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WORKING PAPER SERIES

234, 2025

INSTITUTIONAL QUALITY AND THE SHADOW ECONOMY IN AFRICA: EFFECT AND TRANSMISSION CHANNELS

Forthcoming: Transnational Corporations Review

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Abstract

The present work investigates the effect of institutional quality on Africa's underground economy, as well as the mechanisms that modulate this effect. Considering cross-sectional dependency between panels, this study considers data of 41 African countries from the period 1996 to 2017 and the system generalized method of moment is used. The results of this investigation propose that institutional quality has a considerable detrimental impact on Africa's underground economy. The interactive effect findings reveal that modulating institutional quality through natural resource rents and trade has a adverse net effect on the size of Africa's shadow economy up to the threshold values of 37.14843 for natural resource rents (% GDP) and 40.55319 for trade (% GDP), after which the negative effect is nullified. Policy implications are discussed

Keywords: institutional quality, shadow economy, governance, panel data, system GMM
Jel Codes: E26; G38; C23

1. Introduction

The shadow economy is a good characteristic of the world's labour market which supports hundreds of millions of people to operate underground to survive. The concept of shadow economy is still debatable among economists since its definition relies on the method of measurement. According to Schneider et al. (2010), the term "shadow economy" refers to all market-based production activities that are legal but are purposefully kept hidden from government authorities for a variety of reasons, including avoiding paying taxes. This definition focuses on activities authorised by law that go against the institutional rules and laws that guide the operation and functioning of economic activities as such it is coined to a narrow definition. Informal activities such as prostitution, stealing and do-it-yourself activities are not considered in the measurement of informality as a share of the official Gross Domestic Product (GDP) of a country. On his part, Smith (1994) defines informality as "the production of goods and services, either authorised by law or not, that can contribute to the GDP, but avoid traced in the legal estimates of GDP". This definition is taken from a panoramic view as it involves legal and illegal production activities that escape from the declaration of tax and as such, do not contribute to the GDP of a country. The underground economy is made up of activities which do not contribute to the national income of a country.

For the first time a number of years ago, the International Labour Organisation (ILO) helped popularise the idea of informality in Africa. In 1972, ILO's initial investigation on the shadow economy started in Africa with a multidisciplinary employment mission from Kenya. The terms "shadow economy," "underground economy," "grey economy," "hidden economy," "informal economy," and "black economy" are all used synonymously in our work. Agents engaged in the black economy are undetected and this makes it pretty difficult to estimate or measure the size of the underground economy. Mixed findings have been established in literature on the impact of informality on the economy. On the one hand, the informal sector contributes to the employment of a given percentage of the population, and provide cheaper markets to low-income earners, leading to an increase in household income and purchasing power (Colombo et al., 2019). On the other hand, informality informal business may struggle to maintain consistent productivity and quality standards, which impact overall economic efficiency (Amin and Okou, 2020; Njoya et al., 2023). It can equally lead to a reduction in tax revenues for the government, affecting public finance and infrastructural development (Meagher, 2021). As it is called, "underground economy", means activities in this sector of the economy are done in a hidden manner. That explains why this economic system continues to exist especially in Africa as most Africans earned their living from engaging in this sector.

Following the ILO statistics, illegal sector accounts for more than 66% of all employment in sub-Saharan Africa, with the hidden economy's average size in developing nations calculated to be about 36% of the official GDP between the years 2002 to 2015 (Schneider, 2018). In Africa,

it is believed that informality is the central hindrance to the growth of a suitable business sector and an efficient economy that adequately contribute to the GDP. According to Alm and Embaye (2013), the misallocation of economic resources, transforms income distribution including the reduction of tax revenue are led by the presence of the informal economy. The global growth of the shadow economy according to some researchers, is on a declining trend (Elgin and Oyvat, 2013; Schneider 2010). The main factors contributing to the expansion of informality in Africa are corruption, ineffective administration, avoiding regulation, and public distrust in the political system.

Also, the effectiveness of the institutions in existence is responsible for the economy's efficient operation. According to North (1981), institutions are created limitations that control human behaviour and influence how people interact with one another in society. In his definition, institutional quality improves when power is shared or when the executive has limited power. This definition focuses more on the legal rights of the citizens and their freedom to take part in decision-making. According to the World Bank's research programme, which has been in place for a while, institutional quality can be described in terms of universal governance indicators of the rule of law, voice and accountability, political stability and inexistence of violence, government effectiveness, regulatory quality, and corruption control. Governmental financial resources do not necessarily reflect the quality of governance; rather, they demonstrate the extent to which public authorities can develop and deliver quality policies and services as well as the rate to which decisions are made and policies are carried out in a transparent, effective, and impartial manner (Rothstein and Teorell, 2008).

The origin of informality can be rooted in the economic perspective, the legal context, regulatory, and policy framework. Creating informal activities is easier in Africa than working in the formal economy. This occurs as a result of Africa's inadequate data collection and control methods. Moreover, government effectiveness in enforcing law and order is not as tight as in the developed world. The spread of the shadow economy can be attributed to high taxes and burdensome regulation (Schneider and Enste, 2000). To Goel and Nelson (2016), increased public resources made available through mechanisms like tighter regulation and checks and balances could prevent the growth of unofficial businesses. Equally, a weak institutional quality (corruption, weak legal system, bureaucracy, regulatory inefficiency) is usually considered the fundamental reason of spread informality. In light of this, it is formal for economists to study institutions by examining the degree of regulation, which is determined by the number of laws and mandates such as permits, market regulations, labour restrictions for foreign nationals, trade barriers, etc. that raise labour costs in the formal sector and encourage businesses to operate in secret. (Schneider and Enste, 2000).

Dreher et al. (2009) studied the relationship between institutional quality, the shadow economy, and corruption in 145 countries from 2000 to 2002. They found out better institutions reduce the scope of informality. Following their findings, the size of the African's shadow economy as percentage of GDP stood at 41.3 in 1999/2000 and increased to 43.2% in 2002/2003. This shows that over the period of four years (on average), the underground economy grew by 0.9%. Following this, Zimbabwe, Tanzania, and Nigeria have by far the largest shadow economies (with 63.2, 60.2, and 59.4%, respectively); Mozambique has the median shadow economy with 42.4%; South Africa has the lowest shadow economy with 29.5%, followed by Lesotho with 33.3% and Namibia with 33.4% (Schneider and Klinglmair, 2004). Moreover, according to data up to 2015, Africa's average share in the shadow economy has decreased to roughly 39%. South Africa scores least in the informal sector, with an average of 25.9% and 26% in 2015. As a proportion of GDP, Zimbabwe has the largest shadow economy, accounting for roughly 60.6% on average and 46.5% in 2015. Till today, more than 80% of employment in Africa is the highest compared to anywhere in the world (Ngouhouo and Nchofoung, 2021; Sen et al., 2022). In the same context, Ngouhouo et al. (2021) posit that the quality of institutions in Africa is nothing to ride home about whereas, trade openness is on the rise. Also, Ngouhouo and Njoya (2020) established that women's parliamentary participation reduces the size of the informal sector in Africa. It is a policy challenge for Africa to limit the spread of informality, it is therefore a concern to know or identify the modulating variable through which institutional quality affects the shadow economy. Canh and Thanh (2020) suggested that institutional quality has a varied impact on informality. Gallien (2018) demonstrates that it is typical practise in Africa to hire undocumented workers without official contracts and social insurance programmes. Therefore, the objective of this study is to respond to the following research question: What impact does institutional quality have on Africa's informal economy?

The study adds to the past works on the determinants of the shadow economy, especially in Africa by integrating governance as a determinant. In essence, no study focused on Africa has established the effect of governance on the shadow economy in the continent by using the governance indicators of Kaufman (2010) that encompass both economic, social and political governance. This is of vital importance especially to the African continent given that Nchofoung and Ojong (2023) recently argue that the continent is still wanting in terms of governance quality since the continent tops the chat in terms of corruption and political instability. There is therefore, the need to investigate the possibility of this poor governance system to be a push factor of the proliferation of illegal economy in the continent. The closest study to this effect is that of Ouédraogo (2017), who, however, limits the governance measures to the indicators of governance of the freedom house, which are limited to economic governance. Through a governance indicator that integrates both economic, political and

social governance there is a need in elaborating policies on reducing the size of the informal sector in the continent. The study also establishes the transmission mechanisms for this effect and the thresholds for complementary policies which no past study to the best of knowledge has been done on the subject. The transmission mechanisms identified are trade openness and natural resources rents. In reality, trade openness can create conditions that encourage informal businesses to formalise by improving governance standards, enhancing market access and promoting regulatory alignment to international norms. Also, good governance leads to proper management of natural capital, which can be used for investment in other formal sectors of the economy, thereby, reducing informal employment.

The literature review (section 2), methodology (section 3), results and discussion (section 4), conclusion and policy implications (section 5) are the order in which this paper is further structured.

2. Literature Review

It is important to note that, the theoretical foundation for this work is the Neoliberal theory of the shadow economy which stated that, the informal economy constitutes "fortunate" micro-entrepreneurs who choose to operate covertly to avoid onerous bureaucratic red tape and overbearing government regulations that drive up institutional costs (De Soto, 2000). This school of thought believes that excessive government regulations are choking free entrepreneurship. Therefore, informality is seen as a symbol of free trade forces reacting to a government's incapacity or failure to act. The neoliberal viewpoint supports deregulation as a way to strengthen free market forces. Deregulation, however, may result in a decline in job quality and an expansion in lewd work. It would typically lead to the erosion of employment benefits since improving the quality of a job is not a process that occurs on its own but rather as an institutional consequence. Furthermore, the introduction of regulated economic systems into societies around the world encourages people to break the rules, especially if they appear unfair. If we define informal economic activities as those conducted outside of the regulatory rules established in a regulated economic system, we can conclude that the informal economy is the same age as the formal economy (Gasparėnienė et al., 2022).

In the empirical perspective of this research, we mobilise four different strands of literature; The first body of literature focuses on the factors that influence the shadow economy from a global perspective, the second highlights studies on how institutions or governance affect the shadow economy, the third summarises studies on the shadow economy in Africa, and the final body of literature examines the mediating role of trade openness.

In the first strand of literature, Goel and Saunoris (2017) contend that unemployment has an impact on the shadow economy and that unemployed men are more likely than unemployed women to participate in these activities. Additionally, Berdiev and Saunoris (2018) look at how globalisation affects the shadow economy in 119 different countries and suggest that political globalisation diminishes it while economic and social globalisations only provide little statistical evidence for it. Besides, while spending and fiscal decentralisations have little effect on the shadow economy in OECD nations, a decline in income inequality will do so. Bayar and Öztürk (2019) in the same line affirmed that, the European Union transition economies claim that economic freedom decreases the size of the underground economy in the long term in the overall panel, but globalisation also has a somewhat smaller detractive effect on the shadow economy in some countries. Additionally, Canh and Thanh (2020) argue that financial development shrinks the size of the shadow economy, with the relationship being non-linear. Schneider and Buehn (2007) assess in the second strand of literature, the impact of tax morale and institutional quality on the extent of the shadow economy. The size of the shadow economy was estimated using the dynamic multiple indicators multiple causes technique.

They used data from the years 1990 to 2000 and included pooled fixed effects in their analysis. Their research was separated into three time periods, with samples taken from 86 nations in 1990, 88 countries in 1995, and 100 countries in the year 2000. They discovered substantial evidence that better institutional quality reduces the shadow economy by employing more than 25 proxies to gauge governance and institution quality. Also, through the GMM estimator, Razmi et al. (2013) study the institutional quality and underground economy of 51 OIC (organisation of Islamic cooperation) using control of corruption, political stability and the rule of law as proxies for institutional quality and conclude on a statistically negative and significant relationship between the two concepts (institutional quality indicators and the size of the shadow economy). Their results also confirm that the size of the underground economy is expected to reduce if the official economy grows bigger and individuals, as well as firms, are given economic liberty. Besides, Maulida and Darwanto (2018) analyse the influence of institutional on the shadow economy among the ASEAN member countries using the multiple indicators multiple causes approach from the year 2007 across 2016. Based on their results, except regulatory quality, institutional quality shows a negative relationship with the growth of the underground economy. What reduces the size of the unofficial economy are the variables of control of corruption, political stability and absence of violence, voice and accountability. For SSA, Ouédraogo (2017) argue that the informal sector is determined by corruption, the quality of institutional settings, and the unemployment rate. Recently, Canh et al. (2020) argue of a two-way relationship between institutional qualities on the shadow economy. They discovered that while political stability has a large negative influence on the shadow economy in the long run whereby, the control of corruption and the rule of law have a significant negative impact on it in the short term. In the long run, voice and responsibility have a huge positive impact on the shadow economy. This demonstrates a really intriguing phenomenon to demonstrate that improved institutions do not always imply a decrease in the unofficial sector. This is because, as a result of increased voice and accountability, agents may have the chance to discuss and impart their information about, say, tax evasion practises. This demonstrates how institutional quality has a varied impact on the shadow economy. Duong and Nguyen (2021) on their part argue that corruption control and trade openness are negatively associated with the development of the informal economy development in the BRICS countries, while social trust and tax morale can hinder the size of the shadow economy. Also, Estevão et al. (2022) argue that in order to reduce informality, solutions based on improving government efficiency should be prioritised.

From the previous paragraph, the existence of a negative effect of governance on the size of the informal sector in Africa was our first hypothesis.

In the third strand of literature, there is increasing literature on the subject in the African Context. In this respect, Gajigo et al. (2012) posit that productivity and corruption push firms to leave the formal economy to the informal sectors in Africa. Moreover, Medina et al. (2017) estimate the size and determinants of informality in Africa. Their results revealed that the determinants of informality in Africa are financial policy, economy size, unemployment, trade openness, currency and labour force participation. Furthermore, Njangang et al. (2020) show that the relationship between financial development and the shadow economy in Africa is a non-linear. In this regard, Akçay and Karabulutoğlu (2021) revealed that remittances moderate the negative relationship between financial development and the informal economy. Besides, Ajide (2021) looks into how financial inclusion affects Africa's informal economy and finds that it has a negative impact on the extent of this economy. He also demonstrates that lower levels of corruption and faster rates of economic growth are more conducive to financial inclusion's ability to reduce the size of the shadow economy. Just of recent, Sen et al. (2022) argue that factors explaining the presence of informality are not only economic in nature, but also incorporate social factors such as trust and division levels of labour in the household. Also, greater access to credit and reducing taxes and fees for the smaller formal firms make it more likely that they will formalize.

Some studies have emphasised the importance of free trade as a determinant of the informal economy. The issues surrounding trade and the informal economy can be seen as either trade influencing how informal the economy is or how informality affects potential advantages from commerce. For the case of a paired approach, where capital is movable between the formal and informal sectors, international trade raises wages in the informal sector, resulting in an expansion of the underground economy (Marjit, 2003). Kar and Marjit (2001) on their part, argue that openings to international trade does not improve the wage or welfare of informal labour within the economy, even if a discount in tariffs results into an expansion of the size of the informal sector. According to Goldberg and Pavcnik (2003), a free trade market causes production to shift from the formal to the informal economy, which lowers employment in the formal sector. The structuralist economists, however, argue that growth in free trade leads to an increase in the production in the formal export-oriented sector of the economy and the production of non-exported goods and services relegated to the informal economy, leading to an expansion in the formal sector (Cimoli and Porcile, 2009). Equally, Kpognon (2022 a) theorised that the reason for an increase in the size of the non-formal economy in Africa is due to the abundance of natural resources and that, the positive effect becomes negative when good and powerful institutions are in place. This finding was complemented by Kpognon (2022 b) and equally, Blanton and Peksen (2021).

On the other side, both trade openness and natural resources have been argued to be strongly determined by governance. In this respect, Governments must consider the governance environment when assessing both their trading environment and that of their trading partners. A company must take into consideration a potential trading partner's attributes (such as reputation, resources, etc.), the country's trade policies, and the governing structure of that country when choosing trading partners (Li and Samsell, 2009). Besides, both political, social and economic governance is enhancing on trade openness (Ngouhouo et al., 2021). Furthermore, Busse and Gröning (2013) established that increase in natural resources exports have led to persistence in corruption in the economy. Also, Asiamah et al. (2022) argue that the abundance of natural resource in Africa has weakened institutional quality in Africa, while Njangang et al. (2022) on their part argue that good governance is necessary for optimising resource rents in the economy. In summary trade openness can create conditions that encourage informal businesses to formalise by improving governance standards, enhancing market access and promoting regulatory alignment to international norms. Also, good governance leads to proper management of natural capital, which can be used for investment in other formal sectors of the economy, thereby, reducing informal employment.

From the highlighted literature, we further hypothesise that, the informal sector is affected by governance, and mediated through free trade and natural resource wealth.

Although of the above studies make reference to institutional quality, no study has taken depth into its effect on the informal sector, especially in Africa. Moreover, no study has established the transmission mechanisms through which this is possible and this study fills this gap.

3. Methodology

This part presents the empirical model, the data used and the estimation method.

3.1 Econometric Specification

In this work, we scrutinize the result of institutional quality on the shadow economy (informality) through the following dynamic model inspired by the works of Canh et al. (2020) and Njangang al. (2020)

$$Informality_{it} = \beta_0 + \beta_1 informality_{it-1} + \beta_2 Inst\_qual_{it} + \beta_3 X_{it} + \varepsilon_{it} \qquad (1)$$

Where, i, t represent the economy i at a given year t; informality is the proxy for shadow economy;$informality_{it-1}$ is the lag dependent variable, inst-qual is the institutional quality composite index which is captured by taking the average of the six governance indexes from WGI of Kaufmann (De Groot et al., 2004; Ngouhouo et al., 2021) including **fight against** corruption (corruption) which measures the magnitude to which individuals abused power by using it for private benefit. It complements the state of law and quality rule and regulation put in place as well as the extent of illegal transactions in private-public transactions. **Government effectiveness** (government_eff) ability to formulate and apply suitable policies. **Political stability** (political-stab) measures the ability or possibility of the government not taking over or overthrowing the **Regulatory quality** (regulatory-qual) measures the degree of burdens imposed by state intervention, unfriendly policies., **Rule of law** (rule-law) measures the degree of agents' trust in the law and the rate to which they obey the norms of society. **Voice and accountability** (voice-account) measures the right to the political process to be free and fair without government intervention, political right to belong to any party and civil liberty; X is a control variable of shadow economy including agricultural, forestry, and fishing value added (agriculture-va); mobile cellular subscription (Mobile); gross domestic product per capita (GDPK); total unemployment, (Unemployment); trade openness(trade); foreign direct investment, net inflows (FDI); total natural resources rents(resources-rents); β_0 is fixed individual effect,β_1, β_2 and β_3 are coefficients; and the residual term denoted as ε. Table I presents the details of these variables.

Table 1: Description, measurement, and Justification of variables

Variables	Definitions	Expected signs	Justifications	Sources
Regressand				
Informality	Size of shadow economy (% GDP)			Medina and Schneider (2019)
Regressors				
Insti-qual	A composite institution index, captured by the average of the six governance indicators of Kaufmann (control of corruption, gov't effectiveness, political stability, rule of law, regulatory quality, and voice and accountability)	-	Cahn (2020), Scheinder et al. (2020)	WGI
Agriculture-VA	Agriculture, forestry, and fishing, value added (% GDP)	+	Kireenko et al. (2019)	WDI
Mobile	Mobile cellular subscription (per 100 people)	+	Remeikienė et al. (2021)	WDI
GDPK	GDP per capital (constant 2020 US$)	-	Canh (2020)	WDI
Unemployment	Unemployment, total (% of total labour force)	+	Canh (2020)	WDI
Trade	Trade (% of GDP)	-/+	Canh (2020),	WDI
FDI	FDI, net inflows (% of GDP)	-	Canh (2020)	WDI
Resources-Rents	Total natural resources rents (% of GDP)	+	Falahati et al. (2020)	WDI

Source: Authors' computation

From the above specifications and the African literature on the subject, trade openness and natural resources are the possible transmission channels through which the quality of institutions can affect the shadow economy. In this regard, (1) can be specified in accordance with

recent literature (Nchofoung et al., 2021; Nchofoung and Asongu, 2022) on modulating mechanisms:

$$Informality_{it} = \beta_0 + \beta_1 informality_{it-1} + \beta_2 Inst\_qual_{it} + \beta_3 X_{it} + \boldsymbol{\alpha}_1 (Inst\_qual_{it} * \mathrm{W}) + + \varepsilon_{it} \quad (2)$$

The variables in (2) are defined as above, β is the direct effect t coefficient while a is the indirect effect coefficient and W is the modulating variables of either trade or natural resources. Based on existing works (Nchofoung et al., 2021; Nchofoung and Asongu, 2022), the sign of the direct effect,β_1 may be different from that of the indirect effect, $\boldsymbol{\alpha}_1$. In such a case, a net is computed such that.

$$Net\ effect = (\boldsymbol{\alpha}_1 * \overline{W}) + \beta_1 \qquad (3)$$

Where, $\overline{W}$ is the average of the modulating variables apparent in the summary statistics in Table II. The modulating variables could yield a threshold by solving the first derivative of equation 2.

$$\frac{\partial Informality_{it}}{\partial Inst\_qual_{it}} = \beta_2 + \boldsymbol{\alpha}_1 W \qquad (4)$$

If (4) is equated to zero, then the threshold is as in (5)

$$Threshold_W = \frac{\beta_2}{\boldsymbol{\alpha}_1} \qquad (5)$$

The threshold is always positive because for it to exist, $\boldsymbol{\alpha}_1$ and β_2 must be opposing in signs, annulling the negative sign of β_2 that comes when (4) is equated to zero.

3.2 Data

The study used panel data on variables specification from 1996 to 2017 based on the availability of data. The data was collected yearly for 41 African countries. From three sources the cross-sectional time series data gotten was quantitative in nature. Firstly, data for the shadow economy was gotten from Medina and Schneider (2019). Secondly, data on institutional quality was gotten from the Worldwide Governance Indicators (WGI) of Kaufmann et al. (2019). Thirdly, data from the World Development Indicators (WDI) provided by the World Bank (2020) on control variables (agriculture-VA, mobile cellular subscription, GDPK, unemployment, trade, FDI, resource-rent) helped the researcher in the analysis.

Table II shows that the average size of the economy informality in Africa between the periods of 1996-2017 stands at 38.76696%, with an observation of 820 and a maximum value of 63.47%

and a minimum value of 20.35%. This shows that the shadow economy is reducing in Africa as the mean is closer to the minimum value than the maximum value.

The summary of institutional quality is shown in the third row. It is a composite institution index, captured by the average of the six governance indicators of Kaufman (2010). It has a maximum value of 0.533944% and a minimum value of -4.02967%, having a variation of 0.612715% from the mean of -0.74155% for the overall observation. This shows that the quality of institutions in Africa has improved as its mean value is closer to the maximum value than the minimum value.

Table II: Summary of descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Informality	902	38.76696	7.97992	20.35	63.47
institutional quality	901	-0.74155	0.612715	-4.02967	0.533944
agricultural value added	954	24.48052	14.17526	0.892696	79.04237
Mobile	861	4.382463	5.807694	-12.0409	41.5676
Per capita GDP	898	6.967445	0.973087	5.233868	9.929787
Unemployment	861	-0.06159	0.74651	-6.07	5.648
Trade	859	65.30003	31.60407	20.96405	311.3541
Fdi	898	4.30791	10.19371	-8.70307	161.8237
resources rents	894	14.03209	12.63512	0.308303	84.22876
Corruption	902	-0.76242	0.588818	-3.37078	0.808773
government effectiveness	902	-0.80862	0.647476	-3.7623	1.020496
political stability	902	-0.66098	0.956718	-5.52657	1.790256
regulatory quality	902	-0.70639	0.626641	-4.32498	0.804242
rule of law	902	-0.79616	0.674427	-4.03542	0.348419
voice and accountability	902	-0.71224	0.695862	-3.4622	0.846978

Source: Authors' computation using stata

3.3 Estimation Method

The explanatory variables in some models have a strong endogeneity property or the value of the dependent variable in the previous periods affects the model or both situations exist simultaneously, Eugenio et al (2004). The Arellano and Bond (1991) model was used to solve these problems.

The generalised method of moment estimator is used because our time dimension is smaller than our individual dimension, which satisfies the condition of Roodman (2009) for the application of GMM. Besides, our model contains the lagged dependent variable and estimation through simple regression methods like the Ordinary Least Squares will lead to a

Nickell's bias (Nickell, 1981). The GMM system offers a number of benefits. It (i) accounts for potential unobserved heterogeneity in the regression process and (ii) accounts for potential bidirectional causality between the model's explanatory variables. All of our explanatory variables are thought to be endogenous and are handled as such in compliance with the body of existing literature on the GMM methodology in order to address the identification, simultaneity, and exclusion constraints problem that is always associated with GMM (Nchofoung et al., 2022; Nchofoung and Asongu, 2022). Also, Roodman (2009) used the forward orthogonal deviation to restrict the maximum sample size and prolificity of instruments, building on the research of Arellano and Bond (1991) and Arellano and Bover (1995). In this study, we limited the proliferation of instruments by employing a similar strategy.

4. Empirical Results

Here, we present the test results pre-estimated, the main results and the post-estimation results for the validity of the instruments.

4.1 Results of the Pre-Estimated Test

The results prior to the estimation of the impact of institutional quality on the shadow economy in Africa are shown in this subsection. When implementing the estimation, it is imperative to account for cross-sectional dependence due to common shocks that may affect African countries, as well as economic and financial globalization manifested by economic and financial integration in Africa. This test assists in selecting between unit root tests of the first and second generations. (Kengdo et al., 2020).

Table III: Test of Weakly cross-sectional dependence (Pesaran, 2015)

Variable	CD-test	p-value	abs(corr)	Corr
Informality	44.44	0.000	0.546	0.351
Agriculture_va	27.02	0.000	0.462	0.221
Trade	16.71	0.000	0.422	0.135
Mobile	110.92	0.000	0.94	0.937
gdp_k	50.96	0.000	0.656	0.415
Unemployment	11.2	0.000	0.51	0.099
FDI	13.5	0.000	0.104	0.273
Resources_Rents	3.1	0.000	0.118	0.387
insti_qual	12.76	0.000	0.101	0.408
Corruption	16.4	0.000	0.409	0.128
Government_effetiveness	12.73	0.000	0.396	0.099
Regulatory quality	10.75	0.000	0.384	0.084
rule_law	12.65	0.000	0.455	0.099
Voice_account	22.65	0.000	0.426	0.177
Political_stab	2.62	0.009	0.451	0.021

Source: Authors' construct using stata version 14

Table III indicates that all the variables have a p-value of less than 10% as such, the null hypothesis is rejected for all the variables. This shows that these variables are all cross-sectional dependent. In such a situation, the second-generation unit root test is the most appropriate (Kengdo et al., 2020). According to the previous authors, the best choice of second-generation unit root test is the Pesaran (2007) unit root test. This is because it takes into consideration both slope heterogeneity cross-section dependence.

Table IV: Unit Root Test (Pesaran (2007) test of second generation unit roots).

Variable	P-value at level	Level of integration
Informality	0.000	I(0)
agriculture_va	0.002	I(0)
Trade	0.038	I(0)
Mobile	0.002	I(0)
gdp_k	0.043	I(0)
Unemployment	0.014	I(0)
FDI	0.000	I(0)
Resources Rents	0.047	I(0)
insti_qual	0.004	I(0)
Corruption	0.029	I(0)
Government_effetiveness	0.080	I(0)
Regulatory quality	0.080	I(0)
rule_law	0.000	I(0)
Voice_account	0.007	I(0)
Political_stab	0.056	I(0)

Source: Authors' computation

The results of table IV show that all the variables are stationary at level. This established, the GMM can be used as an estimator for our model.

4.2 Result of the Effect of Institutional Quality on the Shadow Economy in Africa

Our objective here is to examine the effect of domestic institutions on the size of the shadow

Table V.Effect of institutional quality on the shadow economy

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Dependent variable=informality						
L.informality	1.007***	1.012***	1.069***	0.856***	1.043***	1.027***	1.013***
	(0.0409)	(0.0413)	(0.0379)	(0.0607)	(0.0418)	(0.0404)	(0.0371)
Institution quality	-1.266**						
	(0.560)						
Agriculture value added	0.0520	-0.0108	-0.0491	0.00102	0.0160	0.0138	0.0718*
	(0.0427)	(0.0443)	(0.0570)	(0.0496)	(0.0490)	(0.0364)	(0.0426)
Mobile	0.0549	0.0678*	0.119**	-0.184*	0.106*	0.0992**	0.0678*
	(0.0429)	(0.0400)	(0.0587)	(0.0995)	(0.0585)	(0.0504)	(0.0392)
Per capita GDP	0.683	-0.0784	-0.211	0.0362	0.421	0.351	0.745*

	(0.468)	(0.501)	(0.530)	(0.630)	(0.503)	(0.391)	(0.418)
Unemployment	0.0298	0.175	0.451	0.630	0.207	0.434	0.203
	(0.329)	(0.301)	(0.291)	(0.533)	(0.324)	(0.308)	(0.313)
Trade	0.0189***	0.0245***	0.0258***	0.0118**	0.0191***	0.0207***	0.0180***
	(0.00672)	(0.00608)	(0.00694)	(0.00572)	(0.00682)	(0.00623)	(0.00591)
FDI	-0.0392*	-0.0475**	-0.0599***	-0.0131	-0.0440*	-0.0463**	-0.0452**
	(0.0227)	(0.0237)	(0.0229)	(0.0369)	(0.0227)	(0.0227)	(0.0197)
Resources rents	-0.0701***	-0.0699***	-0.0805***	-0.00780	-0.0745***	-0.0735***	-0.0531**
	(0.0216)	(0.0179)	(0.0226)	(0.0203)	(0.0234)	(0.0210)	(0.0237)
Corruption		-1.622***					
		(0.543)					
Governm't effectiveness			-1.871***				
			(0.713)				
Political stability				-0.620			
				(0.441)			
Regulatory quality					-1.704**		
					(0.722)		
Rule of law						-1.467**	
						(0.582)	
Voice and accountability							-0.695
							(0.704)
Constant	-7.973*	-1.976	-2.724	4.771	-6.989*	-5.941*	-8.878**
	(4.174)	(4.563)	(4.316)	(6.889)	(3.942)	(3.570)	(3.955)
Observations	803	804	804	804	804	804	803
Number of crossestion	41	41	41	41	41	41	41
Prop>AR2	0.609	0.685	0.579	0.985	0.552	0.627	0.683
Instruments	23	23	23	20	23	23	23
Prop>sargan	0.424	0.413	0.472	0.485	0.545	0.420	0.228
Prop>hansen	0.185	0.117	0.199	0.886	0.164	0.161	0.166
chi2	5718***	7866***	8503***	1553***	5035***	5535***	4166***
Prop>AR1	0.00597	0.00645	0.00465	0.00312	0.00521	0.00615	0.00492

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

Source: Authors' computation using stata 14

The result in Table V shows that institutional quality, foreign direct investment inflows and natural resources rents are negatively related to the shadow economy, while trade openness is positively related. When alternative measures of institutions are used, the negative results are robust. The effect of six indicators of governance quality is reported equally in table V. The coefficients of these indexes are negatively significant and consistent except for political stability and voice and accountability which are though negative but insignificant. For this result to be valid our instruments must be valid and there must be the absence of first order and second order autocorrelation of residuals. The results show that first order autocorrelations is absent (Prop of AR1<10%). Second order autocorrelation is also absent (Prob of AR2>10%). Regarding the validity of instruments, the instruments are valid since both the Sargan and the Hansen probabilities are greater than 10%. Moreover, following Rodman (2009), to avoid the proliferation of instruments, the number of instruments must be less than the number of the cross-section. This condition was respected in our regression by collapsing the instruments in

the system GMM. In all cases, we had number of instruments less than the number of cross-sections.

To have an economic interpretation, it is important first of all to see the modulating variables through which institutional quality affects the shadow economy in Africa. This is the objective of the next computation as apparent in Table VI.

4.3 Result of Transmission Channels through Which Institutional Quality Affect the Shadow Economy in Africa

Table VI, evaluate the transmission channels through which institutional quality affects informality in Africa.

Results from Table VI show that institutional quality is modulated to informality through policies on trade openness and natural resource rents. In fact, when interacted with trade openness, institutional quality has a negative direct effect on informality when interacted with natural resource rents and a positive direct effect. However, the effects are respectively positive and negative in the marginal interactions. In this case, there is a need to compute the net effect and a threshold effect to see the actual interaction. This is done in reference with contemporary literature (Tchamyou et al., 2019; Asongu and Nchofoung, 2021; Nchofoung et al., 2021; Nchofoung and Asongu, 2022).

In net effect methodology, the exact effect of institutional quality modulated through natural resources rents is -1.775335. This value is gotten as:

Net effect= (direct effect coefficient) + (indirect effect coefficient*average of policy modulating variable as in summary statistics)

Threshold= (Direct effect coefficient)/(indirect effect coefficient)

In this case, -1.775335 is {-2.853+ (0.0768*14.03209)}.

From the above explanations, the following economic interpretations are given to our results. Institutional quality has a direct negative impact on illegal transactions when modulated through natural resource rents and a positive direct effect when modulated through trade openness. But the effect of institutional quality on informality produces a negative net effect in both cases. This negative effect is up to a natural resources rents threshold of 37.14843 (as a % of GDP) and a trade openness threshold of 40.55319 (As a % of GDP) when this negative effect becomes positive. These results have a lot of policy implications as the threshold values are within the range of values of the policy variables reported in the summary statistics.

Table VI: Transmission Channels of Institutional quality to Informality

VARIABLES	(1)	(2)
	Dependent variable=informality	
L.informality	1.018***	0.949***
	(0.0304)	(0.0284)
Institutional quality	-2.853***	1.906*
	(0.777)	(1.041)
Agriculture value added	-0.0227	-0.00385
	(0.0415)	(0.0474)
Mobile phone penetration rate	0.0547**	-0.0170
	(0.0217)	(0.0239)
Per capita growth	-0.0505	0.220
	(0.445)	(0.591)
Unemployment	0.0690	0.0136
	(0.226)	(0.219)
Trade	0.0277***	-0.0300**
	(0.00695)	(0.0128)
FDI	-0.0434**	-0.0202
	(0.0219)	(0.0133)
Resources rents	0.00107	-0.0475***
	(0.0273)	(0.0157)
resources_rents* institutioal_quality	0.0768**	
	(0.0321)	
Trade*institutional quality		-0.0471***
		(0.0156)
Constant	-3.097	2.119
	(3.662)	(5.750)
Net effect	**-1.775335**	**-1.16963**
Threshold(-/+)	**37.14843**	**40.55319**
Observations	803	803
Number of cross-section	41	41
Prop>AR2	0.588	0.774
Prop>sargan	0.701	0.936
Pro>hansenp	0.198	0.272
chi2	6563***	6621***
Prop>AR1	0.00528	0.00298
Number of instruments	14	26

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

Source: Authors' computation using stata 14

According to Table VI, there is a significant negative correlation between institutional quality and the size of the shadow economy, with a 5% threshold. The significance of institutional quality and its roles in the management of the shadow economy are confirmed by the negative effects of all six institutional quality indicators (voice and accountability, political stability, government effectiveness, regulatory quality, and rule of law) on the size of the shadow economy. The outcome is consistent with that of Cahn et al. (2020), who claim that

lower levels of the shadow economy are caused by higher protections, lower transaction costs, and lower risk associated with better institutional quality. Better institutional quality also implies regulations put in place that guarantee formal employment and also less inequality in fiscal policy means equity tax. Generally, in Africa, the size of the shadow economy has gradually decreased between the 1996 to 2017 periods thus still significant. For instance, in 1996 it was 37.68, 415 and 52.41 whereas in 2015 it was 23.98, 28.05, and 32.99 for Algeria, Rwanda and Zambia respectively. This can be explained by an improvement in institutional quality for instance Government effectiveness was -1.08877, -1.14908 and -1.12838 in 1996 and -0.50088, -0.04584 and -0.55566 in 2015 for Algeria, Rwanda and Zambia respectively. In the same light voice and accountability also witness some improvement from -1.16629 to -0.84907, -1.5792 to -1.13521, and -0.33402 to -0.06654 in 1996 and 2015 and the same three countries respectively. To that effect, we can say that development in institutional quality in Africa will lower the size of the underground economy.

To elaborate, there are a number of ways in which high-quality institutions can help to shrink the size of the informal economy. First of all, a stable legal environment and strong institutional quality can foster an atmosphere in which property rights are safeguarded and contract enforcement is dependable. This may incentivize companies to operate in the formal economy, where contracts and rights are governed by law and respected. A reduction in corruption, which is frequently linked to informal economic activity, is another indication of high-quality institutions. Institutions can level the playing field for businesses by encouraging accountability and transparency, which lessens the motivation for them to operate covertly in order to avoid engaging in unethical behaviour. Additionally, strong institutional quality can lessen a company's reliance on unofficial funding sources by increasing its access to formal financial services. Businesses may be encouraged to formalise their operations in order to take advantage of credit and investment opportunities. In addition, businesses can have a lighter regulatory load by implementing efficient administrative procedures and uniform, clear regulations. As a result, formalisation may become more appealing by lowering administrative and compliance cost. Robust institutions have the ability to enable the delivery of social protection schemes, like healthcare and unemployment benefits, which are frequently inaccessible to employees in the informal sector. This can promote formal employment and lessen the need for social protection from informal employment.

5. Conclusion and Policy Implications

In this paper, we examined the relationship between institutional quality and the size of the African countries' shadow economies. Our model estimation result, using a dynamic panel data and system GMM as an estimator in the context of African countries indicates that institutional quality as an index on multiple columns had a significant negative outcome on the size of the shadow economy of these African countries during 1996-2017. Thus, when we considered the institutional variables individually to better explain the significance, we realized that all the six indicators of institutions had significant negative effects, except for political stability and voice and accountability which had negative insignificant effects on the size of the shadow economy in Africa. Equally, it hypothesized that institutional quality affects the shadow economy through two channels confirmed by our results which are natural resource rents and trade.

Relying on the net effect, institutional quality when modulated through natural resource rents and trade affected informality in Africa negatively.

The study's policy implications compelled the various African States included in the sample to raise the calibre of their national institutions and develop anti-informality policies. It is recommended that States increase their investments in institutional development. This is significant because it shows that better institutions are trusted by business people. Government should consider institutional reforms that limit the shadow economy. The countries must take action to improve on government effectiveness since it affects informality negatively. Countries should, in particular, improve the quality of public and civil services by establishing their dependability and independence from political influence, as well as improve the quality of policy by promoting public involvement in the process of formulating and executing policies. Improve the openness of government for credibility by the people on the soundness of the government in formulating and implementing policies. Countries should reduce their levels of administrative bottleneck in formalizing businesses; create a friendly environment and policies that enable business freedom and employment freedom and economic operators should not feel overburdened by excessive regulations. Corruption should be controlled to reduce the level of informality. This can be done by creating and implementing anti-corruption committees which should be in charge of monitoring and auditing government officials so that public offices should not be used for private gain. A sound legal system including rule of law, securing of property rights and judicial effectiveness should be put in place. Laws should be well implemented and punishable when required and the costs of doing formal business reduce to a minimum. This would increase the cost of operating the underground economy, thereby, shifting economic operators to formalize with the confidence that their rights and

businesses are protected by the law. Securing property rights strengthens incentives to invest formally.

Globalization through trade openness and FDI inflows can be beneficiary to the domestic economy by reducing the informal sector. The government should focus on economic globalization or integration with the aim of increasing trade openness. Free trade zone should be equally encouraged. Government should shift the allocation of money from the natural resource rents to create formal employment. This will go in a long run to tilt people away from the informal employment to formal employment. In this regard the free trade market threshold of 40.553 (%GDP) and the resources rents threshold of 37.148 (% GDP) should be avoided in these economies for the quality of institutions to continue alleviate the size of the informal sector.

The findings of this study are not definite on the subject. The study has not taken into account the distribution of informality across different cross-sections. Future studies could consider methods that could take this into account such as the quantile regression methods. Besides, given that the GMM technique is inefficient in small samples, country and regional specific studies could be considered through the use of other methods in future studies.

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