Drivers of unemployment intensity in sub-Saharan Africa: do government intervention and natural resources matter?

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Abstract

Purpose – African countries are endowed with both human and natural resources. These resources constitute integral components for any economic development due to the long-lasting relationship with all sectors in an economy, yet there is an obvious disagreement between growing economy and employment generation in Africa. Though there has been a growing pattern of economic size, particularly the gross domestic product (GDP) among African countries, most of these economies are low in human development. The disagreement between economic growth and employment generation in Africa despite abundant natural resources located on the continent calls for public discourse among scholars. Therefore, the purpose of the study is to examine the peculiar drivers of unemployment intensity in a region characterized by endowed resources.

Design/methodology/approach – The paper adopts two approaches; the authors employed the pooled mean group (PMG) estimator and utilised stochastic frontier analysis (SFA) to generate a government efficiency index between the period 1991 and 2017 among sub-Saharan Africa (SSA) countries.

Findings – The empirical results through the single output-multiple inputs framework indicate that on average, there is a low level of government efficiency towards increasing the objective of human development in Africa. However, in the long run, natural resource endowment has a positive and significant relationship with employment generation for SSA. Hence, the study established that a low level of government efficiency has a long-lasting effect on low human development experienced in Africa.

Social implications – The need to improve the level of government efficiency towards economic development by making both human and physical capital more effective will spur the exploration of natural resources.

Originality/value – The paper provides an empirical study of the effectiveness and efficiency of government through PMG and SFA in establishing the relationship between government approaches and employment level in selected SSA countries.

Keywords Unemployment, Natural resources, Government expenditure, Efficiency, Human development

Paper type Research paper

1. Introduction

African countries are endowed with both human and natural resources. These resources constitute integral components for any economic development due to their long-lasting

relationships with all sectors in an economy. On the average, the contribution of natural resources to an economy cannot be overemphasized due to the pace set for other sectors of the economy in the generation and expansion of output. Notably, African countries have received a spur in the output over the years in which 60% of these countries were resource-rich though this performance is not without involvement of government (Loizides and Vamoukas, 2005; Afonso and Jalles, 2011; Gisore *et al.*, 2014). The government's participation in economic activities tends towards meeting the well-being of populace through creating an enabling and sustainable environment for employment generation and output expansion (Gisore *et al.*, 2014; Sedrakyan and Candamio, 2019). Large economic growth is majorly associated with investment decisions and labour productivity as indicated by Cobb–Douglas production theory. In addition, an economy characterized by increased growth; employment opportunities and good quality of life ideally should be inevitable owing to the fact that capital and labour are effective and efficient component of a growing economy. There are many drivers of economic growth among African countries. However, the role of government intervention becomes vital owing to the enabling and sustainable environment government provides. According to the World Bank Development Report (2013), economic growth is achieved through various factors which include supply factors (natural resources, human resources, capital goods and technology), demand factor (population) (Rahman *et al.*, 2019; Dao, 2014) and efficiency factor (either productive or allocative efficiency). In particular, the role of labour force participation among African countries cannot be overemphasized owing to issues around labour intensive process. Labour productivity is considered a healthy and vibrant driver for an economy.

However, despite the expansion of output, increased government expenditure instrument and endowed resources, the development levels in most African countries are still low. Evidently, countries with the largest economies in Africa are among the countries rated with high unemployment rates (see Figures 1 and 2). In addition, most African countries are ranked low in human development indicators; the Human Development Index (HDI) was introduced by the United Nations Development Programme in 2018. Africa's economy has been characterized by increased growth without a corresponding reduction in the unemployment rate. The link between economic growth and unemployment, therefore, becomes questionable especially in sub-Saharan Africa, which is known to be characterized by the labour factor form of production processes. Studies over the years across different units have been carried out to examine and evaluate factors responsible for unemployment. Studies have examined both the supply and demand factors on unemployment (Shaar *et al.*, 2012; Ugwuegbe *et al.*, 2013; Osei *et al.*, 2015; Oluseyi *et al.*, 2016; Matthew and Ogunlusi, 2017; Mounkalia, 2017; Sajjad, 2017; Silvia and Nguyen, 2017). However, the phenomenon persists,

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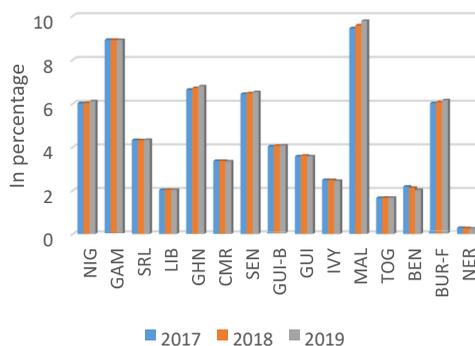
Figure 1.
Unemployment rate as
a percentage of total
labour force
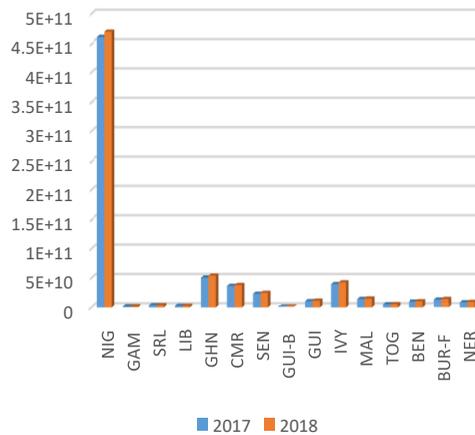
Figure 2.
GDP (Constant
2010 US$)

and there is divergent view in theories and empirical findings among studies on the direction of the relationship. Most African countries are faced with development issues such as high unemployment rate (Philip *et al.*, 2013 cited Nigeria unemployment rate at 23.9% in 2012), yet the report keeps on showing the growth of an economy.

Most countries in sub-Saharan Africa are characterized by the world's youngest population, which has the potential for driving African economic development though currently experiencing alarming youth unemployment. Akeju and Olanipekun (2014) revealed that high rate of unemployment over the years has been the attribute of most sub-Saharan Africa (SSA) economies despite the expansion of output. This result contradicts traditional economic postulates like the Okun's law, which found that an annual 2.5% rise in real growth rate causes unemployment to fall by 1% in an economy. Could this be a result of the ineffective and inefficient role of government among SSA countries? As argued by Keynesian proponents, government involvement accelerates market forces to adjust for any critical disturbance. Economic growth and employment opportunities are both part of macroeconomic variables that government policies were been formulated to address within a fiscal and financial framework across different countries. Allure to this, Africa has achieved a tremendous economic growth, particularly among SSA countries, 2.2% within the space of a decade (Kenya, 5.3%; South-Africa, 0.15%; Nigeria, 2.2%; Ghana, 6.4%; Gambia, 5.9% and Togo, 5.3%; (World Development Indicator, 2020). However, the rate of unemployment to the share of the labor force that is without work but available for and seeking employment have become alarming especially in SSA, 6.1% (Kenya, 2.6%; South-Africa, 28.1%; Nigeria, 8.0%; Ghana, 4.3%; Gambia, 9.0% and Togo, 2.0%; (World Development Indicator, 2020). Succinctly, the World Bank estimated that the highest resource-rich country has a low unemployment rate in comparison to other countries unlike the relationship between economic growth and unemployment rate in SSA. This places a significant role on natural resource endowment and government efficiency in Africa as a measure for tackling long-term low development. Hence, the potential of endowed resources and employment generation may be vulnerable when there are weak government institutions to provide an enabling and sustainable environment that will enhance a healthy and vibrant economy as proposed by Keynesians' proponents.

There is a persistent rise in the unemployment rate among sub-Saharan Africa coupled with output expansion that serves as a channel for economic growth. Economic growth in Africa has however not provided a sufficient platform for entrepreneurs that are ready and willing to work such that unemployment will significantly reduce despite the theoretical discourse that proved the role of economic growth: the platform for an entrepreneur to emerge (Lee, 2000). There has been a sharp increase in the extent to which economy grows in output among SSA countries, and at the same time, the unemployment rate has risen in Sub-Saharan Africa which induces the low development indicators. The role of government intervention, especially in equitable distribution, efficient production and economic stabilization for achieving well-being, is essential and cannot be overemphasized. In recent years, there has been discussion in the literature to examine the potential role of government in the equitable distribution, production and stabilization essentially in an environment characterized by macroeconomic imbalance (Rajan, 2010; Ranciere *et al.*, 2012; Pettis, 2013; Frank *et al.*, 2014; Bertrand and Morse, 2016; Piketty *et al.*, 2018). Also, studies have examined the importance of institution of government in achieving any of the welfare objectives with findings suggesting that the performance of government institution determines the development of an economy (Kim *et al.*, 2018; Hall and Ahmad, 2012; Slesman *et al.*, 2015; Acemoglu and Robinson, 2008). Hence, government performance determines the outcome for any development issues like unemployment.

Unemployment is seen as one of the most critical global economic problems especially among SSA countries. The most important economic policy used to solve this serious economic problem is government social spending since the public social policies are policies that directly affect the poor. The need for increased government performance becomes imperative. A performing government through the creation of an enabling and sustainable environment will induce investors and engage the active population in day-to-day activities; hence, improving job opportunities and increasing output expansion with which job creation for the active population will induce government performance through the reduction of social –vices. The macroeconomic imbalance caused by increasing expenditure patterns and issues around tax base of most African countries necessitates the need for public spending efficiency rather than a mere increase in public spending. In addition, African countries have experienced the increased pattern of public expenditure over the years without a corresponding increase in socioeconomic outcomes. Hence, owing to the growth of an economy without the corresponding creation of more employment opportunities and the nature of endowed resources located in Africa, the assessment of unemployment level will be incomplete, unreliable and inaccurate without examining the relationship between unemployment intensity and natural resources endowment. For this purpose, a two-stage approach of the econometric model is adopted. At the first stage, an index for government efficiency is generated using the econometric model of stochastic frontier analysis (SFA); this provides public spending efficiency adopted for the study owing to the centrally planned economy system practised among most African countries. The derived index was implemented for the second stage where a computable pooled mean group (PMG) estimator is employed for the relationship among unemployment, resource endowment and efficiency of government.

Following the introduction, we presented the study in four (4) sections. The existing studies on unemployment rate was presented in section 2, a summary of methodology was presented in section 3 consisting empirical model, technique of analysis, data and sources. In section 4, the empirical results and discussions followed while section 5 provided conclusion and policy recommendations (see Figure 3 and Table 1).
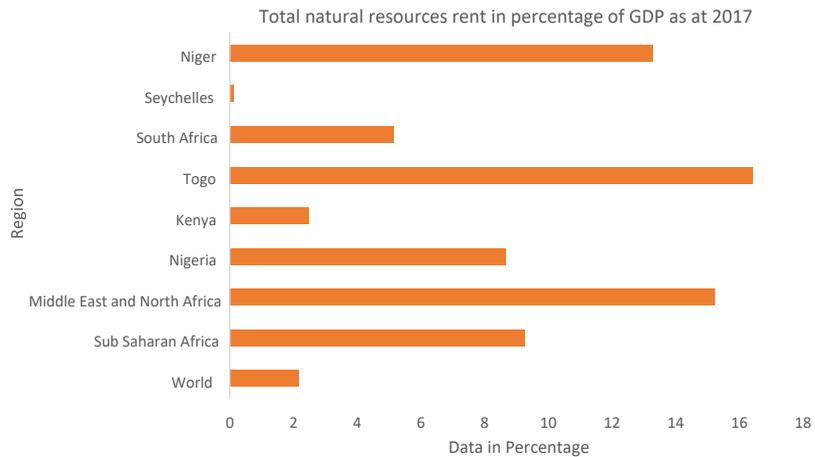
Total natural resources rent in percentage of GDP as at 2017

2. Literature review

2.1 Theoretical review

The paradigm of economic growth draws strength from investment decision and labour productivity that brings about employment generation as explained by the Okun (1962). This is related to the Okun's law that found a positive relationship between economic growth and employment generation. Although the drivers of economic development are not without government intervention, there are divergent views on the link of government intervention and the outcomes (Sedrakyan and Candamio, 2019; Gitana *et al.*, 2018; Tanchev, 2016; Forte and Magazzino, 2016; Gisore *et al.*, 2014; Usman *et al.*, 2011). However, the underpinning theories emphasized government intervention as the key component for economic development, especially in mitigating the market mechanism crisis. The theoretical view of Keynesian and Wagnerian perspectives on government intervention sees increase in government expenditure as the fuel for rise in economic activities such as output and employment through multiplier effect (Sedrakyan and Candamio, 2019). The Keynesians' proponents strongly believe that government intervention is majorly to provide good welfare for the populace through output and employment generation. Hence, an increase in government expenditure should be an increase in socio-economic outcomes (Peacock and Wiseman, 1961; Musgrave, 1969; Prasetyo and Zuuhdi, 2013; Sedrakyan and Candamio, 2019). Government intervention is regarded as growth-enhancing, therefore, employment generation is expected. Okuns law proposed direct link between economic growth and employment generation. While government expenditure has been on the rise over time and endowed natural resources for most of sub-Saharan countries are integral components for driving the size of an economy, yet development indicators are ranked low in SSA among the regions of the world. The attribute of government intervention across the globe in correcting economic imbalances suspect has not been efficient in the SSA region. Nonetheless, further investigation is necessary to ascertain drivers of unemployment intensity. Studies have discussed efficiency as the ability to produce an output with the least input factors (Bolarinwa *et al.*, 2021). An efficient government intervention enhances economic development (Barrios and Schaechter, 2008; Shen *et al.*, 2015; macek and Janku, 2015).

2.2 Empirical review

Empirical studies have established divergent findings on the nexus between economic growth and employment generation. The argument for economic growth as the driver for

Very high human development (above 0.8)	High human development (above 0.7)	Medium human development (above 0.5)	Low human development (below 0.5)
Seychelles	Algeria	Morocco	Rwanda
	Tunisia	Cabo Verde	Nigeria
	Botswana	Namibia	Tanzania
	Libya	Congo	Uganda
	South Africa	Eswatini	Mauritania
	Gabon	Ghana	Madagascar
	Egypt	Zambia	Benin
		Equatorial Guinea	Lesotho
		Kenya	Cote d'Ivoire
		Angola	Senegal
		Cameroon	Togo
		Zimbabwe	Sudan
			Djibouti
			Malawi
			Ethiopia
			Gambia
			Guinea
			Liberia
			Guinea-Bissau
			Congo DR
			Mozambique
			Sierra-Leone
			Burkina-Faso
			Mali
			Burundi
			South Sudan
			Chad
			Central African Republic
			Niger

Source(s): Calculations based on data from the United Nations (2019), UNESCO Institute for Statistics (2019), United Nations (2017), World Bank (2019), Barro and Lee (2018) and IMF (2018)

Table 1.
Classifications of human development in Africa (2018)

employment generation has highly been documented in the literature (Okun, 1962; Lee, 2000; Viren, 2001) though there are some views that found otherwise emphasizing that growth may not bring a performance of labour market outcomes (Keller and Nabil, 2002), especially when there is a weak institutional framework. Unemployment has been the most complex phenomenon in the history of development, especially among the developing regions' like Africa owing to the structure and institutional framework of the region's economy. There has been a growing concern among scholars, government and international organizations in recent decades on the measures to address unemployment intensity among African countries. Over the past decades, there has been a substantial rise in the development level with about 50%, which was strongly attributed to economic growth recorded between 1990 and 2010 (Doumbia, 2018). In addition, Okun's law of 1962 explained the substantial agreement that exists between economic growth and employment level with emphasis on the economic growth as a measure for unemployment reduction. However, in the recent time, studies have revealed that unemployment is the attribute of most African countries despite the growing nature of output. There are theoretical and empirical issues surrounding the unemployment problem without a concrete consensus. Based on the share of the labor force that is without work but available for and seeking employment, studies across development and labour

economics have examined the determinants of unemployment phenomenon with divergent findings.

Perugini and Signorelli (2010) critically investigated macroeconomics and microeconomic variables by employing financial crises, low human capital, mismatching skills and job requirement effects on unemployment while Scarpetta *et al.* (2010) also examined the effect of economic crisis on unemployment. Findings suggested that the size of gross domestic product (GDP) or GDP per capita is not enough for employment generation but rather structural and institutional factors are the pivotal issues that were most significant for economic development, especially employment generation.

The persistence of unemployment among nations calls for public discourse without the exemption of researchers and policymakers. Other notable studies are the role of financial constraint to generate employment (Choudhry *et al.*, 2012); the introduction of methodological approach of fixed effect to address unemployment phenomenon and the role of early youth involvement in economic activities (Carling and Larson, 2005). They concluded on the inconsistent effect financial constraint on employment generation. The government's role becomes indispensable, and evidence shows that an increase in minimum wage creates a substantial reduction in unemployment (Iden, 1980; Neumark and Wascher, 1992; Abowd *et al.*, 2000). Government legislation has a potential influence on unemployment reduction, especially in well-structured institutions that play a significant role on its performance. This could be due to the fact that government institutions are meant to address social well-being issues of the populace though some studies revealed that government minimum wage has a negative relationship with employment generation (O'Higgins, 2001).

The contribution of economic growth towards development in most African countries is mostly determined by the effectiveness and efficiency of government spending owing to institutional framework of the region. Over the years, studies have examined the role of government advantage to economic progress for many regions. According to Keynesian proponents, government expenditure is an integral measure of social well-being. Studies have revealed economic advantages of increasing government size (Sedrakyan and Candamio, 2019; Gisore *et al.*, 2014; Patricia and Izuhukwu, 2013; Afonso and Jalles, 2011) but not without limitations (Usman *et al.*, 2011; Folster and Henrekson, 2001; Cashin, 1995; Gregoriou and Ghosh, 2009), especially in developing regions like Africa where limited tax base and macroeconomic uncertainty are the attributes of most economies. The need for efficiency of government spending becomes imperative owing to the efficiency concept which emphasized rising development outcomes without incurring increasing government spending instruments. Hence, African region development strongly depends on the availability and quality of government effectiveness and efficiency particularly due to negative relationship that exists between economic growth and natural resources in some studies (Auty, 1990, 2003; Grossman and Krueger, 1995; Shao and Qi, 2009; Van der Ploeg and Venables, 2009; Van der Ploeg, 2011; Van Der Ploeg and Poelhekke, 2017; Apergis and Payne, 2014; Gilberthorpe and Papyrakis, 2015; Venables, 2016) over the years since Africa is synonymous with natural resources abundance.

A country with abundant assets such as human, physical and natural assets, and economic development sounds coherent and achievable. However, in reality, the development tends to be ambiguous as African countries are continuously and naturally endowed despite the low development. Charles *et al.* (2018) revealed the potential contribution of natural resource endowment to boosting and increasing economic development. In addition, studies in the past have investigated the dimensions of endowed resources in influencing economic development. Wang *et al.* (2017) investigated the role of natural resources on environmental quality. Shahbaz *et al.* (2019) examined the role of natural resources toward carbon emission. Li *et al.* (2018) examined the relationship among economic development, natural resources and environmental quality though there is no consensus on the relationship between

economic development and natural resources. However, findings show that natural resources grow both economic growth and environmental degradation across studies. Hence, natural resources and economic development are conducive to making up the current research gap. The inability of resource-rich countries to transmit resource wealth to growth may be the reason for the low development of African countries thereby inhibiting their ability to develop human capital, boost employment generation and enhance the income earning potentials of their citizens (Collier and Laroche, 2015; Mesagan and Eregha, 2019). The resource endowment in Africa does not translate to economic development; likewise, human development is in comatose despite economic growth experienced. Specifically, the study investigates the effect of government efficiency and endowed natural resources on unemployment. There are few studies that adopted computed index of SFA for government spending efficiency to examine the effect on unemployment, which constituted contributions to the body of knowledge and the extant literature.

3. Methodology

3.1 Empirical model

Following extant studies (Okun, 1962; Lee, 2000; Viren, 2001; Silverstone and Harris, 2001; Sogner and Stiassny, 2002), the empirical model for the nexus between unemployment and size of an economy was criticized. The Solow growth model explained economic growth through the various input factors particularly the labour input, which explains the number of workers involved in the output process. However, the economic growth among SSA countries as Cobb–Douglas mathematical form explicitly specifies does not translate to economic development despite the existing studies in the literature, which postulate negative relationship between economic growth and unemployment rate. Essentially, the relationship between economic growth and unemployment majorly draws strength from government efficiency coupled with endowed resources located in the SSA region. This thereby suggests the relationship among these variables, since government institutional efficiency is sine qua non to economic development. The study adopts various preestimation tests in a bid to validating the appropriate and reliable model for the relationship. First, panel unit root test was conducted following Pesaran *et al*. (1999) owing to the large number of countries, large length of the time series and, lastly, to avoid spurious regression, nonstationary deserves more attention. Hence, Levin, Lin and Chu test was implemented owing to moderate size and makes computation feasible and sufficiently powerful. However, for robustness, Im, Pesaran and Shin, augmented Dickey–Fuller and Philip–Peron tests were implemented. Second, lag length selection was used for the optimal lag length selection. Third, we implemented the SFA to generate public spending efficiency as the index. Finally, we estimated our model using PMG estimation technique introduced by Pesaran *et al*. (1999). We specify the following model to establish the effect of government intervention and natural resource endowment on unemployment;

$$UNE_{it} = \alpha_0 + \alpha_1 GOV_{it} + \alpha_2 RENT_{it} + \alpha_3 EFF_{it} + \alpha_4 GDP_{it} + \alpha_5 LFP_{it} + \beta \sum X_{it} + \varepsilon_{it}$$

(1)

where in equation (1), UNE is the share of the labor force that is without work but available for and seeking employment, GOV is the ratio of government expenditure and government instruments in this study are expected to stabilize economy using appropriate fiscal measures. Hence, the ratio of government expenditure is expected to be negatively related with the unemployment rate particularly for welfare objective of government (Prasetyo and Zuhdi, 2013; Forte and Magazzino, 2016). RENT is the total natural resource rents which are expected to have a negative relationship with the unemployment rate though the abundance of natural

resources is not synonymous with economic development (Van Der Ploeg and Poelhekke, 2017). EFF is the government efficiency calculated by the SFA, and subscripts i and t are countries and time periods used in the study. To achieve the welfare objective of the government, the quality of government spending must increase and as such, government efficiency is expected to be negatively related with the unemployment rate. GDP is the per capita income in $US, LFP is the proportion of the population ages 15 and older that is economically active and $\sum X_{it}$ is the vector of l variables for sensitivity of the model. The efficiency score calculated by SFA was achieved through the specified model in equation (3), using single output-multiple inputs approach. The SFA was implemented owing to the strength of generating an index for efficiency. In this approach, the government as an institution is held responsible for producing well-being for the populace through various factors which include labour effectiveness, capital utilization, rent resources and government instrument. The measure for efficiency level in this study draws strength from stochastic frontier owing to the peculiar attribute attached to the measurement such as functional representation and the separation of technical inefficiency from noisy effect (Aigner *et al.*, 1977; Meeusen and van Den Broeck, 1977; Pitt and Lee, 1981; Jondrow *et al.*, 1982; Schmidt and Sickles, 1984; Battese and Coelli, 1988, 1992, 1995; Kumbhakar, 1990; Greene, 2005, 2008). The basic SFA is thus specified as follows:

$$Y_{it} = \beta X_{it}^1 + V_{it} - U_{it} = \beta X_{it}^1 + \varepsilon_{it} \text{ for } i = 1, \ldots, n, t = 1, \ldots T \tag{2}$$

where Y_{it} is a scalar output, X_{it} is a $k \times 1$ vector of covariates, β is a $k \times 1$ vector of parameters, V_{it} is noise and U_{it} represent technical inefficiency. In the study, the production efficiency model in line with the submission of extant literature was adopted (Battese and Coelli, 1988, 1992, 1995; Kumbhakar, 1990; Greene, 2005, 2008). From equation (2), the technical efficiency of production for the i-th country at time t is defined as follows:

$$TE_{it} = \frac{\exp (\beta X it + Vit - Uit)}{\exp(\beta X it + Vit)} \tag{3}$$

Simply put $\mathbf{TE_{it}} = \exp (U_{it})$

The production efficiency model as used in the study is therefore specified as follows:

$$HDI = \alpha LFP_{it} + \beta GFC_{it} + \theta GOV_{it} + \delta RENT_{it} \tag{4}$$

where the output is measured by the human development index and the input used in the production is the proportion of the population ages 15 and older that is economically active (LFP), gross capital formation (GFC), ratio of government expenditure (GOV) and total natural resource rents (RENT). On the overall, the analysis was implemented by STATA software. Hence, the PMG model from the equations above can be specified as follows:

$$\Delta UNE_{it} = \alpha_0 + \sum_{I=1}^{P} \beta_1 \Delta UNE_{it-1} + \sum_{I=1}^{P} \beta_2 \Delta GOV_{it-1} + \sum_{I=1}^{P} \beta_3 \Delta RENT_{it-1} + \sum_{I=1}^{P} \beta_4 \Delta EFF_{it-1}$$

$$+ \sum_{I=1}^{P} \beta_5 \Delta GDP_{it-1} + \sum_{I=1}^{P} \beta_6 \Delta X_{it-1} + \delta_1 GOV_{it} + \delta_2 RENT_{it} + \delta_3 EFF_{it} + \delta_4 GDP_{it}$$

$$+ \sum_{I=1}^{P} \delta_5 X_{it-1} + \acute{\Gamma} ECM_{it} + \varepsilon_{it}$$

$$\tag{5}$$

where β_1 to β_6 are short-run parameters and $\acute{\Gamma}$ is the adjustment parameter, which is expected to be negatively significant.

We estimated two strategies in the study. The first stage was adopted to know the performance of government using SFA while in the second stage, PMG was adopted to investigate the relationship that exists among unemployment, government intervention and natural resources.

3.2 Data and sources

Our data span between the period 1991 and 2017 for 17 African countries: Nigeria, Ghana, Gambia, Sierra-Leone, Cameroon, South-Africa, Cote d'Ivore, Mali, Togo, Burkina-Faso, Niger, Zimbabwe, Uganda, Mozambique, Kenya, Gabon and Botswana. The countries in the analysis are selected from the SSA region following the study of Akeju and Olanipekun (2014), and owing to SSA country location gives unique and important economic and geographical comparative advantages and offers opportunities and access to compete in the global market. The period under investigation is majorly constrained by data availability and post-colonial era of government institution. The World Bank Development database managed by the World Bank Group (2020) serves as the source of our data. The variables, government expenditure (GOV) and resource rent (RENT) are used as the measure for government effectiveness while SFA generates the measure for government efficiency (EFF). GDP per capital is used to proxy the size of an economy. These variables are expected to be negatively related with the dependent variable following the Keynesian and Wagnerian proponents on the positive relationship between government spending and economic development. The dependent variable in the model is unemployment rate (UNE) and variable measures in the model are explained in Table 2.

4. Empirical results and discussions

The empirical results for understanding the unemployment intensity among countries in Africa were presented and divided into three sub-sections. The first sub-section presents the preestimation test comprising of descriptive statistics, correlation analysis, the unit root tests and lag length selection while sub-section 2 presents the empirical results on the PMG estimator.

4.1 Preestimation analysis of the variables

The empirical analysis of the study starts with preestimation test, which are presented between Tables 3 and 6 in the study. On the descriptive result in Table 3, the unemployment rate has an average of about 8% in Africa. The worst unemployment rate among African countries has about 33% of the labor force that is without work but available for and seeking employment. This situates the low development that is characterized by African countries compared to opportunities in the labour market associated with the global South. Although the African economy still has as low as 0.3% of her labor force that is without work but available for and seeking employment, the result indicates that the unemployment indicator has a large divergence among African countries which put the countries in different levels of HDI. Similarly, the macroeconomic objective specifically for economic growth improved in Africa economy. On average, Africa countries have per capita income of $2,145. In particular, the best growing size of an African economy stood at $11,949 while the least economy size stood at $200. This suggests a growing pattern of Africa's economy with critics for measuring the performance of an economy. These results are well commendable though the economy has not performed according to expectation because the country has not taken full advantage of the human resources available as evidenced by the 33% unemployment level ravaging the youthful population. The economy diversification among the countries led to output expansion although did not translate to development. There is an internal consistency

Variables	Symbols	Measurement	Source
Unemployment	UNE	Unemployment refers to the share of the labor force that is without work but available for and seeking employment	WDI
Size of an economy	GDP	This is measured by per capita income in $US	WDI
Government expenditure	GOV	This is the ratio of government expenditure to GDP	WDI
Resources endowment	RENT	This is measured by total natural resource rents (% of GDP)	WDI
Efficiency of public spending	EFF	This is calculated by the SFA of 5 variables in *single output-multiple input framework*	Author computation
Output (HDI)		The Human Development Index (HDI) is an index that measures key dimensions of human development	WDI
Input (LFP)		Labor force participation rate is the proportion of the population ages 15 and older that is economically active	WDI
(GFC)		This is measured by gross capital formation (% of GDP)	WDI
(GOV)		This is the ratio of government expenditure (% of GDP)	WDI
(RENT)		This is measured by total natural resource rents (% of GDP)	WDI
Source(s): Authors' compilation			

Table 2.
Data and sources

Variable	Obs	Mean	Std. dev.	Min	Max
UNE	459	8.0018	7.3716	0.317	33.473
GDP	459	2145.446	2759.314	200.2979	11949.28
GOV	459	14.2265	5.0609	0.9112	30.0692
RENT	459	10.7418	7.8086	0.4228	53.6271
EFF	459	0.4552	0.1464	0.0089	0.7746
LFP	459	19.0670	1.5149	16.4644	22.8819
GFC	459	19.159	7.644	−2.424	48.4
Source(s): Authors' compilation					

Table 3.
Descriptive statistics of variables

of all the series as the means and medians lie between the maximum and minimum values of each variable.

Quantifying government performance, the average performance of country in Africa between 1991 and 2017 uses an average of 14% government spending instrument during the period of analysis. Also, as indicated by the maximum value, African countries spend the maximum proportion of 30% of government expenditure while the least government spending among African countries stood at 0.9%. This shows the level of government effectiveness in the African economy coupled with the expected role for healthy living of the people. In addition, a large proportion of African countries are resource rich as evidenced in the maximum value of rent resources with 53%, which is commendable while resources poor stood at 0.42%. This shows that resources represent the integral component for African development. However, the government performance in the continent is not fully explored as shown by an average of 45%. This implies that on average, African countries have not maximized youth potential, capital, government funds and resource endowment to achieve optimum human development.

Similarly, the study examines the correlation between the variables. The result was presented in Table 4. As shown, the correlation coefficients are not as unexpected of the variables. For instance, there is a moderate negative relationship between unemployment and rent resources. Besides, unemployment and size of the economy show a positive relationship.

Moreover, all the coefficients are largely less than 0.5 showing that there is no inherent problem of simultaneity asides from unemployment and the size of economy which is greater than 0.5. Thus, the empirical results are not biased and fit for policy formulations. Furthermore, the study examines the unit root properties of the variables using four tests and individual effect only model. The results are presented in Table 5. Overall, the results are not as unexpected, the variables are a combination of both I(0) and I(1). Moreover, in establishing the relationship between unemployment and government effectiveness and efficiency in selected countries in sub-Saharan Africa, the unit root test established that all our variables are stationary at first difference. The results are presented in Table 5 while the optimal lag length criteria that minimizes the Minimum Bayesian Information Criterion (MBIC), Minimum Akaike Information Criterion (MAIC) and Minimum Qartz Information Criterion (MQIC) satisfied the Hansen's J test for over-identifying restrictions; hence, one lag was selected as MBIC, MAIC and MQIC criteria are lower than two lag lengths (Table 6).

4.2 Empirical results of the pooled mean group estimator

The PMG model was estimated on one lag with result showing long- and short-run coefficients. To obtain unbiased, reliable and robust estimates, four PMG models were

Variable	UNE	GOV	RENT	EFF	GDP	LFP
UNE	1.0000					
GOV	0.3551	1.0000				
RENT	−0.0686	−0.2777	1.0000			
EFF	0.0846	−0.0611	0.0139	1.0000		
GDP	0.7564	0.1954	0.2379	−0.0980	1.0000	
LFP	0.4121	−0.0982	0.0115	−0.0427	0.4447	1.0000
Source(s): Authors' compilation						

Table 4. Correlation matrix of the model variables

Variable	LLC	IPS	ADF-Fisher	PP-Fisher
UNE	−0.6085	−1.0625	46.8240[*]	24.1235
GDP	−2.6932[***]	2.1753	30.2877	11.8867
GOV	−2.8741[***]	−2.9895[***]	57.5683[***]	54.4217[***]
RENT	−2.3665[***]	−2.0789[**]	47.8075[**]	50.4474[**]
EFF	−1.0202	−0.5405	49.1455[**]	25.0803
LFP	0.2880	6.1454	18.1105	9.0832
ΔUNE	−4.7086[***]	−5.9045[***]	108.235[***]	94.2556[***]
ΔGDP	−8.4753[***]	−11.0452[***]	181.894[***]	236.927[***]
ΔEFF	−6.7476[***]	−7.3964[***]	130.489[***]	133.586[***]
ΔLFP	−10.6352[***]	−12.7420[***]	205.903[***]	233.264[***]
Note(s): [***], [**] and [*] represent the 1, 5 and 10% significant level, respectively				
Source(s): Authors' compilation				

Table 5. Panel unit root result of variables

Lag	CD	J	J p-value	MBIC	MAIC	MQIC
1	1	90.4829	0.0695	−339.2641	−53.5171	−166.7775
2	1	24.1494	0.9162	−184.7554	−45.8506	−100.9077
Source(s): Authors' compilation						

Table 6. Lag length criteria for the model

analyzed. The empirical results of the study were presented in Tables 7 and 8, with the baseline model shown in column 1 while column 2 presents government effectiveness and efficiency with labour-intensive approach in the model. Lastly, column 3 and 4 present the interaction effect of government effectiveness and efficiency on the unemployment level. The study specifically determines the extent to which government effectiveness and efficiency influence SSA unemployment. Overall, the models' Hausman test proves that there exists long run homogeneity for the selected SSA countries. The empirical result of the Hausman test satisfies PMG models, and the convergence coefficients signs are not as unexpected with a significant level at 5% for the chosen PMG models. The empirical result shows that the average value of the convergence coefficient is 0.0904 and thus implies that the various speed of adjustment is fast for long-run equilibrium to be achieved in SSA.

The empirical result addresses the unemployment level in SSA with long-run result in Table 7 revealing that government expenditure does not reduce unemployment in SSA countries. There is a positive and significant relationship between government expenditure and unemployment level. As government spending increases, the unemployment level rises, this may be due to the structure and institutional setting of government instrument in SSA. This result is in consonance with the finding that suggested higher government size slowdown economic performance (Schaltegger and Torgler, 2006; Gregoriou and Ghosh, 2009; Usman *et al.*, 2011). However, government spending interaction with natural resources implies a vast reduction in the unemployment level of the SSA economy as indicated in column 4 where government spending increases while the unemployment rate reduces. This suggests if the government instrument is focused and targeted at natural resource endowment, improvement and enhancement of economic performance is inevitable especially the reduction of unemployment level among SSA countries owing to integral contributions natural resources have with other sectors. Also, it is evident in Table 7 that natural resources played a significant role in the economic performance of SSA countries. Notably, natural resources endowment has a negative and significant relationship with the unemployment level. By implication, as resource rent increases, the unemployment level reduces among SSA. In the long run, this could be the ability of the resource-rich countries to convert and/transform natural resources endowment to economic performance through human capital development, output expansion, employment generation and improve the potential growth of

Dependent variable: Unemployment LR coefficient	Pooled mean group			
	I	II	III	IV
GOV	0.0848 (0.0225)***	0.0086 (0.0162)	0.2035 (0.0345)***	−0.2804 (0.0663)***
RENT	−0.1459 (0.0217)***	−0.0852 (0.0154)***	−0.0448 (0.0185)**	−0.5127 (0.0708)***
EFF	12.4622 (0.2944)***	11.7309 (0.2894)***	20.5890 (1.8867)***	13.0392 (0.8086)***
GDP	0.00003 (0.0002)	0.00008 (0.00008)	0.0002 (0.00005)***	−0.00002 (0.0001)
LFP	–	−0.3361 (0.1167)***	–	–
EFF_RENT	–	–	0.0504 (0.0247)**	–
EFF_GDP	–	–	−0.6491 (0.1729)***	–
GOV_RENT	–	–	0.0016 (0.0009)*	0.0333 (0.0049)***
GOV_EFF	–	–	−0.3861 (0.0732)***	−0.0711 (0.0626)
Convergence coefficient (ECT)	−0.0904 (0.0492)**	−0.1443 (0.0515)***	−0.1085 (0.0395)***	−0.1036 (0.0579)*

Table 7.
Empirical result of the long-run model

Note(s): The standard error is presented in parenthesis while ***, ** and * represent the 1, 5 and 10% significant level, respectively. ECT represents error correction term
Source(s): Authors' compilation

Dependent variable: Unemployment		Pooled mean group		
SR coefficient	I	II	III	IV
ΔGOV	0.0495 (0.0061)***	0.0504 (0.0048)***	0.0401 (0.0949)	0.1460 (0.0435)***
ΔRENT	−0.0017 (0.0091)	0.0029 (0.0084)	−0.2450 (0.2253)	0.0407 (0.0552)
ΔEFF	9.9745 (0.6312)***	9.6017 (0.6293)***	32.0441 (31.4025)	12.0233 (1.3868)***
ΔGDP	0.0001 (0.0004)	−0.0015 (0.0014)	−0.0009 (0.0012)	0.00009 (0.0004)
ΔLFP	–	2.1259 (1.1827)*	–	–
EFF_RENT	–	–	0.0113 (0.0557)	–
EFF_GDP	–	–	−2.0403 (3.8294)	–
GOV_RENT	–	–	0.0127 (0.0109)	−0.0026 (0.0035)
GOV_EFF	–	–	−0.1219 (0.1148)	−0.1737 (0.0979)*
Constant	0.6282 (0.3207)***	1.9614 (0.7799)**	−0.0161 (0.2579)	1.4790 (1.0315)

Note(s): The standard error is presented in parenthesis while ***, ** and * represent the 1, 5 and 10% significant level, respectively
Source(s): Authors' compilation

Table 8.
Empirical result of the short-run model

the region. This conforms to the finding on natural resources as a measure for boosting economic performance (Charles *et al.*, 2018). Furthermore, there is a varying performance of government spending among SSA countries. Hence, government efficiency has not been targeted to reduce the unemployment level in SSA. There is positive and significant relationship between government efficiency level and unemployment rate in SSA. This implies that the proportion of labour force participation, the degree of investment, government funds and rent resources have not been addressing rising human development; hence, to address economic development especially on employment opportunities, government investment must center on skills acquisition that will equip and transform available resources in the region. Therefore, government performance does not reduce unemployment among SSA countries owing to a low efficient level of government in improving human development. The result reveals that as government performance rises, the unemployment rate in SSA also increases. Though the size of the economies keeps on expanding, it has not really addressed human development. As expected, the proportion of labour force active participation has a great potential of reducing unemployment as revealed in the empirical result in column 3 of long-run result.

Furthermore, the empirical result also presented the short-run analysis of the models as presented in Table 8. In the short run, only government expenditure and government efficiency have a significant effect on unemployment. All other forms of effects on the unemployment exhibit insignificant relationships even rent resource and size of an economy. This provides full grasp about government instrument that has a long-lasting impact on the development of an economy whatever direction it takes. Though the size of an economy is a major driver for government intervention, government involvement particularly in a developing economy is a necessary condition for economic development. In essence, this result shows the necessary needs for collaboration among stakeholders for sustainable government intervention instrument.

5. Conclusion and policy recommendation
The study on unemployment intensity among sub-Saharan Africa has revealed some salient issues about the SSA economy; First, within the period of the study, there has been an increasing size of SSA economy though this does not translate to economic development. Second, natural resource endowment remains an integral component for the employment

generation of SSA economy and lastly, the direction of government involvement determines the degree of economic performance for most countries in sub-Sahara Africa. Notably, government is relatively low in the provisions of basic human development despite the growing nature of expenditure profile although there is the need for greater intervention of government but not without rise in the performance of government expenditure.

Hence, the following recommendations are made to ensure a viable, reliable and sustainable SSA economy. One, the government of SSA needs to improve the level of government efficiency towards economic development by investing in infrastructural facilities that will aid the exploration of natural resources and grow the human resources. Two, government spending instruments must be focused to create opportunities for the youth and enabling environment for ease of converting raw material to finished products. Lastly, the study recorded that government intervention most especially in a developing pseudo capitalist economy like SSA is a necessary condition for economic growth and development. Government should, therefore, encourage collaboration of all stakeholders in the administration to access necessary intervention programs in the country to solve unemployment problems. The study has extended the frontier of knowledge on the relationship between government efficiency, natural resource endowment and unemployment level in the SSA economy. The study provides insight to policymakers to know that economic development is low among SSA countries and effort should be geared towards increasing government efficiency level. Hence, future studies in this area can be carried out on African countries by incorporating the regional analysis among the countries.

Note

1. In 1928, Charles Cobb and Paul Douglas published a study in which they modeled the growth of an economy. They considered a simplified view of the economy in which production output is determined by the amount of labour involved and the amount of capital invested while there are assumptions factor in to make an economic performed.

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