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Public Debt, Institutional Quality and Economic Growth in Sub-Saharan Africa

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Abstract: *While other regions with better institutional quality have benefitted considerably from borrowing, sub-Saharan Africa continues to accumulate public debt with a long history of dismal economic performance. This paper examines the impact of public debt and institutional quality on economic growth using the Generalised Method of Moments (GMM) approach on a sample of 46 sub-Saharan African countries over the period 2000–2014. The empirical result indicates that institutional quality has both a direct and indirect impact on economic growth and therefore reveals that the interaction term of institutional quality and public debt has a statistically significant impact on the debt-growth relationship. This confirms the hypothesis that the impact of public debt on economic growth is a function of institutional quality. Moreover, government effectiveness, control of corruption and regulatory quality were found to have the strongest influence in mitigating the negative impact of public debt on economic growth in sub-Saharan Africa. Therefore, comprehensive improvement of the institutional quality is necessary not only in minimising the negative impact of public debt but also in delivering the unwavering benefits of government borrowing.*

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1. Introduction

Economic theory suggests that public debt is beneficial to the economic growth of a nation. However, this has not been seen in sub-Saharan Africa (SSA). Other regions with comparably better institutional quality have benefitted considerably from public debt (Jalles, 2011; Kim, Ha, & Kim, 2017), but countries in SSA continue to accumulate public debt with a long

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history of dismal economic performance (Fosu, 1996; Milton, 1999). A number of debt management strategies like debt rescheduling, Structural Adjustment Programme, debt relief initiatives etc. have been adopted as conventional approaches to debt management, yet the spectre of indebtedness and poor economic performance continue to raise its ugly head in the region (Ershad Hussain, Haque, & Igwike, 2015; Lekomola, 2010). This challenge required a renewed focus if the reoccurrence of the SSA debt crisis of the1980s to1990s is to be averted.

Meanwhile, empirical evidence has shown that institutional quality plays a significant role in explaining the growth differentials among countries (Acemoglu, Johnson, & Robinson, 2001; Butkiewicz & Yanikkaya, 2006; Siba, 2007). Moreover, the impact of finance to economic growth was found to be higher when the country is imbued with good institutional qualities (Law, Azman-Saini, & Ibrahim, 2013; Law & Habibullah, 2006). This suggests the need to explore the role of institutional quality on a debt-growth relationship, which has been largely ignored in SSA. It has been argued that good institutions manage public debt efficiently (Daud & Podivinsky, 2014; Presbitero, 2008), and that bad institution destabilises the borrowing decisions of the country, divert the borrowed funds to a potentially meaningless projects (Jalles, 2011), and have a more likelihood of debt defaulting and poor economic performance (Ciocchini, Durbin & Ng, 2003).

Meanwhile, given the impression that the underdevelopment of SSA is attributable to the poor institutional quality (Brautigam & Knack, 2004; 2013; Siba, 2007) and the mounting debt burden of the region (Ezenwe, 1993; Milton, 1999; Omotola & Saliu, 2009), this study attempts to ascertain the role of institutional quality on the debt-growth relationship in SSA. This is particularly relevant because the institutional quality in this region typically manifests in a high level of corruption, the feeble rule of law, escalating social unrest, recurring political instability and the spillover effects of armed conflict. This has widened their fiscal and external imbalances due to the rising cost of war and more demand for public debt (Onuoha & Qobo, 2012; Tarek & Ahmed, 2017).

Against this backdrop, this paper is an improvement over the previous empirical study, such as Milton (1999) on the debt-growth nexus in many important aspects. First, it looks at the direct impact of institutional quality on economic growth as well as the indirect impact of institutional quality on economic growth through the interaction term. Second, it uses the system GMM approach, which has several econometric benefits over the traditional panel approach and thus, provides a more robust conclusion.

The paper is organised as follows: Section 2 reviews the literature on public debt, institutional quality, and the economic growth relationship. Section 3 describes the dataset and the econometric methodology used in the

study, while Section 4 presents the discussions on the empirical results, and Section 5 gives the conclusion and recommendations.

2. Literature Review

2.1 Public debt and economic growth

The impact of public debt has been one of the most argumentative topics that triggered a heated debate between the Keynesian and neoclassical economists since the 1930s. According to the neoclassical economists, public debt is a burden on the future generations and thus, has a negative impact on the economic growth of a nation (Majumder, 2007). This argument was later supported by Krugman (1988) and Sachs (1989) and argued that a high level of public debt is detrimental to economic growth due to its discouraging effects on investment. Therefore, when the public debt exceeds the domestic revenue generation, the country is exposed to the danger of debt default, which has a discouraging effect on potential investors. This is in contrast to the Keynesian school that is very flexible towards the same as they see no harm in public debt in time of necessities and therefore, imposes no charges on the current or future generations. The idea was further reinforced in "Two-Gap" model by Harrod (1939) and Domar (1946) and later supported by (Chenery & Strout, 1966). This model assumed that savings and foreign exchange gaps are the predominant constraints that inhibit the economic growth of developing countries and therefore the need for public debt.

However, although the empirical literature has been debatable and yield conflicting findings, the most dominant view is that of the negative relationship. For example, the empirical evidence on the impact of public debt on economic growth in SSA according to Fosu (1996), Milton (1999) and more recently Hussain et al. (2015) has been negative over the years. These conclusions concur with that of Panizza and Presbitero (2014) who confirmed that public debt has a negative correlation with economic growth on some selected countries in OECD. Similarly, Bal and Rath (2014) used the autoregressive distributed lag (ARDL) model to investigate the impact of public debt on the economic growth of India over the period 1980 to 2011. The study confirmed a long-run equilibrium relationship between public debt and economic growth. Mweni, Njnguna, and Oketch (2016) used the ordinary least square method on the time series data to examine the relationship between economic growth and external debt in Kenya throughout 1964-2012. The study confirmed a negative relationship between GDP growth rate and external debt. This suggests that an increase in external debt stock leads to a reduction in the level of GDP economic growth in Kenya. In another study, Boboye and Ojo (2012) used the ordinary least squares (OLS) regression approach to study the relationship between the

external debt and economic growth in Nigeria. The results reveal that external debt negatively affects the level of per capita income in Nigeria. The study concludes that an increase in debt leads to the devaluation of the currency, workers retrenchment, industrial strikes, and deprived education, which eventually translated into a lower level of economic growth in the long-run. Summarily, despite the heated debate and conflicting findings on the relationship between the public and economic growth, it is pertinent to note that the empirical literature tends towards a negative relationship.

More recently, Reinhart and Rogoff (2010) argued, that the relationship between the public debt and economic growth appears to be weak at "normal" level of debt and that public debt is associated with poor economic growth when it goes beyond 90% of GDP. While this finding has gained considerable support from the subsequent writers like Yang and Su (2018); Cecchetti, Mohanty, and Zampolli (2011); Checherita-Westphal and Rother (2012), and Baum, Checherita-Westphal, and Rother (2013), however, it lacks unanimous agreement over the threshold level of 90%. For instance, Herndon, Ash, and Pollin (2014) argued that there was no significant different in the rate of economic growth when the debt-to-GDP ratio is less than the 90%. Moreover, Egert (2013), Eberhardt and Presbitero (2015), Chudik, Mohaddes, Pesaran and Raissi (2015), and Lee, Park, Seo, and Shin (2017) find a negative impact of debt on economic growth at a lower threshold level of 30%. Thus, research on the relationship between public debt and economic growth is inconclusive.

2.2 Institutional quality and economic growth

There is growing emphasis among economist and policy analysts that institutional quality plays a pivotal role in determining the growth differentials among the countries. For instance, Kilishi et al. (2013) employed a system GMM approach to ascertained whether institutional quality matter to the economic performance of SSA. The empirical results indicate that, institutionally really matter and that regulatory quality appeared to show the strongest influence on the economic performance of SSA. This suggests that the economic performance of SSA could be enhanced by the improvement of the regulatory quality in the region. Vianna and Mollick (2018) studied the role of institutional quality on economic development in Latin America over the period 1996 - 2015 for a sample of 192 countries. The empirical result confirms that on the average improvement of 0.1 points in institutions leads 3.9% increase in per capita output with a 2.6% influence on the world development. This confirmed the evidence of a missing opportunity tthe o the achieve sustainable development primarily due to feeble nature of rule of law in Latin America. The study conjecture that the effectiveness of fiscal\monetary policies will certainly

improve when the institutional quality and fiscal responsibility improved in the region. Examining the factors that determine the rates of economic growth Butkiewicz and Yanikkaya (2006) confirmed that the specific characteristics of a country exert a significant effect on its growth performance. The empirical results confirmed that the maintenance of the rule of law has a positive role in promoting the rate of economic growth in the sample study. In an attempt to answer the question of why many development programmes failed to yield expected result in Russia in the period 2000 to 2010 Gurvich (2016) analysed the Russian economy, making a comparative analysis of 20 countries on the same level of development. The result confirmed that the development programme largely failed in the Russian economy due to a rigid institutional framework, and therefore the economic growth cannot improve without institutional reforms.

2.3 *Institutional quality, public debt and economic growth*

The new wave of research highlighted that poor institutional quality is not only the reason for the dismal economic performance of the developing countries but also explains why they are heavily indebted. This has been demonstrated by several researchers, such as, Jalles (2011), who examined the impact of democratic accountability and control of corruption on the debt-growth relationship on a panel of 72 developing countries over the period 1970-2005. The empirical results confirmed that countries with a lower level of corruption can utilise their debt effectively. In the same way, Kim et al. (2017) studied the effects of corruption on the debt-growth relationship and observed a statistically significant impact of corruption on the debt-growth relationship. Similarly, Cooray et al. (2017) investigated the relationship between corruption, shadow economy, and government debt over the period 1996-2012. The study confirmed that the shadow economy was found to increase the impact of corruption on public debt and that they act complementarily. The study also confirmed that the shadow economy reduces the revenue generation from tax, which eventually increases the debt burden. In a related development, Daud and Podivinsky (2014) used a threshold approach and examined the relationship between public debt, economic freedom, and economic growth in Malaysia. The result confirmed the existence of contingency effects of institutional quality on the debt-growth relationship in Malaysia. More recently, Tarek and Ahmed (2017) test the hypothesis that poor institutions lead to public debt accumulation in the MENA region. The study confirmed that political stability and the absence of violence, regulatory quality, and rule of law have a statistically significant impact on debt accumulation in the region. Moreover, the results showed a significant indirect impact of poor institutions in the declining GDP growth rate. Fan (2008) examined the relationship between public external

debt and economic growth in a panel of 114 developing countries focusing on the impact of policy and institutional framework. The result revealed that this relationship depends to a very large extent on the role of institutions and policies. Asiedu (2003) used 12 institutional measures to explore the linkage between debt relief and institutional quality in the highly indebted countries. The result confirmed that most HIPCs are characterised by poor institutions that are weaker than that of the rest of the developing countries. He argued that a specific threshold level of institutional quality needs to be attained for countries to benefit from the debt relief programme.

Therefore, while the problem of poor economic growth has been attributed to public indebtedness in most developing countries, the medium through which public debt affects economic growth could be traceable to the poor economic mismanagement generated by the poor institutional quality. This requires a systematic study highlighting the role of institutional quality on the debt-growth relationship, an area that is rarely explored particularly in SSA where public debt crisis has been a lingering issue over the years. This paper attempts to fill this gap.

3. Data and Methodology

3.1 Data

To examine the role of institutional quality on a debt-growth relationship, data were drawn from 46 SSA countries over the period 2000-2014. While the real GDP per capita (2010 US$), population growth annual, gross capital formation, and trade as percentage of GDP were obtained from the *World Development Indicators*, the debt-to-GDP ratio was drawn from the *World Economic Outlook* (WEO) and *World Development Indicators*, and lastly institutional quality from the *Worldwide Governance Indicator* database. The GDP per capita (constant 2010 US$) is the dependent variable considered in this study. It is a proxy used to measure the sustained rise in the level of production in a given country over a given period. This variable has been used by Law and Singh (2014) and Hussain et al. (2015) in the growth model.

The debt-to-GDP ratio measures the debt burden by considering the productive capacity of a country in a given year. It varies in proportion to the debt burden in the country because the amortisation of debt is usually done through the imposition of taxes on the current level of production in the country. The theoretical literature remains vague concerning the most preferred debt indicators to measure the level of indebtedness. Nevertheless, the total debt stock is assumed not to be a good indicator for measuring the debt burden of a country. This is because its significant portion is concessional and contains some element of grant. This study follows

(Siddique, Selvanathan, & Selvanathan, 2016) in using the debt-to-GDP ratio to measure the burden of debt in SSA. The expected sign could be positive or negative.

The gross fixed capital formation (GCF) comprises all forms of investment to improve the land (fences, ditches, drains); purchases of equipment and machinery; the construction of roads and railways; and the building of schools, hospitals, industries, and residential houses. As a proxy to capture the level of investment in physical capital, it is widely used in the growth literature (Law & Singh, 2014).

The rate of population growth refers to the rate at which the number of people increases in a city, state, or country. It is an important factor to consider while examining the past and future of a given population in a country or a region. It is based on the defector definition of the population, which counts the residents regardless of their citizenship. It is expected to exert a positive or negative impact on economic growth. Population growth has been used by Jalles (2011) in the growth model.

The trade-to-GDP ratio is a variable that indicates the relative importance of international trade to a given country. It is measured by dividing the total monetary value of imports and exports by the GDP (X+M)/GDP) over a given period, usually a year. It is viewed as an indicator of the level of globalisation of a country and has been used by Hussain et al. (2015) in the growth model. Its expected sign is positive.

Institutional quality (INS) refers to humanly devised constraints that shape the interaction among the people living in a particular country; it has been used in the growth model in many studies (Hamdi, Hakimi & Sbia, 2017; Siba, 2007). This study used the six measures of institutional quality assembled by the Worldwide Governance Indicators (WGI). As a multidimensional concept, the indicators are measured in scores of −2.5 to +2.5. The highest score signifies better institutional quality and vice versa. The subcategories of institutional quality are briefly explained below.

Voice and accountability: This measures the perception of the extent to which the citizens in the country are allowed to take part in choosing their government, their access to free media, and the freedom of association and expression.

Political stability and absence of violence/terrorism: This indicator captures the perceptions of the possibility of overthrowing the government through unconstitutional or violent means like terrorism and politically-motivated violence.

Government effectiveness: This measures the government's ability to formulate and implement sound policies in the country. It measures the

quality of the public and civil services as well as the extent to which the government is free from political pressures. It emphasises the government's abilities to design and implement policies as well as the delivery of public goods.

Regulatory quality: This indicator focuses on the government's ability to formulate and implement sound policies, which permit the promotion of private sector development.

The rule of law: This captures the perceptions of the extent to which the agents have confidence in and accept the rules of society. These include, among others, the property right, quality of contract enforcement, the police force, courts, and likelihood of crime and violence.

Control of corruption: This captures the perceptions of the extent and magnitude of corrupt practices through the use of public offices for private gain. This comprises both the petty and grand forms of corruption, as well as the state of the elites and private interests.

However, due to the likelihood of strong correlation and the consequent risk of multicollinearity among the WGI, these variables were aggregated as a principal component to form a single index (Knack & Keefer, 1995). Moreover, to simplify the examination of the cross-sectional data with a long (N) and a short time (T), our dataset used an average of three-year intervals for easy estimation using the generalised method of moment (GMM). The study equally follows Law and Singh (2014) by taking three-year averages to smooth the effects of short-term fluctuations in the variables. Thus, the data used in our samples have a maximum of five different observations with three-year intervals.

3.2 Model Specification

The modelling approach to studying the direct and indirect impact of institutional quality on the debt-growth relationship is based on the standard growth regression model by (Siddique et al., 2016). This model has been augmented with institutional quality and modified into a dynamic function, as specified below.

$$GDP_{it} = \beta_1 + \lambda GDP_{it-1} + \beta_2 DEB_{it} + \beta_3 INS_{it} + \beta_4 GCF_{it} + \beta_5 POP_{it} + \beta_6 LTRD_{it} + \varepsilon_{it} \quad (1)$$

where GDP is the real GDP per capita constant for 2010 in US dollars - a proxy used for economic growth. The subscripts i and t represent the

number of the countries and the periods covered for the study respectively (i= 1-46 and t = 2000- 2014). DEB is the public debt-to-GDP ratio and INS is the institutional quality; these are expected to have a negative and positive sign, respectively. GCF is the gross fixed capital formation as a percentage of GDP - a proxy for the investment in physical capital, and is expected to have a positive sign; POP is the log of annual population growth, with the sign expected to be either positive or negative; TRD is the trade as a percentage of GDP with an expected positive sign; and ε_{it} is the random variable. With the exception of institutional quality, all the variables were transformed into a logarithm form.

To test the hypothesis that institutional quality affects a debt-growth relationship, as highlighted in the preceding section, the Eq. (2) is applied principally to capture the existence of the indirect impact of institutional quality on economic growth. Consequently, we follow Kim et al. (2017) and introduce the interaction term (DEB*INS) of public debt and institutional variable in the model based on the multiplicative interactive term, an approach highlighted by(Brambor, Clark, & Golder, 2005). This makes it possible for the study to distinguish between the direct and indirect impacts of public debt and institutional quality on economic growth, as specified below.

$$\begin{aligned} LGDP_{it} = {} & \beta_1 + \lambda LGDP_{it-1} + \beta_2 LDEB_{it} + \beta_3 INS_{it} \\ & + \beta_4 (DEB * INS)_{it} + \beta_5 LGCF_{it} + \beta_6 LPOP_{it} \\ & + \beta_7 LTRD_{it} + \varepsilon_{it} \end{aligned} \quad (2)$$

3.3 Estimation technique

The econometric methodology employed for this study is based on the dynamic panel GMM estimators proposed by Arellano and Bond (1991) and then developed by (Blundell & Bond, 1998). This technique has been chosen for its ability to address the simultaneity of bias and country-specific effects. To explain the relevance of this approach to our dataset, the baseline model (1), Arellano and Bond (1991) suggested that to eliminate the country-specific effects and eliminate the simultaneity bias; such an equation can be transformed into a first-difference equation. However, it has recently been argued that this form of modelling could lead to wrong inferences, particularly when the explanatory variables are found to be persistent (Arellano & Bover, 1995). This is mostly applicable to institutional quality; hence, it has the potential to persist as soon as it is established. To address this problem, Blundell and Bond (1998) recommended a system GMM estimator as an alternative, which combines both the level and difference equations. Therefore, the lagged differences of the regressors are used as an added instrument for the level equation. They further stressed that this form

of strategy reduces the bias and imprecision associated with the difference estimator. Thus, the system GMM estimator was chosen as the most preferred due to its consistency and lack of bias in the parameter estimates over the difference GMM estimators, pooled ordinary least squares (OLS) method, or fixed effect. This approach provides the most efficient estimate and handles the endogeneity problem better than the difference GMM or fixed effect models.

Another justification for choosing this approach over the pooled OLS or fixed effect estimations approach is to forestall any biases. Certainly, the correlation among the lagged dependent variable and fixed specific effect may perhaps be biased when the coefficient of the lagged dependent variable inclines to zero. This is specifically probable with a model with a smaller time scope. It has been argued that the coefficient of the lagged dependent variable acquired through the use of pooled OLS tends to be biased upward, and the within-groups estimator is biased downward (Bond, Hoeffler, Temple & Ruj, 2001). Thus, before reporting our estimation results, we will endeavour to confirm these properties that encouraged us to employ the system GMM estimator.

Although the system GMM estimator is divided into one-step and two-step systems, the two-step system is theoretically assumed to be the most efficient due to its optimal weighting matrices. However, Bowsher (2000) argued that using system GMM estimator with a sample that has a small cross-section dimension could lead to biased estimated parameters and a weakened over-identification test; Windmeijer (2005) added that this could lead to biased standard errors. However, Roodman (2009) contended that too many instruments or instrument proliferation cause such problems. Therefore, he suggested an innovative solution that potentially decreases the dimensionality of the instrumental variable matrix. Thus, for a study having a dataset with a cross-sectional unit of N = 46 and T = 5, the moment conditions are limited to a maximum of two lags on the dependent variable. We, therefore, follow Roodman (2009) and reduce the dimensionality of the instrumental variable matrix. Since the regressors are possibly endogenous, they are consequently instrumented with two lags in the first-difference equation and one lag in the level equation. This study employs the two-step system GMM estimator to estimate the role of institutional quality on the debt-growth relationship through the interaction term. Most importantly, for the estimated result of this approach to be consistent, two basic specification tests must be considered. These are the Hansen (1982) test of over-identifying restrictions and the serial correlation test in the disturbances (Arellano & Bond, 1991). The instruments are said to be valid, and the model is said to be correctly specified when the null hypothesis failed to reject the Hansen test. For the serial auto-correlation test, the null hypothesis should

be rejected in the absence of the first order serial correlation (AR1) and not be rejected in the absence of the second order serial correlation (AR2).

4. Results

4.1 Descriptive Statistics and Correlation Matrix

Table 1 presents the descriptive statistics and correlation matrix presents of the variables used for a sample of 46 SSA countries over the period 2000-2014. A significant variation is observed in real GDP per capita income across the sampled countries. It ranges from as low as $202.38 in Ethiopia to as high as 18274.22 in Equatorial Guinea. This wide disparity could be attributed to domestic and external influences, such as the institutional quality, level of indebtedness and mineral deposits. Similarly, the debt-to-GDP shows considerable variations, from a minimum of 0.802% for Equatorial Guinea and a maximum of 715.96 for Lesotho. Thus, some countries depend heavily on public debt to finance their government expenditure. In terms of institutional quality, the minimum score was -1.83 in the Congo Democratic Republic and a maximum score of 0.85 in Mauritius. As revealed panel A, whereas, high indebtedness is associated with lower economic growth, high institutional quality is associated with high real GDP per capita and vice versa.

Panel B provides the correlation matrix, which shows the strength of the relationship among all the variables used in the study. The public debt variable has shown a negative correlation with the economic growth variable. Most importantly, the analysis indicates the lack of a high correlation among the explanatory variables in the model. This is because all the values are below 0.80 as a point of reference to rule against the existence of multicollinearity. These results prompt the need to investigate further whether institutional quality has any influence on the debt-growth relationship.

Table 1: Descriptive Statistics and Correlation Matrix

Panel A: Descriptive Statistics

	Observations	**Mean**	**Sta. Dev.**	**Minimum**	**Maximum**
GDP	225	2158	3187	202	18274.
DEB	225	77	89	.80	716
INS	225	-.63	.60	-1.83	.85
GCF	225	22	11	3.5	109
POP	225	2.5	.85	-.34	4.6
TRD	225	78	41	22	312

Table 1: (Continue)

Panel B: Correlation Matrix

	GDP	DEB	INS	GCF	POP	TRD
GDP	1.0000					
DEB	-0.0995	1.0000				
INS	0.3089	-0.0347	1.0000			
GCF	0.3863	-0.0897	0.2455	1.0000		
POP	-0.1530	-0.1630	-0.4334	0.1753	1.0000	
TRD	0.5143	0.0214	0.1646	0.5067	0.1446	1.0000

Note: GDP = Real GDP per capita, DEB = Debt-to-GDP ratio, INS = Institutional Quality, GCF = gross fixed capital formation as percentage of GDP, POP = Population growth annual, TRD = Trade as percentage of GDP.

4.2 Estimated Results and Discussions

Table 2 shows the estimates of Equation (1) as an unconditional model using seven separate columns. The first columns show the direct impact of the overall institutional quality, and the subsequent columns present results on the impact of the control of corruption, political stability, government effectiveness, and regulatory quality, the rule of law, and voice and accountability respectively. Moreover, the lagged growth was introduced to assess the impact of the previous growth on the current growth rate. Interestingly, the coefficient of the lag dependent variables appeared to be at a 1% level of significance in all the models, indicating that the models are dynamic. Thus, the system GMM is found to be suitable for this study rather than the difference GMM (Bond, 2002).

Generally, the debt-to-GDP ratio shows a statistically significant negative impact on economic growth across the models. This support the most dominant view in the literature that an increase in the debt-to-GDP ratio is associated with a decrease in the real GDP per capita. At 1% level of significance, the effects of the debt-to-GDP ratio on economic growth are statistically significant in all the models. This suggests that public debt has a negative influence on the economic performance of SSA. This result concurs with the previous findings (Fosu,1996 and Milton 1999). Therefore, to address the poor economic performance of SSA, public debt should be effectively utilised to minimise its needless implication on economic growth.

The table further reveals that, with the exception of voice and accountability, both the overall and subcategories of institutional indicators have shown a statistically significant positive impact on the economic growth in all the models. This indicates that good institutional qualities are potent in delivering long-term economic performance in SSA. This result concurs with the empirical findings of the other researchers (Kilishi et al., 2013; Tsaliki, 2014), which shows that institutional quality has a direct impact on economic growth.

Additionally, all the estimated results of the other determinants of economic growth used as control variables in the models are found to be consistent with the empirical literature. For instance, the gross fixed capital formation (GCF) as a percentage of GDP was found to have a positive and statistically significant impact on GDP per capita growth in all the models. This suggests that investment stimulates economic growth in SSA. On the other hand, the coefficient of the estimation result on the impact of population growth was found to be negative on GDP per capita. This confirms that an increase in POP reduces the GDP per capita growth in SSA. However, trade as a percentage of GDP was found to have a positive and statistically significant influence on economic growth in all the models. This shows that an increase in trade as a percentage of GDP increases the GDP per capita growth in SSA.

Table 3 presents the estimates of Equation (2), which consist of the interaction term of debt-to-GDP ratio and institutional qualities showing a highlight of the role of institutional quality on debt-growth relationship across the models. The estimated results of the overall institutional quality in model 1 reveals that both the direct and indirect model maintain their negative sign and statistically significant. However, although the impact was found to be negative after the use of the interaction term, the magnitude of the negativity significantly declines with the inclusion of the interaction term. This suggests that an improvement in the institutional quality have a significant influence in reducing the negative impact of public debt on economic growth. Therefore, an improvement in institutional qualities plays a pivotal role in not only minimising the negative impact of public debt on economic growth but also the likelihood of enhancing the economic performance of SSA. This result is in tandem with the findings of the previous studies (Daud & Podivinsky, 2014; Presbitero, 2008).

Furthermore, the regulatory quality, political stability, control of corruption, the rule of law and government effectiveness have shown a statistically significant impact on debt-growth nexus at a 1% level of significance. The empirical results indicate that government effectiveness, control of corruption and regulatory quality were found to have the strongest influence in mitigating the negative impact of public debt on economic growth in SSA. This suggests that the feeble nature of the government effectiveness, control of corruption and regulatory creates an avenue for the gross embezzlement of the borrowed funds and therefore worsens the negative impact of public debts on the economic growth of SSA. Therefore, all efforts to effectively utilise the public debt to stimulate economic growth should consider a determined stand to comprehensively improve the institutional quality.

Table 2: Impact of Public Debt and Institutional Quality on Economic Growth

Independent Variable	**(1) LGDP**	**(2) LGDP**	**(3) LGDP**	**(4) LGDP**	**(5) LGDP**	**(6) LGDP**	**(7) LGDP**
L.GDP	0.952***	0.965***	0.938***	0.960***	0.968***	0.961***	0.975***
	(207.02)	(184.36)	(151.19)	(117.67)	(167.88)	(146.59)	(154.67)
DEB	-0.0257***	-0.0278***	-0.0325***	-0.0227**	-0.0146*	-0.0261***	-0.0203*
	(-4.54)	(-4.53)	(-5.42)	(-3.21)	(-2.14)	(-4.16)	(-2.57)
INS	0.0816***						
	(5.54)						
CC		0.0313*					
		(2.34)					
GE			0.152***				
			(9.75)				
PS				0.0244*			
				(2.44)			
RQ					0.0569***		
					(3.82)		
RL						0.0527***	
						(3.71)	
VA							0.0151
							(1.38)
GCF	0.0375**	0.0677***	0.0101**	0.0578***	0.0541***	0.0457**	0.0550***
	(2.92)	(4.33)	(0.89)	(3.40)	(4.82)	(3.14)	(3.47)
POP	-0.0162**	-0.00754**	-0.0570***	-0.0239*	-0.00554**	-0.00776**	-0.0112**
	(1.59)	(-0.57)	(5.01)	(-2.40)	(0.56)	(0.76)	(-0.91)
TRO	0.142***	0.100***	0.167***	0.114***	0.148***	0.134***	0.130***
	(10.05)	(8.65)	(11.73)	(8.14)	(11.18)	(10.85)	(8.17)
Constant	-0.185*	-0.195*	-0.0555	-0.200	-0.421***	-0.245***	-0.390***
	(-2.41)	(-2.23)	(-0.58)	(-1.95)	(-3.94)	(-3.43)	(-4.31)
Observations	183	183	183	183	183	183	183
Instruments	37	37	37	37	37	37	37
Group	46	46	46	46	46	46	46

Table 2: (Continue)

Independent Variable	(1) LGDP	(2) LGDP	(3) LGDP	(4) LGDP	(5) LGDP	(6) LGDP	(7) LGDP
AR(1)	0.784	0.663	0.865	0.627	0.701	0.827	0.720
AR(2)	0.977	0.570	0.984	0.813	0.898	0.939	0.842
Hansen	0.270	0.217	0.327	0.223	0.283	0.232	0.245

Note: t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: GDP = Real GDP per capita, DEB = Debt-to-GDP ratio, INS = Institutional Quality, GCF = gross fixed capital formation as percentage of GDP, POP = Population growth annual, TRD = Trade as percentage of GDP.

Table 3: Role of institutional qualities on debt-growth relationship using interaction term

Independent Variable	**(1) LGDP**	**(2) LGDP**	**(3) LGDP**	**(4) LGDP**	**(5) LGDP**	**(6) LGDP**	**(7) LGDP**
L.lGDP	0.958***	0.970***	0.952***	0.968***	0.947***	0.962***	0.971***
	(222.55)	(361.27)	(131.35)	(288.49)	(283.12)	(221.08)	(188.64)
lDEB	-0.0584***	-0.0215***	-0.0441***	-0.0498***	-0.0683***	-0.0542***	-0.0278***
	(-9.42)	(-3.85)	(-9.47)	(-8.40)	(-11.05)	(-10.58)	(-7.38)
DEB*INS	-0.000679***						
	(-14.37)						
INS	0.0669***						
	(10.81)						
DEB*RQ		-0.000158***					
		(-6.42)					
RQ		0.0743***					
		(8.54)					
DEB*PS			-0.000565***				
			(-16.50)				
PS			0.0423***				
			(5.96)				
DEB*CC				-0.000705***			
				(-17.98)			
CC				0.0188**			
				(3.05)			
DEB*GE					-0.000753***		
					(-12.79)		
GE					0.112***		
					(11.51)		
DEB*RL						-0.000606***	
						(-18.14)	
RL						0.0570***	

Table 3: (Continue)

Independent Variable	(1) LGDP	(2) LGDP	(3) LGDP	(4) LGDP	(5) LGDP	(6) LGDP	(7) LGDP
DEB*VA							0.0000837
							(1.10)
VA							-0.0181*
							(-2.07)
lGCF	0.0374***	0.0245**	0.0850***	0.0734***	0.0304***	0.0388**	0.0423***
	(3.42)	(2.70)	(8.17)	(9.10)	(3.50)	(2.62)	(4.03)
lPOP	-0.00434	-0.0199**	-0.0449***	-0.0394***	-0.0186*	-0.00232	-0.0356***
	(-0.54)	(3.18)	(-5.93)	(-3.49)	(2.35)	(-0.31)	(-3.47)
lTRD	0.105***	0.121***	0.0936***	0.0885***	0.116***	0.104***	0.124***
	(12.63)	(23.54)	(11.87)	(14.36)	(13.76)	(9.77)	(12.33)
Constant	0.0360	-0.211***	-0.0530	-0.107	0.134*	-0.0140	-0.259***
	(0.49)	(-3.59)	(-0.72)	(-1.55)	(2.02)	(-0.20)	(-3.76)
Observation	183	183	183	183	183	183	183
Instruments	43	43	43	43	43	43	43
Group	46	46	46	46	46	46	46
AR(1)	0.759	0.714	0.524	0.590	0.797	0.749	0.770
AR(2)	0.710	0.913	0.699	0.845	0.605	0.703	0.704
Hansen	0.482	0.450	0.382	0.264	0.432	0.310	0.316

Note: *t* statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: GDP = Real GDP per capita, DEB = Debt-to-GDP ratio, INS = Institutional Quality, GCF = gross fixed capital formation as percentage of GDP, POP = Population growth annual, TRD = Trade as percentage of GDP.

4.3 *Robustness Check*

Table 4 is the robustness check of the above result by substituting the public debt-to-GDP ratio with the public debt-to-GNI ratio. The result was found to be consistent with the earlier one in terms of the signs of the coefficients of the variables used in the previous findings. However, there is a slight decrease in the respective correlation values of the present result. For example, whereas the coefficient of the interaction of the overall institution in Table 4 was -0.000679, the coefficient of the corresponding value in Table 5 was reduced to -0.000432 in the robustness check.

5. Conclusion and Recommendations

This paper examined the impact of public debt on economic growth, highlighting the role of institutional quality in SSA. Using the system GMM approach, a sample of 46 SSA countries was examined over the period 2000–2014. The result confirms that institutional quality has both the direct and indirect impact on economic growth and that public debt has a larger negative impact on economic growth when the indebted country is imbued with poor institutional quality. This suggests that institutional quality plays a crucial role in influencing the debt-growth relationship and that good institution, to a great extent, not only affect economic growth positively but also play a pivotal role in mitigating or even forestalling the needless implications of public debt burdens. Moreover, government effectiveness, control of corruption, and regulatory quality were found to have the strongest influence in moderating the negative impact of public debt on economic growth in SSA.

Although some institutional indicators seem to be more significant than others in moderating the negative impact of debt, to adequately exploit the unwavering benefits of public debt, the policymakers should make a concerted effort to improve all the subcategories of institutional indicators comprehensively. This could potentially play a key role in ensuring the proper collection and utilisation of public debt and eventually offer a key to the successful delivery of long-term economic benefits to SSA. This will not only mitigate but also forestall the negative impact of public debt that continues to stifle the efforts to realise sustainable economic growth in the region. Moreover, three other important variables appeared to be important in determining the economic growth in SSA. These are increasing the level of investment in the physical and human capital, reducing the population growth rate, and increasing the trade openness in the region. This conclusion has important policy implications that strengthen the agenda for institutional reform to attain sustainable growth and development in developing countries. It will also give rise to a reassessment of the former consensus that

considered adequate financial resources to be the only automatic way to resolve the problem of underdevelopment of developing countries. This finding will also draw the attention of the international financial institutions to believe that public debt is more effectively utilised in countries with better institutional quality. Finally, in the face of these findings, this research recommends further study to examine the long-run relationship so as to ascertain the causality between the institutional and public debt accumulation in the region.

Table 4: Robustness Check Using Debt-to-GNI Ratio

	(1) LGDP	(2) LGDP	(3) LGDP	(4) LGDP	(5) LGDP	(6) LGDP	(7) LGDP
L.lGDP	0.956***	0.968***	0.947***	0.961***	0.973***	0.964***	0.970***
	(332.47)	(332.56)	(209.67)	(163.88)	(291.29)	(259.89)	(272.10)
lDEB1	-0.0499***	-0.0446***	-0.0461***	-0.0386***	-0.0214***	-0.0520***	-0.0249***
	(-11.56)	(-11.26)	(-8.39)	(-5.01)	(-5.26)	(-10.87)	(-5.30)
INS	0.109***						
	(17.55)						
DEB*INS	-0.000432***						
	(-18.47)						
lGCF	0.0384***	0.0790***	0.0170**	0.122***	0.0475***	0.0484***	0.0660***
	(4.02)	(10.52)	(2.74)	(9.21)	(6.03)	(5.31)	(8.75)
lPOP	-0.0388***	-0.0166**	-0.0872***	-0.0285***	-0.0400***	-0.0430***	-0.0194*
	(8.82)	(3.23)	(10.51)	(-3.31)	(7.52)	(8.40)	(-2.27)
lTRD	0.134***	0.111***	0.153***	0.0764***	0.146***	0.133***	0.103***
	(19.79)	(13.68)	(18.01)	(7.55)	(21.80)	(16.12)	(22.58)
DEB*CC		-0.000329***					
		(-9.33)					
CC		0.0486***					
		(10.76)					
DEB*GE			-0.000265***				
			(-5.40)				
GE			0.166***				
			(19.70)				
DEB*PS				-0.000698***			
				(-24.66)			
PS				0.0600***			
				(8.42)			
DEB*RQ					-0.00000314		
					(-0.13)		

Table 4: (Continue)

	(1) LGDP	(2) LGDP	(3) LGDP	(4) LGDP	(5) LGDP	(6) LGDP	(7) LGDP
RQ					0.0746***		
					(7.38)		
DEB*RL						-0.000429***	
						(-22.69)	
RL						0.0893***	
						(10.24)	
DEB*VA							0.000330
							(6.83)
VA							-0.0140
							(-1.43)
Constant	-0.113*	-0.257***	-0.0664*	-0.188*	-0.422***	-0.197***	-0.257***
	(-2.29)	(-7.50)	(-2.17)	(-2.28)	(-7.77)	(-3.90)	(-4.69)
Observation	183	183	183	183	183	183	183
Instruments	43	43	43	43	43	43	43
Group	46	46	46	46	46	46	46
AR(1)	0.655	0.547	0.666	0.213	0.684	0.667	0.684
AR(2)	0.661	0.994	0.866	0.816	0.710	0.584	0.781
Hansen	0.431	0.366	0.351	0.388	0.170	0.310	0.206

Note: *t* statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: GDP = Real GDP per capita, DEB = Debt-to-GDP ratio, INS = Institutional Quality, GCF = gross fixed capital formation as percentage of GDP, POP = Population growth annual, TRD = Trade as percentage of GDP.

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