

CORRUPTION IN SUB-SAHARAN AFRICA: THE ROLE OF INSTITUTIONAL QUALITY*

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This study assesses the determinants of corruption in the Sub-Sahara Africa region and focuses on the effect of institutional quality on corruption by applying the Instrumental variables Two Stages Least Square (IV-2SLS) regression model during the period from 1996 to 2022. The model is based on Luo's (2005) approach, which includes institutional theories as a theoretical approach established by DiMaggio and Powell (1983), Tolbert and Zucker (1996), and Scott (2001). Results highlight the significant effects of four institutional quality indicators (government effectiveness, political stability, voice and accountability, and rule of law) on the reduction of corruption. Also, general results show that income inequality measured by the GINI index plays an important role in increasing corruption levels. Therefore, SSA governments should take responsibility for implementing a comprehensive whistle-blower protection act to guarantee that those who speak out about dishonest or illegal activities occurring in a government organization are not retaliated against.

Keywords: GINI Index; Accountability; Transparency; Political Stability

JEL Classification: C26; D73; E02; O43

1. INTRODUCTION

Corruption in Africa has grown to malignant extents, and it now has established a detrimental influence on the region's growth. Corruption, whether in the public or private enterprise, results in the misappropriation of limited resources, which has a

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tremendous impact on a whole economy due to multiplier impacts. Corruption has a detrimental relationship with economic development goals. Monitoring or eliminating corruption thus becomes even more important in the search for economic growth. Prevalent corruption erodes trust in governments and gives rise to crime rates and political disorders, particularly in countries plagued by high levels of unemployment and extreme poverty. Corruption negatively affects good governance and democracy in the political domain by breaking or even undermining legitimate procedures (Przeworski et al., 2000). Corruption in governmental organizations undermines accountability and misrepresents decision-making depiction. Moreover, corruption in the judicature jeopardizes the administrative law and in state administration, it may lead to uneven service delivery.

Corruption also erodes the government's institutional capability by ignoring rules; draining resources, as well as selling and buying public offices. Uncontrolled corruption, at its most severe, may result in instability of the economic system and catastrophic conflicts, downward a country into an "incessant spiral of institutional chaos and ferocity" (Theobald, 1990). Over the last few years, there has been an upward consciousness of the harmful impact of Africa's corruption epidemic and its resulting negative implications on socioeconomic progress, together with its destructive influence on society and the emerging democratic progression. Corruption has been connected to an environment of unethical leadership and poor administration, which has created countless possibilities for corruption to spread like a pandemic. Certainly, over the last few years, the association between a country's institutional quality and its state of economic growth has emerged as a significant topic of economic studies (Glaeser et al., 2004; Tolbert and Zucker, 1996; Hall and Jones, 1999; Rutherford, 2001).

The core notion in these studies is that institutions set the general standards and the circumstances subject to which economic entities function in markets. As a result, the function of institutions as a predictor of a nation's economic growth has gotten a lot of consideration. Accordingly, a slew of empirical literature has developed in an attempt to give further evidence of institutions' effects and the implements by which institutions might influence economic growth. The reason there is an increased attentiveness to the problem of institutional quality, and good governance, policymakers, and global development organizations have turned their attention to the query of the association between institutional quality and economic growth (Coase, 1960; Williamson, 1975). For example, Coase (1960) criticized the postulation of the neoclassical economics of zero transaction fees, stating that "with significant transaction costs, institutions matter".

According to modern institutional economists, institutions are a mix of regulations, economics, and political science that have a critical part in economic growth since they regulate the costs of production and trade (Williamson, 1975). Institutions, it is said, enhance seamless human connections and lower the expenditures related to uncertainty by establishing mutually formal and informal regulations, encouraging social relationships together with effective production and trade of commodities and services. Indeed, the government is considered almost the most significant institution in any

community. To produce a well-constructed society and thriving economy, the government establishes written regulations and enforces them through different powerful mechanisms over and with its legislative, administrative, and judicial offices. The rules of the game in a particular society are established by these official regulations, as well as the predominant informal norms formed by the community and its social institutions.

Informal regulations, contrasting with formal regulations, control the standards of behaviour in communities through social customs, prohibitions, and traditions. As stated by the World Bank (World Bank, 2000), these are the “unformulated guidelines of behaviour that ease collaboration and dispute tenacity with little transaction charge.” They are shaped in part by societal customs and people’s perceptions of individuality and the surrounding world. A mix of formal laws and informal regulations of conduct supports element and product market production and trade while also ensuring human relations steadiness. Certainly, low corruption levels and well-performed governments aren’t the only factors that influence economic growth. Some nations with a reputation for poor government have had periods of rapid economic development fueled by other causes, such as natural resource abundance. In certain circumstances, nations with high governance have not always seen rapid economic progress. However, it has been discovered that corruption tends to stifle economic development, acting more similar to sand in the economic engine than grease.

Since the 1980s, the emphasis has shifted away from savings and mechanization and toward the strength of institutions’ quality (World Bank, 1997). It is suggested that the main impediment to economic growth is the inefficiency of administrative processes and weak institutions, rather than a lack of technology or saving levels. Although, distinct but interconnected elements such as technical competence, proper policies, and resource abundance influence economic success in society. In reality, research from several East Asian nations suggests that high-quality institutions may boost economic development and alleviate poverty by creating a convenient climate for development projects to be executed efficiently, assuring the long-run feasibility of initiatives. For instance, South Korea, Singapore, Hong Kong, and Taiwan have all accomplished effective and steady economic growth by developing the appropriate institutional and sociopolitical foundations, allowing them to pursue operative and rational economic development plans.

As a result, the goal of this chapter is to assess the determinants of corruption in Sub Sahara Africa and focus on the effect of institutional quality on corruption. Using a sample of 43 Sub Sahara African countries from 1996 to 2022, the model is based on Luo’s (2005) approach, which includes institutional theories as a theoretical approach established by DiMaggio and Powell (1983), Tolbert and Zucker (1996) and Scott (2001).

The rest of the chapter is structured subsequently; Section 2 represents the recent empirical literature on corruption and its determinants. Section 3 reveals the region’s conditions under corruption. Section 4 displays the data and Instrumental variables regression (IV) methodology. Section 5 addresses the empirical discoveries of the

examination. In conclusion, Section 6 shows the main outcomes.

2. LITERATURE REVIEW

2.1. Institutional Theory

Institutional theory, in terms of comprehending corruption, incorporates social backgrounds and gives classification for determining how corruption can get established in organizations, institutions, and societies regardless of the extent of anti-corruption structures (Luo, 2005). According to institutional theory, corruption is impacted by the features, schemes, and transparency of the political system and its foundations. Simultaneously, it recognizes the complexities of the interaction between corruption, institutional quality, political regimes, and social and cultural factors (Stensöta et al., 2015). Thompson (1995) and Lessig (1995) established an “institutionalist” concept of political corruption stating that while individual corruption may happen, institutional corruption could also grow when organizations are systematized in such a manner that they set off from their intended drives. The game theory is another hypothesis that explains the occurrence of corruption in the government sector. This hypothesis is based on an economic framework and aims to explain why public administrators make dishonest decisions. Macrae (1982) argued that corruption is an inherent and frequently intensely ingrained aspect of rational calculus and a process by which individuals make choices. People are confronted with a “prisoner’s dilemma” in this situation, which demonstrates a contradiction between individual and group logic.

If individuals refuse to participate in corrupt activities, their worries are put at a disadvantage since other people do not reject to do so in a similar scenario. Therefore, everyone benefits in some manner, but it is constantly a smaller amount than the advantages that each of them would have had if they had declined to participate in corrupt acts (DiMaggio and Powell, 1983). For instance, the domain of government procurement is when private sector actors are unaware of the conduct of others who are involved in corruption. Otherwise, ethical corporations are motivated to participate in procurement corruption by fear of being outperformed by competitors who are behaving illegitimately or dishonestly. It’s also worth noting that, regardless of an individual’s finest efforts to perform morally, a variety of environmental and psychological circumstances can contribute to corrupt actions.

The critical role of institutions in the minimization of uncertainty and ensuring a steady economy as well as cultural connections. Institutions establish what is acceptable and undesirable in a social order, whereas governments define the general standards, through explicit regulations, informal rules, and social customs. As a result, society can function smoothly and efficiently (DiMaggio and Powell, 1983). This emphasizes the significance of strong and high-quality institutions and the development of African

nations' institutional capacity to guarantee the sustainability of economic growth programs. Because the process of economic expansion in a country is comparatively dependent on how inadequate resources are being distributed and exploited amongst diverse economic activities. The question of whether resources are conducted into productive or non-productive practices of state expenditure has significant rule insinuations. As a result, there is a lot of debate about the fundamental nature of the link between government spending and economic growth. Some academics stated that unproductive public spending depletes Africa's limited resources and impedes economic progress. For example, accessible data reveal that in the 1960s, Africa's and most East Asian nations' per capita incomes were roughly equal. Nevertheless, by the late 1990s, East Asian nations' income levels had risen above and beyond four times those of African nations (World Bank, 1997).

Previous studies have highlighted the critical part that high-quality institutions play in the economic growth procedure, underlining the need to establish an institutional mechanism that allows for operative expansion planning and execution (North, 1993; Cernea, 1987). Based on the recent institutional economic theory, government institutions take a critical part in the efficient operation of a laissez-faire economy (North 1990, 1996; Rutherford 2001). Institutional quality promotes a productive economic environment by lowering transaction charges and ensuring constancy and transparency by way of the rule of law and constitutional rights fortification (Acemoglu et al., 2005). Also, a comparable point of view indicates that institutions have an important part in encouraging business and innovative activities and, as a result, economic growth (Baumol, 1990). Institutional quality enhancements contrastingly may also arise cause of economic development. In line with the belief that "prosperity breeds democracy" economic growth might raise demand for good government from civic activities and private assemblages (Barro, 1999).

2.2. Corruption

At the yearly summit of the World Bank in 1996, James Wolfensohn, who was the Head of state of the World Bank at the time, discussed a new subject that development associations and global financial institutions evaded for a long time which is the problem of corruption. He stated that there is a need to talk about the cancer of corruption to guarantee economic growth and reduce poverty in developing nations. With this speech, the solution to a political disease such as corruption rose to the top of national and international development and the agenda of the fight against corruption began to take shape. Since then, it has been reported that the World Bank has spent 10 million dollars a year on investigations in nearly 100 countries, more than 600 specific anti-corruption programs, and investigation departments with more than 50 staff have been prepared to handle the issue of corruption (World Bank, 1997).

Corruption has had a limited area of interest in academia and politics for many years. According to most analysts; the concept of corruption has attracted more attention in

recent years and this has been caused by the post-Cold War developments. During the Cold War, the predominant argument was that as long as third-world regimes struggled with communism, the US and its allies tolerated corruption (frequent high corruption) in these countries. Indeed, before the Cold War, allied politicians did not attach much importance to the corruption problem. With the development of trade and neo-liberal policies after the Cold War, unprecedented corruption began to appear (Seligson, 2002). Rose-Ackerman (1978), which is considered to be one of the first studies on corruption and bribery in the social context, aims to inspect countrywide disparities in corruption utilizing perception-based measurements. Most of the studies on corruption and bribery; focus on the impacts of financial development, government forms, and market structures. Studies based on different country examples; while they provide important openings for the explanation of corruption and bribery behaviour in the general framework, they fall short of explaining the regional and national differences in corruption. It contains limited information about why corruption is more common in some countries with similar political institutions, and cultural and historical factors (Wang, 2013).

Economic development, regime type, and market structure are all considered factors that contribute to corruption. According to Treisman (2007), there is an association between GDP per capita and perceived corruption. Additional studies look at how corruption happens in democracies and authoritarian countries with various options. For example, he claims that establishing democratic institutions to decrease perceived corruption is a long-term process that might take many years. In the near term, democratization may increase corruption, but as democratization progresses, it will have a favourable influence on corruption control in the long run. Small improvements in freedom in imperfect democracies or authoritarian nations do not have a durable influence on perceptions of corruption (Treisman, 2007). Based on Sandholtz and Gray (2003) trade openness has a detrimental impact on corruption. Furthermore, most research, such as Ades-di Tella (1999) has revealed that less competitive market arrangements are more likely to create corruption chances.

It is widely accepted that government intervention in the economic system is the foremost source of corruption. This “big, bad state” thesis has also been established by several theoretical and empirical analyses. Theoretical examines are frequently based on “public choice theory,” which examines government and political conduct using neoclassical market concepts. According to the Public Choice method, a big government allows for the concentration of bureaucratic authority and the removal of competition, and so this framework permits public officials to profit from their monopolistic position. For example, according to Themudo (2014), most studies that test the views of this approach fail to check for potential internality between corruption and its causes. As a result, while the logic of a “big, bad state” is unmistakable, it is also maintained that powerful nations are better suited to combat corruption.

Bribery in economic activities, which is the most regular formation of corruption, is extensively analyzed in economics, public policy, and decision-making disciplines. Some studies consider bribery as a social dilemma. Regarded as conflict or social

dilemmas, bribery has been extensively studied in empirical backgrounds. The proposed bribery decision model in the context of a social dilemma and collective action constitutes the conditions of the institutional uncertainty of bribery choices (Li et al., 2014). People are faced with an obvious dilemma. Justice and loyalty are core moral values and loyalty demands special treatment for one's group, whereas justice demands that people be treated equally towards all groups. In this context, whistleblowing plays an important role. spying; is defined as reporting unethical behaviours within one's group to a third party, mostly an external authority (Dungan et al., 2014). First, the impact of institutional uncertainties on bribery decisions; entrepreneurs' social values are shaped by their self-interest orientation as well as ethical impulses or feelings associated with predicted bribery behaviour. Second, depending on the cultural values and self-interest orientation of individual entrepreneurs, the strength of ethical responses such as fear and guilt regarding bribery varies. Third, depending on whether bribery results in favorable impacts for instance access to limited resources or bad outcomes like sanctions, the social repercussions of bribery may deter or induce long-term bribery decisions. Fourth, the model that emerges when the previous processes are integrated, suggests that bribery decisions are influenced either directly by social repercussions or indirectly by internal psychological processes (Li et al., 2014).

The desire for personal gain is frequently assumed to be the root of public sector corruption; however, this oversimplification of the complicated interactions between individuals and the state is incorrect. Several hypotheses have been proposed to aid in the deconstruction of these linkages. The principal-agent model and the associated agency issue are two of the most prevalent ideas on corruption in economic literature (Klitgaard, 1988; Shleifer and Vishny, 1993). The principal-agent concept posits that agents (government officials) serve to safeguard the principal's interests (whether the public, parliament, or supervisors). The benefits of the agents frequently deviate from those of the principal, and while the latter can dictate the pay-off rules in the principal-agent link, there is an informational asymmetry to the agent's favour, which might be used for personal gains (Groenendijk, 1997). In this situation, an agency problem emerges when the agents opt to be involved in a corrupt transaction to enhance their benefits at the expense of the principal's well-being. To restrict the agency's problem, the principal can create inducements and systems (such as checking, connecting, and oversight) to limit the agent's potential exploitations.

The principal-agent theory has been used in economic works and research to elucidate corruption for a long time. Collective action theory has later arisen as an alternate clarification for the reasons that systemic corruption continues regardless of anti-corruption legislation, and why corruption resists different anti-corruption initiatives in some nations. The collective action theory extends further than standard principal-agent interactions, highlighting the relevance of aspects similar to trust and how people interpret other people's behaviour (Groenendijk, 1997). According to Persson et al. (2013), systemic corruption is a social issue where individuals clarify their actions based on beliefs of what others would do in a similar scenario. Once corruption

becomes a social custom, society accepts it as the only method to accomplish their interests. Individuals are attentive to the damaging repercussions of prevalent corruption, nonetheless, they continue to be involved in it because “it doesn’t make sense to be the lone honest person in a corrupt society” (Marquette and Peiffer, 2015).

Therefore, the Anti-corruption methods that rely on the principal-agent theory will be useless because there will be no principled regulators who are qualified to apply anti-corruption rules. Appolloni and Nshombo (2014) found that an institutional principle of corruption results in corrupt activities becoming normal and acceptable in society along with the exemption for breaching or disregarding legislative measures of anti-corruption. Under these conditions, cooperative and synchronized actions including restructuring unions or proactive associations of compatible groups are required to fight corruption. Institutional theories often called institutionalism, elucidate corruption in the governmental and public sectors by examining national and state institutional features including previously standing self-regulating anti-corruption organizations, rule of law, and outlined anti-corruption standards with implementation capabilities. Institutional theory investigates the practices and procedures through which assemblies, plans, and regulations get recognized as commanding standards for societal manners (Scott, 2004).

According to a study by Mauro (1995), corruption negatively affects the effectiveness of public spending. The reason for this is that funds intended for public services and infrastructure are diverted to private benefit by bureaucrats and politicians. Corruption leads to misuse of public expenditure since resources are diverted toward paying bribes rather than enhancing people’s living conditions, resulting in incompetent governments concerning policy-making and supplying public goods and services. Corruption at the administrative level, according to the institutional model, is produced by weakness in the environment in which it operates, a lack of understanding of the rules, as well as their implementation and practices. Other factors include a lack of commitment to fighting corruption, an absence of openness in the institutional context, and the management system’s sophistication (Pillay and Kluvers, 2014). Pillay and Kluvers (2014) presented evidence of corruption in South Africa’s government institutions. By including Luo’s Model in their research, they were able to characterize corruption at the institutional level.

A gift-giving culture is an act of maintaining relationships within the corporate environment. According to Luo (2002), Individual gift-giving culture was oriented to obtain personal profits under the corrupting motivation. In many societies, it is a norm-deviated incentive that is used in corporate activity. Montes and Paschoal (2016) found that in developed countries, corruption has a higher influence on government performance. Moreover, the findings reveal that countries with extreme debt levels and the highest inflation rates have inefficient governments and that improving the rule of law is an effective strategy to improve government efficiency.

In a study of 51 African countries, Ibrahim (2020) concluded that corruption and institutional quality, as well as information and communication technology (ICT) development, have a significant adverse association. Nevertheless, the results indicated

that the development of E-governance has had no substantial influence on corruption. Examining the determinants of corruption for 154 developed and developing countries between 1998-2000, Evrensel (2010) showed that nations with authoritarian political administrations, weak legal organizations, and poor educational stages, along with sluggish economic development and increased inflation levels, have higher stages of corruption.

Applying Panel Vector Autoregressions, Corradini (2021) investigated corruption in 3 Italian regions of NUTS from 2004 to 2012. Results revealed the existence of robust causal relations between corruption, institutional quality, and economic growth. While there is no indication of a significant impact of economic growth on institutional quality measures. In a study of 13 Asia-Pacific countries, Huang (2013) investigated the casualty link between corruption and measures of economic development using the Granger Causality test. The study shows that in South Korea and China, there is a strong positive association between corruption and economic development. For the remaining Asia-Pacific countries, there is no proven association between corruption and measures of economic development.

Nguyen et al. (2018) claimed that the impacts of trade openness and foreign direct investments on economic development are hindered by institutional quality measurements. Institutional quality enhancements, on the other hand, might minimize the rivalry caused by trade openness in the regions where foreign direct investments function, allowing them to maximize their indirect impacts. Kaufmann et al. (2009) inspected the influence of institutions on the growth of different nations and concluded that institutions are important in the growth progression. The idea is that institutions, economic policies, and market constructions have a significant influence on medium and long-run economic development because they must be implemented in a way that stimulates economic productivity and efficient resource distribution. Many failed or marginally effective development programs, it is believed, have demonstrated that sustainability is dependent not just on financial or technological variables but also on institutional and administrative elements (Cernea, 1987).

This disparity is attributed by some researchers and policymakers to rising unproductive government consumption and African nations' inadequate institutional capacity to create and carry out operative and practical development programs. A dedicated government with solid-oriented leadership is necessary, among other things, for an effective development strategy. It needs good regulations as well as implementation. Corruption and incompetence are common in African countries due to a lack of functional institutions and the government's failure to impose standing regulations and procedures, raising the cost of doing business in African countries. In resource-rich countries, where individuals obtain more economic benefits from decreasing corruption than in other countries, the relationship between economic development and governance is exceptionally robust. According to findings, the governance gains for Sub-Saharan African nations are two to three times higher than for the average country even in countries where governance is regarded to be similarly poor.

Carrying Sub-Saharan Africa's governance up to par with the rest of the world might boost GDP per capita by 1 to 2 percentage each year.

3. DATA AND METHODOLOGY

3.1. Data

For the period 1996 to 2022, the study used data from 43 SSA countries. Due to data limitations, this period has been selected. The 2017 version of the Worldwide Governance Indicators (WGI), from which the institutional quality statistics have been obtained, was only available for this period. The Corruption Perception Index (CPI) from the Transparency International organization dataset has been selected as the dependent variable. Based on Transparency International the Corruption Perception Index (CPI) is a measure that ranks nations depending on their perceived levels of government corruption. Scores vary from zero to one hundred, with zero signifying extreme corruption and one hundred indicating a minimal level of corruption.

The study has used six variables as indicators of institutional quality namely; 1) Government Effectiveness measures public views of the quality of government services, the civil service's quality and independence from political constraints, the quality of policy development and application, and the government's adherence to such policies. The estimate is the country's score on the total indicator, expressed in standard normal distribution units (i.e., ranging from -2.5 to 2.5). 2) Political stability, as well as the absence of violence or terrorism is a poll in which respondents are asked about their worries about political instability and/or politically motivated violence, such as terrorism. The estimate is the country's score on the aggregate indicator, expressed in standard normal distribution units (i.e., ranging from -2.5 to 2.5). 3) Regulatory Quality assesses the government's ability to adopt and implement effective rules and regulations that encourage and promote private sector development. 4) The "rule of law" relates to people's perceptions of how much they trust and obey society's rules, particularly contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. 5) Voice and Accountability assess citizens' perceptions of their ability to vote in government elections, as well as their freedom of expression, association, and access to a free press. 6) Property rights and rule-based governance investigate how much an effective legal system and rule-based governance mechanism that consistently respects and protects property and contract rights facilitates private economic activity.

3.2. Methodology

The GINI index, which is the most widely used indicator of income inequality in the literature, has also been utilized as an explanatory variable. According to Sen (1997), for

any certain income distribution over a population with individuals $I = 1, 2, 3, \dots, n$, if y_i is the income for an individual I , y_j is the income for individual j , and the average income for this population is μ thus the GINI coefficient can be illustrated as follow :

$$gini = \left(\frac{1}{2} N^2 \mu \right) \sum_{i=1}^n \sum_{j=1}^n |y_i - y_j|. \quad (1)$$

The control variables have been obtained from the WDI database including; trade openness as a percentage of GDP, government education expenditure, and total natural resource rents. Corruption is examined as a function of institutional quality, income inequality, and other control factors in our empirical models. While the argument over the link between corruption and wealth inequality is still ongoing (Andres and Ramlogan-Dobson, 2011), one thing is certain: they may have a bidirectional relationship (Policardo and Carrera, 2018). On the one hand, society's wealthy and powerful are more inclined to commit corruption by influencing productive resources and political choices in their favour. Corruption tends to hinder economic growth and increase unemployment in the public sector, particularly in developing nations where the government controls the majority of resources and the performance of the country's institutions is weak. This harms the poor, who already lack access to economic resources, resulting in increased income disparity and unstable living situations. Furthermore, corruption consumes a larger portion of the poor's income than it does the wealthy. As a result, the first model to be estimated is as described in the following:

$$\begin{aligned} Cop_{it} = & \beta_0 + \beta_1 gini_{it} + \delta \sum_{i=1}^n IQ\ vars_{it} + \gamma \sum_{i=1}^n control\ vars_{it} \\ & + \alpha_i + \delta_t + \varepsilon_{it}, \end{aligned} \quad (2)$$

in which Cop_{it} is the Corruption Perception Index (CPI) variable, $gini_{it}$ stands for income inequality, $IQ\ vars_{it}$ refers to the institutional quality variables and $control\ vars_{it}$ stands for control variables. β_0 is the constant, β_1 is the slope parameter for income inequality, δ is a vector of the six slope parameters of the institutional quality variables, and γ is a vector of slope parameters for the control variables. α_i accounts for time-invariant country fixed-effects due to variances among countries regarding resource abundance, location, customs, traditions, etc., whereas δ_t accounts for time effects due to time-variant omitted variable biases and random shocks that could be common to all countries (Stern and Common, 2001). i and t refer to nation and year, respectively, whereas ε_{it} is the residuals.

The Equation (2) has been estimated using random effects (RE) and fixed effects (FE) models, as other researchers have done (e.g., Sulemana et al., 2018; Sudibyo and Jianfu, 2015; Efobi et al., 2014; Mendonça et al., 2012; Stern and Common, 2001). Unlike FE models, which use i and t as model parameters, RE models consider them to be part

of the error term (Stern, 2004; Stern and Common, 2001). As a result, if i and t are correlated, the RE model will not produce consistent results. This suggests that the FE model should be used. The RE and FE estimations are put through a Hausman test (Hausman, 1978) to see whether there are any variations in slope parameters. If the null hypothesis is rejected, the RE estimates are inconclusive owing to a connection between the error term and some of the model's independent variables, suggesting that the FE model should be used (Hausman, 1978; Stern, 2004; Stern and Common, 2011).

Therefore, the study utilized the Instrumental variables- Two-Stage Least Squares (IV-2SLS) estimation approach to solving the endogeneity problem that is suspected to arise from the income inequality variable, employing the mature cohort of each country's population as an instrumental variable (IV) for income inequality. Then state that corruption is a consequence of institutional quality, economic inequality, and other control variables, resulting in:

$$Cop_{it} = \beta_0 + \beta_1 gini_{it} + \delta \sum_{i=1}^n IQ\ vars_{it} + \gamma \sum_{i=1}^n control\ vars_{it} + \varepsilon_{it}. \quad (3)$$

Thus, the endogenous variable income inequality is considered as a function of the instrumental variable which is the proportion of the population above 49 years (mature cohort), this is shown as follows:

$$gini_{it} = \beta_0 + \beta_1 matcoh_{it} + \sum_{k=1}^k \beta_k X_{kit} + \varepsilon_{it}. \quad (4)$$

Eq. (4) is computed in the first stage regression to yield anticipated GINI values. Where β_0 is Intercept, β_1 Coefficient of mature cohort, presumably, X_{kit} Vector of control variables (indexed by k). $\sum_{k=1}^k \beta_k X_{kit}$ Proper summation over control variables. ε_{it} idiosyncratic error term; i cross-sectional unit; t refers to time.

Following that, the second stage regression regresses corruption on the projected GINI values derived in Equation (4) and institutional quality variables. The IV 2SLS estimates are thought to be better than the OLS estimates because the OLS estimates are prone to bias, and sampling error, and do not tackle the two-way causality issue, whereas the IV 2SLS estimates do (e.g., Hausman, 1978; Angrist and Imbens, 1995; Jong-Sung and Khagram, 2005). According to Maydeu et al. (2018), a sample size of 500 or a first-stage F statistic greater than 10 is adequate to reliably assess the causal impact using the IVR model within the range of parameter values used in our investigations.

4. EMPIRICAL INVESTIGATIONS

The variables employed in the investigation are described in Table 1. along with

their summary statistics. The mean for Corruption Perception Index was 31.0777, with values ranging from 10 (in Niger in 2001) to 66 (in Seychelles in 2020). The majority of the nations in the study, as predicted, scored extremely low on the Corruption Perception index. Inequality in income spans from 29.8% (in Ethiopia in 2004) to 65.8 per cent (in Malawi in 1997). Most of the SSA countries in the sample also had a low expenditure share on education (varying from 13.22% in Lesotho in 2003 to 0.62 % in the Gambia in 2004). Observing the share of natural resource rents, it can be seen that there is a great variation between SSA countries ranging from the lowest share of 0.0012% (in Mauritius in 2014) and the highest (in Equatorial Guinea in 1999) to 62.04 %. The trade openness share ranges from 0.7846 (Sudan in 2020) to the highest with 225.0231 (Seychelles in 2009). The Proportion of the population above 49 years in SSA countries varies from 13.02 % in Burundi in 1997 to 0.62 % in Mauritius in 2012).

Table 1. The summary statistics

Variable Name	Description	Obs	Mean	Std	Max	Min
CPI	Corruption Perception Index	849	31.0777	11.5114	66.0000	10.0000
GINI	Gini index as a proxy of income inequality	553	44.4904	7.0806	65.8000	29.8000
Gov.Effectiveness	Government Effectiveness	945	-0.7072	0.6093	1.0567	-1.8842
Political stability	Political Stability and the Absence of Violence/Terrorism	946	-0.5052	0.8937	1.2821	-2.8447
Regulatory Quality	Regulatory Quality	946	-0.6272	0.5723	1.1273	-2.2975
Voice_Accountability	Voice and Accountability	946	-0.5530	0.7117	1.0072	-2.0002
Rule of Law	The rule of law	946	-0.6544	0.6356	1.0771	-2.1299
CPIA	Property rights and rule-based governance	553	2.8056	0.6129	4.0000	1.0000
Education	Government Education expenditure (%GDP)	687	4.0159	1.9642	13.2196	0.6225
NaturalRE	Total natural resource rents	1026	11.0410	11.0468	62.0399	0.0012
Openness	Trade Openness (% GDP)	1009	68.1861	34.5472	225.0231	0.7846
Mature cohort	The proportion of the population above 49 years	1075	54.5146	4.7299	60.77499	13.021

Table 2. Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CPI	1										
Gini	-0.055**	1									
Gov_Effectiveness	0.476***	0.199***	1								
Political Stability	0.357***	0.289***	0.647***	1							
Regulatory Quality	0.441***	0.203***	0.880***	0.620***	1						
Accountability	0.426***	0.244***	0.755***	0.651***	0.761***	1					
RuleofLaw	0.454***	0.204***	0.898***	0.753***	0.868***	0.823***	1				
CPIA	0.435***	-0.040	0.819***	0.656***	0.833***	0.730***	0.931***	1			
Education	0.186***	0.191***	0.435***	0.290***	0.345***	0.395***	0.440***	0.342***	1		
NaturalRE	-0.229***	-0.127***	-0.493***	-0.338***	-0.476***	-0.505***	-0.521***	-0.415***	-0.251***	1	
Openness	0.119***	0.145***	0.284***	0.450***	0.172***	0.204***	0.295***	0.085*	0.337***	0.138***	1

Notes: *, **, and *** are the respectively significant levels at 10%, 5%, and 1%.

Regarding the institutional quality variables, it can be seen that the mean values are negative which indicates a weak score for each indicator. The Government Effectiveness score spans from -1.8842 (in the Democratic Republic of the Congo in 2000) to 1.0567 (in Mali in 2019). The Political Stability and the Absence of Violence/Terrorism indicators range from -2.8447 (in the Democratic Republic of the Congo in 1998) to 1.2821 (in Seychelles in 2000). The Regulatory Quality score ranges from -2.2975 (in the Democratic Republic of the Congo in 1998) to 1.1273 (in Mauritius in 2014). The Voice and Accountability indicator spans from -2.0002 (in Equatorial Guinea in 2015) to 1.0567 (in Mali in 2019). The rule of law score ranges from -2.1299 (in the Democratic Republic of the Congo in 1998) to 1.0771 (in Mauritius in 2003). The index of Property rights and rule- based governance spans from -1.0000 (in Zimbabwe) to 4.0000 (in Senegal, Cabo Verde, and Ghana).

Both natural resource rents and the GINI index are negatively correlated with the Corruption Perception Index, according to the pairwise correlations shown in Table 2, and are statistically significant at the 1% and 5% levels respectively. All institutional quality variables and the other control variables (Education expenditure and Trade Openness) are positively correlated with the Corruption Perception Index and are statistically significant at the 1% level. Since the interpretation of the Corruption Perception Index is that high scores indicate a low level of corruption according to the correlation matrix, a high level of institutional quality indexes is associated with a low level of corruption.

Table 3. Results of the Between, Random and Fixed Effects Regressions of the Full Sample

	(1) Between effect model	(2) Fixed Effect model	(3) Random Effect model
Gini	-0.299* (-2.00)	-0.517*** (-4.18)	-1.268*** (-5.13)
Gov. Effectiveness	3.786* (1.78)	1.824*** (3.56)	1.143** (2.59)
Political Stability	2.782 (1.38)	0.670** (2.47)	0.055* (1.44)
Regulatory Quality	-1.607 (-0.34)	-0.325 (-0.96)	-0.516 (-1.62)
Accountability	0.389* (1.17)	1.247*** (2.82)	1.859*** (3.42)
Rule of Law	5.588* (1.79)	1.016*** (3.20)	1.907** (2.71)
CPIA	-1.264 (-0.43)	-2.658 (-1.14)	-0.872 (-0.23)
Education	1.321** (2.07)	0.661* (1.33)	-0.191 (-0.25)
Natural RE	-0.078 (-0.62)	0.044* (1.43)	0.176 (0.99)
Openness	-0.012 (-0.34)	0.016* (1.56)	-0.058* (-1.84)
Constant	5.416*** (3.74)	6.232*** (6.22)	6.452*** (6.08)
No. of groups	43	43	43
N	528	528	528
R ²	0.721	0.5488	0.573
F statistic	8.02***	102.15***	6.61***

Notes: *, **, and *** are the respectively significant levels at 10%, 5%, and 1%. T-statistics are in the brackets.

After performing the preliminary panel data tests of the unit root and cross-sectional dependency which are illustrated in the Appendix. Now the regression results of the full sample of 43 SSA countries are presented in Table 3.

Table 3. shows the OLS, RE, and FE regression findings for the complete sample, indicating the impact of institutional quality indicators on the Corruption Perception Index. The findings of the Breusch and Pagan (1980) Lagrange Multiplier (LM) test for random effects revealed that there are considerable differences among nations in terms of the optimal econometric approach for panel data. As a result, the FE model is recommended over the Random effect model. Also, the Hausman test (1978) has been utilized and $\chi^2 = 52.13$, which is statistically significant at the 1% level, indicating that the FE model is preferable to the RE model.

Results from the first model of OLS regression show that at the 10% significant level, only three of the institutional quality indicators (government effectiveness, Accountability, and rule of law) are significant and positively associated with the Corruption Perception Index. This means a rise in the levels of government effectiveness, Accountability, and rule of law leads to a reduction in the corruption level. This suggests that in countries with a strong rule of law, corruption is lower. This is under the assumption that nations with an unruly bureaucracy and a weak rule of law are more prone to corruption (e.g., Kaufmann, 1998). The GINI index is negatively related to the Corruption Perception Index at a 10% significant level. This indicates that higher levels of income inequality increase the corruption level. The coefficient of the government expenditure on education is positively associated with the Corruption Perception Index and is significant at the 1% level.

The results of the fixed effect model display that four indicators of institutional quality namely; government effectiveness, Accountability, rule of law, and Political Stability are significant and positively associated with the Corruption Perception Index at the 1% and 5% levels. This means an increase in the levels of these institutional quality indices results in a reduction in the corruption level. The slope of the GINI index (-0.517) is negatively related to the Corruption Perception Index at a 1% significant level. The coefficients of other control variables (Natural resource rents, education, Openness) are significant and positively related to the Corruption Perception Index at the 10% level.

The last regression of the random-effect model demonstrates that also the four indicators; government effectiveness, Accountability, rule of law, and Political Stability are significant and positively associated with the Corruption Perception Index at the 1%, 5%, and 10% levels. The coefficient of the GINI index (-1.268) is negatively related to the Corruption Perception Index at a 1% significant level. The coefficient slope of openness is negatively related to the Corruption Perception Index at a 10% significant level contrary to the results of the random effect model. It can be observed that regulatory quality property rights and rule-based governance variables are insignificant in all regression models.

As previously stated, there is a plethora of empirical evidence that proves that

corruption generates economic disparity (e.g., Gupta et al., 2002; Gyimah-Brempong, 2002; Jong-Sung and Khagram, 2005; Dincer and Gunlap, 2008; Gyimah- Brempong and de Gyimah-Brempong, 2006; Apergis et al., 2010). The above findings indicate that income disparity has a major impact on the Corruption Perception Index. As a result, there is an endogeneity issue that must be addressed. A strong income inequality instrument must be associated with income inequality but not with the error term. It has been argued that findings from the World Values Survey “showed that persons in the mature cohort were less likely (albeit not considerably) to report bribe-taking as justified.” Therefore, following the studies of Sulemana and Kpienbaareh (2018) and Treisman (2007), the proportion of the population in the mature cohort has been employed as an instrumental variable to control the endogeneity that may arise from income inequality variable based on the argument of the previously mentioned studies.

Table 4. Results of Instrument Variable 2SLS Regressions of the Full Sample

	(4)	(5)	(6)	(7)
	model	model	model	model
Gini	- 0.469*** (-4.07)	- 0.570*** (-2.97)	-0.832** (-2.43)	2.179** (1.99)
Gov. Effectiveness	1.087*** (2.71)	1.462** (2.01)	2.262*** (2.83)	2.012** (0.53)
Political stability	0.776*** (-3.13)	1.370** (2.48)	1.281*** (3.10)	-1.693 (-1.02)
Regulatory Quality	-1.324 (-1.49)	-2.200 (-1.98)	-2.612 (-0.68)	-1.139 (-0.66)
Accountability	1.328** (2.43)	3.412 (0.34)	0.249* (1.87)	1.979 (0.36)
Rule of Law	1.033** (-2.10)	-1.352 (-1.24)	1.267** (1.36)	1.165** (1.88)
CPIA	1.105* (1.92)	1.236* (1.81)	2.180 (0.63)	0.175 (0.73)
Education		0.765* (1.75)	0.373* (1.76)	-1.722 (-0.82)
Natural RE			-0.027* (-1.72)	0.099 (0.53)
Openness				0.003 (0.05)
Constant	1.092*** (5.08)	2.465*** (3.57)	3.002 (0.90)	-0.583* (-1.62)
No. of groups	43	43	43	43
N	553	536	433	428
R ²	0.1852	0.2636	0.4470	0.1688
chi2	45.954***	20.761***	25.125***	10.783**

Notes: *, **, and *** are the respectively significant levels at 10%, 5%, and 1%. Z-statistics are in brackets.

Table 4 shows the outcomes of the Instrument variable - 2SLS models of the full sample. First in model (4) the relationship between Corruption, institutional quality variables, and instrumented variable GINI index has been estimated using the two-stage least square method. Results of the model (4) demonstrate that all coefficients of institutional quality variables except the Regulatory Quality are significant and positively associated with the Corruption Perception Index at 1%, 5%, and 10% levels. The GINI index coefficient (-0.469) is significant and negatively affects the Corruption Perception Index at a 1% level. Nevertheless, the model fitness is low where the adjusted R squared coefficient equals (0.1852).

An improvement in the adjusted R-squared coefficient can be seen after the addition of the education variable in the model (5). The slopes of Government Effectiveness (1.462) and Political Stability (1.370) are significant and positively affect the Corruption Perception Index at a 5% level. The coefficient of property rights and rule-based governance (1.236) is significant and positively associated with the Corruption Perception Index at a 10% level. The coefficient of the education variable (0.765) is significant and positively associated with the Corruption Perception Index at a 10% level and the adjusted R squared coefficient equals (0.2636).

Model (6) displays estimations with the addition of natural resource rents as a control variable and the results indicate that model (6) is the best-fit model that demonstrates the corruption institutional determinants in the 43 SSA countries sample. The adjusted R squared coefficient equals (0.4470) which could be considered a good fitness of the model. The GINI index coefficient (-0.832) is significant and negatively linked to the Corruption Perception Index at a 5% level. The coefficients of Government Effectiveness (2.262) and Political Stability (1.281) are significant and positively associated with the Corruption Perception Index at a 1% level. The slopes of Voice and Accountability (0.249) and Rule of Law (1.267) are significant and positively associated with the Corruption Perception Index at 10% and 5% levels respectively. The coefficient of the education variable (0.373) is significant and positively associated with the Corruption Perception Index while the natural resource rents (0.027) negatively affect corruption at a 10% level. Figure 1 graphically illustrates the interaction effects of quality institutional indicators on the Corruption Perception Index.

Contrary to several studies such as Sandholtz and Gray (2003) and Treisman (2007) that argued that trade openness has a substantial effect on corruption, our results of model (7) show that the addition of trade openness in the absence of the endogeneity problem resulted in a significant change in estimations. It can be seen that there is a decline in the model fitness where the adjusted R squared coefficient equals (0.1688). Also, there is a change in the coefficient's signs of the education variable (-1.722), Political Stability (-1.693), and constant (-0.583) but their effect is statistically insignificant. Only two of the institutional quality coefficients; the Government Effectiveness (2.012) and Rule of Law (1.165) are statistically significant and positively associated with the Corruption Perception Index at a 1% level. The GINI index coefficient (2.179) is significant and positively affects the Corruption Perception Index

at a 1% level.

Next step the full sample of 43 SSA countries has been divided into three groups based on the income classification of the World Bank: Low-Income countries (\$1,035 or less), Lower-middle-income economies (\$1,036 to \$4,085), and Upper-middle-income economies (\$4,086 to \$12,615). Then the Instrument variable - 2SLS estimation was performed on the selected model (6) independently for each income group. Table 5 illustrates the results of the Instrument variable - 2SLS of the three income groups. The first model of the 24 Low-Income SSA Countries demonstrates that the Government Effectiveness (1.690) and Political Stability (0.899) are statistically significant and positively affect the Corruption Perception Index at a 1% level while the other institutional quality indicators are statistically insignificant. Results show that The GINI index coefficient (-1.183) and natural resource rents (-0.769) are significant and negatively associated with the Corruption Perception Index at a 1% level. That means the Government's Effectiveness and Political Stability play an important role in the reduction of the corruption level in Low-Income Sub-Saharan African Countries while high-level income inequality and natural resource rents increase corruption levels.

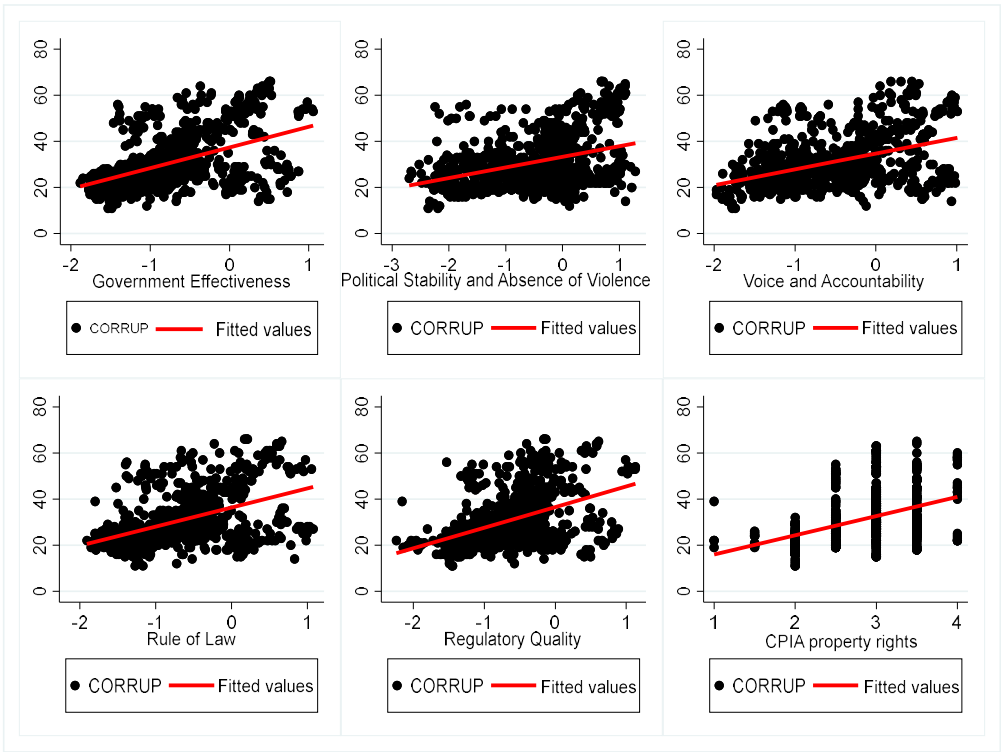


Figure 1. Relationship Between Corruption and Quality Institutional Indicators
Based on Observed Data of 43 SSA Countries

Table 5. Results of Instrument Variable -2SLS Regression of the Income Groups

	(1) Low-Income countries	(2) Lower-middle-income economies	(3) Upper-middle-income economies
Gini	-1.183*** (-3.94)	-0.923** (-1.64)	0.428 (0.28)
Gov. Effectiveness	1.690*** (2.83)	0.689*** (3.40)	0.319** (2.49)
Political Stability	0.899*** (3.29)	1.293** (2.10)	1.175 (0.80)
Regulatory Quality	0.789 (0.58)	-0.936 (-0.66)	-1.537 (-0.96)
Accountability	0.391 (0.56)	1.530* (1.66)	0.796*** (3.45)
Rule of Law	0.870 (1.13)	1.385*** (3.07)	1.515*** (3.80)
CPIA	-0.613 (-0.78)	-1.443** (-2.81)	-1.828 (-1.26)
Education	0.011 (1.54)	0.944*** (2.40)	0.479 (0.44)
Natural RE	-0.769*** (-2.70)	-0.018** (-1.60)	0.590* (1.49)
Constant	2.801** (1.90)	1.777** (2.35)	1.088*** (4.50)
No. of countries	24	11	8
N	155	146	132
R ²	0.2959	0.2979	0.6510
chi2	58.50***	31.67***	47.38***

Notes: *, **, and *** are the respectively significant levels at 10%, 5%, and 1%. Z-statistics are in brackets.

The second model of the 11 Lower-middle-income SSA Countries reveals that Government Effectiveness (0.689) and Political Stability (1.293) are statistically significant and positively affect the Corruption Perception Index at 1% and 5% levels respectively. The slopes of Rule of Law (1.267) and Voice and Accountability (1.530) are significant and positively associated with the Corruption Perception Index at 1% and 10% levels respectively. The property rights and rule-based governance coefficient (-1.443) is statistically significant and negatively affects Corruption at a 5% level. Outcomes display that The GINI index coefficient (-0.923) and natural resource rents (-0.018) are significant and negatively linked with the Corruption Perception Index at a 5% level. The coefficient of education (0.944) is significant and positively associated with Corruption at a 1% level.

That means the institutional quality indicators except the Regulatory Quality play an important role in the reduction of the corruption level in Lower-middle-income Sub-Saharan African Countries. Also a high level of government expenditure on education reduces corruption, while the high-level income inequality and natural resource rents increase corruption levels.

The third model of the eight Upper-middle-income SSA Countries demonstrates that Voice and Accountability (0.796) and Rule of Law (1.515) are the most institutional quality indicators that affect corruption positively at a 1% significant level. Then the slope of Government Effectiveness (0.319) is significant and positively associated with the Corruption Perception Index at a 5% level. The slope of natural resource rents (0.590) is significant and positively associated with the Corruption Perception Index at the 10% level. It can be seen that The GINI index coefficient (0.428) and coefficient of education (0.479) have an insignificant impact on corruption for the Upper-middle-income group as well as the remaining institutional quality variables. Appendices 5, 6, and 7 graphically demonstrate the interaction impacts of quality institutional indicators on the Corruption Perception Index for each income group country.

5. CONCLUDING REMARKS

By concentrating on Sub-Saharan Africa, an area plagued by large income inequalities, weak institutional performance, and high levels of corruption, this study assesses the determinants of corruption in Sub-Saharan Africa and focuses on the effect of institutional quality on corruption. Our analysis adds to a scant but rising literature on the influence of the quality of African institutions on corruption. Our findings differ from earlier research based on industrialized economies (e.g., Jong-Sung and Khagram, 2005; Apergis et al., 2010), but they are consistent with data from Latin America (Andres and Ramlogan-Dobson, 2011; Martinez-Vazquez et al., 2006).

The study utilized the Instrument Variables-Two Stage Least Square (IV-2SLS) method to estimate the determinants of corruption and also the models of OLS, Random effect, and Fixed effects have been examined for comparisons and further investigations. The method of Instrument Variables-Two Stage Least Square (IV-2SLS) estimation is being used widely for estimating causal inferences. Primary results of OLS, Random effect, and Fixed effects regressions highlight the significant effects of four institutional quality indicators (government effectiveness, political stability, voice and accountability, rule of law) on the reduction of corruption for the full sample of 43 Sub-Saharan African countries. Also, general results show that income inequality measured by the GINI index plays an important role in increasing corruption levels.

Further examination of the effect of institutional quality on corruption for different groups of Sub-Saharan African countries based on World Bank income classifications has shown that there is a shift in the institutional quality indicators that impact

corruption based on the country's income level. Findings reveal that in low-income and lower-middle-income SSA countries, both government effectiveness and political stability play a significant role in the reduction of corruption levels. As income level increases the effect of the voice and accountability indicator and rule of law becomes significant. Therefore, in Upper-middle-income SSA countries, the voice and accountability index and rule of law are the most institutional quality factors that affect corruption compared to the government effectiveness and political stability. The overall estimations indicate that regulatory quality, property rights, and rule-based governance indices have no impact on corruption in SSA countries. That suggests the weakness and disability of the Sub-Sahara African government's capacity to design and implement solid rules and regulations that allow and foster private sector growth and thus play a role in reducing institutional corruption.

The key implication of our findings is that Sub-Saharan African countries should take responsibility for implementing a comprehensive whistle-blower protection act to guarantee that those who speak out about dishonest or illegal activities occurring in a government organization are not retaliated against. These approaches contribute to institutions that are more effective, responsible, and transparent, as well as a culture of honesty and justice. Moreover, governments alone will not be able to combat corruption. Individual behaviour and society's culture regarding corrupt activities are both important factors in preventing and combating corruption. As a result, Sub-Saharan African governments should endeavour to raise community awareness about the risks of corruption and the necessity of anti-corruption legislation to foster resilience and integrity at all levels of society.

APPENDIX

Table A1. List of Sub-Saharan African Countries Based on Income Group Classification

Low-Income Countries (\$1,035 or less)					
Benin	Burkina Faso	Burundi	Central African Rep.	Chad	Comoros
Congo, Dem. Rep.	Eswatini	Ethiopia	The Gambia	Guinea	Guinea-Bissau
Kenya	Madagascar	Malawi	Mali	Mozambique	Niger
Rwanda	Sierra Leone	Tanzania	Togo	Uganda	Zimbabwe
Lower-middle-income economies (\$1,036 to \$4,085)					
Cabo Verde	Cameroon	Congo, Rep.	Cote d'Ivoire	Ghana	Lesotho
Mauritania	Nigeria	Senegal	Sudan	Zambia	
Upper-middle-income economies (\$4,086 to \$12,615)					
Angola	Botswana	Equatorial Guinea		Gabon	Mauritius
Namibia	Seychelles	South Africa			

Source: World Bank income classifications.

Table A2. Breusch and Pagan Lagrangian Multiplier Test for Random Effects

Test: Null hypothesis: There are no differences among cross-sections		
Chi2(01) = Test:	Var(u) = 0 =	30.11
Prob > chibar2 =	0.0000	

Table A3. Hausman test

Test: Null hypothesis: difference in coefficients not systematic		
Chi2(10) = (b-b)'[(v_b-v_b)^(-1)](b-b) =	52.13	
Prob>chi2 = 0.0000		

Table A4. Panel Unit Root Test

Variables	Fisher-ADF	
	level	First Difference
CPI	120.1213 (0.0089)	-
GINI	29.6287 (0.9246)	286.8804 (0.0000)
Gov. effectiveness	178.3099 (0.0000)	-
Political stability	162.5202 (0.0000)	-
Regulatory quality	186.6347 (0.0000)	-
Accountability	122.6352 (0.0058)	-
Rule of Law	-6.3941 (0.0000)	-
CPIA	31.8288 (0.9620)	225.5121 (0.0000)
Education	83.2973 (0.5625)	459.0670 (0.0000)
Natural RE.	94.5118 (0.2485)	614.2473 (0.0000)
Openness	112.2452 (0.0215)	-
Population	97.3956 (0.0000)	-

Note: Probability values are in the parenthesis, Trend was included.

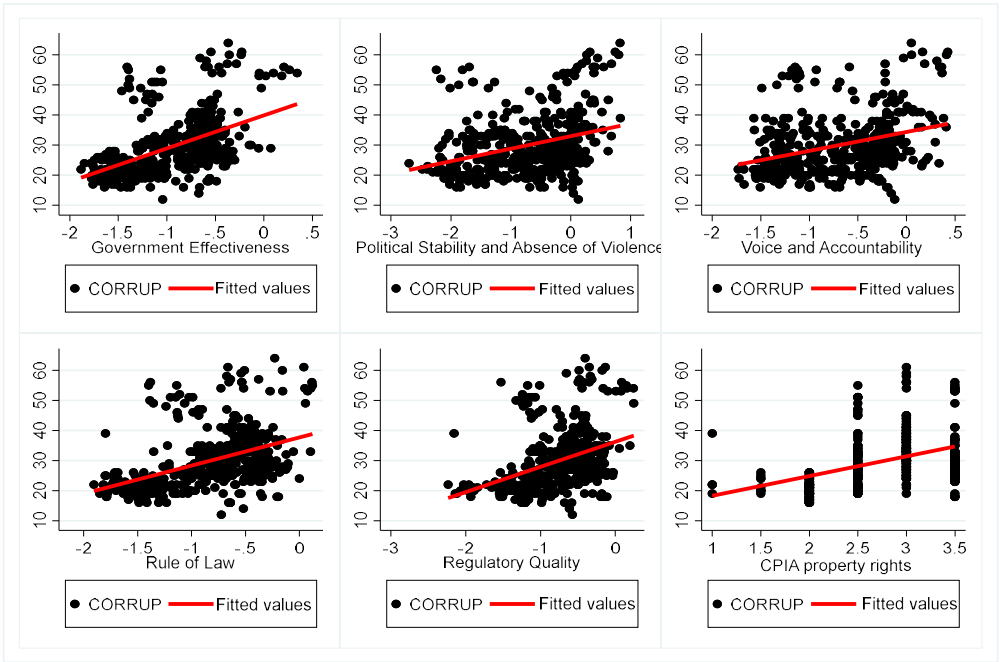


Figure A1. Relationship Between Corruption and Quality Institutional Indicators Based on Observed Data of Low-Income SSA Countries (\$1,035 or Less)

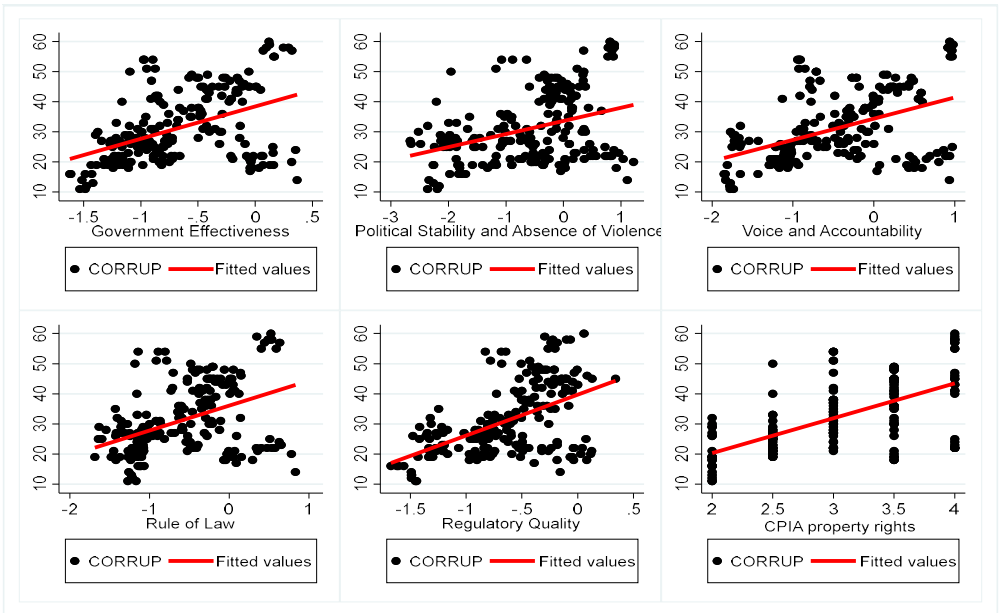


Figure A2. Relationship between Corruption and Quality Institutional Indicators Based on Observed Data of Lower-middle-income Economies (\$1,036 to \$4,085)

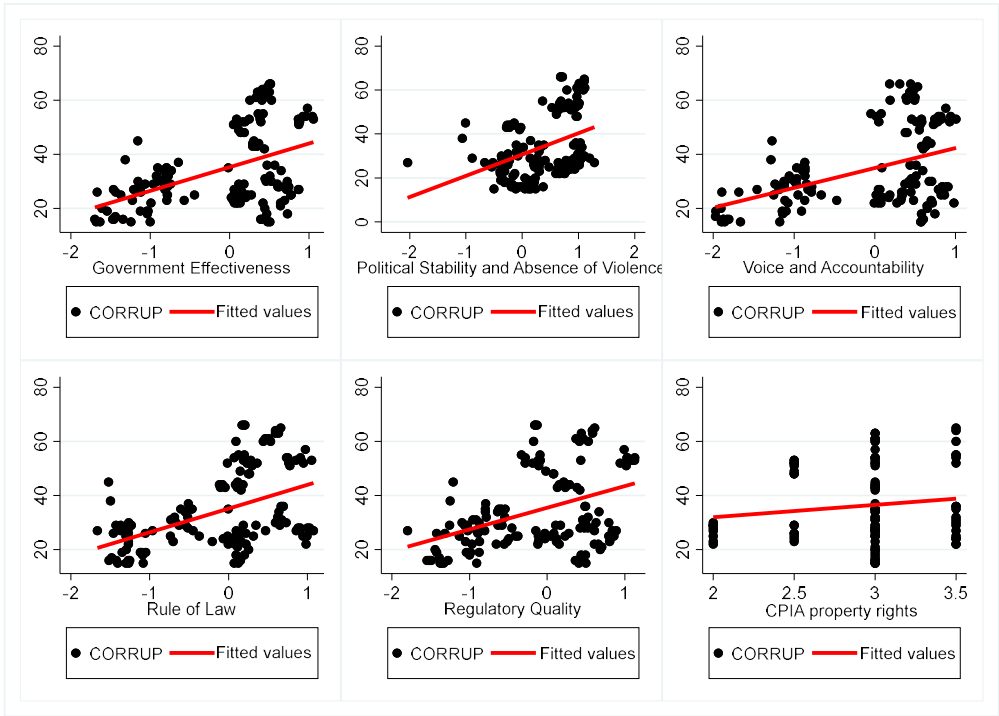


Figure A3. Relationship Between Corruption and Quality Institutional Indicators Based on Observed Data of Upper-middle-income Economies (\$4,086 to \$12,615)

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