} + \beta_{15} GDPg_{it} + \beta_{16} FM_{it} + \beta_{17} RLE_{it} + \beta_{18} PVE_{it} + e_{ijt} \quad (1)$$

J denotes source country, *i* denotes host country and *t* denotes the year. λ_t, μ_i and φ_j are time, source and host country fixed effects which control for the multilateral resistance terms. The variable ICPI is an interaction variable measuring the interaction between host country's CPI and source country's CPI. Also, explaining the variable Chinese CPI ($dchncpi_{jt}$) and Chinese absolute difference in CPI between China and African host country ($dchnabsdiffcpi_{ijt}$) are created to measure the relationship between Chinese CPI and host country CPI and how it affects FDI from China.

Furthermore, the error term (e_{ijt}) has been added as a random disturbance. Ordinary least square (OLS) is used to show the best fitted line connecting the dependent variable FDI and the explaining variables GDP, distance, common language, previous colony, bilateral investment treaties (BIT), regional trade agreements (RTA), corruption perception index (CPI), Absolute difference in CPI, openness, GDP growth, fuels and minerals as part of total merchandise exports in host country, rule of law in host country, political stability in host country, Chinese CPI dummy and Chinese absolute difference dummy. OLS minimizes the sum of squared errors and under certain assumptions about the errors, parameter estimates enable the conduction of hypothesis testing and enables draw of inferences.

When estimating a gravity model for panel data, two problems are important to consider. The first one is the possibility that the error terms are heteroscedastic rather than homoscedastic

(independent normal distributed with fixed variance). The second problem is possibility that the error terms are correlated with a specified independent variable. Failing in stating clusters for specified variable can give understated standard errors. To address these issues, clustered robust standard errors will be used. The error terms are likely to be correlated by country pair in the gravity model context, thus making the variable "distance" clustered when it is identical in both directions.

3.2 Data and descriptive statistics

Bilateral FDI data is obtained from the OECD and UNCTAD, the sample contains all 54 African host countries (see appendix) and 35 source countries (see appendix) covering the years 2003 to 2012. The corruption perception index (CPI) is acquired from Transparency International and uses a scale variable ranging from 1-100 (were higher values imply lower corruption). To test the hypothesis about the differences in corruption levels, a variable measuring the absolute difference in CPI between source country's corruption levels and host country's level of corruption was created. The other gravity variables, distance between host and source countries' capital cities, previous colonial relationship and common language spoken by 9% of the population are all from CEPII. Gross domestic production (GDP) is from Penn World Table and annual GDP growth, host country's openness to trade and fuel and minerals as part of host country's total merchandise exports are all from World Development Indicators. The regional trade agreement (RTA) dummy is from De souse and the bilateral investment treaty dummy variable (BIT) is created from UNCTAD. Only BIT-contracts in force are being used and thus not signed agreements, since relevant date is when the agreement enters into force, same goes for the RTA variable. Both the rule of law variable and the political stability variable are indexes varying between -2.5 to 2.5 (where higher values indicate strong governance performance) and are obtainable from Worldwide Governance Indicators. Summary statistics for all variables included in the regression analysis are shown in Table 1.

Table 1: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Log FDI	2463	2.109	2.518	-6.908	9.466
GDP growth (%)	16555	.048	.084	-.621	1.231
Log GDP host country	17500	9.984	1.593	5.732	13.844
Log GDP source country	18900	13.177	1.553	9.368	16.68
Openness	15050	.732	.349	.27	2.25
Distance	18200	8.775	.51	6.003	9.85
Common language	18200	.157	.363	0	1
Colonial relationship	18200	.01	.099	0	1
Regional trade agreement	18550	.068	.252	0	1
Bilateral investment treaty	18900	.138	.345	0	1
Perceived Corruption Index	16555	2.938	.989	.8	6.5
Abs. Diff. in CPI	16449	4.016	2.027	0	8.5
Fuel and minerals (%) as total merchandise exports	12005	.264	.309	0	1
Rule of law	18270	-.688	.638	-2.606	1.077
Political stability	18270	-.487	.909	-3.315	1.2

4. Results

As previously mentioned, the gravity model of FDI flows will be estimated using an OLS regression analysis with host, source, and year fixed effects. Table 2 presents the results, with column 1 detailing the estimation results for the baseline model. The results for the main variables of interest, an African host country's corruption perception index (CPI) and the absolute difference between source country's CPI and host country's CPI, are varied. In columns 2 through 7 the additional control variables openness to trade, GDP growth, fuels and minerals as part of the export portfolio, rule of law and political stability in the African host country are added. For the African host country's CPI, the regression estimates imply that (with statistical significance in all columns except for column 7) a higher CPI, i.e., implying less corruption, was associated with a maximum of 28% increase in FDI flows. However, when the source country's CPI is introduced in the estimation model in column 8, the regression estimate for the host country's CPI does not achieve statistical significance (p-value = 0.618). When it comes to the variable absolute difference between source country's CPI and host country's CPI, the regression estimates in column 7 demonstrate a non-significant (p-value = 0.178) trend towards a negative relationship. Moreover, in column 8 the interaction variable ICPI is introduced and show a positive relationship without statistical significance (p-value = 0.182) between source country's CPI and host country's CPI. The results of estimates of bilateral investment treaties (BIT) and regional trade agreements (RTA) in general show a negative relationship without statistical significance, which suggests an unexpected negative effect on FDI inflows.

As expected, the results also show the estimated coefficients of the source countries' GDP are positive and statistically significant, which implies that larger OECD countries invest more in African countries. The coefficient of distance is negative and statistically significant, which suggests that FDI flows are smaller between countries that are more distant from each other.

Table 2. Regression Results for the OLS estimation (Dependent Variable = Log FDI)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Distance	-0.614*	-0.626*	-0.806**	-0.805**	-0.863**	-0.861**	-0.876**	-0.876**
	(0.346)	(0.347)	(0.359)	(0.359)	(0.362)	(0.362)	(0.363)	(0.364)
Common language	0.679***	0.642**	0.462	0.464	0.423	0.426	0.421	0.421
	(0.250)	(0.263)	(0.292)	(0.292)	(0.302)	(0.302)	(0.301)	(0.301)
Colonial relationship	-2.301	-2.177	-1.452	-1.441	-6.357***	-6.338***	-6.331***	-6.188***
	(2.509)	(2.527)	(2.611)	(2.613)	(0.850)	(0.845)	(0.844)	(0.850)
Log GDP host country	0.378	0.331	0.521	0.493	0.683	0.655	0.632	0.632
	(0.323)	(0.337)	(0.408)	(0.418)	(0.462)	(0.467)	(0.467)	(0.466)
Log GDP source country	3.727***	3.514***	3.651***	3.657***	3.497***	3.499***	3.668***	3.511***
	(0.449)	(0.480)	(0.520)	(0.517)	(0.566)	(0.566)	(0.578)	(0.570)
Bilateral investment treaty	-0.006	-0.013	-0.162	-0.161	-0.202	-0.205	-0.212	-0.197
	(0.149)	(0.149)	(0.154)	(0.154)	(0.164)	(0.165)	(0.164)	(0.164)
Regional trade agreement	-0.035	-0.047	-0.056	-0.058	-0.083	-0.080	-0.087	-0.110
	(0.284)	(0.282)	(0.272)	(0.272)	(0.270)	(0.272)	(0.276)	(0.272)
CPI host country		0.278**	0.241**	0.239**	0.206*	0.203*	0.077	-0.119
		(0.115)	(0.122)	(0.121)	(0.123)	(0.121)	(0.142)	(0.239)
Openness to trade			0.317	0.299	0.301	0.275	0.241	0.268
			(0.482)	(0.487)	(0.580)	(0.599)	(0.601)	(0.597)
GDP growth				0.910	0.858	0.820	0.602	0.531
				(1.134)	(1.481)	(1.502)	(1.519)	(1.507)
Fuels and minerals as part of export merchandise					-0.194	-0.233	-0.225	-0.203
					(0.555)	(0.557)	(0.566)	(0.565)
Rule of law						-0.262	-0.301	-0.318
						(0.499)	(0.516)	(0.518)
Political stability						0.099	0.125	0.147
						(0.207)	(0.204)	(0.207)
Absolute difference in CPI between source and host country							-0.127	
							(0.094)	
CPI source country								-0.128
								(0.137)
ICPI (CPI host country x CPI source country								0.044
								(0.033)
Observations	2,340	2,240	1,905	1,905	1,699	1,699	1,686	1,686
R-squared	0.575	0.579	0.597	0.597	0.600	0.600	0.600	0.601
Year Dummies	YES	YES	YES	YES	YES	YES	YES	YES
Source Dummies	YES	YES	YES	YES	YES	YES	YES	YES
Host Dummies	YES	YES	YES	YES	YES	YES	YES	YES

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3 presents the results of the estimation using the same gravity model of FDI flows as in Table 2, but with the added variables for Chinese CPI and the difference in host country's CPI and Chinese CPI. Column 1 shows the estimation of the baseline model with the additional main variable of interest, an African host country's CPI, and a dummy variable for Chinese CPI. For China as a source of FDI, the regression estimates imply that higher African host country CPI, which means lower corruption, is associated with a 25% increase in FDI flows in columns 1 to 2 with statistical significance. The estimated coefficient for the absolute difference in CPI between African host country and China in column 4 is positive but not statistically significant (p-value = 0.885).

Table 3. Regression Results for the OLS estimation with a Chinese dummy (Dependent Variable = Log FDI)

VARIABLES	(1)	(2)	(3)	(4)
Distance	-0.609*	-0.611*	-0.848**	-0.841**
	(0.351)	(0.351)	(0.366)	(0.369)
Common language	0.643**	0.642**	0.426	0.427
	(0.263)	(0.263)	(0.302)	(0.302)
Colonial relationship	-2.211	-2.198	-6.344***	-6.351***
	(2.521)	(2.525)	(0.850)	(0.854)
GDP host country	0.337	0.336	0.639	0.639
	(0.336)	(0.336)	(0.466)	(0.466)
GDP source country	3.227***	3.163***	3.102***	3.091***
	(0.565)	(0.567)	(0.650)	(0.654)
Bilateral investment treaty	-0.015	-0.014	-0.207	-0.206
	(0.149)	(0.149)	(0.165)	(0.165)
Regional trade agreement	-0.035	-0.037	-0.068	-0.071
	(0.284)	(0.284)	(0.274)	(0.271)
CPI host country	0.252**	0.253**	0.172	0.173
	(0.116)	(0.116)	(0.122)	(0.123)
CPI source country x Chinese dummy	0.581	0.538	0.830	0.813
	(0.595)	(0.599)	(0.751)	(0.767)
CPI source country		0.058	0.011	0.011
		(0.083)	(0.088)	(0.088)
Openness to trade			0.270	0.270
			(0.596)	(0.596)
GDP growth			0.648	0.638
			(1.494)	(1.493)
Fuel and minerals as part of merchandise export			-0.254	-0.254
			(0.565)	(0.565)
Rule of law			-0.307	-0.309
			(0.517)	(0.519)
Political stability			0.127	0.128
			(0.203)	(0.204)
Absolute difference in CPI between host and source country x Chinese dummy				0.053
				(0.369)
Observations	2,224	2,224	1,686	1,686
R-squared	0.579	0.579	0.600	0.600
Year Dummies	YES	YES	YES	YES
Source Dummies	YES	YES	YES	YES
Host Dummies	YES	YES	YES	YES

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4 presents the results of the estimation using the gravity model of FDI flows where the dependent variable FDI is either 0, if FDI is negative or non-existing in the host country, or 1 if FDI flows are positive. Column 1 presents the estimation results for the baseline model (same

as in Table 2). The results for the main variables of interest, an African host country's CPI and the absolute difference in CPI between source country and host country, demonstrate yet again mixed results. For the variable African host country's CPI, the regression estimates in columns 2 through 8 (with statistical significance in column 5 and 6) suggest that a higher CPI is associated with a 1.6% increase in FDI flows. With regards to the variable of absolute difference between source country's CPI and African host country's CPI, the regression estimate in column 7 implies a positive relationship without statistical significance (p-value = 0.764). Furthermore, for the interaction variable ICPI, a non-significant (p-value = 0.464) trend towards a positive relationship between source country's CPI and host country's CPI was noted. Moreover, the results of estimate of BIT and RTA in general show a positive relationship with statistical significance, which suggests positive effect on FDI.

In Table 4, columns 2 through 8 show the results for the same specifications, similar to Table 2, but with the added binary dependent variable. The addition of these control variables did not affect the coefficients of interest. As expected, the estimated coefficient of the percentage of fuels and minerals as part of the host country's exports is statistically significant in columns 6 through 8. The estimated coefficient of the GDP growth of the host country, the openness of the host country, rule of law in host country and political stability in host country all lacked statistical significance.

Table 4. Regression Results for the OLS Estimation with binary FDI (Dependent Variable = FDI)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Distance	-0.024	-0.025	-0.036	-0.036	-0.040	-0.040	-0.038	-0.038
	(0.023)	(0.024)	(0.026)	(0.026)	(0.027)	(0.027)	(0.027)	(0.027)
Common language	0.095***	0.096***	0.102***	0.102***	0.117***	0.117***	0.118***	0.117***
	(0.019)	(0.021)	(0.023)	(0.023)	(0.024)	(0.024)	(0.025)	(0.025)
Colonial relationship	-0.055	-0.045	-0.045	-0.045	-0.055	-0.055	-0.056	-0.056
	(0.036)	(0.037)	(0.042)	(0.042)	(0.044)	(0.044)	(0.044)	(0.044)
Log GDP host country	0.037**	0.032	0.046*	0.044*	0.031	0.032	0.031	0.030
	(0.018)	(0.022)	(0.025)	(0.025)	(0.030)	(0.031)	(0.031)	(0.031)
Log GDP source country	0.158***	0.164***	0.164***	0.164***	0.182***	0.182***	0.180***	0.162***
	(0.037)	(0.042)	(0.046)	(0.046)	(0.055)	(0.055)	(0.055)	(0.056)
Bilateral investment treaty	0.082***	0.072***	0.064***	0.064***	0.060**	0.060**	0.059**	0.060**
	(0.020)	(0.020)	(0.023)	(0.023)	(0.024)	(0.024)	(0.024)	(0.024)
Regional trade agreement	0.085***	0.084***	0.086***	0.086***	0.084***	0.084***	0.087***	0.087***
	(0.026)	(0.026)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)
CPI host country		0.009	0.011	0.011	0.015*	0.016*	0.017	0.003
		(0.008)	(0.009)	(0.009)	(0.009)	(0.009)	(0.011)	(0.019)
Openness to trade			0.023	0.022	0.019	0.020	0.020	0.020
			(0.030)	(0.030)	(0.035)	(0.035)	(0.035)	(0.035)
GDP growth				0.042	0.032	0.037	0.023	0.022
				(0.054)	(0.075)	(0.076)	(0.076)	(0.076)
Fuels and minerals as part of export merchandise					0.067	0.070*	0.073*	0.073*
					(0.042)	(0.042)	(0.041)	(0.041)
Rule of law						0.009	0.007	0.007
						(0.030)	(0.031)	(0.031)
Political stability						-0.006	-0.004	-0.004
						(0.014)	(0.014)	(0.014)
Absolute difference in CPI between source and host country							0.002	
							(0.007)	
CPI source country								0.006
								(0.010)
Interactive CPI (CPI host country x CPI source country								0.002
								(0.002)
Observations	17,150	15,330	12,635	12,635	10,255	10,255	10,190	10,190
R-squared	0.296	0.302	0.317	0.317	0.334	0.334	0.334	0.334
Year Dummies	YES	YES	YES	YES	YES	YES	YES	YES
Source Dummies	YES	YES	YES	YES	YES	YES	YES	YES
Host Dummies	YES	YES	YES	YES	YES	YES	YES	YES

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5 presents the results for the estimates using the same gravity model of FDI flows as a binary variable as in Table 4, that is with variables for Chinese CPI and the difference in Chinese CPI and an African host country's CPI. Column 1 presents the estimation of the

baseline model with the added above stated variables. For China as a source of FDI, the regression estimated results suggests that higher African host country CPI is associated with a 1.5% increase in FDI flows with statistical significance in column 4. When controlling for absolute difference in CPI between African host country and China in column 4, the estimated coefficient is positive, albeit without statistical significance (p-value = 0.199).

Table 5. Linear model Estimation Results for binary FDI with a Chinese dummy (Dependent Variable = FDI)

VARIABLES	(1)	(2)	(3)	(4)
Distance	-0.024	-0.024	-0.038	-0.036
	(0.024)	(0.024)	(0.027)	(0.027)
Common language	0.097***	0.097***	0.118***	0.118***
	(0.021)	(0.021)	(0.025)	(0.025)
Colonial relationship	-0.046	-0.047	-0.057	-0.056
	(0.037)	(0.037)	(0.044)	(0.044)
GDP host country	0.032	0.032	0.031	0.031
	(0.022)	(0.022)	(0.031)	(0.031)
GDP source country	0.165***	0.137***	0.161***	0.160***
	(0.041)	(0.042)	(0.054)	(0.054)
Bilateral investment treaty	0.071***	0.071***	0.059**	0.060**
	(0.020)	(0.020)	(0.024)	(0.024)
Regional trade agreement	0.087***	0.087***	0.087***	0.087***
	(0.026)	(0.026)	(0.027)	(0.027)
CPI host country	0.008	0.008	0.015	0.015*
	(0.008)	(0.008)	(0.009)	(0.009)
CPI source country x Chinese dummy	-0.003	-0.007	0.006	-0.026
	(0.114)	(0.114)	(0.137)	(0.133)
CPI source country		0.016***	0.012*	0.012*
		(0.005)	(0.006)	(0.006)
Openness to trade			0.020	0.020
			(0.035)	(0.035)
GDP growth			0.023	0.021
			(0.076)	(0.076)
Fuel and minerals as part of merchandise export			0.073*	0.072*
			(0.041)	(0.041)
Rule of law			0.007	0.006
			(0.031)	(0.030)
Political stability			-0.004	-0.004
			(0.014)	(0.014)
Absolute difference in CPI between host and source country x Chinese dummy				0.090
				(0.070)
Observations	15,232	15,232	10,190	10,190
R-squared	0.302	0.302	0.334	0.334
Year Dummies	YES	YES	YES	YES
Source Dummies	YES	YES	YES	YES
Host Dummies	YES	YES	YES	YES

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

5. Discussion

The main finding of this study is that investing firms, including Chinese, appear to prefer African host countries with strong institutions and lower levels of corruption. Thus, it is pivotal that policy makers in African host countries prioritize the control of corruption on the grounds that it is costly, creates inefficiencies, and reduce potential profits, which together hamper their potential for economic growth. Additionally, African countries that are able to reduce corruption in the long term will likely be viewed as more favorable candidates for future investments.

With regards to the hypothesis A, i.e., that higher levels of corruption are associated with lower FDI flows, the estimation results imply two results. The OLS regression analysis in Table 2 demonstrated that the effect of corruption in the African host country has a negative statistically significant effect on FDI flows (20%-28%) to the host country in column 2 through 6. Moreover, when more observations are included in Table 4 columns 5 through 6 the estimated coefficient results are still in line with hypothesis A, albeit with considerable smaller negative effect (1.5%-1.6%). The estimated results may appear ambiguous secondary to differences in magnitude, but as most of the coefficient estimates show a negative correlation between FDI flows and perceived corruption index, this supports hypothesis A and the "sand the wheels" hypothesis. The evidence is in line with Wei (2000), where he demonstrated that corruption distorts FDI inflows in a capital importing country and also that corruption reduces inward FDI stocks. Furthermore, the results corroborate the findings of Habib and Zurawicki (2002), where corruption indeed had a negative effect on FDI. Also, Egger and Winner (2006) used the same variable for measuring corruption, i.e., CPI, and they also found evidence supporting the notion that corruption has a negative effect on FDI. Similarly, Belgibayeva and Plekhanov (2015) noted that the level of corruption affects the composition of FDI implying that reducing corruption attracts source countries with less corruption.

As to the hypothesis B, i.e., higher differences in corruption levels between host country and source country results in lower FDI flows, no supportive or contractive evidence was observed as the results are not statistically significant in neither Tables 2 or 4. The estimated coefficient results hence differ from Habib and Zurawicki (2002), where they found that difference in corruption between host and source country had a negative effect on FDI. However, the results

are in line with Hines (1995), when he found a non-significant relationship between corruption and FDI. Finally, Blundell-Wignall and Roulet (2017) also noted a non-significant effect on FDI.

The results for the elaborated hypothesis A, where higher corruption levels in an African host country will continue to have a negative effect on FDI flows when China is the FDI provider, are congruent with the results supporting hypothesis A. Table 3 demonstrate a negative statistically significant effect (25%) in columns 1 and 2 on FDI flows from China to an African host country with higher corruption levels. However, when more observations are included in Table 5, column 4 is the only model specification that demonstrates a negative statistically significant effect (1.5%) on FDI flows from China. The evidence results suggest that Chinese FDI flows are lower to African host countries with high levels of corruption, but also that the elaborated hypothesis A can neither be rejected nor accepted. Hence, the estimation results in Table 3 imply support for the "sand the wheels" hypothesis, that in general, corruption is harmful for the economy and for the business processes in the host country, but the same cannot be said for the result in Table 5. When including variables for fuels and minerals as part of the host country's export portfolio as well as FDI flows from China (Table 5, column 4), Chinese investors increase FDI flows by 7.2% if the African host country is rich in natural resources but also in African host countries with lower corruption levels. These results are in line with Kolstad and Wiig (2012), where they reported that natural resources were a significant factor for Chinese investment, but also in line with Cheung et al. (2012), where the authors indicated a negative relationship between corruption and Chinese FDI flows.

The elaborated hypothesis B, regarding a higher difference between the corruption level of China and the African host country equaling less FDI flows, is the same as for hypothesis B, i.e., it did not achieve statistically significance in either Tables 3 or 5. Due to the non-statistically significant results, the elaborated hypothesis B cannot be rejected. The evidence is against Kolstad and Wiig (2012), where they explained that Chinese investors have the same experience of dealing with corruption at home and thus tend to invest in countries with similar level of corruption.

This study examined the relationship between corruption and FDI based on a data sample for all African host countries between the years 2003-2012. The findings regarding a host country's CPI's effect on FDI flows are consistent with previous reports suggesting that corruption is a

grave obstacle to efficient FDI flows. The negative effect of corruption on FDI in the result section suggests that African host countries should maximize efforts to restrain corruption in order to increase FDI, even though the provider is an OECD country or China. African countries with weak and underdeveloped institutions will struggle to attract investment and consequently, from the African perspective, weak institutions will likely prevent African countries from fully utilizing the benefits of FDI, including technological spillovers, economic growth, job creation, and resource transfer effects. All these factors can be considered important determinants in the growth, development, and sustainability in Africa.

The study is limited by the fact that FDI data for African countries has several missing values. It is unclear whether the missing values are null values or simply lacking observations. A possible resolution of this issue is to replace the missing values with zeros, and to assume that these are true null values in the OECD data and the UNCTAD data. Moreover, this study could not underline the specific impact of corruption on FDI (e.g., Market vs. asset-seeking FDI). To address this issue, the addition of FDI data classified by projects will be required in future work. Furthermore, the results rely on the perception-based measure of corruption, which is broad and fails to capture differing forms of corruption which can have varying impacts on FDI. Including more specified empirical measurements of corruption in future analysis could help elucidate important nuances regarding the overall burden for the investors.

An additional relevant concern is that the results may be driven by omitted variables. For example, low labor costs could be correlated with corruption and thus if one fails to control the cost of labor, corruption may only reflect that vertical FDI is primarily driven by cheap labor. However, as the aim of this thesis was not to distinguish any differences between the effect of horizontal FDI and vertical FDI, it seemed unnecessary to include labor endowments. Another concern is that corruption may pick up the effect of other country-specific institutional factors. This was accounted for when adding the control variables for a host country's rule of law and political stability. Nevertheless, for possible future studies one should probably consider adding further control variables such as a voice and accountability variable and a regulatory quality variable to determine whether the results remain robust.

There is also the possibility of reversed causality, i.e., that foreign direct investments could potentially affect corruption. One could capture the casual effect by instrumenting for the effect of corruption with a factor that is not determined by investment flows at the time and is

correlated with corruption. Treisman (2000) suggests using the share of the population professing the Protestant faith, when Protestantism is regarded as less hierarchical than other major religions and arose as dissenting movement opposed to the state-sponsored religion. He also proposes using the exposure to democracy as instruments for country-level corruption when misuse of resources can be exposed in media and voters can keep state officials accountable through regular democratic elections. Despite the fact that there may be a possibility of reversed causality, this thesis did not capture any casual effect by instrumenting for the effect of corruption, when it seems unlikely that foreign firms have a great influence on corruption in African countries. Corruption is still deemed prevalent in African countries, in spite of increased FDI flows over the years.

6. Conclusion

This study investigates the impact of corruption perception index (CPI) on FDI from China and 34 OECD source countries to 54 African host countries between the years 2003-2012. A baseline gravitational model, extended with the additional control variables openness to trade, GDP growth, fuels and minerals as part of the export portfolio, rule of law and political stability in the African host country is used for the empirical analysis. The results indicate that a higher level of corruption in an African country will have a negative statistically significant effect on FDI flows originating both from an OECD country and China. Hence, the estimated results support the "sand in wheels" view rather than "grease the wheels" view, where corruption is seen as detrimental for FDI flows. Furthermore, the estimated coefficients did not show any statistically significant effect when the absolute difference in CPI between an OECD country and an African host country as well as the absolute difference when taking China into account were included. Thus, no evidence was found supporting the notion that foreign firms from equally corrupt countries tend to invest more in African host countries.

The estimated results are surprising especially in the context of China, where the results imply that African host countries with high corruption levels deter Chinese FDI flows. This differs from previous literature which suggest that Chinese firms investing in African countries abundant in natural resources with high corruption levels, are experienced with dealing with corruption at home.

In light of this study's findings, policy makers in African countries should prioritize measures to minimize corruption on the grounds that corruption deters FDI from both China and OECD countries, which are the greatest provider of foreign direct investments to the continent. To extend the understanding of the underlying mechanism through which corruption impacts FDI flows, it may be warranted to further evaluate whether factors such as company size, the project, or the nature of the industry in question also play a pivotal role. Addressing these issues is an important and timely task.

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Appendix

Table 6. List of African host countries

Algeria	Angola	Benin	Botswana	Burkina Faso	Burundi	Cabo Verde	Cameroon	Central African Republic	Chad
Comoros	Democratic republic of Congo	Congo	Cote d'Ivoire	Djibouti	Egypt	Equatorial Guinea	Eritrea	Eswatini	Ethiopia
Gabon	Gambia	Ghana	Guinea	Guinea-Bissau	Kenya	Lesotho	Liberia	Libya	Madagascar
Malawi	Mali	Mauritania	Mauritius	Morocco	Mozambique	Namibia	Niger	Nigeria	Rwanda
Sao Tome and Principe	Senegal	Seychelles	Sierra Leone	Somalia	South Africa	South Sudan	Sudan	Tanzania	Togo
Tunisia	Uganda	Zambia	Zimbabwe						

Table 7. List of source countries

Australia	Belgium	Canada	Chile	Czech Republic	Denmark	Estonia	Finland	France	Germany
Greece	Hungary	Iceland	Ireland	Israel	Italy	Japan	Korea	Luxembourg	Mexico
Netherlands	New Zeeland	Norway	Poland	Portugal	Slovak Republic	Slovenia	Spain	Sweden	Switzerland
Türkiye	United Kingdom	USA	China						