

Interactions between the Informal Economy and Income Inequalities: The Influence of Political Commitment in Africa

Armand Gilbert Noula, Ruth Dzokou Petnga*

Faculty of Economics and Management, University of Dschang, Dschang, Cameroon
Email: *ruthpetnga015@gmail.com

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Abstract

The objective of this work is to explore the complex links between the informal economy, income inequality and the role of state political will in 32 African countries by analyzing secondary panel data from 1995 to 2018. Using econometric models based on the Driscoll-Kraay method, we highlighted several significant results: the increase in informal employment has a direct correlation with the increase in economic inequality, suggesting that a one-percentage-point increase in informal employment leads to a 0.011-point increase in inequality. At the same time, the political will of the state, captured by the efficiency of public administrations, appears to be a factor in reducing inequalities, because when administrations are more efficient, they are able to implement policies that promote a more equitable distribution of resources. In addition, the analysis of the interaction between informal employment and government efficiency indicates a coefficient of -0.499 . This underscores that the negative impact of the informal economy on inequality can be reduced by improving the effectiveness of public policies, hence the importance of effective governance to counter the adverse effects of the informal economy on income inequality in Africa.

Keywords

Informal Economy, Inequalities, Africa, Efficiency of Public Administrations

1. Introduction

The relationship between the informal economy and income inequality is a crucial issue for economic development in Africa. The informal economy, which encompasses a wide range of unregulated activities, is often seen as a response to eco-

conomic constraints and the lack of formal opportunities. Nearly 85% of workers in sub-Saharan Africa are employed in the informal sector, highlighting the importance of this dynamic for understanding income inequality on the continent. Income inequality is a key determinant of economic development and social cohesion. According to the economist [Stiglitz \(2015\)](#), information asymmetries and lack of regulation can increase economic inequality. These inequalities, fuelled by failing economic systems, hinder growth and development. [Banerjee & Duflo \(2019\)](#) also highlight the negative impact of inequality on economic growth and social stability, arguing that reducing it can foster inclusive growth that benefits society as a whole. This is particularly relevant in Africa, where economic disparities are often exacerbated by fragile political and economic systems. The evolution of the size of the informal economy and income inequality in Africa over the past several decades illustrates complex and worrying dynamics. According to the International Labour Organization (ILO), the share of jobs in the informal economy in sub-Saharan Africa has remained largely preponderant, fluctuating between 60% and 80% between 1990 and 2020. In 1995, about 65% of workers were in the informal sector, a figure that has changed little, reaching 72% in 2000 and now around 70% in 2020. The stagnation has been exacerbated by the COVID-19 pandemic, which has strongly affected informal workers, thus aggravating their economic vulnerability. At the same time, income inequality in Africa has risen alarmingly. The Gini Index, which measures income disparities, showed an upward trend, from about 0.41 in 1995 to 0.46 in 2020. Countries such as South Sudan and Nigeria have Gini indices above 0.50, illustrating a growing gap between rich and poor. A study by [Krishna et al. \(2023\)](#) demonstrates that countries with high informality tend to have higher income inequality, suggesting that the integration of informal workers into the formal economy could help reduce these disparities.

Africa faces a dual challenge: a high informal economy and a continued widening of income inequality, requiring targeted policy interventions. Political commitment, defined as the willingness of governments to adopt policies that reduce inequality, is a key factor in the interrelationship between the informal economy and income inequality. [Piketty's \(2014\)](#) work shows that the concentration of wealth can widen inequality, making it crucial to examine public policies aimed at addressing these issues within informal economies. Research by [Banerjee & Duflo \(2019\)](#) highlights the importance of policy interventions to improve the living conditions of vulnerable populations. They also argue that targeted policies can strengthen the economic and social fabric, including measures to integrate informal workers into the formal sector. [Kim et al. \(2018\)](#) delve deeper into this issue by arguing that the inclusion or exclusion of economic actors determines a country's economic performance. An inclusive policy environment can transform the economic landscape and reduce income inequality. Since the late 1990s, several African countries have implemented public policies aimed at combating informality and income inequality. For example, in Rwanda, reforms initiated after the

1994 genocide encouraged the formalization of enterprises through training and access to credit programs (Pritchard, 2013). In addition, tax reforms have targeted the informal sector as an untapped tax base. In South Africa, the 2004 tax reform broadened the tax base to include the informal sectors, thus promoting a more equitable redistribution of income (Kgatla, 2016). Similarly, support mechanisms for small and medium-sized enterprises (SMEs) have been strengthened, notably through the UN Youth Employment Initiative in Africa, which aims to encourage young entrepreneurs, whether in the formal or informal sector.

In Cameroon, several public policies have been put in place, such as the National Development Plan (NDP) 2020-2030, which includes specific measures to formalize informal businesses and improve the living conditions of vulnerable populations. This initiative is supported by the ILO. The National Employment Strategy also includes the “Youth Integration Programme” (PIJ), which responds to youth unemployment. In addition, the National Employment Promotion Policy has been developed to improve working conditions, especially for informal workers, by including measures for skills development and guidance towards better-paid jobs (Avom et al., 2021). In addition, the government has introduced social support programs, including direct cash transfers, to help vulnerable populations working in the informal sector, as highlighted by the National Anti-Corruption Commission. Promoting gender equality in Africa has also become a priority, as the informal economy particularly impacts women. In this regard, the International Trade Centre’s “SheTrades” program, launched in 2015, seeks to connect women entrepreneurs to global markets, offering them resources to exit the informal sector. This initiative highlights the importance of empowering women to mitigate economic inequalities and strengthen the social fabric.

At the same time, empirical research is continually evolving. A report by the Economic Commission for Africa indicates that formalization policies and institutional improvements are crucial to integrating informal workers into the formal economy, with positive effects on income inequality. This report shows that when governments implement transparent and effective measures, it is possible to improve access to labour rights and social protections, thereby contributing to a reduction in inequalities. Other work, such as that of the World Bank, highlights the positive contributions of regulation and robust institutions to reducing informality. World Bank researchers note that policies to support education, vocational training, and social protection can increase the room for maneuver of informal workers, allowing them to participate meaningfully in the formal economy. The researches of Tyagi et al. (2021) also argue that improving access to education and training is key to reducing income inequality.

This exploration of the interactions between the informal economy, income inequality and political engagement can therefore only be relevant to a better understanding of economic development in Africa. Failure to address income inequality in the informal context could undermine long-term development efforts. This article aims to analyze these complex relationships in depth, based on theo-

retical and empirical analyses.

2. Review of Literature

The theoretical literature on the interactions between the informal economy, income inequality and political engagement in Africa is rich and varied, drawing on several conceptual frameworks. The first relevant theory is that of the informal economy, defended by [De Soto \(1989\)](#), who points out that the informal economy often emerges as a response to overly restrictive bureaucratic mechanisms that prevent entrepreneurs from joining the formal sector. He argues that the non-integration of informal workers into the economic system leads to income inequality, as these workers lack access to the resources, finance and social protections that exist in the formal sector. This view is corroborated by studies such as those of [Chen \(2012\)](#), which emphasize the role of the informal economy in the survival of poor families through income diversification strategies. At the same time, the capability theory developed by [Sen \(1993\)](#) offers a useful framework for analyzing these dynamics. [Sen \(1993\)](#) argues that income inequality often stems from the lack of capabilities that allow individuals to realize their potential. In the African context, political commitment to strengthen the economic and social rights of informal workers can lead to improved capabilities, thereby reducing income inequality. [Kabeer \(2005\)](#) reinforces this idea by emphasizing that policy interventions that increase access to education and vocational training are crucial to providing informal workers with the means to improve their living conditions. Similarly, the theory of economic duality, introduced by [Lewis \(1954\)](#), illustrates how the separation between a modern and an informal sector can lead to growing inequalities. [Lewis \(1954\)](#) explains that workers in the informal sector lack opportunities for professional development and are often condemned to precarious, low-paid jobs. This separation highlights the need for strong political commitment to promote the integration of the formal and informal sectors, fostering inclusive growth that would benefit all segments of society. On an institutional level, the theories of Institutions developed by [North \(1992\)](#) emphasize that strong institutions are essential for a functional and inclusive economy. [North \(1992\)](#) argues that weak institutions in Africa contribute to the persistence of the informal economy and exacerbate income inequality. This analysis highlights the importance of a political commitment to strengthen institutions to regulate the informal sector, thereby promoting a more equitable redistribution of resources, as suggested by [Robinson & Acemoglu \(2012\)](#). Finally, the theory of human capital, largely developed by [Becker \(1964\)](#), emphasizes the importance of education and skills in improving incomes. Researchers, such as [Lazear \(2004\)](#), have shown that investment in human capital is a key driver for reducing income inequality. Therefore, a policy commitment focused on the education and training of informal workers can create opportunities for social mobility and higher incomes.

At the same time, empirical research is constantly evolving. In Africa, several

studies highlight the close links between the informal economy and socio-economic instability. For example, a study conducted by [Etim & Daramola \(2020\)](#) in Nigeria identifies major determinants of informal sector participation, such as economic instability, lack of social protection, and regulatory gaps. In this regard, [Svensson \(2021\)](#) in Kenya reveals through interviews that informality aggravates income inequality due to insufficient regulation. Workers interviewed suggest that proactive policies, such as access to finance and training programs, are crucial to improving their living conditions. Other studies highlight the impact of government policies on the informal economy. At the same time, [Oualy \(2024\)](#) shows that political instability contributes to the expansion of the informal economy, further aggravating income inequality in sub-Saharan African countries ([El-bahnasawy et al., 2016](#)). Informal workers' perceptions of government policies are also a key aspect. Finally, the study by [Wahyuningrum & Aisyah \(2023\)](#) reveals that workers often feel that these policies do not meet their real needs, thus contributing to persistent inequalities.

In Europe, research also highlights the complex interactions between informality and inequality. [Schneider \(2015\)](#) examines the impact of the size of the informal sector within the European Union, revealing that countries with larger informal economies have greater income inequality. Another study conducted by [Gimpelson & Kapeliushnikov \(2015\)](#) in Russia indicates that rigid labor market regulations can push some workers into informality, thus exacerbating inequality. The economic crisis has also had a significant effect on the growth of the informal economy in southern European countries. [Fossati and Cleasby \(2020\)](#) show that individuals in Spain and Italy resort to informality due to the lack of formal employment opportunities. The lack of adequate social protections for informal workers accentuates socioeconomic inequalities and calls for a re-examination of social policies to better support them ([Mumtaz, 2022](#)). Finally, studies on political engagement highlight the importance of institutions in regulating the informal economy. [Swain et al. \(2022\)](#) show that transparent and accountable governments are associated with smaller informal sectors. On the other hand, corruption and a lack of trust in institutions promote the prosperity of the informal economy. The study by [Dellas et al. \(2024\)](#) in Greece reveals that higher tax rates may encourage individuals to migrate to the informal economy due to the perceived excessive tax burden.

While previous studies have provided valuable insight into the dynamics between the informal economy, income inequality, and political engagement, they have some limitations. Many of them focus on specific national contexts without taking into account regional variations within African countries, which can influence outcomes and possible solutions. This research therefore aims to fill these gaps by providing a more nuanced analysis of the interactions between the informal economy and income inequality, while examining the critical impact of political engagement at different local levels, in order to offer recommendations tailored to African realities.

3. Data and Econometric Model

3.1. Data Sources and Variables

The data used in this study are from secondary sources and are mainly drawn from the World Development Indicators 2020 for socio-economic indicators. Data on the informal economy and employment from ILOSTAT. The study covers 32 African countries over the period 1995-2018. This choice is motivated by the availability of data for all the countries in the sample. For a better description of the variables, see **Table 1**.

Table 1. Description of the variables.

Variables	Description	Spring
LnShadow	Proportion of informal employment in total employment (%)	ILOSTAT data
EAPUTIC	Efficiency of public administrations in the use of ICT (%)	Authos ¹
Inequality	Inequality	
LnConsme	Consumer spending (% of GDP)	
Depensesn	Nominal expenditure (% of GDP)	
RNA	Adjusted national income (% of GDP)	
LnInternet	Internet (% of GDP)	WDI ² (2023)
LnPOP	Logarithm of population	
GFCF	Gross fixed capital formation (% of GDP)	
IDE	Foreign direct investment, net inflows (% of GDP)	

Source: Authors. ¹Based on IAG data; ²World Development Indicators.

For the variables used in the study, they are either endogenous or exogenous. The endogenous variable of our model is materialized by the variable “Inequality” which is an indicator taken from the WDI. In the context of this econometric study, it represents the level of economic inequality within the sample of data analyzed. This variable is an important measure in socio-economic studies because it can have a significant impact on many aspects of society, such as economic growth, social stability, and public health. Analysis of this variable can help to better understand the distribution of resources, access to economic opportunities, and the social implications of these disparities. By examining this variable in relation to other economic and social factors in our research, it will provide a better understanding of the complex dynamics that govern inequalities within a society and thus formulate more effective policies to promote equity and social justice. Inequality was measured mainly using the Gini index, which is widely recognised for its ability to provide a consistent and comparable assessment of income inequality between different countries. We ensured the consistency of the data by using reliable sources and checking the comparability of the indicators across the countries studied.

The exogenous variables are essentially made up of the Shadow variable, which measures the size and extent of the informal sector in the economy, and several other variables, namely: the log of consumer expenditure (LnConsme), nominal expenditure (Depensesn), adjusted national income (RNA), the log number of internet users (LnInternet) and the log population (LnPOP).

3.2. Econometric Model and Estimation Techniques

3.2.1. Econometric Model

The objective of this study is to investigate the relationship between the informal economy and income inequality in Africa. We assume that the larger the informal sector in an economy, the more inequality grows.

$$\text{Inequality}_{it} = \alpha_0 + \beta_1 \text{Shadow}_{it} + \delta_i X_{it} + u_i + v_t + \varepsilon_{it} \quad (1)$$

where u_i is the specific effect not observed in each country, v_t is the time-specific effect, ε_{it} is the error term and X_{it} is the vector of the control variables as shown in **Table 1**. To take into account the role of the state's political will (measured here by the Public Administration Efficiency Index (EFFAPU)) as a transmission channel in the relationship between the informal sector and inequality, we have defined the Shadow * EFFAPU interaction variable in the following model with the interaction variables (see **Table 1**):

$$\begin{aligned} \text{Inequality}_{it} = & \alpha_0 + \beta_1 \text{Shadow}_{it} + \beta_2 \text{EFFAU}_{it} + \beta_3 \text{Shadow}_{it} * \text{EFFAPU} \\ & + \delta_i X_{it} + u_i + v_t + \varepsilon_{it} \end{aligned} \quad (2)$$

3.2.2. Estimation Techniques

The generalized least squares method (FGLS) is an estimation technique that allows for heteroscedasticity and correlation between units of observation in panel data (Mouelhi & Goaid, 2001; Daba, 2021). This method involves applying a transformation to the data to make the errors homoscedastic and uncorrelated, and then estimating the model using the ordinary least squares (OLS) method on the transformed data. The FGLS method has several advantages over the MCO method for analysing the effects of the size of the informal economy on inequality (Jemisa, 2019).

First of all, the FGLS method allows to obtain more efficient estimators than the MCO method, i.e., they have a lower variance and are therefore closer to the true parameters. Indeed, the FGLS method uses the information contained in the variance-covariance structure of errors to optimally weight observations, which reduces bias and root mean square error of estimators (Wooldridge, 2002).

Secondly, the FGLS method allows more general hypotheses about the fixed or random effects of units of observation to be tested, using specification tests such as the Hausman test or the Breusch-Pagan test. These tests make it possible to check whether or not the individual effects are correlated with the explanatory variables, and whether or not the variance of the errors is constant between the units of observation. These tests are important in choosing the most appropriate model and avoiding problems of endogeneity or omission of variables (Baltagi &

Maasoumi, 2013; Baltagi & Baltagi, 2021). Finally, the FGLS method makes it possible to take into account the cross-sectional dependence between the observation units, i.e., the correlation of errors between the different countries in the panel. This cross-cutting dependence may be due to common shocks, spillovers, or strategic interactions between countries. If not taken into account, it can lead to an underestimation of the variance of the estimators and an overestimation of the statistical significance of the coefficients. The FGLS method corrects this problem by using robust variance-covariance estimators of errors, which take into account the cross-sectional dependence structure (Driscoll & Kraay, 1998; Pesaran & Chudik, 2013; Pesaran, 2021).

Thus, the FGLS method is a suitable estimation technique for the analysis of the effects of the size of the informal economy on inequality, as it allows to address the problems of heteroscedasticity, correlation and cross-sectional dependence that can affect the validity and efficiency of estimators.

4. Results and Interpretations

4.1. Preliminary Test Results

4.1.1. Post-Estimation Tests

The aim here is to present in this section the test of normality of coefficients, the test of autocorrelation of errors, the test of multicollinearity and the test of heteroscedasticity. The normality test of the Jarque-Bera coefficients (Bera & Jarque, 1981) is built on the Kurtosis and Skewness estimators from which the normality of a random variable is judged. Kurtosis measures the flattening of a distribution compared to the normal distribution. A high kurtosis coefficient indicates a sharper, concentrated distribution around its mean, while a low kurtosis coefficient indicates thicker tails and a more uniform concentration around the mean. Skewness, on the other hand, measures the asymmetry of a normal distribution. A positive skewness coefficient indicates a skew on the right, while a negative skewness indicates a skew on the left. If the kurtosis and skewness values are close to zero, it suggests that the data are close to a normal distribution. In contrast, values that are significantly different from zero may indicate a distribution that does not conform to normality. (See **Figure 1(a)**)

Since our study uses time series data, it is necessary to approach their manipulation with caution in order to obtain BLUE (Best Linear Unbias Estimator) estimators by suitable methods. According to our results, the F-statistic is 0.087 with a p-value of 0.7698. However, when the p-value is above a 5% materiality level, the null hypothesis that there is no first-order autocorrelation in the data cannot be rejected. So in this case, we can conclude that there is no first-order autocorrelation in our panel data. (See **Figure 1(b)**)

The multicollinearity test makes it possible to know if the explanatory variables are strongly correlated with each other. This correlation can be highlighted from the correlation matrix. If the partial correlation coefficient between two explanatory variables is close to 1, we will say that there is a risk of multicollinearity. Gen-

erally, the VIF (Variance Inflation Factor) is used, which is compared to 10 or 5, to detect a possible multicollinearity. The results of the multicollinearity test show that all variables have VIF values less than 5, indicating that there are no significant multicollinearity issues between the variables. In addition, the mean of the VIFs is 1.21, which also confirms the absence of significant multicollinearity in the model. (See **Figure 1(c)**)

Skewness and kurtosis tests for normality

Variable	Obs	Pr(skewness)	Pr(kurtosis)	— Joint test —	
				Adj chi2(2)	Prob>chi2
res	571	0.0000	0.0000	105.14	0.0000

(a)

Wooldridge test for autocorrelation in panel data

H0: no first order autocorrelation

$$F(1, 31) = 0.087$$

$$\text{Prob} > F = 0.7698$$

(b)

. estat vif

Variable	VIF	1/VIF
LNConsme	1.42	0.705343
RNA	1.28	0.779074
depensesn	1.26	0.793271
LNPOP	1.21	0.823352
LNInternet	1.16	0.862563
shadow	1.10	0.909806
Inflation	1.02	0.976071
Mean VIF	1.21	

(c)

Source: Authors.

Figure 1. (a) Normality; (b) autocorrelation; (c) multicollinearity.

4.1.2. Descriptive Statistics

Table 2 presents descriptive statistics for the variables used in the study, such as mean, standard deviation, minimum and maximum. It can be observed that the variable Inequality, which represents inequality, has a mean of 0.434 with a standard deviation of 0.087. This suggests some variability in the levels of inequality between the countries studied. In addition, the Shadow variable, which measures the level of informal employment, has an average of 35,428 with a standard deviation of 11,442. This indicates that the informal sector is relatively large in the countries studied. Other variables such as after-tax income (RNA), consumption (LnConsme), expenditure (Depensesn), inflation, internet access and population also have different means and standard deviations, indicating diversity in the characteristics of the countries studied.

4.1.3. Correlation Matrix

Table 3 presents the matrix of correlations between the variables used in the

Table 2. Descriptive statistics.

Variables	Obs	Mean	Std. Dev.	Min	Max
Inequality	728	0.434	0.087	0.283	0.799
Shadow	768	35.428	11.442	12.02	71.95
RNA	768	-87.548	861.242	-11,284.669	199.215
LnConsme	768	1.565	1.483	-0.97	12.259
Depensesn	642	1.668	1.24	-5.174	6.562
Inflation	768	9.362	37.85	-61.748	541.909
LnInternet	742	0.163	2.591	-9.131	4.088
LnPOP	760	0.85	0.553	-3.166	2.811

Source: Authors.

Table 3. Correlation matrix.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Inequality	1.000							
(2) Shadow	0.143	1.000						
(3) RNA	-0.348	-0.008	1.000					
(4) Depensesn	0.194	-0.208	0.102	1.000				
(5) LnConsme	0.527	0.125	-0.426	0.134	1.000			
(6) Inflation	-0.137	-0.020	0.007	-0.029	-0.018	1.000		
(7) LnInternet	-0.257	-0.128	0.123	0.072	-0.288	-0.138	1.000	
(8) LnPOP	-0.081	0.178	-0.135	-0.373	0.024	0.032	-0.178	1.000

Source: Authors.

study. It measures the degree of linear relationship between two variables. The correlation coefficients vary between -1 and 1 , where -1 indicates a perfect negative correlation, 0 indicates no correlation, and 1 indicates a perfect positive correlation.

It can be observed that the variable Inequality (inequality) is positively and significantly correlated with the variable Shadow (informal employment), suggesting that the higher the informal employment, the greater the inequality. It can also be noted that the variable Inequality is negatively and significantly correlated with the LnInternet variable, which implies that the lower the use of the Internet, the higher the inequality. The other variables show variable correlations, with higher or lower coefficients and positive or negative signs. For example, the variable Shadow (level of informal employment) has a positive low correlation with expenditure, while the variable Inflation has weak correlations with all other variables.

4.1.4. Cross-Sectional Dependency Test

Table 4 presents the results of the cross-dependence test (CD-test) for the differ-

ent variables used in the study. This test makes it possible to check whether the observations of the countries are independent of each other or whether they are affected by common shocks. The cross-dependence test is based on the calculation of the average correlation between countries, as well as the absolute value of this correlation. The higher the correlation, the more cross-dependence there is between countries. **Table 4** shows that most variables have a p-value of less than 0.05, which means that the cross-dependence test is significant and the null hypothesis of cross-independence is rejected. This implies that these variables are more country-specific and less influenced by common shocks.

Table 4. Cross-sectional dependency test.

Variables	CD-test	p-value	corr	abs (corr)
Inequality	3.030	0.002	0.030	0.283
Shadow	16.520	0.000	0.212	0.571
RNA	3.140	0.002	0.034	0.296
Depensesn	9.050	0.000	0.103	0.564
LnConsme	2.950	0.003	0.030	0.260
Inflation	23.430	0.000	0.294	0.447
GFCF	6.740	0.000	0.066	0.385
GDP	3.600	0.000	0.036	0.203
LnIDE	15.380	0.000	0.152	0.312
LnInternet	98.210	0.000	0.968	0.968
LnPOP	-0.970	0.033	-0.010	0.442

Source: Authors.

4.2. Economic Interpretation of the Results

In this section, we present the results of our empirical analysis of the effect of the informal sector on inequality in Africa. We use different estimation methods to account for the specifics of our data and the assumptions of our model. We also discuss the transmission channels through which the informal sector can be reduced, as well as the robustness of our results.

We begin by presenting the results of the ordinary least squares (OLS) estimation in **Table 5**. This method allows us to have a first idea of the relationship between the informal sector and inequality, by controlling for the usual explanatory variables. However, OLS results may be biased in the presence of heteroscedasticity, or cross-dependence. So we do tests to check the validity of these assumptions, and we find that some of them have been rejected. Therefore, we use the generalized least squares (GCS) method to correct these potential problems. The GCM results are presented in **Table 6**.

Then, we analyze the transmission channels of the informal sector's effect on inequality. We consider a possible channel: the role of political will captured here

Table 5. Effect of the informal sector on inequality: Estimated by the OLS.

VARIABLES	Inequality						
	1	2	3	4	5	6	7
Shadow	0.00920** (0.00372)	0.00893** (0.00353)	0.0134*** (0.00353)	0.00740** (0.00323)	0.00711** (0.00320)	0.00885*** (0.00311)	0.0111*** (0.00310)
RNA		-0.000386*** (4.52e-05)	-0.000410*** (4.43e-05)	-0.000200*** (4.27e-05)	-0.000199*** (4.24e-05)	-0.000228*** (4.55e-05)	-0.000246*** (4.51e-05)
Depensesn			0.164*** (0.0272)	0.108*** (0.0251)	0.105*** (0.0249)	0.141*** (0.0244)	0.111*** (0.0255)
LnConsme				0.365*** (0.0338)	0.366*** (0.0335)	0.312*** (0.0341)	0.302*** (0.0337)
Inflation					-0.00526*** (0.00157)	-0.00625*** (0.00155)	-0.00641*** (0.00153)
LnInternet						-0.0649*** (0.0153)	-0.0701*** (0.0154)
LnPOP							-0.184*** (0.0656)
Constant	1.468*** (0.139)	1.440*** (0.132)	1.017*** (0.147)	0.708*** (0.134)	0.757*** (0.134)	0.752*** (0.133)	0.874*** (0.144)
Observations	683	683	683	597	597	578	571
R-squared	0.009	0.105	0.150	0.321	0.333	0.365	0.378
F	6.133	39.78	39.95	69.83	59.09	54.82	48.79
Prob > F	0.0135	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Source: Authors; Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

by the public administration efficiency index. We are testing the impact of this channel on inequalities, as well as on its interaction with the informal sector. The results of this analysis are presented in **Table 6**. Finally, we check the robustness of our results using another estimation method: the Driscoll-Kraay and the addition of additional variables in the model. This method allows to take into account the cross-dependence between the units of the panel, while maintaining the efficiency of the MCOs. The results of the robustness analysis are presented in the last column of **Table 7**.

4.2.1. Interpretation of the Estimate by OLS

Table 5 presents the results of the ordinary least squares (OLS) estimate of the effect of the informal sector on inequality. The last column (7) is the most complete model, which includes all explanatory and control variables, as well as the variable of interest (Shadow), which represents the proportion of informal em-

ployment in total employment as a percentage. The effect of the Shadow variable on the Inequality variable is positive and significant at the 5% level. This means that the higher the level of informal employment, the more inequality is likely to increase.

The coefficient of 0.0111 indicates that if the proportion of informal employment increases by 1 percentage point, the level of inequality increases by 0.0111 points. Because OLS is sensitive to extreme observations that can significantly affect the slope and y-intercept of the regression line, if outliers are present in the data, they can bias the estimated coefficients.

4.2.2. Interpretation of the Estimate by the FGLS

Estimating the effect of the informal economy on generalized least-squares inequality gives us the results in **Table 6** below. The last column (10) presents the estimated coefficients for the Shadow variable (share of informal employment in total employment). The coefficient of 0.011 is positive and significant at the 5% level. This means that when the proportion of informal employment increases by one percentage unit, the level of inequality increases by 0.011 points. In other words, informal activities can contribute to the worsening of economic inequalities, as they are often unregulated and can benefit a small group of people. This result can be justified by several factors, such as the precariousness of jobs in the informal sector, the lack of social protection for informal workers, low wages and difficult working conditions. Researchers such as [De Soto \(1989\)](#) have studied the informal sector and its impact on inequality in depth, emphasizing in particular the importance of formalizing informal activities to reduce income disparities.

4.2.3. The Role of State's Political Will

As a continuation of our analysis, we sought to identify a mechanism that could mitigate the effects of the informal economy on inequality. We questioned the role of the state's political will, measured here by the Public Administration Efficiency Index (EFFAPU). The results (column 7) show that the effect of government efficiency on inequality is captured by the coefficient 0.0115, which is statistically positive and significant. This means that an increase in the efficiency of public administration is associated with a reduction in economic inequality, all else being equal. In other words, more efficient governments are likely to put in place social policies and programs that promote a more equitable distribution of income and economic resources. To further underline this dynamic, the interaction coefficient between the level of informal employment (shadow) and the efficiency of public administrations (EFAPU), represented by the coefficient -0.499 , reveals that the effect of informal employment on inequalities is inversely proportional to the efficiency of administrations. This indicates that improving the efficiency of public policies can mitigate the harmful effects of a large informal sector on economic inequality. For each unit increase in public efficiency, we observe a significant decrease in inequality. Moreover, this interaction highlights the importance of systematic reform within public administrations, where targeted

Table 6. Estimation of the effect of the informal sector on inequality by FGLS and the role of government efficiency.

Variables	Inequality							Role of government efficiency
	1	2	3	4	5	6	7	Inequality
Shadow	0.00920** (0.00371)	0.00893** (0.00353)	0.0134*** (0.00352)	0.00740** (0.00322)	0.00711** (0.00319)	0.00885*** (0.00309)	0.0111*** (0.00308)	0.0242*** (0.00582)
RNA		-0.000386*** (4.51e-05)	-0.000410*** (4.41e-05)	-0.000200*** (4.25e-05)	-0.000199*** (4.21e-05)	-0.000228*** (4.53e-05)	-0.000246*** (4.48e-05)	
Depensesn			0.164*** (0.0271)	0.108*** (0.0250)	0.105*** (0.0248)	0.141*** (0.0243)	0.111*** (0.0254)	
LnConsume				0.365*** (0.0337)	0.366*** (0.0334)	0.312*** (0.0339)	0.302*** (0.0334)	
Inflation					-0.00526*** (0.00156)	-0.00625*** (0.00154)	-0.00641*** (0.00152)	
LnInternet						-0.0649*** (0.0152)	-0.0701*** (0.0153)	
LnPOP							-0.184*** (0.0651)	
EFFAPU								0.0115*** (0.00329)
Shadow * EFFAPU								-0.499*** (0.154)
Constant	1.468*** (0.138)	1.440*** (0.132)	1.017*** (0.146)	0.708*** (0.134)	0.757*** (0.133)	0.752*** (0.132)	0.874*** (0.143)	3.992*** (0.846)
Observations	683	683	683	597	597	578	571	683
Number of ID	32	32	32	32	32	32	32	32
Chi ²	6.151	79.92	120.6	281.7	298.5	332.9	346.4	18.66
Prob > Chi ²	0.0131	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Source: Authors; Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

strategies can not only mitigate the impact of the informal economy, but also maximise the benefits of social programmes. For example, more efficient public administrations are better able to design and implement redistributive policies aimed at reducing income and wealth inequalities within the population. These policies can include social programmes, progressive tax systems and social protection mechanisms.

Thus, these results highlight the role of the state's political will in reducing economic inequality, and several factors may justify these results concerning the role of government efficiency in inequality. First, effective public administrations are better able to design, implement, and monitor redistributive policies aimed at reducing income and wealth inequality among the population. These policies include social programs, progressive tax systems, and social protection mechanisms. Second, effective public administrations can ensure a more equitable allocation of public resources, by investing in key sectors such as education, health and employment, which can help reduce socio-economic disparities. And finally, effective public administration is generally more transparent and accountable in the management of public affairs, which can reduce the scope for corruption and mismanagement, and thus promote a more equitable distribution of resources.

4.2.4. Robustness of Results

In order to strengthen the validity and reliability of our results, we performed robustness analyses using the Driscoll-Kraay method and added additional variables to the model. First, the Driscoll-Kraay method is an extension of the ordinary least squares (OLS) method that allows to efficiently correct the standard errors of the estimated coefficients in the presence of heteroscedasticity and autocorrelation, which allows for better modeling of the spatial relationships between observations, and leads to more accurate estimates of parameters while improving the statistical validity of the results. Moreover, it is relatively simple to implement and can be used in a variety of econometric models.

With regard to the addition of additional variables as robustness, it should be noted that they make it possible to strengthen the validity of the results by controlling the effects of the variables of interest more precisely and by reducing the possibility that omitted variables could bias the estimates. The results obtained from the analysis of the additional variables added (**Table 7**) to the robustness model using the Driscoll-Kraay method and FGLS suggest that various socio-economic factors influence inequality in a given society.

We have the GDP (growth) and LnIDE (foreign direct investment) variables which are positive and significant in relation to inequality. The variable GFCF (Gross Fixed Capital Formation), on the other hand, shows a negative relationship with inequality. These results highlight the importance of public policies in terms of investment and growth in promoting social equality between individuals. Despite the use of these new estimation methods, we note that all the results remain significant. This reinforces the validity of our conclusions.

5. Conclusion

The objective of this study was to analyze the effect of the size of the informal sector on economic inequality in Africa. We assumed that the larger the size of the informal sector in an economy, the higher the level of inequality. To test this hypothesis, we used secondary panel data for 32 African countries over the period 1995-2018 from the World Development Indicators, ILOSTAT and the World

Table 7. Robustness with additional variables (FGLS and Driscoll-Kraay estimation).

Variables	FGLS				Driscoll-Kraay	
	Inequality					
	1	2	3	4	5	6
Shadow	0.0111*** (0.00308)	0.0112*** (0.00307)	0.0115*** (0.00303)	0.0125*** (0.00308)	0.0125*** (0.00254)	0.0242*** (0.00412)
RNA	-0.000246*** (4.48e-05)	-0.000340*** (7.09e-05)	-0.000217*** (7.61e-05)	-0.000258*** (7.82e-05)	-0.000258** (0.000114)	
Depensesn	0.111*** (0.0254)	0.113*** (0.0253)	0.123*** (0.0251)	0.122*** (0.0252)	0.122*** (0.0246)	
LnConsme	0.302*** (0.0334)	0.304*** (0.0334)	0.298*** (0.0329)	0.293*** (0.0331)	0.293*** (0.0597)	
Inflation	-0.00641*** (0.00152)	-0.00640*** (0.00152)	-0.00589*** (0.00150)	-0.00608*** (0.00151)	-0.00608*** (0.00109)	
LnInternet	-0.0701*** (0.0153)	-0.0611*** (0.0161)	-0.0573*** (0.0159)	-0.0649*** (0.0164)	-0.0649*** (0.0134)	
LnPOP	-0.184*** (0.0651)	-0.165** (0.0659)	-0.182*** (0.0651)	-0.174*** (0.0657)	-0.174* (0.0973)	
Additional variables						
GFCF		-0.00732* (0.00429)	-0.00951** (0.00426)	-0.0148*** (0.00471)	-0.0148** (0.00712)	
GDP			0.0241*** (0.00588)	0.0236*** (0.00593)	0.0236** (0.00975)	
LnIDE				0.0661** (0.0280)	0.0661** (0.0309)	
Role of government efficiency						
EFFAPU						0.0115*** (0.00331)
Shadow * EFFAPU						-0.499*** (0.109)
Constant	0.874*** (0.143)	1.007*** (0.163)	0.920*** (0.162)	0.989*** (0.166)	0.989*** (0.197)	3.992*** (0.516)
Observations	571	571	571	553	553	683
Number of id	32	32	32	32	32	32
Chi ²	346.4	351.0	378.1	379.5		
Prob > Chi ²	0.0000	0.0000	0.0000	0.0000		
F					112.4	12.00
Prob > F					0.0000	0.0001

Source: Authors; Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Development Index. We estimate different econometric models using the Driscoll-Kraay method. The main findings of our analysis are as follows: the impact of the size of the informal sector on inequality in Africa is significant. The more preponderant the size of the informal sector, the more the level of inequality increases. This correlation can be justified by several factors, such as precarious jobs in the informal sector, lack of social protection for informal workers, low wages and difficult working conditions. On the other hand, the political will of the State, captured by the efficiency of public administrations, has a favorable effect on inequalities, and it contributes to reducing inequalities despite the presence of a large informal sector. In other words, more efficient governments are likely to put in place social policies and programs that promote a more equitable distribution of income and economic resources. Moreover, the interaction between the level of informal employment and the efficiency of public administration is also significant. This suggests that the effect of informal employment on inequality is modulated by the level of efficiency of public administrations. Improved efficiency of public administrations can mitigate the negative impact of informal employment on inequality. Based on these findings, we make the following economic policy recommendations for African governments: Promote the formalization of the informal economy through simple initiatives by facilitating access to social protection and public services for informal sector actors and simplifying administrative and fiscal procedures. Second, governments need to strengthen the use of ICTs in public administrations to make them more effective. Efficient public administrations can help mitigate the negative effects of the informal economy on inequality by promoting more transparent, efficient and controllable processes.

6. Limitations of the Study

It is important to recognise certain limitations of our study. For example, variables that could have a significant impact on inequality, such as education, access to financial services and political stability, were not taken into account in our analysis. These variables could enrich our understanding of the dynamics at work and offer additional insights into the relationship between the informal sector and economic inequality. We therefore encourage future research to explore these unaccounted-for dimensions, which would allow us to reflect more deeply on the public policies to be implemented and assess their overall effectiveness. In addition, a more detailed regional analysis could also highlight specific local features and solutions adapted to national or regional contexts.

Ethical Approval

This article does not contain any studies with human participants.

Availability of Data and Material

The data used is available on request.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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