

**IMPACT OF DISAGGREGATED PUBLIC EXPENDITURE ON UNEMPLOYMENT RATE OF SELECTED AFRICAN COUNTRIES: A PANEL DYNAMIC ANALYSIS**

**ABSTRACT**

*The study examined the impact of disaggregated public expenditure on unemployment rate in selected African countries with panel data spanning from 2000 to 2017. The data were majorly sourced from the World Bank Indicator. The study employed Generalized Method of Moments (GMM) techniques for empirical analysis. The findings of two-step system GMM showed that expenditure on infrastructure and education reduce unemployment rate, while expenditure on defense and health increase unemployment rate in the region. The short-run elasticity estimate showed that infrastructure and education expenditures reduce unemployment rate by 9% and 1.83%. A unit rise in defense and health expenditure increase unemployment rate by 5.2% and 84.5%. The long-run elasticities of infrastructure and education expenditure reduce unemployment rate by 3.8% and 7.89 %, while the long-run defense and health expenditure elasticities increase unemployment rate by 22.22% and 364.58% in the selected African countries. The policy implication is that, the positive relationship between expenditure on health and unemployment could be attributed to mismanagement of government funds due to corruption, while that of defense and unemployment could be high rate of insecurity and crimes in the region. Therefore, the study recommended among others a drastic measure to further improve the education sector through adequate investment in education that will help in skills, development and training.*

**Keywords: System GMM, Health, Defense, Education, Infrastructure, Unemployment.**

**Introduction:**

**1.1 Background to the study**

Public expenditure plays an important role in aggregate economy in multiple dimensions and has remained a crucial issue in economic development, and most especially in the less developing countries of Sub-Saharan Africa (Peter, 2015). Public expenditure has occupied a

42 strategic position in various economies of the world and it is an important instrument in public  
43 sector policy. No economy exists without incurring public spending for the benefit of its citizens  
44 and to stimulate economic activities. In an underdeveloped country, public expenditure has an  
45 active role to play in reducing regional disparities, developing social overheads, creation of  
46 infrastructure of economic growth in the form of transport and communication facilities,  
47 education and training, growth of capital goods industries, basic and key industries, research and  
48 development, reducing unemployment rate and so on (Bhatia, 2002).

49 Government role in the economy has been subjected to series of debate over the years.  
50 Some argue against large governments others believe that without government's participatory  
51 role to guides the economy, countries could be endangered with unstable growth which may lead  
52 to prolonged recessions and massive rates of unemployment. Nwosa (2014) opined that the role  
53 of government includes the financial bail-outs of the entire economy or a particular sector of the  
54 economy which is to increase the government expenditure. But challenges still remain, despite  
55 increase in government spending especially for the structural transformations to create more jobs  
56 and reduce poverty by deepening investment in agriculture and developing agricultural value  
57 chains to spur modern manufacturing and services in African countries.

58 African Economic Outlook (2018) portrayed that African countries growth rate have not  
59 been accompanied by high job growth rates, employment grew at an annual average of 2.8  
60 percent between 2000 and 2008 roughly half the rate of economic growth. Algeria, Burundi,  
61 Botswana, Cameroon, and Morocco experienced employment growth of more than 4 percent.  
62 Between 2009 and 2014, annual employment growth increased to an average of 3.1 percent  
63 despite slower economic growth. But this figure was still 1.4 percentage points below average  
64 economic growth. Slow job growth has primarily affected women and youth (ages 15–24).  
65 Africa is estimated to have had 226 million youth in 2015, a figure projected to increase 42  
66 percent, to 321 million by 2030. The lack of job growth has retarded poverty reduction. Although  
67 the proportion of poor people in Africa declined from 56 percent in 1990 to 43 percent in 2012,  
68 the number of poor people increased. Inequality also increased, with the Gini coefficient rising  
69 from 0.52 in 1993 to 0.56 in 2008.

70 The effect of government expenditure on employment generation has been subject to  
71 considerable interest in recent years. There has been growing concern about the extent to which  
72 government expenditure has impacted the unemployment rate in African countries. The rising

73 cost of governance remained a challenge by African countries; the public expenditure size has  
74 expanded which has generated interest in both developed and developing world to optimize the  
75 size of government. The need to provide and expand the tentacles of public goods becoming too  
76 obvious and unavoidable recognized, mismanagement and misappropriation of public  
77 expenditure in the economy cannot be underestimated, coupled with the pressing demand to  
78 expand and cater for the rising population via provision of employment opportunities.  
79 Employment is generated when job opportunities are provided by the government through their  
80 expenditure arm of the provision of social and economic infrastructural amenities in the  
81 economy. Hence, Jhinghan, (2008) opined that the provision of infrastructural facilities through  
82 public funds has dual purpose of generating employment opportunities directly while at the same  
83 time using the amenities towards encouraging the productive sectors in order to produce and  
84 provide employment opportunities for the populace/labour force (Araga, 2016). Although, high  
85 rate of unemployment is not peculiar to less developed countries but also developed ones. The  
86 macroeconomic problem is severe in LDCs' including African countries.

87 Lack of employment opportunities aggravates unemployment situation in which some  
88 employable persons, in the labour force, with requisite qualifications, skills and ability are  
89 willing and seeking to work but cannot get jobs (Adawo, Essien and Ekpo, 2012). In related  
90 terms, deficiency in employment opportunities (Jhinghan, 2008) leads to involuntary idleness of  
91 persons who are willing to work at the prevailing wage rate but unable to find work. The level of  
92 employment (Nwosa, 2014) measures the proportion of the available labour force that is  
93 employed in the economy. Amidst the unresolved foregoing controversies, most African  
94 countries are still faced with rising rate of unemployment where employable persons, in the  
95 labour force, with required qualifications, skills and ability are willing and seeking to work but  
96 cannot get jobs (Adawo, Essien and Ekpo, 2012). Therefore, the policy makers emphasized on  
97 the roles of public sector expenditure as important instrument which the government can apply to  
98 restore some economic problems such as reduction in inequality, poor living standards, high rate  
99 of unemployment, dwindling oil price and the desire to restore the economy on the part of full  
100 employment, increase in economic growth etc. However, it has been argued that, the rising state  
101 of public expenditure contributed to employment generation, this has continued to generate  
102 series of debate among scholars, the empirical and theoretical positions on the subject is quite  
103 diverse and still remain mixed.

104 According to empirical evidences of Estache, Ianchovichina, Bacon and Salamon, (2013);  
105 Holden and Sparrman, (2013); Faramarzi, Avazalipour, Khaleghi and Hakimipour, (2014);  
106 Carmignani, (2014), government expenditure can enhance the level of employment and reduce  
107 unemployment in both developed and developing countries. However in spite of the huge  
108 government expenditure being spent on productive sectors such as infrastructures, defense of the  
109 citizenry, education and healthcare in Africa, there has been continuous rise in the level of  
110 unemployment in the continent. Therefore, it is against these issues raised above that this study  
111 examine whether gross public expenditure has any impact on unemployment rate in selected  
112 African countries. Hence, the study provides answers to the impact of public expenditure of  
113 selected African countries on the unemployment. The study is structured to the following  
114 arrangement, section one captures the background to the study, section two focuses on detailed  
115 theoretical propositions and empirical review. Section three explains the method adopts to  
116 analyze the data while section four shows outcome of results and interpretations. Finally, section  
117 five entails summary, conclusion and policy recommendations.

## 118 **2. LITERATURE REVIEW**

### 119 **2.1 Theoretical Review**

120 The theory of employment has always centered on two major arguments and strand of  
121 literature, among them are classical and Keynesian theories of employment. At the forefront of  
122 this theory, the classical economists assumed a full employment of labour and the flexibility of  
123 prices and wages to bring about the full employment in the case of any deviation. The classical  
124 assumption of full employment is based on the belief that over-production and general  
125 unemployment are impossible. In case of any unemployment, it is believed to be abnormal and  
126 will not continue for long since there are economic factors (self-adjusting mechanism) that  
127 inherently work towards bringing it back to equilibrium (Onodugoet *al*, 2017). To this end  
128 therefore, the economy does not need government intervention through spending to achieve full  
129 employment since there is the existence of full employment.

130 Another strand of argument follows the Keynesian theory of employment which states that  
131 in the short run, economic growth through full employment is strongly influenced by total  
132 spending in the economy. Hence, the economy is being regarded as inherently unstable and  
133 required active government intervention through spending to achieve full employment. He is also

134 of the view that public expenditures can contribute positively to economic growth by increasing  
135 government consumption through increase in employment, profitability and investment. This  
136 theory believes that active government intervention in the market place through government  
137 expenditure was the only method for ensuring full employment by ensuring efficiency in  
138 resources allocation and regulation of markets (Sangkuhl, 2015).

139 In support of this theory, Abu and Abdullahi (2010) asserted that in the Keynesian model,  
140 an increase in government expenditure leads to a higher economic growth. Hence, fiscal policy is  
141 a technique to attain and maintain the level of full employment by manipulating public  
142 expenditure and revenue in such a way so as to keep equilibrium between effective demand and  
143 supply of goods and services. In like manner, Dewett and Navalur (2012) posit that if depression  
144 occurs, fiscal policy should help in increasing demand and an increase in demand leads to  
145 increase in output. As such, the government can increase its expenditure and spend more on  
146 public works which will provide employment to more people. And a budget deficit during a  
147 depression they believe is a positive help in fighting unemployment and stimulating output  
148 growth.

149 This work will adopt Keynesian theory of employment just like Araga (2016), because (a)  
150 most empirical evidence revealed that government intervention is inevitable in every economy  
151 around the world today. This was demonstrated during the recent economic recession that lead  
152 government providing funds to bail out some failed banks in UK, USA, Nigeria, etc.(b)  
153 Government intervention is required in providing basic social and economic infrastructural  
154 facilities such as roads, schools, hospitals, etc. for the development of the economy(c)  
155 Government expenditures in capital public projects bring about the development of  
156 infrastructural facilities which can improve productive sectors of the economy and as such create  
157 employment opportunities for the populace, to mention but a few.

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## 161 **2.1 Empirical Review**

### 162 **2.2.1 Studies on the Relationship between Unemployment and Government Expenditures**

163 **in Non-Africa**

164 Holden and Sparrman (2013) empirically analyzed the effect of government purchases on  
165 unemployment in 20 OECD countries from 1980 to 2007. Using ex post factor methodology, the  
166 findings revealed that an increase in government purchases reduced unemployment by about 0.3  
167 percentage point in the same year. The effect was also observed to be greater in downturns than  
168 in booms, while greater under a fixed exchange rate regime than a floating regime. Faramarzi  
169 *al* (2014) examined the long run impact of government expenditure and tax on liquidity and  
170 employment in Iranian economy with time series data spanning 1976-2009. Employing Vector  
171 Auto regressive model (VAR), Vector Error Connection (VECM) and co-integration techniques,  
172 the results indicate that government expenditure have positive impact on both employment and  
173 liquidity while tax has negative effect on employment.

174 Monacilliet *al.* (2010) analyzed the effect of fiscal policy on labour market variables in the  
175 United States. Using a VAR model, the result showed that hour and employment also rise  
176 significantly in response to a government spending stock. Also, increase in government spending  
177 of 1 percent of GDP generated output and unemployment multiplier around 1.3 and 0.6  
178 respectively, implying that each percentage point increase in GDP produces an increase in  
179 employment of about 1.3 million jobs. Kasau, *et al* (2015) examined the effect of government  
180 spending and investment towards job opportunities in Eastern and at the KBI both direct and  
181 indirect as well as the total influence in both regions from 2007 to 2013. The panel data was  
182 analyzed using SEM (Structural Equation Modeling) and the result revealed that government  
183 spending has significant positive effect on the Investment and Employment either indirectly or in  
184 total

185 Aziz and Leruth (1997) analyzed the effect of changes in the composition of government  
186 expenditure between consumption and investment goods on the long run and short run  
187 fluctuations of the U.S economy. Using quantitative research methodology, the result revealed  
188 that the effects of changing the composition of government spending through government  
189 purchases can have efficiency effects as well as affect short run volatility of macroeconomic  
190 variables such as output and employment. Anthanasios (2013) using the SVAR methodology to  
191 analyze unemployment effects of fiscal policy in Greece, found a negative relationship between  
192 unemployment and government purchases and a positive relationship between tax and  
193 unemployment. In like manner, Tagkalakis (2013) examined the unemployment effects of fiscal

194 policy changes in Greece from 2000-2012. Adopting the Blanchard and Perotti (2002) SVAR  
195 methodology, he found that unemployment reduced when there was an increase in government  
196 purchases, government consumption, the government wage bill and government investment, but  
197 it increased when there was a cut in government purchases and its components.

198 Mahmood *et al.* (2014) investigated the causes of unemployment in Pakistan. They  
199 discovered that budget deficit significantly increased unemployment. The study had employed  
200 variance inflation factor analysis and Stepwise regression. Their results were similar to his  
201 conclusion as they found out that fiscal expansion increased output, private consumption and  
202 private investment and reduced unemployment. Battaglini and Coate (2011) explored the  
203 interaction between fiscal policy and unemployment in OECD countries with panel data from  
204 2006 to 2010. Using OLS of fixed effect technique, the result revealed that government spending  
205 has positive relationship with unemployment. Laokulrach (2013) examined the effect of fiscal  
206 policies on service sector employment in Thailand. Adopting multiple regression method, he  
207 found out that fiscal policy had no significant relationship with employment rate.

208 Umut (2015) examined the effect of fiscal policy in Netherland, adopted a VAR technique.  
209 The result showed that fiscal shocks exert significant impact on GDP, Unemployment rate,  
210 Consumption and Investment. Hence, unemployment rises in response to a fiscal contraction and  
211 falls to fiscal expansion. Samira and Khalil (2015) studied the effect of government civil  
212 expenditures on unemployment rate in Iran from 1997-2013. Employed Johansen co-integration  
213 test, (VAR) and VECM techniques. The result showed long run relationship and a negative  
214 impact on unemployment rate.

### 215 **2.2.2 Studies on the Relationship between Unemployment and Government Expenditures** 216 **in Africa**

217 Nwosa (2014) explored the impact of government expenditure on unemployment and  
218 poverty rates in Nigeria for the period 1981 to 2011. Employing the OLS estimation technique,  
219 he observed that government expenditure significantly and directly influences unemployment  
220 rate but inversely and insignificantly affects poverty rate. Okoye, Evbuomwan, Modebe and  
221 Ezeji (2016) investigated the effect of fiscal deficit on unemployment in Nigeria from u used the  
222 vector error correction model (VECM) and granger causality test and found a significant  
223 negative and causal relationship. The study also applied the Ordinary Least Square econometric

224 technique. Araga (2016) examined the implications of public expenditure pattern particularly in  
225 road infrastructure, agriculture sector, road construction, and education sector on employment  
226 rate in Nigeria from 1980-2014 by adopting the VECM and Co-Integration. The result revealed  
227 that agriculture expenditure (AGREX) and road construction expenditure (RCEXP) have  
228 significant negative effect on employment (EMPR) while transport expenditure (TREXP) and  
229 education expenditure (EDEXP) have positive significant effect on rate of employment (EMPR).

230 Emeka (2018) analyzed the Budget Deficit and Unemployment Nexus in Nigeria with a  
231 time series data spanning 1997 - 2017. Employing linear regression and Vector Error Correction  
232 Mechanisms (VECM), the findings revealed that Government Annual Deficit has a significant  
233 positive effect on the Unemployment Rate in Nigeria. Murwirapachena, *et al* (2013) investigated  
234 the effect of fiscal policy on unemployment in South Africa from 1980 to 2010. Employing  
235 vector error correction model and co-integration techniques, the findings showed that  
236 government recurrent expenditure and tax has positive relationship on unemployment whereas  
237 capital expenditure had a negative effect.

238 Chimeziri (2016) examined the Effect of Federal Government Expenditure on  
239 Unemployment in Nigeria from 1981 to 2014. Using OLS technique, the result indicated that  
240 federal government expenditure variables (Expenditure on Administration, economic service,  
241 social and community service, and transfer) jointly have positive and significant impact on  
242 unemployment in Nigeria. Individually, only government expenditure on economic services  
243 affected unemployment significantly and negatively. Ubi and Inyang (2018) analyzed the fiscal  
244 deficit and its implication on Nigeria's economic development from 1980 to 2016. Using  
245 quantitative technique, they observed that fiscal deficit did not reduce unemployment rate.

246 Egbulonu and Amadi (2016) investigated the relationship between fiscal policy and  
247 unemployment rate in Nigeria for the period 1970 to 2013. Using co-integration test and a  
248 parsimonious Error Correction Model (ECM), the result showed a long run relationship between  
249 unemployment rate and fiscal policy tools (Government Expenditure, Government Debt Stock  
250 and Government Tax Revenue). Also there existed a negative relationship between expenditure  
251 and government debt and unemployment rate in Nigeria while government tax revenue indicated  
252 a  
253 positive relationship with unemployment rate. However, the granger causality test showed that  
254 there was no causality running from either of government expenditure or unemployment.



255           Wosowei (2013) empirically studied the link between fiscal deficit and unemployment rate  
256 in Nigeria with time series data spanning 1980-2010. Using Ordinary Least Square and co  
257 integration techniques, the findings revealed a bi-directional causal relationship between  
258 unemployment and deficit. In a similar study employing the same method of analysis, Egbulonu  
259 and Amadi (2016) analyzed the fiscal policy and unemployment rate association in Nigeria  
260 from 1970 to 2013. Their findings revealed a negative relationship between unemployment and  
261 fiscal policy in long-run. Onodugo, *et al.* (2017) empirically examined the impact of public sector  
262 expenditures (CEXP and REXP) together with private sector investment (PINV) on  
263 unemployment in Nigeria from 1980 to 2013. Using a regression model Capital expenditure and  
264 private sector investment have negative effect on unemployment in the medium and long-run.

265           Abubakar (2016) investigated the effect of fiscal policy shocks on output and  
266 unemployment in Nigeria under the Keynesian framework from 1981-2015. Using the Structural  
267 Vector Auto regression (SVAR) methodology and co-integration, the result revealed that shocks  
268 to public expenditure have a long-lasting positive effect on output growth. Also revenue is found  
269 to reduce unemployment in the short run, while public expenditure is found to produce no  
270 significant effect on unemployment. Finally, there exist long run equilibrium relationships  
271 among the variables. Fagbohun (2017) examined the impact of budget deficit on economic  
272 performance in Nigeria from 1970 to 2013. Employing the least square method, he found that  
273 budget deficits did not increase the employment rate in Nigeria. In same manner a study carried  
274 out by Ayogoeze and Anidiobu (2017) revealed that government budget deficit had had a  
275 positive and insignificant impact on unemployment rate in Nigeria within 1986 – 2015. The  
276 methodology used was Ordinary Least Square Method.

### 277 **3. DATA AND METHODOLOGY**

#### 278 **3.1 Data and Measurement**

279           The selection of the sample period and countries are based on the availability of annual  
280 data, ranging from 2000 to 2017. The selected African countries are classified by World Bank.  
281 Hence this work makes use of a balanced panel data of 20 African countries (four from each sub-  
282 region); Angola, Benin, Botswana, Cameroun, Central African Republic, Chad, Egypt,  
283 Equatorial Guinea, Ethiopia, Ghana, Kenya, Mauritius, Morocco, Namibia, Nigeria, South  
284 Africa, Sudan, Tanzania, Togo and Tunisia.

285 The study considered panel series data on real unemployment rate, defense expenditure, health  
286 expenditure and education expenditure obtained from World Development Indicator (WDI)  
287 online database which was published by the World Bank. The variables above are measured as  
288 follows; Unemployment Rate (UNEMP): Unemployment refers to the condition of having no  
289 job. The International Labour Organization (ILO) defines the unemployed as numbers of the  
290 economically active population who are without work but available for and seeking work,  
291 including people who have lost their jobs and those who have voluntarily left work (World Bank,  
292 1998). Unemployment rate is the percentage of the working population that is not currently  
293 employed. The percentage only takes into account the number of unemployed persons who are  
294 actively seeking employment. Those who are unemployed and not seeking jobs are considered to  
295 be “voluntarily” unemployed. Annual growth of gross fixed capital formation (GFCF) based on  
296 U.S dollar. This includes plant, machinery, and equipment purchases; and the construction of  
297 roads, railways, and the like, including schools, offices, hospitals, private residential dwellings,  
298 and commercial and industrial buildings. Defense expenditure (DEXP) measured in U.S dollar,  
299 this is the military expenditure (% of general government expenditure). This includes all current  
300 and capital expenditures on the armed forces, including peacekeeping forces, defense ministries  
301 and other government agencies engaged in defense projects. Health expenditure (HEXP), this is  
302 the general government expenditure on education (current, capital, and transfers), is expressed as  
303 a percentage of total general government expenditure on all sectors (including health, education,  
304 social services, etc.). It includes expenditure funded by transfers from international sources to  
305 government. General government usually refers to local, regional and central governments.  
306 (Onuoha and Agbede, 2019).

307



336 estimator for this purpose, this dynamic panel estimator also allows us to control for the  
337 endogeneity of all the other regressors in the model and at the same time control for the  
338 econometric problems that arise from the inclusion of the initial selected unemployment  
339 rate variables as an explanatory variable. This estimator involves estimating the equations in  
340 levels and in differences.

341 For the levels equations lagged values of all explanatory variables are used as instruments while  
342 for the differenced equation we use the lagged values in levels of all explanatory variables as  
343 instruments. The two equations levels and differenced are then combined to give the GMM  
344 system estimators. These instrumental variables are called internal instruments because they rely  
345 on previous realizations of the explanatory variables and we test their validity using the Sargan  
346 test and their consistency using the second-order serial correlation test.

### 347 **3.3 The Long-run GMM Estimates**

348 The mathematical computation of the long run elasticity coefficient for the  $K^{\text{th}}$  parameter is  
349 specified as;

350  $\beta / (1 - \phi)$  where  $\beta$  is the short run coefficient of the explanatory variables,  $\phi$  is the coefficient  
351 of the lagged dependent variable.

### 352 **3.3 Justification of the use of the model**

353 The method of GMM is chosen because our panel is of  $N > T$  ( $N=20$ ,  $T=18$ ) size. However, two-  
354 step system GMM was chosen over one-step system GMM for the following reasons;

- 355 i. It is the augmented two-step difference GMM
- 356 ii. It is more robust to one-step system GMM
- 357 iii. It is more efficient and robust to treating heteroskedasticity and autocorrelation

358 Following Bond (2001)'s rule of thumb for selection between Difference GMM or System  
359 GMM, decision is based on the following criteria:

- 360 .i. Pooled OLS  $\rightarrow \phi$  estimate biased upwards
- 361 ii. FE  $\rightarrow \phi$  estimate biased downward
- 362 iii. Diff. GMM  $\rightarrow \phi$  estimate lies below or close to FE estimate. It is biased downward and

363 iv. Use system GMM estimator,

364 Our model indicate that system GMM is preferable for analyzing our dynamic model.

## 365 **4.0 EMPIRICAL RESULTS**

### 366 **4.1 Selection between Difference GMM and System GMM**

367 Based on Blundell-Bond (2001) rule of thumb, the estimated one-step and two-step difference  
368 GMM are both less than fixed effect estimate. This implies that difference GMM is downward  
369 biased and as such Blundell and Bond (1998) proposed use of system GMM.

370

371 **Table 1: Bound test Estimators (involving Pool, FE, Diff. GMM and Sys. GMM)**

<b>Estimators</b>	<b>Coefficients</b>
<b>Pooled OLS</b>	<i>0.97345</i>
<b>Fixed Effects</b>	<i>0.88352</i>
<b>One-step Diff.GMM</b>	<i>0.72452</i>
<b>Two-step Diff. GMM</b>	<i>0.60144</i>
<b>One-step Sys. GMM</b>	<i>0.78624</i>
<b>Two-step Sys. GMM</b>	<i>0.76818</i>

372 **Source: Author's computation**

373

### 374 **4.2 Two-Step System GMM Estimation Regression Results**

375 The results of the two-step system GMM estimation is considered more appropriate as indicated  
376 by the bound testresult in table 1proposed by Bond (2001). The result indicates that a unit  
377 increase in gfcf and edexp bring about 0.009 and 0.0183 decrease in unemp respectively. Also, a  
378 unit increase in dexp and hexp bring about 0.0515and 0.8451increase in unemp respectively.  
379 Statistically, all the explanatory variables significantly influenced unemp (unemployment rates)

380 in the selected countries of Africa. This implies that expenditure on infrastructure (gfcf) and  
 381 education (edexp) reduce unemployment rates rate in the region under study, while expenditure  
 382 on defense and health increase unemployment rate. The overall statistics is significant which  
 383 implies that the variables are stable. In like manner, number of groups is greater than the number  
 384 of instruments which means that the model is good.

385 However, Sargan and Hansen tests of over identification restrictions indicate that p-values are  
 386 not significant (0.78 and .803). This implies that we will not reject the null hypothesis and so we  
 387 conclude that all instruments as a group are pure exogenous. Hence, the instruments used in the  
 388 model are desirable.

389 Finally, the Arellano-Bond tests for AR (2) insecond order autocorrelation tests is insignificant  
 390 (0.129). This means acceptance of null hypothesis and we conclude that error term of the  
 391 differenced equation is not serially correlated at 2nd order.

392 **Table 2: Comprehensive GMM results**

<i>Variable</i>	<b>Pool Regression</b>	<b>Fixed Effect</b>	<b>One-step D.GMM</b>	<b>Two-step D.GMM</b>	<b>One-step sys. GMM</b>	<b>Two-step System GMM</b>
<i>unemp(-1)</i>	<b>0.9734***</b> (0.0000)	<b>0.884***</b> (0.0000)	<b>0.7245***</b> (0.005)	<b>0.6014**</b> (0.041)	<b>0.7862***</b> (0.000)	<b>0.7682***</b> (0.000)
<i>Gfcf</i>	<b>-0.0086***</b> (0.001)	<b>-0.0089*</b> (0.07)	<b>-0.0067</b> (0.176)	<b>-0.0049</b> (0.318)	<b>-0.008*</b> (0.076)	<b>-0.009**</b> (0.044)
<i>Dexp</i>	<b>0.0053</b> (0.331)	<b>0.0182</b> (0.257)	<b>0.0062</b> (0.657)	<b>0.0102</b> (0.459)	<b>0.046</b> (0.135)	<b>0.0515**</b> (0.043)
<i>Hexp</i>	<b>0.1679***</b> (0.012)	<b>0.1338***</b> (0.008)	<b>-0.2525**</b> (0.024)	<b>-0.2514**</b> (0.037)	<b>0.8068*</b> (0.07)	<b>0.8451***</b> (0.002)
<i>Edexp</i>	<b>-0.0072*</b> (0.076)	<b>-0.0099</b> (0.432)	<b>0.0184</b> (0.185)	<b>0.0096</b> (0.451)	<b>-0.0181**</b> (0.054)	<b>-0.0183***</b> (0.010)
<b>Diagnostic test</b>						
<b>AR(1)</b>			<b>0.126</b>	<b>0.205</b>	<b>0.004</b>	<b>0.004</b>
<b>AR(2)</b>			<b>0.075</b>	<b>0.091</b>	<b>0.092</b>	<b>0.129</b>

Sargan test			0.316	0.316	0.780	0.78
hansen test			0.335	0.335	0.803	0.803
Obs	323	323	304	304	323	323
Prob>F	0.000		0.000	0.0015	0.000	0.000
No of Groups			19	19	19	19
No of instruments			6	6	8	8

393 \*\*\*designate the significance at 1% significance level, \*\*designate the significance at 5%  
394 significance level while \*designate the significance at 10% significance level. The regression  
395 coefficients are estimated using the Arellano and Bover (1995) and Blundell and Bond (1998)  
396 Two-step System GMM estimation approach. AR(1) and AR(2) are Arellano and Bond (1991)  
397 tests for autocorrelation indifferences. Sargan test (Arellano and Bond (1991)) and Hansen test  
398 for over-identification restrictions. p values for these tests shown in parenthesis. Estimation uses  
399 the xtabond2 (Roodman, 2009) and two-step robustnodiffsarganinstata 15. GMM type  
400 instruments for the difference equation include fourth and fifth lags of unemployment rate and  
401 collapse. Standard-type instruments for the difference equation include the first differences of  
402 gfcf, dexp, hexp, edexp, variables. GMM-type instruments for the level equation include the  
403 lagged first difference of unemployment rate variable and collapse option.

404 **Source: Authors Computations**

405 **4.2 Unemployment rate variable Elasticity Estimate Calculated Using the Estimates of Table 2**

406 **Table 3: Long run GMM Elasticity Estimates**

	Unemp	prob*
<b>Short run</b>		
<b>Gfcf</b>	<b>-0.009**</b>	(0.044)
<b>Dexp</b>	<b>0.0515**</b>	(0.043)
<b>Hexp</b>	<b>0.8451***</b>	(0.002)
<b>Edexp</b>	<b>0.0183***</b>	(0.010)
<b>Long run</b>		
<b>Gfcf</b>	<b>-0.0388</b>	
<b>Dexp</b>	<b>0.2222</b>	
<b>Hexp</b>	<b>3.6458</b>	

***Edexp*            *-0.0789***

407 \*\*\*designate the significance at 1% significance level, \*\*designate the significance at 5%  
408 significance level while \*designate the significance at 10% significance level.

409 **Source: Author's computation**

### 410 **4.3 Analysis of Short and Long-run Elasticity**

411 The short-run unemployment rate elasticity indicates that a 1% increase in gfcf and edexp  
412 reduced unemp by a value of 9% and 1.83% respectively. Also, the short run dexp and  
413 hexpelasticities are 0.0515 and 0.8451 which implies that a 1% increase in dexp and hexp  
414 increase unemp by a value of 5.2% and 84.5% respectively. The long-run elasticities are obtained  
415 by dividing the short-run elasticities by one minus the estimated coefficient on the lagged  
416 UNEMP variable. The long-run gfcf and edexpelastitiesare0.0388 and 0.0789indicatingthat a  
417 1% increase in gfcf and edexpducedunemp by a value of 3.8% and 7.89 %respectively.  
418 Also,the long-run dexp and hexpelasticities are 0.2222and 3.6458which indicate that a 1%  
419 increase in dexp and hexpincreased unemp by 22.22% and 364.58% respectively.

### 420 **4.4 DISCUSSION OF FINDINGS**

421 The short-run unemployment rate elasticity indicates that a 1% increase in gfcf and edexp  
422 reduced unemp by a value of 9% and 1.83% respectively. The finding corroborates with the  
423 study of Okoye *et al* (2016). Also, the short run dexp and hexpelasticities are 0.0515 and 0.8451  
424 which implies that a 1% increase in dexp and hexp increase unemp by a value of 5.2% and  
425 84.5% respectively, this finding is in line with the work of Chimeziri (2016). Also, the long run  
426 effects of gfcf and edexp on unemp are 0.0388 and 0.0789. This means that a percent change in  
427 infrastructural expenditure (gfcf) and education expenditures (edexp) are associated with  
428 0.0388% and 0.0789% reduction in unemployment rate in the long run. This finding is in  
429 agreement with the studies of Mahmood *et al*(2014) and Samiral and Khalil (2015) but against  
430 the work of Araga (2016) in terms of infrastructural expenditure. Hence, infrastructural and



431 educational expenditures have larger inverse effect on unemp in the long run (0.0338 and  
432 0.0789) than in the short run (0.009 and 0.0183). On the other hand, the long run effects of dexp  
433 and hexp on unemp are 0.2222 and 3.6458. This means that a percent change in defense  
434 expenditure (dexp) and health expenditures (hexp) are associated with 0.2222% and 3.6458%  
435 increase in unemployment rate in the long run, as established by Faramarzi *et al* (2014) study.  
436 Hence, defense and health expenditures have larger positive effect on unemp in the long run  
437 (0.2222 and 3.6458) than in the short run (0.0515 and 0.8451), this result is in line with the studies  
438 of Murwirapachena *et al* (2013) and Emeka (2018).

## 439 **5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

440 The major objective of this research work is to examine the impact of gross public  
441 expenditure on unemployment rate in selected African countries with panel data from 2000 to  
442 2017. The study employed dynamic panel Approach of two-step system Generalized Method of  
443 Moments (GMM) techniques for empirical analysis. The findings from the two-step GMM result  
444 shows that gross fixed capital formation and education expenditure have an inverse relationship  
445 with the unemployment rate in selected African countries. The study also finds that expenditure  
446 on defense and health increase unemployment rate in the region. However, all the variables  
447 investigated are statistically significant. The inability of defense and health expenditure to meet  
448 up with *apriori* could be attributed to high rate of insecurity and crime as a result of joblessness,  
449 and mismanagement of funds meant for health sector due to corruption in the region. In  
450 conclusion, the study unravelled that unemployment rate in selected African countries had  
451 created the emergence of militants groups, constituting hiccups to security of lives and properties  
452 in the region.

453 Therefore, the study recommends stiffer constraints for cases of mismanagement of  
454 government funds by economic managers in order to limit the occurrence of repeated cases.  
455 Also, adequate attentions should be given to infrastructural development in order to build up  
456 productive capacity through government expenditure. There is need for drastic measures to  
457 improve the educational sector through adequate investment in education that will help in skills  
458 development and training. Finally, more effort should be given to the health sector at all levels  
459 with the government and private sector in order to improve the capacity for additional  
460 opportunities.

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