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The influence of institutional quality on income inequality in sub-Saharan Africa

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Abstract

The rising rate of income inequality is becoming a disturbing problem globally. Despite efforts in evaluating the influence of various factors affecting inequality, the problem still persists. The situation in the sub Saharan Africa is by far more worrisome than any other part of the globe. There is growing interest within economic literature lately of how institutional quality play some vital roles in affecting development. On this note, the current paper aims to render some contributions to the literature on the influence of institutional quality on income inequality in the sub-Saharan African (SSA) countries. To achieve the above objective, this study uses data from the World Income Inequality Database (WIID), International Country Risk Guide (ICRG) and World Development Indicators from 27 sub-Saharan African countries; for the period of 1990 to 2018. Having established the existence of cross-sectional dependence (CSD), it also employs the Pooled Ordinary Least Squares (Pooled OLS) from the Driscoll-Kraay standard errors to estimate the equation. The findings reveal that, in general terms improvement in the level of corruption, government stability and democratic accountability will go a long way in reducing income inequality in the SSA countries. On the other hand law and order tends to increase inequality in the selected countries. Hence, all hands

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must be on deck especially within the government circle in order to ensure that institutional indicators are strengthened in order to provide the required support to the low income earners towards reducing inequality. Where institutional reforms become necessary, such should be done with caution in order not to afflict more hardship to the citizens, thereby leading to widening inequality situation.

The current study contributes to the literature by deviating from the traditional practice and being the first to determine the influence of institutional quality on income inequality in the SSA within the context of cross-sectional dependence. Hence, it employs the second generation estimation techniques that are robust to CSD.

Key words: Institutional quality; income inequality; sub-Saharan Africa; Cross-sectional dependence

BACKGROUND

Within the context of modern day economics, strong arguments are prevailing as to how indicators of equality and income distribution are vital within the context of socio-economic dimension in any economy (Le et al., 2020). Thus, the situation of rising and widening rate of inequality within various economies remains a serious area that is gaining widespread concern among policy-makers and researchers alike (Anyanwu, 2016). Achieving reduced level of inequality presently constitute a significant challenge among development partners and other global leaders (Kunawotor et al., 2020); especially towards attaining goal number 10 as enshrined in the sustainable development goals (SDGs) (see, Sarkodie and Adams, 2020; Kanbur, 2021). Hence, as widening inequality indicates continuous disadvantage for a certain class of individuals within as well as among economies (Zhang and Churchill, 2020), efforts towards reducing such widening situation remains cardinal.

Meanwhile, high and persistent nature of inequality has terrible consequences for socio-economic and political stability that may lead to unimaginable social disorder (Jauch and Watzka, 2016; Pickett and Wilkinson, 2015). Similarly, increasing level of inequality creates inefficiency and under-productivity of labour and other factors of production (Stiglitz, 2015). This further undermines the bulk of investment and expenditure in the areas of education and

infrastructural requirements (Simplice Asongu & Odhiambo, 2021; Cojocaru & Diagne, 2014). Essentially also, it is on record that around 50% of the Sub Saharan African (SSA) countries may not attain some of the Millennium Development Goals (MDGs) especially the poverty reduction target due to the rising nature of inequality (Asongu et al., 2019).

On this, Fosu (2015) and Shimeles & Nabassaga (2018) argued that meaningful poverty reduction may remain a mirage despite a better level of economic growth unless a corresponding reduction in inequality is achieved. Despite the increasing nature of income inequality within most of the countries; whether developed economies, emerging or developing economies, there seems to be lack of consensus as to what actually are its causes. Nonetheless, there is a rising attention especially in development literature on how institutional quality influence developmental process and status. Thus, leading to similar attention of institutional influence on income inequality as well.

However, there are contradictory views regarding such institutional quality and inequality relationship. Looking at the aspect of corruption for example, a well-known organisation-Transparency International- has in one of its reports classified countries like Denmark, Finland, New Zealand and Iceland as those with good and least level of corruption (Chong & Gradstein, 2007). Such countries recorded clean corruption results of around 95%, while countries like Nigeria, and Haiti recorded a disturbing score of as low as around 15%.

Aside, disturbing records of corruption in such developing economies, other indicators of institutions such as government stability, bureaucratic quality, democratic accountability, law and order are also discouraging. Thus, as a result of the harmful effects of poor institutions on inequality, countries with low level quality of institutions are more related to high level of inequality. Such detrimental influence of weak institutions on inequality has been well documented (Chong & Calderón, 2000; Chong & Gradstein, 2007). Having weak institutional arrangement can lead to high corruption level, among other; thereby making beneficiaries of tax evasion and unwarranted tax exemption for example, to be those associated to the wealthy elites (Andres & Ramlogan-Dobson, 2011a). By this, most of the tax burden from such an arrangement goes to the poor. Thus, in

order to reduce regional inequalities, scholars within economic circle are of the agreement that ensuring the achievement of credible institutional structures should be part of those measures for regional development.

Thus, evaluating such a region is of great importance especially in the present day where cross-sectional dependence becomes prominent and relevance among global economies. Despite many studies in the aspect of institutional quality and its influence on income inequality in various regions of the world, there are very few or none in the SSA region. Similarly, the structure of inequality in Africa as a whole (SSA inclusive) remains high and unacceptably persistent (Asongu et al., 2019; Shimeles and Nabassaga 2018;Kunawotor et al., 2020). Furthermore, the United Nations Development Programme (2017) maintain that of all 19 countries with the highest record of inequality globally, 10 are in the SSA region. Similarly, the Gini coefficient showing inequality status of SSA stands at 0.43, making it the highest among other regions of developing world, signifying extreme level of inequality within the sub-region (Bhorat et al., 2016). On this note, this study tries to contribute in extending the existing literature by employing the second generation estimation technique of Driscoll and Kraay (1998) standard error model as extended by Hoechle (2007) which remains robust to cross sectional dependence to determine the influence of institutional quality on income inequality.

Following the introduction, the rest of the paper is structured as follows; the literature review regarding the relationship between institutional quality and income inequality is in the next section. The theoretical model and data are presented in section 3. Section 4 presents the empirical estimation results with discussions of the results.

LITERATURE REVIEW

Theoretical Review

There are various theoretical perspectives that try to connect various economic determinants and income inequality. This dates back to the efforts of Kuznets (1955) that offered an 'inverted-U shaped' connection describing the relationship between a nation's average level of growth and the existing level of income inequality; showing

that at an early stage of development, interaction between market forces results to rise of income inequality and subsequent fall as time goes by. Aside growth and income level as determinants of inequality, other aspects of determinants within theoretical provisions have also been put forward (Barrios et al., 2006). These include human proficiency, institutional features, elimination of regulatory or any legal restrictions, and obstacles towards technological adoption.

Lately, the "institutionalist or the bureaucratic dimension" is gradually becoming prominent in explaining the occurrence of inequality (Moller et al., 2009). This is apart from the accepted role played by resource-endowments and that of functionalist perceptions in determining inequality. Numerous theoretical perspectives regarding the functions of government in any societal structures have agreed that, dissemination of power defines how distributional outcomes are achieved; either directly by market forces, or indirectly by agencies of the state especially in civil society. The general opinion therefore is that, power either from political or certain talents can have asymmetric outcome. Such an arrangement can lead to wider abnormalities in income distribution which in turn favours the wealthy or the highly-connected individuals within the society.

The emergence of the "New Institutional Economy" has led to more pressure towards exploring the influence of institutional framework on inequalities, whose theoretical lineage extends up to the point of seminal work by (Engerman & Sokoloff, 1994). Subsequently, Acemoglu & Robinson (2012) advanced an institutional theory regarding international variations in income founded on the impression that colonial authorities installed various institutions within those colonies under their control. According to such a theory, the primary industries specialising in extractive activities alongside required institutions were created by settlers when there are unfavourable conditions. However, when the situations become conducive, they create some settlements that accommodate both, non-extractive opportunities and general institutions, that permitted them to travel in mass.

Accordingly, North (1991) asserts that, "institutions are those rules of games in any society". They signify constraints that regulate human interactions. Hence, going by the neo-institutionalist hypothesis which is designed around a macroeconomic dimension, that explores the significance of institutions (Aoki, 1996), as well as

micro-economic dimension, which covers how they are structured (Cherrier & Saïdi, 2019); have led to the advent of double antagonistic ideas of institutions and inequality nexus. The first dimension is the optimist class that visualise basic highpoints regarding how institutions ensure the reduction of transaction costs and warranting tyranny-free negotiations. They further uphold drives in human interactions, ensure the protection of stipulated property rights, promote entrepreneurial accomplishments, and contributing to productive inventions towards reduction of inequalities (Dobson & Ramlogan-Dobson, 2010).

For the pessimistic ideology, the basic vision is towards the notion of negative pressure of institutions to inequality. Centrally, the impression is that poor institutions tend to intensify the level of socio-economic uncertainties and discrepancies. Such declarations have cleared any doubt regarding the significance of such a relationship, indicating that inequalities experienced in many countries are arising not only from economic dynamics but also other meso-economic causes like institutional quality. Similarly, a vital economic challenge of any society is to apply the available scarce knowledge efficiently. The first contention of efficient knowledge is to ensure reduction on inequality, although in many circumstances the potentials of knowledge may likely lead to increase in inequality (Cherrier & Saïdi, 2019).

Empirical Review

It is conventionally believed that "poor institutional quality" has a negative influence on the nature of income inequality. However, the studies relating to such aspect of institutional quality and inequality nexus remain inconclusive while the outcome tend to be mixed. By this therefore, positive, negative as well as no-significant influence on the income inequality have been reported.

On this regard, many studies have established a direct and positive relationship between institutional arrangements and the level of income inequality. Among such, Andres & Ramlogan-Dobson (2011) maintained that, the level of corruption, for instance, can modify the structure of social-spending towards being beneficial to the rich-elite, while compromising the needs of the poor; resulting to higher inequality situation.

In contributing to the debate of institution-inequality relationship also, Sulemana & Kpienbaareh (2018) carried out a panel study for 21 years (i.e. from 1996) covering 48 SSA countries. Utilising panel data techniques of analysis, the study reported corruption as a cause of income inequality within the countries of study. In this line also, Chong & Gradstein (2007) employing a dynamic panel estimation technique of "system-GMM" on series of 121 countries from different stages of development for the period of 1960-2000. Their findings disclosed that fragile institutional quality results to higher level of income inequality.

The above result is similarly related to the findings of Gyimah-Brempong (2002), who applied dynamic panel estimation technique to examine the impact of corruption level on income inequality among certain African countries. The study showed that rising level of corruption tends to be positively associated with rising level of income inequality. Similarly, Gyimah-Brempong & de Camacho (2006) indicated that the 'deteriorating' dimension of corruption being experienced mostly in Africa and Latin-America tends to be more 'deleterious' in affecting income distribution pattern, especially when compared to the perceived 'developmental-type' of corruption experienced in Asia. Likewise, Berisha et al. (2018) maintained that corruption intensifies the level of income inequality. Similarly, Ben & Zribi (2014) maintain that poor governance status intensifies the level of inequalities especially within developing economies.

On the other hand, Andres and Ramlogan-Dobson (2011) provide new proof on the corruption and income inequality nexus after employing a panel data method of analysis on data from Latin America. The study found that lower level of corruption relates to more income inequality in the sample utilised. Also, Dobson & Ramlogan-Dobson (2010) carried a study the within Latin America for 19 economies from 1984-2003. Utilising panel data in a four-year structure, the findings revealed that an inverse relationship exist between corruption and inequality within the sampled countries.

Furthermore, Perera & Lee (2013) utilised a panel data estimation technique of GMM to examine the possible effects of institutional quality on income inequality. The study used nine developing economies within Asia covering the period of 1985–2009. Their findings showed that improvements in some indicators of

corruption, democratic accountability, and bureaucratic quality tend to be linked with a deteriorating income distribution level. Similarly, Ortiz (2015) established an inverse relationship between some indicators of institutional quality and income inequalities. The institutional indicators are in the form of multi-party political setting, political accountability, institutional restructurings, and the tendency of elected representatives to listen to side-lined voters.

Few studies have also reported a negative relationship with of other measures of institutions. Among them for example, Ahmad (2016) found democracy to have an indirect and also negative influence on inequality. This finding goes in line with Amendola et al. (2013) who also submitted similar outcome of an indirect but also negative influence through economic liberalization of democratic structures on inequality.

The last alternative component of studies comprise of those that report insignificant influence of institutional quality on inequality. For example, in their study, Perera & Lee (2013) found the institutional indicators of government stability as well as law and order to be insignificant statistically in influencing income inequality. Other studies within this class include that of (Policardo & Carrera, 2018) who also reported an insignificant effect on inequality by institutional quality; it also tallies with the findings of (Fakir et al., 2017).

A critical review of available literature shows that the empirical evidence within the institutions–inequality nexus remains mixed; thus, drawing a standard and generalised conclusion may remain an impossibility on the influence of institutional quality on the income inequality. Furthermore, previous studies that tend to evaluate the "institutions–income inequality" nexus employed various available data from numerous countries across different regions, with very few of them focusing on the SSA region in particular despite the pressing need of such studies.

3.0 METHODOLOGY AND DATA

3.1 Empirical model connecting income inequality to institutions

The following model specification will be estimated for the current study:

$$G_{it} = \beta_0 + \beta_1 INST_{it} + \beta_2 LogGDPPCC_{it} + \beta_3 FD_{it} + \mu_{it} \quad (3.1)$$

where G_{it} represents the Gini coefficient which measures income inequality in any country *i*. This is a standard indicator of income inequality. INST represents the explanatory variables which captures our main variables of interest and are signified by corruption (CORR), law and order (LO), bureaucratic quality (BQ), government stability (GS), and democratic accountability (DA). Additionally, LogGDPPCC denotes the log of GDP per capita, and FD is financial development. Similarly, **β**'s represent parameters of the intercept and slope coefficients, respectively. μ_{it} is the stochastic term, which depicts the influence of those variables which are not taken care of in the model; *i* denotes the cross-section (i.e. the countries), while *t* denotes the time-series (annual). The study uses data from 27 sub-Saharan African countries (i.e. n = 27), and covers the period of 1990 to 2018 (i.e. T = 29). Employing the Driscoll and Kraay standard errors technique to evaluate the relationship between G_{it}, **INST, LogGDPPCC**, and **FD**.

The data on the dependent variable, which is income inequality (i.e. Gini) is sourced from the "United Nations University's (UNU-WIDER) World Income Inequality Database" (WIID) i.e. (UNU-WIDER, 2021). This data version was released in March 2021 and is an improvement on the previous older versions of the WIID. Being the most commonly obtainable data due to restriction, the Gini coefficients employed in this study are based on income inequality only which portrays income distribution within a country.

For the data on our variables of interest, the explanatory variables; that is the institutional quality, INST (i.e. CORR, BQ, GS, DA and LO), were obtained from the "Political Risk Services' International Country Risk Guide" (ICRG) dataset. The five different measures of institutions utilised in this study were also used in Perera and Lee's (2013), and Chong and Gradstein's (2007) study, which accordingly were also sourced from the "Political Risk Services' ICRG dataset (i.e. Political Risk Services Group). The lowest amount of grades that can be earned in all five institutional measures is zero. Hence for all such institutional indices, an improved level of institutional quality is represented by a higher grade, while a poor institutional quality is represented by a lower mark. Table 1 below provides the summary of description, measurement and the various sources of data for all the variables used in this study.

Table 1
Description of variables

Variable	Description	Measurement	Sources
G	Gini Coefficient	The "Gini coefficient" gives the measure of income inequality. The values range from 0 to a 100; such that greater values entails higher level of inequality.	United Nations University's (UNU-WIDER, 2021)
CORR	Corruption	It reflects the level of corruption within the political circle. It is the degree to which government officials are likely to demand illegal payments. (Highest score: 6 points).	International Country Risk Guide" (ICRG) dataset.
BQ	Bureaucratic Quality	Bureaucratic Quality evaluates the strength and capability of the bureaucratic setting "towards administering without extreme changes in policy or harsh disturbances in government services". Good scores indicate that "bureaucracy is fairly independent from political pressure". (Highest score: 4 points).	International Country Risk Guide" (ICRG) dataset
GS	Government Stability	Government Stability gives an assessment of both the "government's capability to execute its declared program(s), and its ability to stay in office". (Highest score: 12 points). Thus, "12 points is "Very Low Risk" and "0 points to Very High Risk".	International Country Risk Guide" (ICRG) dataset
DA	Democratic Accountability	Democratic Accountability gives an evaluation of how credible/well the existing government responds to its citizens. (Highest score: 6 points)	International Country Risk Guide" (ICRG) dataset
LO	Law and Order	"Law and Order" constitute a single element with two components evaluated separately. "The strength and impartiality" of the legal structure are assessed by "the Law" element, while "Order" evaluates the popular observance of the law. (Highest score: 6 points).	International Country Risk Guide" (ICRG) dataset
GDPPCC	GDP per Capita	The GDP per capita measures the gross domestic product divided by mid-year population. It is the "annual percentage growth rate of GDP per capita based on constant local currency with aggregates using constant 2010 US dollars".	WDI
FD	Financial Development	This is measured by the "domestic credit by financial institutions to private sector". FD is measured as a percentage of GDP.	WDI

3.2 Estimation Techniques

3.3 Cross-sectional Dependency Test

It is imperative to check the issue of cross-sectional dependence (CSD) as the starting point before choosing the remaining suitable methods necessary. The CSD makes that residuals to seen as not cross-correlated and having zero error covariance which is an important element in panel data integration determination. In this regard, Chang (2002) upheld that when such an assumption is not satisfied, the resulting distributions of such panel unit root tests may be misleading. On this basis, as stated in Cerrato (2001) , different elements that include cases of common shocks or problems of model misspecification may be the causes of CSD. Hence, attempting to overlook the presence of CSD in the series may lead to great unreliable results (Pesaran, 2021; Breusch & Pagan, 1980).

3.4 Panel Unit Root Test

At this stage of analysis, it is essential to carry out the unit root test among the variables for this study which sets the stage for the next point of empirical investigation. In this regard, various tests have been provided by the literature for checking stationarity. However with the confirmation of CSD, the second generation panel unit root test becomes preferred to the conventional test due to its robust to CSD and heterogeneity (Salahuddin et al., 2015). Hence, this study employs the two sets of unit root test as advanced by Pesaran (2007) and Breitung & Das (2005) which are robust to heterogeneity and CSD. The technique of Pesaran (2007) test to check for stationarity properties is defined as:

$$\mathbf{CIPS(N,T)} = \mathbf{N^{-1}} \sum_{\mathbf{i=1}}^{\mathbf{N}} \mathbf{t_1\,(N,T)} \qquad \mathbf{3.1}$$

where $t_i(N,T)$ denotes the CSD 'augmented Dickey~Fuller' statistic for the ith cross-section unit.

3.5 Panel Cointegration Analysis

Just like the case of unit root tests in any first-generation tests regarding panel data, the cointegration technique within first-generation may not also take account of CSD issue in panel analysis. Thus, the Westerlund (2007) panel cointegration test is accepted to be robust in dealing with the issue of CSD for panel data, which can be specifically employed to examine the long-run relationship between the variables. To check for CSD, the probability values are projected from the test statistics using bootstrapping techniques. A total of two-fold group mean estimations as well as two-panel tests are also carried out under the null hypothesis which states the absence of cointegration; while on the contrary, the alternate hypothesis shows the presence of cointegration among a minimum of one cross-sectional element or possible cointegration within the entire panel, respectively. Hence, the structure of Westerlund (2007) tests can be expressed as follows:

$$\boldsymbol{\Delta Y_{it}} = \boldsymbol{\vartheta_i' d_t} + \boldsymbol{\alpha_i}\left(\boldsymbol{Y_{i,t-1}} - \boldsymbol{\beta_i' X_{i,t-1}}\right) + \sum_{\boldsymbol{j=1}}^{\boldsymbol{p_i}} \boldsymbol{\alpha_{ij}}\, \boldsymbol{\Delta Y_{i,t-j}} + \sum_{\boldsymbol{j=-q_1}}^{\boldsymbol{p_i}} \boldsymbol{\lambda_{ij}}\, \boldsymbol{\Delta X_{i,t-j}} + \boldsymbol{\varepsilon_{it}} \qquad \mathbf{3.2}$$

which is within the framework of error-correction model. From 3.3 above, t=1… T and i=1… N are denoting the time-series and cross-

sectional components, respectively, while $d_t = (1, t)'$ represents the deterministic parts, and $\vartheta_i = (\vartheta_{1i,} \vartheta_{2i})'$ is the related vector of parameters. Also, p_i and q_1 are the lag lengths and lead orders, respectively, that differ all across specific cross-sections.

3.6 Panel Regression Estimation

This study employs the Hoechle (2007) modified model of the robust standard errors (SE) as offered by Driscoll & Kraay (1998) , which is applicable to panel regressions with CSD. Specifically here, the said Hoechle (2007) model extends the Driscoll & Kraay (1998) SE applied to linear panel models. Furthermore, such extensions are robust to not just heteroskedasticity but also to those expected general forms of CSD as well as temporal dependence (Haruna & Abu Bakar, 2020; Le & Tran-Nam, 2018). Additionally, the model supports both the situation of balanced and unbalanced types of panel. From this, Driscoll and Kraay (1998) SE for coefficient will be employed as given in the regression below:

$$y_{it} = X'_{it}\,\boldsymbol{\theta} + \boldsymbol{\mathcal{E}_{it}} \qquad \mathbf{3.3}$$

where y_{it}, a scalar, is the dependent variable, X_{it} is a (K + 1) × 1 vector of explanatory variables whose first component is 1, and $\boldsymbol{\theta}$ is (K + 1) × 1 vector of unknown coefficients, i denotes the individual cross-sectional parts, and t is time.

Nevertheless, the disturbances $\boldsymbol{\mathcal{E}_{it}}$ are within themselves acceptable to have elements of autocorrelation, heteroskedasticity, and CSD. Under such assumptions, we can have $\boldsymbol{\theta}$ from 3.4 above to be in line with estimations done by the OLS regression that yields:

$$\widehat{\boldsymbol{\theta}} = (X'X)^{-1} X'y \qquad \mathbf{3.4}$$

The square roots from the presentation of diagonal features of the asymptotic (robust) covariance matrix are obtained based on the SE for the coefficient estimates of Driscoll and Kraay:

$$\boldsymbol{V(\widehat{\theta})} = \boldsymbol{(X'X)^{-1}\hat{S}_T\,(X'X)^{-1}} \qquad \mathbf{3.5}$$

such that, based on Newey and West (1987), $\hat{S}_T$ is characterised as;

$$\hat{S}_T = \widehat{\Omega}_0 + \sum_{k=1}^{n(T)} \boldsymbol{w(k,n)}[\widehat{\Omega}_k + \widehat{\Omega}'_k] \qquad \mathbf{3.6}$$

From **3.6** above, **n(T)** signifies the extent of the lag length which the residuals may possibly be autocorrelated.

4.1 Empirical Analysis

4.2 Descriptive Statistics

Table 2 below contains and presents a summary of the descriptive statistics from the data based on mean, median, standard deviation, minimum, maximum, and the number of observations.

Table 2
Summary of Descriptive Statistics

Variables	Mean	Median	Std. Dev.	Minimum	Maximum	Obs
GINI	57.9996	57.004	3.407	55.025	77.085	783
CORR	2.229	2.000	0.601	1.500	3.000	783
LO	2.909	3.000	0.965	0.000	6.000	783
BQ	1.353	1.000	0.893	0.000	4.000	783
GS	7.887	7.708	1.556	5.833	10.042	783
DA	3.192	3.000	1.108	0.000	5.500	783
GDPPCC	1737.994	747.092	2345.491	164.943	11937.640	783
FD	18.420	12.118	24.581	0.403	160.125	783

Source: Authors' computation

From Table 2 above, GDP per capita (GDPPCC) and Gini coefficient (GINI) have the highest and second-highest mean and median, respectively. For standard deviation value, it is GDP per capita (GDPPCC) and Financial Development (FD) that have the highest and the follow-up highest values, respectively. Furthermore, each of the institutional quality measure of corruption (CORR), law and order (LO), bureaucratic quality (BQ), government stability (GS), democratic accountability (DA), all have positive value for mean, median, and standard deviation, respectively. Similarly, all the values of GINI, GDPPCC and FD all have positive values for mean, median and standard deviation as well. Finally, the minimum and maximum values indicate the form of each variable regarding the lowest and highest values within each series. Comparison between the minimum and maximum observations reveals the range values of the variables utilised in the analysis.

4.3 Pairwise Correlation Analysis

The strength and direction of relationship among the variables are identified by employing the correlation analysis as presented in table 3 below.

Table 3
Pairwise Correlation Analysis

	CORR	LO	BQ	GS	DA	LGDPPCC	FD
CORR	1.0000						
LO	0.2721	1.0000					
BQ	0.3344	0.2035	1.0000				
GS	-0.0796	0.1635	-0.2370	1.0000			
DA	0.1080	0.3242	0.2193	0.0235	1.0000		
LGDPPCC	0.0814	0.1673	0.3602	0.0969	0.2097	1.0000	
FD	0.1627	0.0159	0.2963	-0.0052	0.2994	0.5250	1.0000

Source: Authors' computation

The pairwise correlation analysis from table 3 shows the correlation results among all the independent variables. From Table 3, all the variables of CORR, LO, BQ, DA, LGDPPCC and FD have positive correlation, while GS reveals negative correlation. The highest degree of correlation is between LGDPPCC with FD, with an average coefficient of 0.525. The correlation is however moderate for LO and BQ, while the correlation coefficients for GS, DA, LGDPPCC and FD are low.

4.4 Panel Unit Root Analysis

In order to ascertain the unit root features (which is either at level or first difference) of each of the variables, the current study employed the second generation unit root tests as contained in Table 4, below.

Table 4
Analysis of Panel Unit Root

	Pesaran (2007)			Breitung		
	Level	First Difference		Level	First Difference	
Variable	Zt-bar	Zt-bar	Order of integration 0 or I	Zt-bar	Zt-bar	Order of integration 0 or I
GINI	-3.322***		I(0)	0.5411	-6.5852***	I(1)
CORR	-1.655	-7.814***	I(1)	-0.9046	-9.8671***	I(1)
LO	-6.421***		I(0)	-0.8465	-6.3728***	I(1)
BQ	-1.904	-9.460***	I(1)	0.1787	-4.1862***	I(1)
GS	-5.256***		I(0)	-1.6960	-10.2163***	I(1)

DA	-3.440***		I(0)	-1.0382	-7.8249 ***	I(1)
LGDPPCC	0.832	-6.318***	I(1)	3.4183	-7.2231***	I(1)
FD	-5.132***		I(0)	-1.0068	-5.5951***	I(1)

***, **, * denotes the level of significance at 1%, 5% & 10% respectively.

Source: Authors' computation

From Table 4 above, two tests of unit root examination using Pesaran (2007) and Breitung & Das (2005) were utilised. From Table 3, and going by Pesaran (2007), all the variables of GINI, LO, GS, DA and FD are stationary at level, while other variables of CORR, BQ and LGDPPCC are stationary at first difference. This makes the order of integration to be I(0) and I(1) for this category. For the Breitung & Das (2005) on the other hand, all the variables are stationary at first difference with none been stationary at level.

4.4 Panel Cointegration

Having ascertained the existence of CSD, a second generation cointegration test is required. Hence, Table 5 below presents the panel cointegration test result.

Table 5: Westerlund panel cointegration tests

Variable	Statistic	Statistics	P-value
Gini	Variance ratio	53.7688	0.0000***

***, **, * denotes the level of significance at 1%, 5% & 10% respectively.

Source: Authors' computation

Thus, to confirm the existence of long-run relationship between all the series, the current study employed the Westerlund (2007) panel cointegration test; which is robust to CSD. The result presented in Table 5 above confirms the presence of long-run relationship between the variables. Hence, going by Westerlund (2007), we can conclude that a long-run relationship exists among the series.

Table 6: *Driscoll and Kraay's Estimation Results*

Variable DV = GINI	Coefficient	Drisc/Kraay Std. Err.	t-Statistics	Prob-Value
CORR	1.206488	0.1787206	6.75	0.000***
LO	0.7820655	0.2851501	2.74	0.011**
BQ	-0.346568	0.2773921	-1.25	0.222
GS	-0.2526329	0.1465699	-1.72	0.096*
DA	-0.3505099	0.1214533	-2.89	0.007***
LGDPPCC	0.5063046	0.1048553	4.83	0.000***
FD	0.0278335	0.0034218	8.13	0.000***

Breusch-Pagan LM test		0.000***
Mean VIF	1.36	
F-Statistics	161.54	
R-squared	0.1755	

***, **, * denotes the level of significance at 1%, 5% & 10% respectively.
Source Authors' computation

4.5 Driscoll and Kraay's Estimation Results

Having established the existence of CSD, estimating the regression with Driscoll and Kraay becomes valid. From Table 6, corruption level has a positive coefficient and statistically significant with income inequality. It shows that an increment by one point in corruption level raises the level of inequality by 1.206 percent. This finding agrees with Gupta *et al.* (2002) and Gyimah-Brempong & de Camacho (2006) who concluded that corruption level leads to an increase in the level of income inequality. Therefore going by this result, improved measures in checking corruption will lead to a reduction in inequality within the SSA. The finding however disagrees with Perera & Lee (2013) who presented that an improvement in the level of corruption increases the inequality level.

The result of law and order has a positive influence on the inequality level, where a one point increase in the level of law and order increases inequality by 0.782 percent. It is also statistically significant. This result is in line with the findings of Chong & Calderón (2000b). Such a situation may arise as a result of reforms towards strengthening institutional environment especially in developing economies. Thus, such reforms lead to increase in transaction expenses on those individuals operating in informal sectors who are mostly poor and also constitute a greater segment of the population. However, the outcome goes in contrary to Kunawotor et al. (2020) who found rule of law to be negatively related to inequality.

For the coefficient of bureaucratic quality, though the estimate has a negative value of 0.3466, it is statistically insignificant in influencing the level of inequality. Based on the estimate, the indicator of bureaucratic quality neither reduces nor increase the inequality level in SSA. Looking at the poor nature of institutions in the sub-region, such a relationship may not be surprising. This finding aligns with that of Kunawotor et al. (2020) who also found statistical insignificance of such quality in influencing inequality.

However, the current finding runs in contrary to Perera & Lee (2013) who found improvement in bureaucratic quality to increase income distribution problems.

The government stability and income inequality have a negative relationship based on the coefficient. It shows that one point improvement in government stability will lead to a reduction by 0.253 percent of income inequality in SSA. The estimate is also statistically significant. This finding runs in line with that of Chong and Gradstein (2007) who also reported that improved level of government stability leads to reduction in income inequality. It however, runs in contrary to the findings of Perera and Lee (2013) who found it to be insignificant in influencing inequality.

For democratic accountability and income inequality, the estimate has a negative and statistically significant influence of democratic accountability on inequality. The coefficient indicates that as democratic accountability improves by one point, income inequality will reduce by 0.351 percent. This reflects that improvement in institutional quality of democratic accountability will go a long way in reducing the level of inequality in SSA region. This finding also goes in agreement with that of Chong and Gradstein (2007) as well as that of Gyimah-Brempong & de Camacho (2006) who all reported that reduction in inequality can be realised as a result of improved nature of democratic accountability.

The estimation for economic growth and income inequality is positive and statistically significant. This shows that a one percent rise in growth will lead to 0.506 percent rise in income inequality in the SSA region. Going by this findings, economic growth in the SSA is likely to escalate the level of inequality in the region which can be attributed to the level of development there. Such a situation may be explained from the position of "Kuznets (1955) hypothesis", argued that GDP per capita and inequality relationship may exhibit "an inverted U-shaped relationship". Hence based on his proposition, such relationship occurs due to the structural changes that occur as an economy develops, by shifting from agricultural base to industrial; thereby leading to rise in inequality. This finding goes in accordance with Anyanwu et al. (2016) and Dincer & Gunalp (2012). This however goes in contrary to Shahbaz (2010) who stated that economic growth and inequality nexus maintain a positively relation either in the long run or short run.

Finally, the coefficient of financial development is statistically significant and positively related to inequality. This suggests that a one percent increase in financial development results to 0.0278 percent rise in the level of inequality in the SSA region. Considering the level of financial development in the SSA region which is still in poor and under-development stage, this outcome does not come as a surprise. Inequality tends to rise as financial markets undergo developmental processes. On this therefore, the current finding conforms to Adams and Klobodu (2016) as well as Tita and Aziakpono (2016) who envisage a "Kuznets curve link" between finance and income inequality nexus. However, this finding is in contrast to Michael et al. (2010) who found that inequality decreases as countries' financial sector experience development.

Summary and Conclusion

As policymakers, academics and other interested economic agents strive hard in uncovering the real factors that influence inequality, the situation tends to be an alarming one. Similarly, the rising interest in the roles of institutional qualities in modern day development process cannot be over emphasised. Expectations are therefore high that countries will strive hard in attaining strong and effective institutional arrangements that will improve economic developmental process and status. On this note, this study employs five indicators of institutional quality sourced from the "Political Risk Services' International Country Risk Guide" (ICRG) dataset "(i.e. Political Risk Services Group)" to examine how they influence income inequality in 27 sub Saharan African countries. Using the Driscoll and Kraay (1998) standard error model as extended by Hoechle (2007) which remains robust to cross sectional dependence, the current study seeks to address estimation problems associated to previous studies. Hence, this study is the first to examine the institutional quality-inequality nexus while taking into cognisance of CSD. Similarly, deviating from the existing pattern of studies, other second generation techniques of Pesaran (2007) and Breitung & Das (2005) for unit root test as well as the Westerlund (2007) for panel cointegration test were employed by the current study.

Thus, appropriate policies that can facilitate effective reduction in income inequality within the SSA region by utilising

institutional arrangements must be put in place. Specifically, at regional and country levels, governments should promote the required measures that will reduce income inequality. Most importantly, all those institutional indicators that have significant influence on inequality should be strengthened. This means that control of corruption, government stability and democratic accountability should be given the required attention in order to achieve the desired objection towards inequality reduction. Furthermore, the institutional environment should also be overhauled and transformed in such a way that all the economic agents especially those in lower echelon of income distribution/level to derive maximum benefits from institutional reforms.

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