



How do institutions facilitate the relationship between corruption and FDI?

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Abstract

Qualitative research on the institutional environment, corruption, and FDI highlights an important facilitating relationship between these factors. Subsequently providing more conclusive results than prior research which saw the institutional framework as a black-box. Theoretical research conducted in prior years found that variables proxying the institutional environment facilitate the relationship between corruption and FDI. The facilitating relationship is such that it suggests the existence of a threshold effect. This, combined with the competing views in corruption-FDI literature – also known as the helping- and grabbing-hand hypotheses – provides an intriguing and novel area of research. Namely, investigating the existence of a threshold value at which the relationship between corruption and FDI changes from grabbing- to helping-hand and vice versa, giving insight into the mixed results in the literature so far. This study, through the use of dynamic panel threshold estimation, fills a gap in the literature by providing empirical evidence for the existence of significant threshold effects which explain the facilitating nature of various institutions – political stability, government effectiveness, rule of law and regulatory quality – on the corruption-FDI relationship. It is the first of its kind to use panel threshold analysis to investigate threshold effects on a sample of African countries. Using data on 34 African countries over the 2005 to 2019 period, the results of this study indicate that in an environment proxying the institutional framework of a country, significant threshold effects of institutions do exist. Subsequently, showing at exactly what level the relationship between corruption and FDI changes from having a helping- to a grabbing-hand effect and vice versa. In addition, the results indicate differences in the way political and economic institutions mediate the corruption-FDI relationship.

Keywords: Institutions, threshold, corruption, FDI

JEL classification: C33, E22, F21, K42, P37

1. Introduction and literature study

Foreign Direct Investment (FDI) holds a considerably large share of the composition of external finance in developing countries with portfolio equity, official development assistance and remittances making up the remaining portion (UNCTAD, 2018). While industrialised countries have strong streams of local investment, developing countries rely heavily on FDI to advance their economies through the establishment of international business (Habib & Zurawicki, 2001). It is for this reason that FDI remains a high priority on the developmental agenda (Wang *et al.*, 2013).

The largest and most resilient source of external finance to developing countries between 2013 and 2017 was FDI, accounting for 39 per cent of external finance on average

(UNCTAD, 2018). FDI to developing countries does more than contribute to growth; according to Quazi *et al.* (2014) FDI fills three “development gaps”. These are the investment, foreign exchange, and revenue gaps, filled by FDI through the provision of capital, foreign currency, and generation of tax revenue for investment. While FDI to Africa decreased by 21 per cent in 2017 from 2016 (UNCTAD, 2018), flows expanded by 11 percent from 2017 to 2018 taking FDI inflows to Africa to the \$46 billion level. Supporting the rise in investment flows were resource-seeking investments and a more than doubling of FDI flows to South Africa (from \$2 billion to \$5.3 billion) (UNCTAD, 2019). These recent statistics on FDI inflows to Africa support the claim made by Asiedu (2005) which states that flows to Sub-Saharan Africa (SSA) are predominantly driven by natural resources and market size. FDI inflows to the region being perceived as resource-driven have been a trend since the early 2000’s with Angola, Nigeria and South Africa receiving the largest share of inflows between 2000 and 2002, absorbing 65 per cent of the flows to the region (World Bank, 2004b). As a result, FDI to SSA may be driven by a largely uncontrollable factor and resource-poor countries would attract very little FDI (Asiedu, 2005). While this may be true, it is also known that a wide range of factors determine the level of FDI a country attracts.

Research on the macroeconomic determinants of FDI has been conducted extensively. Economic factors such as capital accumulation, GDP per capita, market size, trade openness, and innovation are among the factors that influence a country’s level of FDI and growth (Jun & Singh, 1996; Dunning, 1998; Woo, 2010; Jayasuriya, 2011); but differences in institutional quality also have an imperative role to play in the explanation of comparative growth (North & Thomas, 1973). Jones (2002) states that investment is needed for growth to occur and one of the factors determining the profitability of an investment is a political institution.

The increasingly important role of institutions in FDI research has become apparent in recent years (Ali *et al.*, 2010). Research of this nature aims to identify the extent to which improvements in institutional quality help attract FDI. Pioneering investigations on the relationship between FDI and institutions, North (1990, p.3) defines institutions as “... the rules of the game in a society or, more formally, they are humanly devised constraints that shape human interaction.” In addition, Acemoglu *et al.* (2005) state that the differences in wealth levels of countries are a consequence of the institutional quality prevailing in the country, with countries that have worse institutions generally being poorer. This suggests that the organisational structure of a society determines whether they prosper or not. On a related note, North (1990) explains that institutions can be formal constraints such as rules and laws,

or informal constraints such as conventions and codes of conduct. Institutions are useful when information is imperfect and cooperation is difficult to realise in the Neoclassical setting – when transactions are costly to carry out, institutions matter (Ebben & de Vaal, 2009).

Stating that some ‘good’ institutions in a developed country may be ‘bad’ for a developing country, Khan (2012) claims that the lack of necessary infrastructure to implement institutions will prevent a country from operating efficiently. In a good institutional setting, economic growth is promoted because transactions can occur with trust and order. This contrasts with an environment characterised by bad institutions in which large shares of resources need to be allocated to accomplish transactions, reducing available resources for transformational processes, and discouraging participation in productive activities (Ebben & de Vaal, 2009). It should be noted that while FDI may contribute to economic growth (Jones, 2002) it is not a strong proxy for it, with research indicating mixed results that FDI has a positive, negative, and neutral influence on growth (Baiashvili & Gattini, 2020).

While the importance of institutional factors has become increasingly important in recent years, one institutional factor’s relationship with FDI – and more predominantly growth – has already been extensively researched. That factor is corruption. Evidence for the sometimes positive and sometimes negative effect of institutions is readily available in the literature investigating the relationship between corruption and FDI. The results of these investigations are mixed with some authors finding that corruption ‘greases the wheels of commerce’ enabling transactions to happen more easily, hence having a helping hand (positive) effect on FDI (Leff, 1964; Leys, 1965; Egger & Winner, 2005; Quazi *et al.*, 2014). Contrastingly, other researchers found that corruption ‘sands the wheels of commerce’ because the action of taking bribes causes firms and governments to allocate resources to less productive, rent-seeking projects and hence it has a grabbing hand (negative) effect on FDI (Murphy *et al.*, 1991; Shleifer & Vishny, 1993).

I postulate that the reason results are mixed is threefold. First, there may be existence of threshold effects which means that the relationship between corruption and FDI is not linear and continuous as has been previously assumed. This reason is justified by the theoretical model developed by Ebben and de Vaal (2009) which suggests that beyond a certain level of institutional quality, the effect of the institution on FDI may change. Second, institutional variables interact, and so studying them in isolation does not produce conclusive results.

Lastly, corruption is a largely unobservable factor by nature and so the reliance on indices to measure its perceived level presents problems in inference (Aidt, 2009). The aim of this study is to focus on the first reason; specifically, to determine the existence of said threshold effects that would justify the regime-switching nature of the corruption-FDI relationship in an environment characterised by several institutional factors.

1.1 The two views

Presenting the earliest rationalisation of the helping hand hypothesis, Leff (1964), Leys (1965) and Huntington (1968) suggested that corruption may be beneficial in a system with ill-functioning institutions. Leff (1964) argues that corruption is only seen as a hinderance to economic growth when bureaucracies are assumed to be promoting economic growth. If the goal of the government is staying in control or self-enrichment for example, the effect of corruption should be re-evaluated. In this case bribery enables the entrepreneur the opportunity to gain influence on the decision-making process which fosters economic growth through the reduction of uncertainty. Additionally, it supports innovative behaviour of entrepreneurs. 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, the role of civil servants is also important for the helping hand hypothesis. Leys (1964) and Bailey (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. Again, the relation between corruption and other institutions is highlighted by Cuervo-Cazurra (2008) who argued that the existence of corruption in transition economies enable them to improve underdeveloped institutions allowing them to function optimally.

On the other side of the coin, advocates of the grabbing hand hypothesis claim that through the extraction of bribes, firms and governments get embroiled in resource-wasting, rent-seeking activities (Applebaum & Katz, 1987; Murphy *et al.*, 1991; Shleifer & Vishny, 1993). In addition to contributing to the misallocation of resources, corruption adds to the cost and uncertainty of investing and thus acts as a variable tax on investors disincentivising investing (Shleifer & Vishny, 1993). Mo (2001) shows that corruption creates socio-political instability which, in turn creates uncertainty, lowering productivity and subsequently economic growth.

Since corruption contracts are not enforceable in courts, investors bear additional contract related risks (Boyko *et al.*, 1995). Moreover, 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). This view is supported by Kurer (1993) who argued that, in an attempt to sustain their illegal source of income, corrupt officials will create distortions in an economy that deliberately hinder the inflow of investment funds. Thus, at an aggregate level corruption and the quality of civil servants are more closely related than they seem (Méon & Sekkat, 2005).

Thus, the implied relation between corruption and civil servant (government effectiveness) suggests that the relationship between corruption and investment cannot be effectively investigated without considering the effect of other institutional factors. In their analysis of the impact of corruption on FDI from a quality of governance perspective, Méon and Sekkat (2005) found that the negative effect of corruption is greater when rule of law is weak. They argue that corruption is not a substitute for government effectiveness or rule of law. It has also been suggested that the globalization of the economy presents opportunities for corporations to take advantage of economies with weak regulatory frameworks when corruption is present because it is easier to avoid tax controls and other regulations imposed by the government (Cooper *et al.*, 2018).

1.2 The existence of threshold effects

Mixed evidence on the relationship between corruption and FDI suggests that the analysis conducted thus far is not as thorough as it could be and that a more in-depth analysis can be conducted to provide a deeper understanding of the two streams of evidence that have emerged in the corruption-FDI literature. According to Ebben and de Vaal (2009) the role of institutional environment facilitating the relationship between corruption and FDI is what has been missing from the literature.

To fill this gap in the literature, this study investigates how various institutional factors – rule of law, government effectiveness, political stability, and regulatory quality – facilitate the relationship between corruption and FDI while controlling for macroeconomic determinants of inward FDI. Considering 34 SSA countries over the 2005 to 2019 period, I investigate if there is a threshold effect in the relationship between corruption and FDI. Augmenting past research which has simply analysed the effect of corruption on FDI or looked at the impact of institutions on FDI, I determine if a significant threshold value exists for each institutional

factor considered as it affects the corruption-FDI relationship. This would highlight asymmetric, non-linear relationships between corruption and FDI on either side of the threshold value for each institutional factor – these relations are otherwise known as the grabbing and helping hand effects.

Thus, the investigation of the existence of threshold effects is the main contribution of my study. In addition to this, it is one of the only studies to investigate the facilitating effect of institutions on the corruption-FDI relationship on SSA countries. It is predicted that rule of law, government effectiveness, political stability and regulatory quality will display significant threshold effects, subsequently facilitating the corruption-FDI relationship.

The results of this study indicate that both in an isolated setting and one in which several institutional variables are considered, significant threshold effects do exist. Subsequently, showing that institutional factors facilitate the corruption-FDI relationship, reinforcing the idea of regime shifting – both from grabbing- to helping-hand and vice versa – on either side of the estimated threshold values. An interesting result of the analysis is that the effect on either side of the threshold depends on the type of institution, with political institutions showing more of a logical relation while economic institutions opening an avenue for future research. In addition, the results indicate that when several institutional variables are considered simultaneously, there are still significant threshold effects. Considering the institutional network enabled me to shed light on the interrelations between various institutions as well. Interestingly, using a threshold model, I am also able to show that institutional factors also have a significant effect on the state dependence property of FDI noted by Quazi *et al.* (2014).

While there is a lack of research conducting panel threshold analysis on how various institutional factors affect the corruption-FDI relationship, there are numerous studies concerned with macroeconomic determinants of FDI and the development of the institutional paradigm.

1.3 Macroeconomics and institutions

In general, the literature on FDI sees the determinants of FDI through the lens of eclectic paradigm set out in Dunning (1993). The framework explains the macroeconomic determinants of FDI using the ownership, location, internalization (OLI) theory based on locational advantages. According to Dunning (1998), the attractiveness of an investment destination is usually driven by a range of locational advantages. The study describes the

quality of inputs, market size, infrastructure, and inflation, among others, as locational advantages. In the early stages, investigations into the determinants of FDI saw factor endowment, labour costs and productivity as the most important locational advantages (Bevan *et al.*, 2004) in addition to the advantages found by Dunning (1998). While the eclectic paradigm holds significant weight in FDI research, its analytical power is often questioned by researchers. This is because Dunning provides only a flexible interpretation of a locational advantage which states that if the factor influences the profit that can be generated from a new production facility in the host country it is a locational advantage (Ali *et al.*, 2010).

Recently however, increasing attention is being placed on “created assets” when analysing the determinants of FDI (Narula & Dunning, 2000). Examples of “created assets” are knowledge-based assets and institutions. North (1990) studied the relationship between institutions and investment. According to him, institutions are constraints developed by humans to shape human interaction and what make up the institutional framework which then establishes the behavioural norm. In his theory, North (1990) states that transaction and production costs most effectively reflect the effect of an institution. Moreover, he claims that there is some degree of information asymmetry in every economic exchange and as such, transactions have a risk premium. The risk premium is a function of institutional quality, specifically contract enforceability and property rights. While investigations of institutions may provide more insight into the determinants of FDI, they also introduce several complicated relations that need to be considered because of the intricate web also known as the institutional framework (North, 1990). This web describes the interactions between one institutional factor and the others, suggesting that each factor cannot be studied in isolation as many researchers have done so far (Ebben & de Vaal, 2009). In other words, the interactions within the web simply suggest that institutions form a delicate ecosystem in which the economy functions, and as such should be investigated on a deeper level as one of the determinants of FDI. A change in one aspect within the ecosystem changes the balance and thus affects other institutions' functioning as well, as such the ecosystem needs to be studied as a whole. Well-developed institutions are important, but Mengistu and Adhikary (2011) note that investors are less likely to invest in a country in which institutions increase red tape to the point where they raise the cost of doing business so much that returns are diminished.

The relation between institutional and locational factors and their effect on FDI led Dunning (1998) to expand the eclectic paradigm to include the influence of institutional factors. Thus,

based on Dunning (1993, 1998) the determinants of inward FDI can be expressed algebraically as

$$FDI = f(\text{market size}, \text{macroeconomic stability}, \text{institutions})$$

in which market size is represented by GDP per capita, macroeconomic stability by the level of inflation and institutions by qualitative indices measuring the rule of law, proprietary rights, expropriation risk and control of corruption among other factors (Sabir *et al.*, 2019).

1.4 The institutional paradigm

While institutions are proving to be an important determinant of FDI, Fadiran and Akanabi (2017) highlight an important point that many researchers overlook. They state that by using the definition of institutions coined by North (1990), many researchers fail to indicate which specific institutions are being addressed and instead simply bundle the factors together with no regard for the endogeneity between them. As a result, researchers fall victim to oversimplified clustering and are unable to draw useful inferences. Vitola and Senefelde (2015) also found fault with the definition of institutions commonly used by researchers. In their study they develop a conceptual framework to illustrate the interaction between institutions and socioeconomic development. They define institutions as “...socially approved behaviour models that restrict the rationality of an individual and constrain or encourage specific behaviour and assume that high quality institutions encourage an efficient use of limited production resources to fulfil the needs of society.”. They classify them into three groups, namely economic, political and value. Through highlighting the weaknesses of past studies and developing frameworks to circumvent them, these authors contributed to the development of the institutional paradigm.

Highlighting a major weakness in the theoretical literature and elaborating on the potential reason for the differences in the outcomes surrounding the corruption-growth relationship, Ebben and de Vaal (2009) argue that the institutional framework should not be treated as a black box as most researchers see it because the relationship between corruption and growth (driven by FDI in developing countries) depends on the overall institutional environment. They claim that the biggest problem is that researchers study one institutional factor in isolation, ignoring the interplay between corruption and other institutions and along with-it valuable relations. Since North (1990) states that formal and informal institutions as well as distortions are the network on which an economy is built and functions, the removal of a distortion alters this network, triggering other distortions. For this reason, the effects of

corruption cannot be studied without accounting for the institutional framework of the society, suggesting a facilitating relationship between the other institutional factors and the corruption-FDI relationship.

On this basis, Ebben and de Vaal (2009) investigate the relationship between corruption and economic growth considering the role of institutions that may influence corruption in an economy. Using a two-layer theoretical framework, they find that corruption may be conducive to growth in countries where institutions are not well-developed and as a result, the removal of corruption by no means promotes economic growth with certainty because it depends on the way the removal of corruption affects the institutional setting as a whole. Research conducted by Ebben and de Vaal (2009) is particularly important because it fills a gap in the literature on corruption and economic growth that overlooks the role of other institutions in determining economic behaviour and hence the need for corruption to stimulate economic growth. The findings of their study provide evidence for the existence of threshold effects between institutional variables from a theoretical perspective and is the main motivation for my study, which aims to highlight these interactions from an empirical perspective.

It should be noted that the result of Ebben and de Vaal (2009) is for the corruption-growth relationship and not the corruption-FDI relationship. While FDI is a contributor to growth in the SSA region as justified by Quazi *et al.* (2014), it is not a proxy for growth (Jones, 2002). Past research has extensively investigated the relationship between corruption and growth, but little has been said about the corruption-FDI relation as it relates to threshold effects. Additionally, when studies have investigated the corruption-FDI relationship, they have not looked at African countries, the entire institutional framework or threshold effects at the same time – which is what my study does, with the aim of finding significant threshold effects of institutions on the corruption-FDI relationship.

Also studying the role of the institutional framework are Fadiran and Akanabi (2017) who examine the link between total factor productivity (TFP) and institutions in SSA. Acknowledging the role of the entire institutional framework, they find fault in the definition of institutions used by researchers claiming that the definition presented in North (1990) is far too broad and rather inadequate to highlight the nuances of the complicated institutional web. Acemoglu *et al.* (2001, 2005, 2012) and Glaeser *et al.* (2004) also highlight the failure of researchers to methodologically account for the endogeneity between institutions by

unbundling them to get more conclusive results. Thus, while institutions have been in the spotlight in recent years, the analysis is by no means perfect. A great amount of consideration should be put into the institutional setting and definitions before conclusive results are to be expected.

For completeness, I discuss a few studies that investigated FDI and institutions. Walsch and Yu (2010) investigate the determinants of FDI using sectoral FDI data and institutional variables such as labour market flexibility, judicial independence, legal system efficiency and financial depth while controlling for macroeconomic determinants given by trade openness, GDP per capita and inflation. To control for endogeneity, the authors use a dynamic GMM approach and find that the most important institutional factors are judicial independence and labour market flexibility. High sunk costs of FDI means investors are sensitive too uncertainty which arises from poor institutions.

Also investigating the FDI-institution relationship, Ali et al., (2010) use a panel of 107 countries from 1981 to 2005. Controlling for market size and trade openness and using a system GMM model to account for the endogeneity problem they find that the most significant institutional factors are proprietary rights, rule of law and expropriation risk. In addition, the authors state that institutions and macroeconomic stability have a comparable effect on FDI; interestingly they have a greater impact than infrastructure quality and taxes.

In a more recent study Sabir *et al.* (2019), used panel data for low-, middle-, and high-income countries from 1996 to 2016. Controlling for heterogeneity and endogeneity by using a system GMM model they find that institutional quality – measured by political stability, voice and accountability, rule of law, control of corruption and government effectiveness – is a more important determinant of FDI in developing countries than in developed countries, but overall better institutions attract more FDI. In particular, they state that quality political institutions can attract large sums of FDI to developed countries, suggesting that this is one of the more important institutional determinants.

Based on the studies presented above, past research has simply seen institutional factors as a determinant of FDI, ignoring possible threshold effects.

2. Data

The 34 countries¹ used in this sample were based on data availability, since the dynamic panel threshold model requires a balanced dataset. Data availability on institutional variables was the main constraint on the analysis. Consequently, the dataset covers the 2005 to 2019 period. This period is chosen because it allows for greater variation in institutional quality index estimates and more significant inference since inference over a short period (less than ten years) is not advised (Hamilton & Hammer, 2018). Additionally, since institutions change as societies learn (Vitola & Senefelde, 2015), the effects of learning may be more easily observed over longer periods. My choice of variables for this study reflects a wide range of literature on FDI and institutions including North (1990), Dunning (1993), Bevan *et al.* (2004), Walsch and Yu (2010), Quazi *et al.* (2014), Ali *et al.* (2018) and Sabir *et al.* (2019).

The main variables of interest in the study are FDI and corruption, whose relationship is hypothesized to be facilitated by institutional factors represented by political stability or the absence of violence – termed political stability from here, the quality of governance, regulatory quality, and rule of law. I expect to find significant threshold effects for each of the institutional variables considered. This expectation is justified by the interactions of institutions highlighted by Ebben and de Vaal (2009), and Aidt (2009) who claim that the missed findings in corruption-FDI literature are due to ignored threshold effects.

Data on institutional variables is collected from the “World Governance Indicators (WGI) project” of the World Bank². The dataset from the World Bank consists of six different indicators of institutional quality, namely voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and the control of corruption. I use only the four measures mentioned above based off their significance in a study conducted by Ebben and de Vaal (2009) who to my knowledge are the only authors to investigate the influence of institutional factors on corruption in an economy using a qualitative approach. Additionally, Sabir *et al.* (2019) studied the same four institutional variables chosen for this study and found that they matter for FDI in developing countries. 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). These indicators are only available on an

¹ See appendix Table A1 for the list of countries.

² I acknowledge that there are other sources to collect data on institutional variables such as Transparency International (corruption data) and Polity IV. For this study, WGI was chosen as the most relevant source due to consistent data availability for all African countries included. Other sources will be considered in future work.

annual basis from 2005 for African countries and so that constrains the period of my analysis. The description of the four institutional variables are as follows.

Political stability is classified as a political institution³ in the framework developed by Vitola and Senefelde (2015) to analyse the nuances of institutions. In the WGI database, political stability measures the perceptions surrounding the likelihood of the government being destabilized or overthrown by constitutional or violent means, including politically motivated violence and terrorism (World Bank, 2020).

Government effectiveness is another political institution. According to Vitola and Senefelde (2015) political institutions should allow benefits to majority of society and not just the politically elite. In the WGI database, 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 is an economic institution and 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 & Stiglitz, 2005).

Regulatory quality is classified as an economic institution by Vitola and Senefelde (2015). According to them, an economic institution should induce investment in human and physical capital by creating significant incentives. 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 free movement of capital, regulatory quality encourages inward FDI (Fazio & Talamo, 2008).

The institutional variable of interest in this study is control of corruption (known as corruption from here) 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 & Hammer, 2018).

³ It can also be argued that political stability is not a political institution itself, but a metric used to analyse a political institution such as a government. For the purpose of this study and the description given in the WGI database, political stability is classified as a political institution.

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. 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, 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. And lastly, corruption indices are measured with error which may bias inference. The 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 I conduct a threshold analysis which aims to split the sample into two regimes, I 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. If negative scores are not converted to positive through the addition of 2.5, the sign change in the data may be picked up as the regime change by the model. Thus, the scale now ranges from 0 (most corrupt/least effective) to 5 (least corrupt/most effective).

While the focus of this study is to analyse the impact of institutions on the corruption-FDI relationship, extensive past research showed that macroeconomic variables such as GDP per capita, inflation, and trade affect FDI inflows as well (Dunning 1993, 1998). Macroeconomic factors are included in the model to give a better understanding of the effect of corruption on FDI (Canare, 2017). Thus, I control for these macroeconomic variables in my analysis. Data on the dependent variable, FDI, and the other macroeconomic variables is obtained from the World Bank. FDI is defined as the net inflows of foreign investment to a country (Quazi *et al.*, 2014). In this study FDI is measured as a percentage of GDP. The World Bank measures FDI as the net inflows of investment that allow 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.

GDP per capita is a good measure to use to account for the effect of population size (Woo, 2010). Additionally, it represents the purchasing power in the host country (Habib &

Zurawicki, 2001). 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 *et al.*, 2014). Following other studies – Habib and Zurawicki (2001), Jayasuriya (2011), Woo (2010) and Quazi *et al.* (2014) – economic openness in this study is measured by the share of total volume of trade (imports and exports) as a share of GDP. The higher the ratio of imports and exports to GDP, the more open the economy. The consumer price index is used as a measure for inflation as done by Habib and Zurawicki (2001). Other variables such as the level of infrastructure and the exchange rate are also said to affect FDI inflows (Walsch and Yu, 2010) but are excluded from this study due to consistent data unavailability.

Table 1: Descriptive Statistics and Correlation matrix

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
corrup	510	1.944	.662	.674	3.66	WGI
pol	510	2.134	.806	.1	3.7	WGI
gov	510	1.881	.597	.733	3.557	WGI
rule	510	1.939	.602	.883	3.529	WGI
regul	510	2.002	.51	.956	3.627	WGI
		corrup	pol	gov	rule	regul
corrup		1				
pol		0.678***	1			
gov		0.893***	0.643***	1		
rule		0.911***	0.716***	0.928***	1	
regul		0.816***	0.550***	0.910***	0.897***	1

Note: 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, pol measures the perceptions of political stability, gov is a measure of government effectiveness, rule measures the rule of law, regul is the regulatory quality in a country. * p<0.05, ** p<0.01, *** p<0.001.

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 in the countries in the sample contributing 74 per cent to GDP while FDI only contributes 4 per cent. 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 bad governance, rule of law and ineffective regulations. It also means that on average countries in the sample are perceived to have high levels of corruption. 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 none of the indicators passing a score of 4.

The correlation table shows that institutional variables are highly correlated suggesting that all the variables cannot be used in a simple regression as pointed out by Globerman and Shapiro (2002) without accounting for endogeneity. It is for this reason that the method used to estimate the regressions in this study instruments for endogenous variables, using a method similar to the GMM method of Arellano and Bond (1991). The high correlations do however suggest that the perceived quality of one institution will affect the performance of the other, motivating the idea that institutional factors facilitate one another and studying relation between them would lead to a deeper analysis than simply analysing the effect of one factor at a time (Ebben & de Vaal, 2009). While this reasoning may be true, it is important to note that due to the nature of institutions the correlation may be a result of the overlap in what each of the factors capture. 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.

3. 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 to 2019 period, this study aims to provide a plausible explanation for the mixed results when it comes to the relationship between corruption and FDI.

In addition, this study follows the findings of Aidt (2009) and Ebben and de Vaal (2009) by controlling for several institutional factors while analysing the effect of corruption on FDI in SSA countries.

Threshold regression models specify that the data can be divided into classes or regimes based on the value of an observed variable. Although intuitively appealing, econometric

techniques used to implement threshold analysis on panel data are not very well developed. Over the years however, huge strides have been made in allowing regressions to be run while simultaneously accounting for the threshold and statistical features of panel data such as individual fixed effects. While many authors have contributed to this research, I discuss the two most cited.

3.1 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.*, 2009). 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.* (2009) and Chang *et al.* (2010) agree that the critical advantages of Hansen's (1999) approach over the standard one is that: (1) there does not need to be a specification of non-linear functional form and the number and the threshold 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 relation? 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.

It is for this reason that I do not use Hansen's (1999) method in my study. Past literature such as Quazi *et al.* (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 *et al.*, (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.

3.2 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 & Shin, 2016). Due to the characteristics of the FD-2SLS approach, the threshold parameter and covariates still need to be exogenous. This is not suitable for my study and so I elaborate more on how the FD-GMM approach was developed.

Noting contributions to the threshold panel regression analysis by Hansen (1999) and Gonzalez *et al.* (2005), 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) and Arellano and Bover (1995), and Arellano and Bond (1998). 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 *et al.*, 2009; Kremer *et al.*, 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 & 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

$$y_{it} = (1, x'_{it}) \beta_1 1(q_{it} < \gamma) + (1, x'_{it}) \beta_2 1(q_{it} \geq \gamma) + \varepsilon_{it} \quad (1)$$

Where y_{it} is the variable of interest, x'_{it} is a vector of time-varying regressors including the lagged dependent variable, $1(\bullet)$ 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

$$\varepsilon_{it} = \alpha_i + v_{it} \quad (2)$$

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

$$H_0: \beta_1 = \beta_2 \text{ for any } \gamma \quad (3)$$

And the test statistic for the null hypothesis is

$$\sup W = \sup W_n(\gamma) \quad (4)$$

where W_n is the standard Wald statistic.

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

3.3 Empirical specification

The aim of this study is to fill the gap in the literature by considering how political and economic institutions facilitate the relationship between corruption and FDI. To my knowledge this has not been conducted empirically before. Using a panel of 34 African countries over 2005-2019 I use the FD-GMM method of panel threshold estimation to estimate the following equation

$$FDI_{it} = \alpha_i + \beta'_1 X'_{it} I(q_{it} < \gamma) + \beta'_2 X'_{it} I(q_{it} \geq \gamma) + \mu_{it} \quad (5)$$

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

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

and q_{it} is the threshold variable. I estimate equation (5) with one institutional variable as the threshold variable at a time to determine the effect of the institution in an isolated environment. I then estimate equation (5) with all the institutional variables included in the X'_{it} vector which enables me to proxy the institutional framework. The measures of institutional quality I consider are political stability, government effectiveness, regulatory quality, and rule of law. The institutional variable of interest is corruption. 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. I expect to find significant threshold effects for each institutional variable considered.

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. This means that FDI inflows affect GDP per capita and trade openness; and at the same time GDP per capita and trade openness affect FDI inflows. Consequently, these control variables are treated as endogenous in the model specification of this study.

4. Results and Discussion

Table 2a presents the results of the dynamic panel threshold model with political stability, government effectiveness, rule of law and regulatory quality used as the threshold variables. In this version of the model, only one institutional variable is considered at a time. The estimation of an empirical model contributes to the literature since other studies considering the institutional framework through the interaction of institutional variables, such as Ebben and de Vaal (2009), simply used a theoretical framework and failed to present any empirical evidence.

Prior to discussing the results, it should be noted that the model used estimates the regression in a similar way to a first differenced GMM model⁴. Subsequently, this specification of the model allows for an endogenous threshold. The model uses higher degrees of lags as instruments for endogenous variables resembling the Arellano-Bond GMM estimator (Seo *et al.*, 2019). In regressions presented in Table 2a, 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 (Ebben & de Vaal, 2009).

Additionally, a caveat should be noted; since this is the first study to use a dynamic panel threshold model to investigate the facilitating effect of institutions on the corruption-FDI relationship – to my knowledge – but there are several studies investigating institutions and

⁴ The model used was developed by Seo and Shin (2016) using the Stata command developed by Seo *et al.* (2019)

the corruption-growth relationship – the results are compared to such research noting that FDI is not a proxy for growth which may lead to subtle differences in results. As a result, I measure my results against the results found by Ebben and de Vaal (2009) based on the two-layer theoretical model they develop and Aidt (2009).

Table 2a: Isolated dynamic panel threshold model results⁵

Threshold variable (q_{it})	Political stability	Government Effectiveness	Rule of Law	Regulatory Quality
Dependent variable	FDI	FDI	FDI	FDI
	Lower regime			
FDI_{it-1}	-0.126* (0.0658)	0.027 (0.0174)	0.168*** (0.0136)	0.197*** (0.0112)
corrup	-5.546*** (1.377)	-2.356*** (0.687)	3.738*** (0.406)	0.108 (0.669)
PRICEIND	0.034 (0.0214)	-0.002 (0.00437)	-0.019*** (0.00522)	0.006 (0.00603)
GDPPC	0.001*** (0.000448)	-0.000164*** (2.08e-05)	-0.000243*** (4.61e-05)	-0.000260*** (4.52e-05)
TRADE	0.027 (0.0281)	0.036*** (0.0102)	0.061*** (0.00603)	0.049*** (0.00384)
	Upper regime			
FDI_{it-1}	0.279*** (0.0622)	0.070*** (0.0224)	-0.235*** (0.0301)	-0.328*** (0.0293)
corrup	7.878*** (1.640)	2.811*** (1.056)	-5.948*** (1.056)	-4.327*** (1.359)
PRICEIND	-0.049** (0.0227)	-0.003 (0.00661)	0.014* (0.00830)	-0.054** (0.0263)
GDPPC	-0.001*** (0.000455)	-0.000230*** (6.43e-05)	-0.000559*** (6.99e-05)	-0.000828*** (0.000209)
TRADE	0.099*** (0.0277)	0.112*** (0.0187)	-0.043*** (0.00599)	0.116*** (0.0225)
constant	-16.46*** (5.917)	-6.685* (3.820)	16.04*** (2.110)	19.77*** (7.666)
Threshold	2.062*** (0.0249)	1.464*** (0.171)	2.492*** (0.136)	2.174*** (0.0783)
Lower regime (%)	42.74	25.88	80	66.86
Linearity test	0.0	0.0	0.0	0.0
Bootstrapped	YES	YES	YES	YES

Note: 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<0.05, ** p<0.01, *** p<0.001.

⁵ 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.

Recall that 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 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) attract more FDI and so corruption has a grabbing hand effect on FDI.

First and most importantly, it should be noted that for each institutional variable considered, there exists a significant threshold effect. 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 regime-switching and mixed results in the literature. The results for each institutional factor are discussed further below.

When political stability is used as the threshold variable, the results presented in Table 2a indicate a significant threshold estimate of 2.062. They also show that 42 per cent of the observations are perceived as being politically unstable. Importantly, the result shows that in politically unstable countries, corruption has a significant helping hand effect on FDI as indicated by the negative sign on the coefficient of corruption in the lower regime section of Table 2a. In contrast, when the political stability scores of a country improve to levels greater than 2.062 (i.e., in the upper regime), corruption begins to have a grabbing effect on FDI. The results presented in Table 2a for political stability demonstrate the facilitating nature of political stability on the relationship between corruption and FDI. It is important to note that the results support the existence of a significant regime shift in the data, highlighting the fact that institutional variables do not have the same effect across the spectrum of index scores. Subsequently, significant threshold effects are a viable reason for the mixed results in corruption-FDI literature.

The macroeconomic determinants of FDI for the regression in column 1, show that the coefficient of lagged FDI is positive for politically stable countries (upper regime) – countries which scored higher than 2.062 – and negative for politically unstable ones (lower regimes) – countries that scored lower than 2.062. This suggests that FDI has a threshold effect with past FDI being positively correlated with current FDI when there is political stability. The result is both interesting and important because it shows that when a country is characterised by political instability, investors are more likely to reduce their investment from the previous

period. This may be due to added uncertainty and the perception that political stability in the country will not improve which increases investment risk. This reduction is characterised by the negative sign of the coefficient of lagged FDI in the lower regime section of Table 2a. Contrastingly, in politically stable countries, past FDI inflows have a significant positive relationship with current FDI suggesting that political stability contributes to the positive sentiment investors have of the country inducing them to invest more in the next period with the expectation that the political climate in the country will remain stable and so too the associated risk. This result provides empirical evidence for the claim made in Ebben and de Vaal (2009) which states that in a situation of political stability, there is some level of trust and confidence which is not present in countries characterised by political instability. The result also shows that inflation, GDP per capita and trade openness matter more in politically stable countries (i.e., they are statistically significant). This result shows that investors respond more to macroeconomic determinants of FDI in politically stable environments suggesting that in stable environments, locational advantages hold more weight. Interestingly, GDPPC is negatively related to FDI, suggesting that in politically stable countries FDI and growth – generally measured by GDPPC – are not positively correlated.

When government effectiveness is the threshold variable, I find that the threshold estimate is 1.464 and significant with a relatively low 25 per cent of observations perceived as having low quality public services and a low degree of civil independence from political pressures. Consequently, 75 per cent of observations are perceived to have good quality policy formation and implementation. When government effectiveness scores fall below the estimated threshold value (when scores are less than 1.464), corruption has a significant helping hand effect on FDI because paying a bribe may enable the investor to circumvent unnecessary conditions created through the political influence on civil servants. This is akin to the argument already put forward by Huntington (1968) in which bribes are referred to as ‘speed money’ that enables the investor to easily get around bureaucratic red tape. On the other hand, when government effectiveness is perceived as good (upper regime), corruption has a significant grabbing hand effect on FDI because the act of reducing efficiency to extract a bribe in an already efficient system acts as a drag on the system, reducing FDI inflows. This argument is justified by Kurer (1993) who argued that, in an attempt to sustain their illegal source of income, corrupt officials will create distortions in an economy that deliberately hinder the inflow of investment funds. Again, significant regime-switching around the estimated threshold value is found.

The results also indicate that in countries with greater civil service independence from political pressure and better policy formulation and implementation (upper regime), macroeconomic determinants of FDI have a more significant effect. This is indicated by the significance of lagged FDI, GDP per capita and trade in the upper regime section of Table 2a (column 2). The positive coefficient on lagged FDI in the upper regime suggests that when policymakers are perceived as credible, investors confidently use policy announcements when formulating expectations and making decisions on investment destinations for future investments. It should be noted that when index scores fall into the lower regime, the effect of lagged FDI on current FDI is insignificant highlighting the effect of the lack of credibility of policymakers on investors' decisions.

Next, consider the model in which rule of law is the threshold variable. The results display a significant threshold value of 2.492 with 80 per cent of observations having ill-defined laws and property rights that are not effectively enforced. Recall that in WGI's framework, rule of law also captures property rights. In countries with worse rule of law (countries that fall into the lower regime), corruption has a significant grabbing hand effect on FDI; and when rule of law is effective, corruption has a relatively larger and significant helping hand effect on FDI. Again, there is evidence of significant threshold effects of institutions on the corruption-FDI relationship.

In contrast to the previous two institutional factors considered, in environments characterised by effective and ineffective rule of law, other macroeconomic determinants of FDI have significant effects. Interestingly, when rule of law is weak, an increase in inflation has a significant negative effect on FDI inflows, but when rule of law is strong, inflation has a positive effect on FDI. This may reflect the credibility of the central bank of the country and the laws that govern whether it adheres to its mandate or not. With weak rule of law, the central bank may have less accountability, decreasing its credibility to potential investors who price this into their investment decisions.

Lastly, when regulatory quality is used as the threshold variable, the threshold estimate is 2.174 and is significant with 66 per cent of observations falling into the lower regime, having weak regulatory quality. Table 2a shows that when regulatory quality is weak, corruption has an insignificant grabbing hand effect on FDI. This means that when it is perceived that government is unable to promote private sector development, the act of making and taking bribes has no effect on FDI. In contrast, when regulatory quality is perceived as effective,

corruption has a significant helping-hand effect on FDI. This result means that nowhere on the regulatory quality spectrum does regulatory quality adversely affect corruption. While this is interesting, but it may also be a result of how regulatory quality is measured in the WGI framework.

Paradoxically, when regulatory quality is ineffective, lagged FDI is positively related to FDI in the current period. The opposite applies for good regulatory quality. This suggests that investors may be used to the irregular regulatory framework making it easier for them to navigate the environment, inducing them to invest more in the current period. This is comparable to the Local Direct Investment (LDI) argument put forth by Habib and Zurawicki (2001) which states that the experience of local investors in the market helps them to better handle the transaction and coordination costs associated with the local market.

Unlike the results for the political institutions, the estimates for the economic institutions veer away from what one would deem logical. This presents another interesting contribution of the research which highlights that the type of institution – political or economic – also has an influence on its facilitating effect. It also reveals an avenue for future research to investigate these unique relationships.

To verify the model specification used in Table 2a, I report the test results for the null hypothesis of no threshold effects. I find that the bootstrap p-values of the supW test are all zero, motivating evidence of threshold effects. In sum, the results presented in Table 2a provide strong evidence of a facilitating relationship between various institutional factors and the corruption-FDI relationship. It also provides evidence for further investigation on the interaction of institutional factors as opposed to studying them in isolation. Supporting the existence of a significant asymmetric relationship between corruption and FDI on either side of the estimated threshold values the results indicate the existence of significant regime shifts when various institutional factors are considered. Methodologically, my results also demonstrate the usefulness of dynamic panel data estimation with threshold effects to supplement the theoretical findings of Ebben and de Vaal (2009) and Vitola and Senefelde (2015).

4.1 Threshold effects in an institutional environment

While the results presented in Table 2a show that significant threshold effects do exist, Table 2b provides a richer analysis of the institutional environment's effect on FDI and the corruption-FDI relationship by considering a range of institutional variables simultaneously,

allowing for the construction of a proxy of the institutional framework. This analysis is important because it highlights the interrelations between institutional factors and how the improvement of one institutional factor may impact another, thus changing the entire institutional environment in which the investment is to be made. It also provides a more realistic setting for the investigation.

Table 2b presents the results of models in which other the institutional variables are considered as independent variables in addition to an alternate institutional factor being used as the threshold variable. This enabled me to determine how the institutional variables interact with each other in the corruption-FDI space. To provide insight into the sensitivity of FDI to various institutional determinants, alternative regressions were run in which the threshold variable was also included in the set of independent variables. The results of these regressions were not significant and have thus been included in the appendix (Table 2A) for completeness.

The regressions in Table 2b treat GDP per capita and trade as endogenous variables as suggested by Jayasuriya (2011). Additionally, corruption, political stability, government effectiveness, rule of law, and regulatory quality are also treated as endogenous because of the interaction between them in the institutional framework (Ebben & de Vaal, 2009). The inclusion of this model assists with filling the gap in the literature in which the corruption-FDI relationship is considered among a range of institutional variables simultaneously. Past studies such as Ebben and de Vaal (2009) only consider political stability and political regime as institutional variables while simply mentioning that other institutional variables may have an influence. While Aidt (2009) did consider a range of institutional variables in a single regression, he investigated their effect on the corruption-growth relationship, which may present different results since one is not a proxy for the other (Jones, 2002).

Like the model that considered only one institutional variable at a time, the model estimated in Table 2b also presents evidence of significant threshold effects. This result suggests that the reason evidence on the helping- and grabbing-hand hypotheses is mixed is because the whole institutional framework is not contemplated. The results presented in Table 2b should be taken with the consideration that macroeconomic variables possess a sizeable degree of noise and interactions between institutional variables are highly likely to be influenced by measurement error and overlap. As a result, while paradoxical results pointed out may indeed

be avenues of further investigation, they could also be a result of noise in the data. This will be better controlled for in future studies.

Starting with political stability as the threshold variable, a significant threshold value of 2.728 is estimated. Table 2b indicates that in a politically unstable environment (lower regime), corruption has a significant helping hand effect on FDI but an insignificant effect in an environment characterized by political stability. This result means that when a country is seen as politically stable, further improvements in the political environment have no significant effect on FDI inflows when the institutional environment is considered. In politically unstable environments, past FDI has a significant positive relationship with current FDI inflows, while the opposite is observed in politically stable countries. Lastly, when a country is seen as politically unstable, regulatory quality has a significant positive effect on FDI inflows, but when it is seen as politically stable, rule of law contributes more significantly as a determinant of FDI. This result highlights the relations between these institutional variables.

Using government effectiveness as the threshold variable in the next estimation, the results indicate a significant threshold estimate of 1.387. In countries with bad government effectiveness (lower regime), corruption has a significant helping-hand effect on FDI but an insignificant effect when government effectiveness is perceived as satisfactory. Lagged FDI has a significant positive relationship with current FDI when government effectiveness is perceived as acceptable. Interestingly, none of the other institutional variables have a significant effect on FDI when government effectiveness is the threshold variable, suggesting little interaction between these institutional variables.

When rule of law is the threshold variable, a significant threshold value of 2.492 is estimated. While the results of this model indicate the existence of a significant threshold, they do not provide evidence of significant regime switching from helping- to grabbing hand effects of corruption on FDI. The model does however indicate that when rule of law is perceived as weak (lower regime), lagged values of FDI contribute positively to current FDI inflows. The opposite is true for strong rule of law. Additionally, the results of this model demonstrate that when rule of law is used as the threshold variable, macroeconomic determinants of FDI are more significant than the institutional environment. This is evident with trade openness which has a significant positive relationship with current FDI inflows when rule of law scores are below the threshold; but has a significant negative relationship with current FDI inflows when rule of law scores are above the estimated threshold.

Table 2b: Dynamic panel threshold estimates in the institutional framework

Threshold variable (q_{it})	Political stability	Government Effectiveness	Rule of Law	Regulatory Quality
Lower regime				
FDI_{it-1}	0.193** (0.0973)	0.00189 (0.0464)	0.195*** (0.0285)	0.0197 (0.0617)
PRICEIND	-0.0189** (0.00949)	0.0339 (0.0375)	0.000710 (0.00736)	-0.0702*** (0.0179)
GDPPC	-0.000194 (0.00029)	-4.06e-05 (4.54e-05)	-0.000209*** (4.23e-05)	-0.000195 (0.000129)
TRADE	0.0733 (0.0691)	0.0687*** (0.0198)	0.0980*** (0.00812)	0.120*** (0.0230)
corrup	-3.460* (1.863)	-4.212* (2.167)	1.232 (2.862)	-6.407** (3.206)
gov	3.665 (3.963)		-0.454 (3.317)	0.954 (3.219)
rule	3.438 (3.450)	-13.13** (5.870)		15.69*** (2.948)
regul	3.291** (1.503)	-0.178 (3.433)	3.646** (1.424)	
pol		-1.437 (1.221)	0.552 (1.733)	-1.901 (2.214)
Upper regime				
FDI_{it-1}	-0.251*** (0.0677)	0.149*** (0.0449)	-0.240*** (0.0421)	0.0634 (0.0675)
PRICEIND	0.0506*** (0.0192)	-0.0674** (0.0294)	0.0278* (0.0167)	0.113*** (0.0231)
GDPPC	-0.000768*** (0.000127)	0.000129 (0.000200)	-0.000790*** (0.000264)	-0.000598*** (0.000191)
TRADE	0.133* (0.0730)	0.0969** (0.0465)	-0.0495*** (0.0166)	0.0740*** (0.0238)
corrup	1.170 (1.771)	5.672 (4.779)	-4.575 (4.164)	8.399* (4.986)
gov	-2.094 (2.696)		0.0225 (7.692)	3.244 (5.788)
rule	-14.84*** (3.479)	8.815 (9.417)		-21.82*** (4.698)
regul	2.222 (6.110)	1.508 (2.709)	-1.731 (1.322)	
pol		1.523 (2.737)	1.826 (2.107)	0.619 (2.232)
Threshold	2.728*** (0.322)	1.387*** (0.288)	2.492*** (0.288)	1.739*** (0.209)
Linearity test	0.00	0.00	0.00	0.00
Bootstrapped	YES	YES	YES	YES

Note: *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, *pol* measures the perceptions of political stability, *gov* is a measure of government effectiveness, *rule* measures the rule of law, *regul* is the regulatory quality in a country. Standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001.

Lastly, using regulatory quality as the threshold variable, I find a significant threshold estimate of 1.739. When regulatory quality is low (lower regime), corruption has a significant helping-hand relationship with FDI. This relationship changes to a significant grabbing-hand relationship when regulatory quality is perceived as strong. Of all the institutional variables considered, regulatory quality is the only one which displays significant regime switching on either side of the threshold, suggesting its close interaction with corruption within the broader institutional network. Additionally, rule of law has a significant positive effect on FDI when regulatory quality is weak but has a significant negative relationship with FDI when regulatory quality is strong. This again highlights the strong interrelations between these institutional variables.

The linearity test for these estimations indicates the existence of a significant threshold effect even when the entire institutional framework is considered. While the coefficients on the other independent variables differ considerably from the estimates presented in Table 2a, the significant threshold estimates are remarkably similar suggesting that threshold effects are both relevant and important in the broader institutional setting for the corruption-FDI relationship.

The results of the models are both interesting and important because they provide empirical evidence to support the results of theoretical models and frameworks, thus filling a gap in the literature and emphasizing the fact that when fighting corruption in a country, one cannot simply develop methods to remove corruption and expect positive effects FDI because in some institutional environments where countries may be lacking in other institutional factors, corruption may not be as bad as perceived; contributing to the advantageous factors that attract investment. Contrastingly, in some cases, even with bad institutions corruption could have a negative effect, as displayed in Table 2a for economic institutions. As a result, more attention should be placed on the classification of the quality of institutional factors in a country as the results indicate that it is simply not enough to say an institution is of satisfactory or inferior quality. This highlights the idea that institutional factors should be given more attention than before as they clearly play a key role in the determination of investment.

5. Conclusion

In this paper I investigated how institutions facilitate the relationship between corruption and FDI. Consequently, I search for the existence of significant threshold effects of institutions on

the corruption-FDI relationship. Of all the institutional factors, corruption, and its relationship with FDI is the most extensively researched in the past with evidence of both positive and negative effects of corruption on FDI (Leff, 1964; Murphy *et al.*, 1991). These two streams are popularly known as the helping- and grabbing-hand hypotheses (Shleifer & Vishny, 1993; Egger & Winner, 2005). Recently however, the importance of other institutions has taken centre-stage with a number of researchers looking deeper into the definition of institutions as well as their impact on investment decision (Ebben & de Vaal, 2009; Ali *et al.*, 2010, Vitola and Senefelde, 2015). While investigations into the institutional impact on FDI have been becoming increasingly popular, Ebben and de Vaal (2009) point out that researchers only consider one institution at a time, failing to recognise the interaction between institutions and thus ignoring the effect of the entire institutional framework.

In their study, Ebben and de Vaal (2009) developed a two-layer theoretical framework to study the effects of the interactions between institutions on the corruption-FDI relationship as it relates to economic growth. The results of their theoretical model motivate the aim of my research which is to provide empirical evidence of the existence of a threshold value that defines the asymmetric effect of institutions on the corruption-FDI relationship on either side of the estimated threshold value. In this way, the results of this study fill a gap in the literature by considering, empirically, the effect of institutions on corruption and FDI.

Using a dynamic panel threshold model developed by Seo and Shin (2016) and Seo *et al.* (2019) and data on 34 SSA countries over the 2005 to 2019 period, I aimed to determine if significant threshold effects existed for various institutional factors as they facilitate the relationship between corruption and FDI. Methodologically, this study contributes to the literature by being one of the first to investigate threshold effects of institutions using a dynamic panel threshold model on SSA country data.

The empirical results reveal that significant threshold effects exist both when one institution is considered in isolation and when the whole institutional framework is proxied. When each institutional variable is considered in isolation, the results indicate that the institution under investigation facilitates a helping-hand relationship between corruption and FDI when the country either is either perceived as being politically unstable or having bad government effectiveness. Contrastingly, the institution facilitates a grabbing-hand relationship between corruption and FDI when the country is perceived as having ineffective rule of law or bad regulatory quality. In other words, the results for political institutions (political stability and

government effectiveness) are in line with what logic would predict, while the results for economic institutions (rule of law and regulatory quality) highlight an avenue for future research. The surprising result for economic institutions may highlight a weakness of the model in that it does not control for all the macroeconomic determinants of FDI which may influence the effect of economic institutions on the corruption-FDI relationship. Additionally, it highlights the inability to fully proxy the effect of corruption through an index due to its secretive nature.

When the entire institutional framework is considered, the model reveals several interesting relationships between the institutional factors that can be researched further. A few examples of these include the relationship between political stability and regulatory quality, the lack of interaction between government effectiveness and other institutions and the relationship between regulatory quality and rule of law.

In both the isolated and unconstrained environments, macroeconomic determinants of FDI still play an important role. The significant coefficients of the lagged values FDI indicate that institutional factors have an important role to play in the state dependent property of FDI. In addition, using a threshold model, helped me to show how various institutional factors affect the relationship between FDI and other macroeconomic determinants through the lens of regime switching.

From a methodological perspective, the results of this study highlight the importance and versatility of using dynamic panel threshold models to supplement the theoretical studies that came before.

While this study, through considering the effect of the whole institutional environment on FDI inflows and corruption, is a step in the right direction, a great deal is left to be said. This is true especially because the institutional environment of a country cannot be completely described by the five factors considered in this study. In addition, while the WGI index does an admirable job of measuring perceptions around institutional quality, work needs to be done around measuring such objective/normative factors. A key point to note here is that institutional factors cannot simply be classified as good quality and bad quality, and that while having an index is a good way to measure institutional quality quantitatively, researchers are still forced to only look at opposite ends of the spectrum because values that fall in the middle of the scale are part of a grey area. Research and development of threshold models will aid the broadening and deepening of this area of study by setting boundaries and enabling researchers

to properly classify the quality of institutions, thus producing more insightful results. In addition, further research should be conducted on the interaction between institutional factors found to be significantly related but paradoxically so, such as government effectiveness as well as regulatory quality and rule of law.

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: Dynamic panel threshold estimates in the institutional framework

Threshold variable (q_{it})	Political stability	Government Effectiveness	Rule of Law	Regulatory Quality
Lower regime				
FDI_{it-1}	0.376*** (0.0982)	0.0659 (0.0755)	0.228*** (0.0377)	-0.00598 (0.0588)
PRICEIND	0.0198 (0.0453)	-0.0701 (0.0646)	-0.0508* (0.0297)	-0.0856** (0.0341)
GDPPC	0.000543 (0.000506)	-0.000180 (0.000188)	-0.000323*** (4.37e-05)	-0.000206 (0.000160)
TRADE	-0.205 (0.165)	0.133*** (0.0273)	0.0842* (0.0432)	0.116*** (0.0322)
corrup	-7.427 (7.010)	0.751 (6.758)	-0.171 (2.596)	-21.95*** (6.148)
pol	15.17* (9.164)	-4.725 (3.025)	-0.547 (0.942)	-0.0108 (3.471)
gov	10.48 (10.32)	8.321 (9.799)	1.792 (2.940)	16.09*** (4.854)
rule	-16.88 (10.41)	9.104 (10.17)	0.685 (2.746)	29.63** (12.53)
regul	4.229 (6.909)	8.140 (5.925)	-0.903 (4.571)	-6.524 (6.067)
Upper regime				
FDI_{it-1}	-0.466*** (0.105)	-0.217** (0.0883)	-0.270*** (0.0374)	0.196*** (0.0588)
PRICEIND	-0.0619 (0.0996)	0.145* (0.0775)	0.106*** (0.0401)	0.0861 (0.0546)
GDPPC	-0.000790** (0.000317)	-0.000517 (0.000382)	-0.000745*** (0.000276)	-0.000526 (0.000428)
TRADE	0.512*** (0.151)	0.0546 (0.0439)	-0.0375 (0.0391)	0.0654 (0.0527)
corrup	4.555 (7.721)	1.283 (7.346)	-7.444** (3.082)	26.12*** (6.057)
pol	-11.67* (6.862)	6.982* (3.860)	4.803** (1.876)	-0.478 (4.835)
gov	-11.68 (12.14)	-11.67 (15.52)	-0.585 (9.840)	-5.005 (12.09)
rule	24.11** (9.611)	-15.35 (10.09)	10.50** (4.556)	-36.07*** (12.82)
regul	-6.772 (5.788)	-8.866** (3.999)	3.066 (5.809)	7.624 (5.050)
Threshold	2.430*** (0.160)	1.572*** (0.368)	2.492*** (0.202)	1.630*** (0.401)
Linearity test	0.0	0.0	0.0	0.0
Bootstrapped	YES	YES	YES	YES

Note: 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, pol measures the perceptions of political stability, gov is a measure of government effectiveness, $rule$ measures the rule of law, $regul$ is the regulatory quality in a country. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The regressions estimated in Table A2 are a variation of the regressions from Table 2b. In Table A2, the threshold variable is included as an independent variable in the regression, which introduces a means to measure the sensitivity of the dependent variable to the threshold variable Seo and Shin (2016). The result however does not reflect significant sensitivity relationships.

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