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Governance and the relationship between corruption and FDI in Africa: a threshold regression analysis

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ABSTRACT

Research on the institutional environment, corruption, and FDI highlights an important facilitating relationship between these factors. The effect of corruption on FDI vis-à-vis the grabbing hand vs. the helping hand hypotheses has been previously examined with suggestions that both hypotheses can co-exist under the assumption that the FDI-corruption relationship depends on the level of institutions. This study revisits this relationship for 34 African countries over the 2005 to 2019 period using the dynamic panel threshold model, which allows for an endogenous threshold variable. Previous studies that have examined this relationship using a threshold regression approach are either not based exclusively on African countries (where the implication of this relationship is more salient) or use a threshold regression that assumes exogeneity of the threshold variable. This study examines the facilitating nature of governance measures – political stability, government effectiveness, rule of law and regulatory quality – on the corruption-FDI relationship. The results indicate significant threshold effects and shows that while the grabbing hand hypothesis is consistent with the data irrespective of the institutional proxy used, the helping hand hypothesis is sensitive to the choice of governance. These results agree with the strand of literature that supports a weak helping hand hypothesis.

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1. Introduction

Foreign Direct Investment (FDI) holds a significant position in the external finance composition of developing countries, constituting an average of 39% between 2013 and 2017 (UNCTAD 2018). FDI plays a vital role as a driver of economic growth (Balasubramanyam, Salisu, and Sapsford 1996; Iamsiraroj 2016). Nevertheless, numerous sub-Saharan African countries encounter difficulties in attracting FDI compared to other regions (De Mello 1997). Economic factors such as capital accumulation, GDP per capita, market size, trade openness and innovation, all influence a country's FDI levels and growth (Asiedu 2006; Dunning 1998; Jayasuriya 2011; Jun and Singh 1996). Additionally,

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differences in governance and quality of institutions can have a crucial role in explaining disparities in growth (Bénassy-Quéré, Coupet, and Mayer 2007; North and Thomas 1973), with institutions potentially exerting both direct (Acemoglu, Johnson, and Robinson 2001; Kaufmann, Kraay, and Zoido-Lobaton 1999; North 1990) and indirect effects on economic outcomes (Seyoum 2011).

The indirect role of the quality of governance and institutions for economic outcomes might also be at play when it comes to the relationship between corruption and FDI. This may be partly because of its influence on both FDI (Du, Lu, and Tao 2008; Sabir, Rafique, and Abbas 2019) and corruption (Gerring and Thacker 2004; Kaufmann 2005). Institutions are defined as the rules of the game in society; the humanly devised constraints that shape human interaction (North 1990). Previous studies have aimed to identify the extent to which improvements in institutional quality promote growth and, of interest to this study, attract FDI (Acemoglu, Johnson, and Robinson 2001; Asiedu 2006).[1] In an environment characterised by good institutions, economic growth is fostered, because transactions occur with trust and order. Conversely, an environment plagued by poor institutions necessitates significant resource allocation for transactions, thereby depleting available resources for productive activities (De Vaal and Ebben 2011).

Within the literature exploring the impact of institutions on FDI, corruption has emerged as a contentious factor. Studies examining corruption's effect on FDI have produced inconsistent findings, with some authors suggesting that corruption facilitates transactions and has a positive effect on FDI (referred to as the 'helping hand' effect), while others argue that corruption diverts resources towards unproductive activities and has a negative impact on FDI (referred to as the 'grabbing hand' effect) (Egger and Winner 2005; Gründler and Potrafke 2019; Ha et al. 2021; Habib and Zurawicki 2002; Leff 1964; Murphy, Shleifer, and Vishny 1991; Quazi, Vemuri, and Soliman 2014). While some studies focus on economic growth (as measured by GDP) others focus on outcomes with significant linkages to growth, like FDI. Irrespective of the economic outcome of interest (FDI or growth) extant literature largely assumes a linear relationship between corruption and economic outcomes (Egger and Winner 2005; Li and Resnick 2003; Méon and Sekkat 2005; Quazi, Vemuri, and Soliman 2014; Sena and Martianova 2008), however more recent literature suggests that the corruption-economic outcome relationship may be non-linear in the quality of institutions/governance. For example, while Mauro (1995) considers a sample splitting approach (which is arguably less efficient), other authors leverage on the developments in the literature on threshold regression estimation to analyse the non-linear relationship between corruption and FDI using some measure of institution as the threshold variable (T. S. Aidt 2009; T. Aidt, Dutta, and Sena 2008; Krifa-Schneider, Matei, and Sattar 2022). The appeal of the threshold regression model is that it allows for the hypothesised regime-switching nature of the corruption-economic outcome relationship. Allowing for the possibility that both hypotheses are consistent with the data and what is observed depends on the threshold variable (i.e. the quality of governance).

Another important point concerning these two hypotheses is what they translate to in terms of policy implication. While the *grabbing hand* hypothesis will suggest that countries should be encouraged to improve on the quality of their institutions to spur growth, the *helping hand* hypothesis will suggest that this process of improvement may need to be tempered, such that the potential rewards to both good governance, and

corruption channels are harnessed for positive economic outcomes.[2] A strand of the literature that compares the two hypothesis argues empirically that the evidence for the *grabbing hand* hypothesis is stronger than the evidence for the *helping hand* hypothesis (T. S. Aidt 2009; Chen, Pinar, and Stengos 2023; Nur-Tegin and Jakee 2020). For example, T. S. Aidt (2009) argue that the *helping hand* hypothesis based on statistical analysis of perception-based corruption indices of corruption disappear when a cross-national index of managers actual experience with corruption is used to approximate corruption. T. S. Aidt (2009, 6) noted that 'even if corruption helps overcome cumbersome regulation in the short term, it creates incentives to create more such regulation in the long term'.

Our analysis focuses on the relationship between FDI and corruption in the African context. This is motivated by several reasons. First, the policy implication of the grabbing versus helping hand hypothesis is arguably more relevant in the African context. The continent remains the most corrupt region in the world with 44 of its 49 (evaluated) countries in 2022 having a Corruption perception Index (CPI) below the mid-point of the CPI scale.[3]

Second, to the best of our knowledge none of the recent papers that use a threshold regression to explore the corruption-FDI relationship have focused on the African continent exclusively. While the studies conducted by Quazi, Vemuri, and Soliman (2014) and Gossel (2018) focus on the African context, the former did not consider a possible non-linear relationship while the latter used an interaction model to tease out possible non-linear relationship (note that interaction terms do not capture regime-switching behaviour). Studies that have used threshold analysis have been a lot more general. For instance, Krifa-Schneider, Matei, and Sattar (2022) examined the mediating role of financial development in the corruption-FDI relationship, revealing that emerging economies demonstrate a higher tolerance for corruption compared to advanced economies, possibly due to the relatively fragile institutional quality often observed in emerging countries.

Third, studies that are based on African countries and employing threshold regression analysis often ignore the role of state dependence in the outcome (FDI) by not considering a dynamic model (Amoh et al. 2023). Lastly, we use a dynamic panel model that allows both threshold variables and regressors to be endogenous (Seo and Shin 2016). This is an important departure from the Hansen (1999) model that is static and requires exogeneity of covariates. This approach also accounts for lagged dependent variables and possible reverse causality between (perception of) corruption and FDI. These gaps underscore the need for further investigation into the impact of governance on the corruption-FDI relationship in the African context. That is, given the high level of corruption in the region, does a threshold effect exist?

The analysis explores data from 34 sub-Saharan African countries spanning the period 2005 to 2019, with a specific focus on subjective measures of institutions or perceived governance. Our empirical findings provide confirmation of threshold effects indicating that the corruption-FDI relationship in general exhibits a *helping hand* effect in the lower regime, and a *grabbing hand* effect in the upper regime. However, we find some heterogeneity in the effects, while the *grabbing hand* hypothesis is consistent across governance measures (political instability, rule of law, government effectiveness and regulatory framework), the *helping hand* hypothesis is only statistically significant for political

instability and rule of law. The implication, particularly for policy is that while the *grabbing hand* hypothesis is consistent with data irrespective of the governance measure used, validity of the *helping hand* hypothesis depends on the aspect of governance being considered. Specifically low levels of government effectiveness and regulatory framework may not support the '*helping hand* hypothesis' in the African context. These results highlight the criticality of considering the role of governance in various domains when empirically examining the corruption-FDI relationship. In other words, grabbing/helping hand hypothesis may be domain specific. For our data, results suggest that corruption does not have a significant *helping hand* effect for some governance variables. This result supports the findings of T. S. Aidt (2009), Chen, Pinar, and Stengos (2023), and Nur-Tegin and Jakee (2020) who examine the relationship in a different context.

The remainder of the paper is structured as follows: the next section presents a literature review encompassing the two views on corruption, macroeconomics, and institutions, as well as the institutions paradigm. Section 3 discusses the data, Section 4 covers the methodology, Section 5 presents the results, and the final section concludes the study.

2. Literature review

2.1. The two views

Presenting the earliest rationalisation of the helping hand hypothesis, Leff (1964), Leys et al. (1965) and Huntington (1968) suggested that corruption may be beneficial in a system with ill-functioning institutions. Huntington (1968) was of the view that corruption served as 'speed money' that allowed investors to get around bureaucratic red tape. In addition to speed money that greases the system, Leys (1965) and Bayley (1966) introduced the effect of the civil servant – commonly measured by an institutional factor by the name of government effectiveness – by arguing that where wages of government officials are inadequate, the availability of an extra source of income may attract more capable civil servants who would have otherwise chosen a different line of business.

Advocates of the grabbing hand hypothesis claim that through the extraction of bribes, firms and governments get embroiled in resource-wasting, rent-seeking activities (Appelbaum and Katz 1987; Murphy, Shleifer, and Vishny 1991). Mo (2001) shows that corruption creates socio-political instability which, in turn creates uncertainty, lowering productivity and subsequently economic growth. Moreover, the existence of the opportunity to extract a bribe may induce civil servants to create delays that would otherwise cease to exist if the opportunity to extract a bribe did not exist (Myrdal 1968).

2.2. Regime switch in the African context

The notion that the mixed evidence on the relationship between corruption and FDI can be attributed to the a regime switching relationship between the two variables of interest has been acknowledged in the literature (Krifa-Schneider, Matei, and Sattar 2022). De Vaal and Ebben (2011) investigate the relationship between corruption and economic growth using a two-layer theoretical framework.

They find that the effect of corruption on growth depends on the institutional setting. They suggest that in situations where institutions are not well developed, corruption may be conducive to economic growth. This finding provides evidence for the existence of threshold effects between institutional variables from a theoretical perspective.

As noted, earlier studies that have investigated this relationship have either not focused on the African context or neglected to recognise the threshold effect (or both); see Quazi, Vemuri, and Soliman (2014) and Gossel (2018),Krifa-Schneider, Matei, and Sattar (2022), Li and Resnick (2003) and Kaushal (2021). Amoh et al. (2023) investigate the corruption FDI relationship in the African context using threshold regression, however, their methodology is based on the Hansen (1999) panel threshold model. We note that this is a static panel threshold model that does not allow for lag values of FDI in the model. As noted by Quazi, Vemuri, and Soliman (2014) lag values of FDI are important because of possible state dependence. Further, this model assumes that the threshold variable and regressors are exogeneous which is an arguably implausible assumption in this setting. Seo and Shin (2016) moved away from the static models developed by Hansen (1999) and Gonzalez et al. (2017) to a more dynamic setting. They developed a model that allows for threshold analysis in panel data while having endogenous covariates and threshold variables. This is ideal for investigating the nature of the corruption-FDI relationship.

3. Data

The sample used for this analysis consists of 34 countries[4] covering the period from 2005 to 2019. A longer period is chosen for a greater variation in institutional quality index estimates and therefore a more credible inference. Additionally, since institutions change as societies learn (Vitola and Senfelde 2015), the effects of learning may be more easily observed over longer periods.

The main variables of interest in the study are FDI and corruption, whose relationship is hypothesised to be facilitated by institutional factors represented by political stability, the quality of governance, regulatory quality, and rule of law. These are based on their significance in the studies conducted by De Vaal and Ebben (2011) and Sabir, Rafique, and Abbas (2019). Data on the institutional variables is collected from the 'World Governance Indicators (WGI) project' of the World Bank.

The description of the four institutional variables is as follows.

In the WGI database, *political stability* measures the perceptions surrounding the likelihood of the government being destabilised or overthrown by constitutional or violent means, including politically motivated violence and terrorism (World Bank 2020). *Government effectiveness* captures how agents perceive public services as well as the degree of civil service independence from political pressures (World Bank 2020). It also measures the quality of policy formation and implementation. *Rule of law* measures the degree of confidence agents have in the rules of society as well as the extent of contract enforceability and property rights in a country (World Bank 2020). It can also be thought of as the sets of agreements that enable countries to execute FDI policies and safeguard against loss of future returns (Hoff and Stiglitz 2005). *Regulatory quality* measures the perceptions of the ability of government to implement regulations to

promote private sector development (World Bank 2020). Through introducing market friendly policies such as free movement of capital, regulatory quality encourages inward FDI (Fazio and Talamo 2008).

The fourth institutional variable of interest is control of corruption (known as corruption henceforth) which despite its name measures the extent to which public power is used for private gain through both grand forms of corruption and 'capture' of the state (World Bank 2020). Sources used to construct the control of corruption index in the WGI project measure both bureaucratic and political corruption (Hamilton and Hammer 2018).

In the WGI database, each institutional variable is given a score between −2.5 (most corrupt/least effective) to 2.5 (least corruption/most effective) (World Bank 2020). Noting that the WGI database of institutional indices is a valid measure of the institutional quality prevailing in a country, it is by no means all-encompassing and thus presents several challenges in model estimation. T. S. Aidt (2009) notes that all the indices rely on perceptions which may be informed by conventional wisdom, or even cultures that are conducive to corruption. Apart from the way the index measures the quality of institutions, T. S. Aidt (2009) notes three more challenges. First, it is impossible to control for all factors that may influence FDI in a single regression. Second, causality may run in either direction. This means that institutional factors affect FDI inflows and FDI inflows also affect institutional factors. Lastly, corruption indices are measured with error which may bias inference. One solution to this problem is the use of instrumental variables, and since finding such variables that meet the required criteria is no easy task, the next best method is to use lagged values of the variable in a GMM fashion.

Since threshold analysis aims to split the sample into two regimes, we add 2.5 to each score given by WGI to eliminate negative scores. This will ensure that the threshold value is not zero and the different regimes are not a mechanical result of the sign change in the data. Thus, the scale now ranges from 0 (most corrupt/least effective) to 5 (least corrupt/most effective).

FDI is defined as the net inflows of foreign investment to a country (Quazi, Vemuri, and Soliman 2014). In this study, FDI is measured as a percentage of GDP. The World Bank measures FDI as the net inflows of investment that allows the investor to acquire controlling interest in an existing or new business, the establishment of a new plant or business and the expansion of existing operations. The data used reports the net inflows in the reporting economy from foreign investors.

While the focus of this study is to analyse the impact of institutions on the corruption-FDI relationship, extensive past research has shown that macroeconomic variables such as GDP per capita, inflation, and trade affect FDI inflows as well (Dunning 1993, 1998). These macroeconomic factors are included in the model to give a better understanding of the effect of corruption on FDI (Canare 2017).

GDP per capita is a good measure to account for the effect of population size (Woo 2010). Additionally, it represents the purchasing power in the host country (Habib and Zurawicki 2002). Jun and Singh (1996) demonstrated that economies with higher export orientation attract higher FDI inflows than countries that are not export-oriented. This may be because economically open countries pursue economic policies that are conducive to foreign trade and investment (Quazi, Vemuri, and Soliman 2014). Economic openness in this study is measured by the share of total volume of trade (imports and

exports) as a share of GDP Habib and Zurawicki (2002), Jayasuriya (2011), Woo (2010) and Quazi, Vemuri, and Soliman (2014). The consumer price index is used as a measure for inflation as done by Habib and Zurawicki (2002). Other variables such as the level of infrastructure and the exchange rate are also said to affect FDI inflows (Walsh and Yu 2010) but are excluded from this study due to inconsistencies in data availability.

Note that to account for the fact that variation (over time) in institutional measures is low, we skip every second year of the data.

Table 1 presents the descriptive statistics and the correlation matrix of the variables in the study. On average, the sum of imports and exports (TRADE) has a higher share of GDP for the countries in the sample contributing 74% to GDP while FDI only contributes 4%. Regarding the institutional factors, on average each indicator is towards the lower end of the spectrum. This means that countries in the sample are generally politically unstable, have ineffective regulations, bad governance and rule of law, a feature that is expected in the African context. This also implies that on average countries in the sample are perceived to have high levels of corruption and raises the question of the existence (or at least weakness) of the threshold effect in this context. On average in the region, political stability has the highest score and government effectiveness the lowest suggesting that perceptions around the quality of public services in the region are not positive. It also suggests that participants surveyed perceive civil services to be highly dependent on the government. On the other hand, relatively high political stability scores show that perceptions around government destabilisation are generally positive indicating a stable environment. Institutional indicator scores are low in the region, with average value of institutional measures below the midpoint of the range (2.5) and none of the indicators passing a score of 4.

The correlation table shows that institutional variables are highly correlated. The high correlations suggest that the perceived quality of one institution will affect the performance of the other, motivating the idea that while institutional variables capture distinct

Table 1. Descriptive statistics and correlation matrix.[5]

Variable	Obs	Mean	SD	Min	Max	Source
FDI	510	4.427	6.21	−11.625	57.838	World Bank
GDPPC	510	2919.959	3792.202	151.682	22942.61	World Bank
PRICEIND	510	113.647	37.115	42.234	378.884	World Bank
TRADE	510	74.465	33.201	20.723	225.023	World Bank
Corruption	510	1.944	.662	.674	3.66	WGI
Political stability	510	2.134	.806	.1	3.7	WGI
Government effectiveness	510	1.881	.597	.733	3.557	WGI
Rule of law	510	1.939	.602	.883	3.529	WGI
Regulatory framework	510	2.002	.51	.956	3.627	WGI

	Corruption	Political stability	Government effectiveness	Rule of law	Regulatory framework
Corruption	1				
Political stability	0.678***	1			
Government effectiveness	0.893***	0.643***	1		
Rule of law	0.911***	0.716***	0.928***	1	
Regulatory quality	0.816***	0.550***	0.910***	0.897***	1

FDI is net Foreign Direct Investment flows as a share of GDP, *GDPPC* is GDP per capita in US Dollars, *PRICEIND* is the consumer price index, *TRADE* is the sum of imports and exports as a share of GDP *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

aspect of a country's institutional framework, institutional factors facilitate one another. Of all the institutional factors, rule of law has the highest correlation with corruption suggesting that when laws are enforced well (high index scores) corruption is low (high index scores). This suggests that when agents have confidence in the laws of a country as well as its property rights, they are less likely to engage in corrupt behaviour.

4. Methodology

This study aims to determine if measures of institutional quality affect the relationship between corruption and FDI using a dynamic panel threshold model and data on 34 SSA countries over the 2005 – 2019 period. The use of the threshold model allows for the data to be divided into classes or regimes based on the value of an observed variable. Recent developments in the econometrics of threshold regressions allows these regressions to be run while simultaneously accounting for statistical features of panel data such as individual fixed effects. While many authors have contributed to this research, we discuss the two most influential.

4.1. Non-dynamic panel threshold model

Hansen (1999) introduced econometric techniques that enable threshold regressions to be run on panel data. Controlling for individual fixed effects, the model divides observations into two or more regimes depending on whether the observations are below or above the threshold value. Unlike traditional threshold models where the threshold value is chosen exogenously and often arbitrarily, Hansen's model estimates the threshold value and confidence intervals from the data (Chang et al. 2010). Thus, the possibility of endogenous sample separation is allowed in the model (Chang et al. 2010).

In addition to developing a technique to take care of individual fixed effects similar to first-differencing, Hansen (1999) developed a statistic to determine if the threshold is significant. In summary, Chang et al. (2010) agree that the critical advantages of Hansen's approach over the standard one is that: (1) there does not need to be a specification of a non-linear functional form, further the threshold and the number of thresholds is determined endogenously in the data, (2) asymptotic theory is used to construct confidence intervals, (3) a bootstrap method to assess the statistical significance of the threshold effect is also available in order to test the null hypothesis of linear formulation against a threshold alternative – in other words, is the threshold effect significant enough to be deemed a non-linear relationship? While these advantages make a strong argument for the model, a constraining factor is that both the threshold variable and all covariates need to be strictly exogenous (Wang 2015). This is to ensure that the first-differencing technique can be used to eliminate the individual fixed effects.

Since the corruption-FDI relationship can exhibit reverse causality and the corruption variable can be endogenous, the Hansen's (1999) method will not be appropriate. Further, there is a possibility that FDI depends on lag values. Quazi, Vemuri, and Soliman (2014) found that lagged values of the dependent variable – FDI – are important determinants of FDI in the current period. He explains that FDI demonstrates substantial state dependence. Additionally, Quazi, Vemuri, and Soliman (2014) argues that long-run contracts behave as institutional constraints that make it more difficult to change the previous course of action.

The introduction of lagged values into the model introduces endogeneity which cannot be handled by Hansen's (1999) framework. Intending to overcome the endogeneity problem, Seo and Shin (2016) developed a dynamic panel threshold model estimated using instrumental variable and Generalised Method of Moments (GMM) techniques.

4.2. Dynamic panel threshold model

Acknowledging the value of threshold analysis in panel data as well as the fact that several economic variables are endogenous, Seo and Shin (2016) developed a model that enables threshold analysis in panel data while having endogenous covariates and threshold variables. Two methods of estimation are proposed, namely, a first-differenced two-stage least squares (FD-2SLS) approach and a first differenced GMM (FD-GMM) approach (Seo and Shin 2016). Due to the characteristics of the FD-2SLS approach, the threshold parameter and covariates still need to be exogenous.

Noting contributions to the threshold panel regression analysis by Hansen (1999) and Gonzalez et al. (2017), Seo and Shin (2016) aimed to move away from the static approach to a more dynamic setting. When considering dynamic panel analysis, the most common and rigorously researched estimation technique is Generalized Method of Moments made popular by Ahn and Schmidt (1995), Arellano and Bover (1995), and Arellano and Bond (1991). While other researchers have noticed the endogeneity problem in the threshold variable, their solutions still require either the threshold or independent variables to be exogenous (Kourtellos, Stengos, and Tan 2016; Kremer, Bick, and Nautz 2013; Yu 2013). In the FD-GMM estimator developed by Seo and Shin (2016), the threshold variable and regressors are allowed to be endogenous. Additionally, they show that the FD-GMM estimator is asymptotically normal so inference on the t-statistic is valid (Seo and Shin 2016). Using a supremum type statistic, Seo and Shin (2016) develop a test to determine the significance of the threshold level in which p-values are estimated using a bootstrap method.

The dynamic panel threshold model developed by Seo and Shin (2016) is given by:

$$y_{it} = \left(1, x_{it}^{'}\right)\beta_1 1(q_{it} < \gamma) + \left(1, x_{it}^{'}\right)\beta_2 1(q_{it} \geq \gamma) + \varepsilon_{it} \tag{1}$$

Where y_{it} is the outcome variable of interest, $x_{it}^{'}$ is a vector of time-varying regressors including the lagged dependent variable (y_{it-1}), $1(\bullet)$ is an indicator function, and q_{it} is the threshold variable with γ being the threshold parameter which is endogenously determined. β_1 and β_2 are the slope parameters associated with the different regimes dependent on the observation's magnitude in relation to the threshold parameter. The error has two components and is given by:

$$\varepsilon_{it} = \alpha_i + \nu_{it} \tag{2}$$

where α_i is the unobserved fixed effect.

It is important to know if the threshold is significant or not; this is called a test for linearity. In this test, the null hypothesis according to Seo and Shin (2016) is:

$$H_0 : \beta_1 = \beta_2 \; for \; any \; \gamma \tag{3}$$

and the test statistic for the null hypothesis is:

$$\sup W = \sup W_n(\gamma) \tag{4}$$

where W_n is the standard Wald statistic.

In developing the code to run the Seo and Shin (2016) estimation method, Seo, Kim, and Kim (2019) propose a fast bootstrap algorithm to test the null hypothesis in (3).

4.3. Empirical specification

Using a panel of 34 African countries over 2005–2019 we use the FD-GMM method of panel threshold estimation to estimate the following equation:

$$FDI_{it} = \alpha_i + \beta_1^{'} X_{it}^{'} I(q_{it} < \gamma) + \beta_2^{'} X_{it}^{'} I(q_{it} \geq \gamma) + \mu_{it} \tag{5}$$

Where $I(\bullet)$ is an indicator function and $X_{it}^{'}$ a vector of independent variables given by

$$X' = \begin{bmatrix} FDI_{it-1} \\ GDPPC_{it} \\ PRICEIND_{it} \\ TRADE_{it} \\ corr_{it} \\ q_{it} \end{bmatrix}$$

and q_{it} is the threshold variable (note that our set of controls X includes the threshold variable since it can directly influence FDI). Equation (5) is estimated with one institutional variable as the threshold variable at a time, if the threshold is significant, the corruption-FDI relationship is expected to be significantly different on either side if the threshold. This may mean that corruption may switch from having a grabbing- to helping-hand effect; or that the grabbing (helping) hand effect becomes stronger or weaker on the other side of the estimated threshold value.

Jayasuriya (2011) states that GDP per capita and trade openness need to be instrumented in any panel analysis with FDI inflows as the dependent variable. This is to guard against the effects of reverse causality between these endogenous variables. Consequently, these control variables are treated as endogenous in the model specification of this study (i.e. they are instrumented by their lag values).

5. Results

Our main result (for the dynamic threshold model) is presented in Table 2, however before discussing that result Table A2 in the Appendix presents the result based on fixed effects regression (i.e. one that does not account for the hypothesised regime switching nature of the FDI-corruption relationship, state dependence in the outcome and endogeneity of the threshold variable and other covariates). The institutional variables are ranked on a scale ranging from 0 (most corrupt/least effective) to 5 (least corrupt/most effective). Since corruption is ranked with 0 being the most corrupt and 5 being the least corrupt, if the estimated coefficient of corruption is negative, this would imply that low

Table 2. Dynamic panel threshold model results.[7]

Outcome Variable	FDI			
Threshold variable	Political Stability	Government effectiveness	Rule of Law	Regulatory quality
Below Threshold				
FDI_{it-1}	−0.11	0.43***	0.37***	0.22**
	(0.11)	(0.06)	(0.13)	(0.10)
pol	7.79**			
	(3.50)			
gov		17.14***		
		(4.26)		
rule			38.61***	
			(12.08)	
regul				8.85***
				(2.39)
PRICEIND	−0.01	−0.02***	−0.05***	−0.02***
	(0.03)	(0.01)	(0.01)	(0.01)
GDPPC	−0.00	−0.00***	−0.00***	−0.00***
	(0.00)	(0.00)	(0.00)	(0.00)
TRADE	0.01	0.26***	0.10***	0.10***
	(0.06)	(0.03)	(0.04)	(0.03)
corrupt	−34.02***	−1.63	−11.88*	−2.94
	(9.08)	(1.81)	(6.14)	(3.09)
cons	−50.28**	1.07	23.26	35.73*
	(23.77)	(13.55)	(15.72)	(18.54)
Above threshold				
FDI_{it-1}	0.45***	−0.40***	−0.26*	0.48**
	(0.11)	(0.06)	(0.16)	(0.23)
pol	−6.31***			
	(2.38)			
gov		−3.49		
		(6.27)		
rule			−36.81**	
			(14.92)	
regul				−26.23***
				(6.43)
PRICEIND	−0.01	0.03*	0.05***	0.02
	(0.05)	(0.02)	(0.01)	(0.03)
GDPPC	0.00	−0.00	0.00*	0.00**
	(0.00)	(0.00)	(0.00)	(0.00)
TRADE	0.01	−0.26***	0.09*	−0.01
	(0.05)	(0.03)	(0.05)	(0.04)
corrup	34.24***	6.21***	10.51*	6.37**
	(8.87)	(1.50)	(6.22)	(2.66)
Threshold value (linearity test based on bootstrapping 99 times)	2.01***	1.92***	1.60***	2.33***
	(0.13)	(0.17)	(0.33)	(0.23)
Number of moment conditions	102	102	102	102
Observations	272	272	272	272
Countries	34	34	34	34

FDI is Foreign Direct Investment as a share of GDP, *GDPPC* is GDP per capita in US Dollars, *PRICEIND* is the consumer price index, *TRADE* is the sum of imports and exports as a share of GDP, *corrup* is the control of corruption measure. Standard errors in parentheses. Corruption is treated as an endogenous variable and is instrumented with lagged values of itself as the method dictates. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

WGI scores (more corruption) attracts more FDI and hence for that interval of institutional factor, corruption has a helping hand effect on FDI. If the estimated coefficient of corruption is positive, this would imply that a high WGI score (less corruption) attracts more FDI and so corruption has a grabbing hand effect on FDI.

While the signs of the result support the grabbing hand hypothesis in the case of political stability and helping hand hypothesis for the rest of the institutional variables, the result neither supports the grabbing nor the helping hand hypothesis since the corruption variable is not statistically significant. This supports the notion that results may be inconsistent when the regime-switching nature of the FDI-corruption relationship is not accounted for. Krifa-Schneider, Matei, and Sattar (2022) acknowledge that the mixed evidence on the relationship between corruption and FDI can be attributed to the regime-switching nature of the relationship between the two variables.

Table 2 presents the results of the dynamic panel threshold model with political stability, government effectiveness, rule of law and regulatory quality used as the threshold variable. We use the first-differences GMM estimator.[6] The model uses higher degrees of lags as instruments for endogenous variables resembling the Arellano-Bond GMM estimator (Seo, Kim, and Kim 2019). In the regressions presented in Table 2, GDP per capita and trade are treated as endogenous variables as suggested by Jayasuriya (2011) as well as corruption to account for the endogeneity that exists between institutional variables (De Vaal and Ebben 2011).

For each institutional variable considered, there exists a significant threshold effect (i.e. the null hypothesis stated in Equation (3) is rejected). Consequently, the results indicate that beyond a certain level of institutional quality, the relationship between corruption and FDI does change, thus providing a reason for the regime-switching hypothesis. While the coefficients of corruption below the threshold is negative across institutional variables (suggesting that the data may be consistent with the helping hand hypothesis) only the coefficients for political stability and rule of law are statistically significant. The result is more consistent above the threshold, in that the coefficients of corruption above the threshold are all positive and statistically significant across institutional variables. These results suggest that while the grabbing hand effect is consistent with the data irrespective of the governance factor used as threshold variable, the helping hand effect is only validated for political stability and rule of law (in contrast to the result presented in Table A2, this suggests that the mixed results in the literature can be explained by model specification).

Other results confirm that FDI is state dependent with the coefficient on the lag value of FDI being mostly statistically significant. Specifically, apart from the regression where political stability is the threshold variable, lag value of FDI is positive and statistically significant for the lower regime. This property of FDI was identified by Quazi, Vemuri, and Soliman (2014). He argues that long-run contracts behave as institutional constraints that make it more difficult to change the previous course of action. For the upper regime, lag values of FDI are positive and statistically significant for political stability and regulatory framework while being negative and significant for government effectiveness and rule of law. This suggests heterogeneity in terms of the nature of state dependence in FDI. Lastly, by including the threshold variable as an additional covariate, we can show that each institutional variable also has a significant effect on FDI in addition to having an interaction effect on the corruption-FDI relationship. Interesting to note about these relationships is the sign change above and below the threshold value. Below the threshold (when the institution is perceived to be ineffective) the institutional

variable has a negative effect on FDI with the opposite holding above the threshold. This is in line with expectations because international investors look for good quality institutions before investing in a country.

The results show that after accounting for the dynamic nature of FDI, the endogeneity of regressors and the threshold variables, there is a nonlinear relationship between FDI and corruption that depends on the quality of governance. Specifically, the result suggests that irrespective of what aspect of governance is being explored as the threshold variable, the *grabbing hand* hypothesis is consistent with the data. This finding is in contrast to the findings of Moustafa (2021) who found that perceived corruption in Egypt is positively associated with total FDI inflows. Our result means that corruption negatively impacts FDI when the perception of institutions/governance variables are positive. What this means is that, in countries with relatively good governance, as perceived by its citizens, corruption will often lead to worse outcomes in terms of FDI flows into that country. This makes sense intuitively, as with a functional and active governance structure, registration of businesses, and the process through which multinational corporations (MNCs) can start engaging in economic activities is a straightforward one. When government officials try to detract from this process, this would inherently lead to delays, or reduction in the flow of FDI into the country. This argument is supported by (Bailey 1966; Leff 1964).

With regards to the *helping hand* hypothesis, while we find some evidence in support of the *helping hand* hypothesis (bad institutions can spur growth/FDI), this is not consistent across institutional variables. This suggests that the *helping hand* hypothesis may differ, based on the governance measure used to proxy for the quality of institutions. It suggests that, while brown envelopes from MNCs may help circumvents the bottlenecks that arise as result of poor rule of law, and high level of political instability, the same may not be successful when government is ineffective, or there are poor regulatory authorities. This is, nevertheless, an interesting result, and is consistent with the result of T. S. Aidt (2009) who found that the empirical evidence in support of the *helping hand* hypothesis is weak. T. S. Aidt (2009) argue that the underdeveloped/inefficient institutions and corruption can be seen as two sides of the same coin. The former may be maintained by corrupt politicians to facilitate the latter.

While it is not exactly clear why government effectiveness and regulatory framework do not show a significant *helping hand* effect one plausible explanation for this may be what is captured by the WGI corruption measure.Hugo et al. (2023) argue that corruption is not a homogeneous phenomenon, their work in Latin America found two forms of corruption that simultaneously exist 'one being rent seeking driven by strategic self-interest and greed, and the other being systemic, used as a way of coping with government failure' (Hugo et al. 2023, 674). Additionally, there are fundamental differences between, for example, the rule of law government effectiveness captures. Poor government effectiveness would signal the lack of capacity, such that, even if bribes were provided, the capacity and resources within government to act on certain requirements may still be limited, whereas, with the rule of law, poor rule of law, may not outright mean an incapable government to perform requisite tasks. The implication is that the idea that corruption can facilitate positive outcomes may not be a prudent policy position since the evidence that supports this is weaker than the counterargument (policy makers should seek to improve on institutional quality improve on economic outcomes).

6. Conclusion

This study revisited the corruption-institutions-FDI relationship in Africa. It introduces a relatively new approach to examining this dynamic. By employing a threshold effects model, it dives into the regime-switching nature of economic outcomes, with the perceived quality of governance serving as our pivotal regime-switching measure. This approach allows for an exploration beyond the traditional linear analyses, offering a more in-depth understanding of the interplay between these variables. Central to this study's exploration was the hypothesis concerning the presence of either a *grabbing hand* effect, a *helping hand* effect, or a combination thereof within African nations, contingent on different aspects of governance – political instability, rule of law, government effectiveness, and regulatory quality.

Our findings confirm the existence of threshold effects of institutions, proxied by perceived governance, in the corruption-FDI relationship, underscoring a regime-switching reality that cannot be ignored. Specifically, the *grabbing hand* effect emerged as a significant and pervasive force across all governance measures, including government effectiveness, rule of law, regulatory quality, and political instability. This ubiquity of the grabbing hand effect reinforces the notion that corruption largely undermines FDI inflows by eroding the trust and predictability necessary for healthy investment climates.

In contrast, the *helping hand* effect displayed a much weaker relationship, challenging the notion of corruption as a facilitator in environments of poor governance. This finding indicates that while it is possible for corruption to circumvent bureaucratic obstacles, such instances may be significantly stymied by the very same poor structures, especially when it comes to government effectiveness and regulatory quality. The role of corruption, within the *helping hand* narrative is at best, a by-product, rather than a strong enough channel to influence strategy or policy. Consequently, the pursuit of corruption as a policy tool or strategy, even in less effective governance systems would be a weak proposition.

Furthermore, the results revealed that countries which consistently surpassed the governance quality threshold – such as Botswana, Ghana, and Mauritius – have also historically exhibited lower levels of corruption, stronger potential for FDI attraction, and overall economic stability. This association underscores the critical importance of robust governance structures in creating favourable conditions for FDI and suggests that efforts to enhance institutional quality are vital for sustainable economic growth in the African context.

Lastly, it is evident that the path forward for African nations lies in quelling the 'grabbing' effects of corruption, rather its weak 'helping' possibilities. Admittedly, given the persistent nature of institutions, exploring the impact of institutions and governance in a regime-switching manner on the corruption-FDI interplay, may require much longer time periods in order to fully unpack the threshold effects. This study lays the groundwork for such future endeavours that may build on its findings.

Notes

1. It is worth noting that while FDI may contribute to economic growth, it is not a robust proxy for it, as research has yielded mixed results regarding its impact on growth (Baiashvili and Gattini 2020).

2. That is improvement on the quality of institutions and governance, may not be immediately necessary as corruption can spur growth even when institutions are underdeveloped. It should be kept in mind that the helping hand channel will always be a more inefficient market outcome, in comparison to good institutions (Acemoglu and Verdier 2000).
3. See https://www.transparency.org/en/cpi/2022. and https://mg.co.za/thoughtleader/opinion/2023-02-03-sub-saharan-africa-worlds-most-corrupt-region-but-conflict-and-corruption-are-linked/.
4. See Appendix Table A1 for the list of countries.
5. Note: regressions are run using data for every second year. Descriptive statistics for this data can be found in Appendix A2.
6. The model used was developed by Seo and Shin (2016) using the Stata command developed by Seo, Kim, and Kim (2019)
7. The dependent variable is FDI. Threshold variables are stated in the first row. Each column represents a regression run with that factor as the threshold variable.

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Appendix

Table A1. Countries in the sample.

Angola	Madagascar
Benin	Mali
Botswana	Mauritania
Burkina Faso	Mauritius
Burundi	Mozambique
Cameroon	Namibia
Cape Verde	Niger
Chad	Nigeria
Republic of Congo	Rwanda
Cote d'Ivoire	Senegal
Equatorial Guinea	Seychelles
Gabon	South Africa
The Gambia	Swaziland
Ghana	Tanzania
Guinea	Togo
Guinea-Bissau	Uganda
Kenya	Zambia

Table A2. Fixed effects regression results.

	(1)	(2)	(3)	(4)
VARIABLES	FDI	FDI	FDI	FDI
PRICEIND	−0.00	−0.00	−0.01	−0.00
	(0.01)	(0.01)	(0.01)	(0.01)
GDPPC	−0.00	0.00	−0.00	−0.00
	(0.00)	(0.00)	(0.00)	(0.00)
TRADE	0.08***	0.09***	0.09***	0.08***
	(0.02)	(0.02)	(0.03)	(0.02)
corrup	0.60	−1.87	−1.47	−1.19
	(1.73)	(2.11)	(2.02)	(1.91)
pol	−0.27	−0.58	−1.20	−0.67
	(0.87)	(0.88)	(0.99)	(0.89)
gov		4.67**		
		(2.31)		
rule			5.05*	
			(2.58)	
regul				4.59**
				(2.17)
Constant	−1.67	−5.79	−5.77	−6.28
	(4.28)	(4.72)	(4.75)	(4.78)
Observations	272	272	272	272
R-squared	0.05	0.06	0.06	0.07
Number of Code	34	34	34	34

Standard errors in parentheses.
***p <0.01, ** p <0.05, * p <0.1.