




HUMAN CAPITAL DEVELOPMENT AND GROWTH IN AFRICA: DOES YOUTH UNEMPLOYMENT MATTER?



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ABSTRACT

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The rates of youth unemployment and low human capital development in Africa have been worrisome. This study empirically investigated the role that youth unemployment played in the relationship between human capital and growth in Africa. The effects of both male and female youth unemployment on growth were examined. A system generalized method of moment (GMM) was used to estimate the model employed in the study. It was found that youth unemployment had resulted to a detrimental effect on growth in Africa in diverse ways. While, male youth unemployment was found to have a negative and statistically significant effect on growth, female youth unemployment shows no statistically significant effect on GDP per capita in Africa. Among the human capital development indices used in the regression, only primary school enrollment was found to have a positive and statistically significant effect on GDP per capita. Secondary and tertiary enrollments were found to be statistically insignificant. Appropriate policies geared towards job creation for the youths and human capital development would reduce the detrimental effect of youth unemployment and low human capacity building on long run growth.

Contribution/ Originality: This study contributes to the existing literature by investigating the effects of male and female youth unemployment on the relationship between human capital and growth in Africa. The study uses recent data to examine the theme and provides interesting findings as well as some policy lessons.

1. INTRODUCTION

High rate of youth unemployment had characterized the economies of developing countries in the Asia and Africa. With about 64 million unemployed youth worldwide and 157 million¹ employed young people living in poverty (ILO, 2017) youth unemployment has remained a global challenge and serious policy concern. The high rate of youth unemployment and alarming rise in working youth living in poverty could result to difficulty in achieving the global goal to end poverty and improve standard of living in 2030.

In the past three decades, African youth population had significantly grown and expected to double to over 830 million in 2050 (AfDB, 2016). In 2015, Africa's youth constituted about 19% of the population of youth globally. This figure is predicted to increase by 42% in 2030 (ILO, 2016). Working youths can play a crucial role to the growth and development of countries globally. Despite the critical value of youth in the supply of labour in an economy, youth unemployment has been very high in Africa due to several factors, namely, financial crisis, lack of

¹ 37.7 percent of working youths are in extreme of moderate poverty in developing and emerging economies in 2018.

access to entrepreneurship training and formal education, skills mismatch and inadequate access to capital, among others. The rate of youth² unemployment is one of the challenges facing many developing countries including Africa. For instance, in sub-Saharan Africa, average youth unemployment rate increased from 11.7% in 2008 to 13.4% in 2018. The high rate of youth unemployment has deepening poverty and resulted to high rate of crime, high migration rate out of Africa, increases conflict on the continent and social exclusion. Available statistics revealed that about 10 to 20 million youth enter workforce each year, only 3.1 million employments are created leaving a large number of youth unemployed (AfDB, 2016). The high rate of youth unemployment in Africa shows the failure to explore one of the greatest assets of the continent to increase productivity and promote growth.

Human capital formation shape employment opportunities and provide assess of young people to decent and formal jobs. However, the global benchmarked learning assessments suggest that many youths lack the required skills to compete in the international labour market. High deficiency in the quality of education among young people suggests that the effect of schooling on productivity is far below expectation. Poor quality education of the youths in Africa directly lowers productivity and hinders individual from acquiring new skills. In 2015, 79 percent of primary school age children were enrolled in sub-Saharan Africa which is far below the world average of 91 percent. Further, sub-Saharan Africa (SSA) has a high rate of education exclusion; available statistics from UNESCO³ shows that about one-fifth of children between the ages of 6-11 have no access to primary education, one-third of youth between the ages of 12-14 are out of school and 60% of youths between the ages of 15-17 are dropped-out of formal education (UNESCO, 2016).

The role of youth employment in the economic progress had generated serious concern in Africa. Youth are seen as energetic and innovative human resource that could drive growth. However, high youth unemployment rate in Africa could slow down growth. Youth plays significant roles in driving the growth of China, India and the Newly Industrialized Countries of the Association of Southeast Asian Countries (ASEAN5). The average growth rate of Africa countries in general was far below the rate achieved by most of the East Asian Economies. Although an impressive growth was recorded in Africa between 2010 and 2014 with an average GDP growth of 4.7%, by 2016 following the global commodity price shocks, GDP growth decline to 2.1% (UNCTAD, 2019). Comparing the growth rate of SSA with the ASEAN5 countries; in 2016, these countries recorded an average growth of 5.1% while the SSA countries' growth stood at 1.5%⁴. Following economic recovery in 2018, SSA growth was estimated to be 3.1% in 2018; this again was well below the average growth rate of ASEAN5 which was 5.3%. These statistics show that even at the pace of SSA economic recovery, it could not compete with the growth trajectory of the Newly Industrialized Countries (NIC) of Asia. Following the aforementioned problems some research questions are pertinent. What extent has youth unemployment affected growth in Africa? Has education attainment improved growth in Africa? What are the differential impact of youth unemployment and education on growth in SSA and North Africa? The principal purpose of this paper is to empirically investigate the relationship among youth unemployment, human capital development and growth in Africa. Specifically, the study would assess the impact of both male and female youth unemployment on growth. Further, the effect of the various level of human capital development (primary, secondary and tertiary) on growth would be analyzed.

This study is different from the earlier studies in several ways. First, previous empirical studies had generally focused on the relationship between unemployment and growth without considering how youth unemployment could affect growth (see for instance, (Choudhry *et al.*, 2012; Baa-Boateng, 2013; Chang and Fung, 2016)). Given the contribution of youth to national development and how youth employment can reduce poverty, crime, social crisis and enhance economic activities in developing countries, it is relevant to investigate whether youth unemployment

² Aged 15-24

³ UNESCO is United Nations Educational Scientific and Cultural Organization.

⁴ The growth slow-down experienced were attributed to structural and institutional bottlenecks.

affect growth in Africa. Second, since human capital development in form of education is seen as an important factor to stimulate growth in Africa, this study examines how human capital development could accelerate the growth potentials of African countries. Third, existing studies only assessed the relationship between youth unemployment and growth in Asia and South America with little attention given to African countries, this study would employ African data and assess the differential impact of youth employment, education on growth in the sub-Saharan Africa and North Africa. Fourth, several techniques ranging from pooled OLS, fixed effect, random effect and panel VAR were used by earlier studies (see for example (Fleisher *et al.* (2008); Phillips and Chen (2011)). No existing study to the knowledge of the researcher has employed the system Generalized Methods of Moments (GMM) to examine the theme. The system GMM adopted in this study is an improvement over existing methodologies as it takes care of consistency, endogeneity and heterogeneity. This technique would ensure accuracy of the findings and helps in arriving at a reliable inference. The remainder of this study is organized as follows. Next section presents the literature review. Both the theoretical and empirical studies would be presented. Section 3 provides the theoretical framework, methodology and data sources. The findings of the study are presented in section 4 and section 5 concludes the study by highlighting some suggested policy recommendation of the findings.

2. LITERATURE REVIEW

The macroeconomics theory of economic growth had emphasized the importance of employment and knowledge in growth differential across countries. Beginning from the contributions of the neoclassical economists; notably, Ramsey (1928); Harrod (1939); Domar (1946) and Solow (1956) with a central tenet that growth differential across countries can be attributed to the rate of their technical progress and capital accumulation. An attempt to explain the neoclassical technical progress in Arrow (1962) learning-by-doing was apparently not successful. The works of Romer (1986) and Lucas (1988) relied on Arrow's mechanism of learning by doing; however, certain modifications were made following Uzawa (1965) which involves the redirection of the application of the neo-classical theory to the accumulation of knowledge and human capital rather than the accumulation of only physical capital. Judd (1985) introduced imperfect competition with innovation-based growth in an industrial organization. Romer (1990a) combined Judd's approach with the Arrow's learning by doing in innovation and therefore developed a model that explains long-run growth at an endogenous rate. His contributions formed the foundation of the endogenous growth model which generally focused on learning by doing in research and development. This provided a realistic theory of growth in the natural state. The basic tenet of the endogenous growth model is that current researcher utilizes the stock of knowledge that has been accumulated over a long period of time (Grossman and Helpman, 1991). According to Romer (1990a) marginal productivity of innovation may not necessarily decline due to new invention which can be as productive as the old. Grossman and Helpman (1991) and Aghion and Howitt (1998) showed that with a given variety of intermediate inputs, output can be increased over a long period at a rate endogeneously determined by research and development investment. The contributions of Mankiw *et al.* (1992) to the theory of endogenous growth also provided an insightful intuition in studying human capital and growth relationship.

Based on a labour market model with hysteresis implications that deal with the deterioration of human capital during unemployment, Moller (1990) argued that the probability of leaving the unemployment pool decreases with the duration of unemployment. Pissarides (1990) posited that a higher rate of productivity growth would reduce unemployment through substantial investment in job creation. Similarly, Mortensen and Pissarides (1998) developed a model of capitalization with creative-destruction effect to explain how a firm can move speedily to production frontier given its level of capacity. Mortensen (2004) presented an endogenous growth and unemployment in a matching framework and explored the implications on tax and employment protection policies. The two policies increased unemployment. Although the effect of tax policies on growth is indeterminate, employment protection policies adversely affected the incentive to innovate.

In an overlapping generation model, with endogenous growth, Cahuc and Michel (1996) showed that wage especially minimum wage could have positive effect on growth through human capital accumulation. Mauro and Carmeci (2003) developed an endogenous growth with an imperfect labour market where the unemployment rate influences the efficiency of human capital accumulation. The model suggested a clear negative relationship between long run growth and equilibrium level of unemployment. Francesconi *et al.* (2000) derived a model that explains differences in the natural rate of unemployment across education groups and suggested that the changing composition of labour force across such groups would better describe changes in unemployment over time

Available empirical studies had shown no consensus on the relationship among unemployment, human capital and growth. Further, most studies in this area generally focused on the effect of unemployment on growth without considering how human capital development can alter the relationship. Using micro-data from US and UK, Blanchflower analyses both causes and effects of youth unemployment. It was posited that the young are negatively affected by youth unemployment at the time they reach the stage of gainfully employed. Also, group cohort largely influences the chance of youths getting employed. Plümer and Schneider (2007) explored the fixed effects estimation technique to assess the relationship between youth unemployment and the rate of university enrollment between the period of 1975 and 2000. Evidence revealed that rising unemployment ratio leads to increase in university enrollment and significantly reduced spending per student. Assessing the effect of training in reducing unemployment in France, Crepon *et al.* (2007) suggested that training does not make certain the exit from unemployment but contribute significantly to the duration of the subsequent employment spell. However, it was suggested that training improve the matching process between jobseekers and firms.

Baa-Boateng (2013) reported that employment growth in Ghana is highly correlated with economic growth because of the high growth and job creation in a few productive sectors. Based on the probit regression model, higher vulnerability of youth and urban dwellers to unemployment with education and gender determining assess to employment in many cases. Using the fixed effect approach, Choudhry *et al.* (2012) identify economic freedom, labour market reforms and active labour market reforms as factors that reduce unemployment and improve labour market performance. On the relationship between human capital and output growth, several studies had generated mixed findings. For instance, based on Chinese data, Fleisher *et al.* (2008) found that human capital positively affected output per worker and productivity growth; educated labour's marginal productivity is higher than uneducated labour. The effect of human capital on productivity was derived from domestic innovation activities. Using OLS technique (Suri *et al.*, 2011) found a positive and statistically significant impact of education on growth, while Phillips and Chen (2011) using OLS reported a negative correlation between school enrollment and growth.

Based on cointegration technique, Teixeira and Fortuna (2010) showed that through investment in human capital and local research and development Portugal can gain from technologies that are produced in more developed countries and improve its total factor productivity. Hanushek and Woessmann (2011) utilizing value added variables shows that without considering scores from growth regression, schooling years are significantly related to growth but when scores are included schooling years shows an insignificant effect on growth. Focusing on the role of human capital, especially cognitive skill on economic growth of developing countries, Hanushek (2013) suggested that improvement in cognitive skills and school quality have a significant role to play in the long run growth process. Benos and Zotou (2014) conducted a survey of literature on education and growth using a meta-regression analysis of 56 studies and 979 estimates. It was revealed that several publications supported the positive impact of education on growth. Variation in findings of studies was attributed to differences in the measurement of education and study characteristics especially in model specification, estimation methodology and type of data.

Hanushek and Woessmann (2012) examined the effect of schooling and education achievement on Latin American growth using instrumental variable regression analysis. A positive growth effect of education achievement was found which explains the poor growth performance of the region. Further, Delgado *et al.* (2013)

employed a nonparametric linear regression estimator and nonparametric variable relevance test to assess the effect of education on growth based on the five of the most comprehensive schooling databases. The results showed that education attainment had not significantly affected growth; but education achievement measured by mean test scores provide evidence of positive and statistically significant effect on growth. Kartal *et al.* (2017) used linear regression model to estimate the effect of human capital development on economic growth in Turkey. Their findings indicated that a positive and statistically significant effect of human capital on growth. Diebolt and Hippe (2018) investigated the long-run impact of human capital on innovations and economic development in regions of Europe, It was found that past human capital is a key factor explaining current regional disparities in innovation and economic development.

Using a panel of 65 countries, Alatas and Cakir (2016) investigated the relationship between human capital and economic growth between 1967 and 2011. Indices of human capital were measured using years of schooling, returns to education and infant mortality rate. It was revealed the effect of human capital on economic growth is positive and statistically significant. Usman and Adeyinka (2019) used data from ECOWAS and explored the random effects technique to examine the relationship between human capital and economic growth from 1980 to 2016. The findings suggested that there is positive and statistically significant relationship between GDP, government expenditure on health, government expenditure on education and school enrollment in ECOWAS countries. Utilizing data for 13 countries over 15 years, Ali and Jabeen (2016) revealed that human capital has a positive effect on per capital GDP only in the presence of better economic opportunities and high quality legal institutions. It was emphasized that economic opportunities reinforce the effect of human capital on growth.

3. THEORETICAL FRAMEWORK AND METHODOLOGY

3.1. Theoretical Framework

Human capital is a core component in growth theory as well as labour theory. In Mincer (1974) human capital of an individual is a linear function of his schooling years and a quadratic function of his work experience. Hence we have;

$$h = f(s, we) \quad (1)$$

The theoretical model is an extension of the one sector version of Lucas (1988); Uzawa (1965) and Mauro and Carmeci (2003) models with a foundational theory from Barro and Sala-i-Martin (1995). It assumes an economy with N , individual with h units of human resources per period which is supplied inelastically. The aggregate amount of human capital in the economy is expressed as:

$$H = h.N \quad (2)$$

It is further assumed that the level of human capital through school attainment⁵ increases the productivity of labour in such that the effective labour produced by each agent is h . Given that the economy's output is produced using a Cobb-Douglas production form which is expressed as follows:

$$Y = K^\alpha(AL)^{1-\alpha} \quad (3)$$

⁵ School attainment of an individual labour varies from primary level, secondary level to tertiary level.

Equation 3 is the conventional Cobb-Douglas production function, where Y stands for output, K stands for capital and AL enters the production function multiplicatively which stands for the effective labor⁶. Assuming that all economic agents belong to the labour force with L rate of employment and normalizing the number of individual in the economy to 1; we have

$$Y = K^\alpha A^{1-\alpha} L^{1-\alpha} \quad (4)$$

In Equation 4, also for simplicity it is assumed that the amount of human capital enters the production function as effective labour, A (also known as knowledge). Hence, taking into account of Equation 2, Equation 4 becomes:

$$Y = K^\alpha H^{1-\alpha} L^{1-\alpha} \quad (5)$$

Equation 5 shows an augmented Cobb-Douglas production function with human capital, H . Where Y in this case is the per capita output. L has been explained earlier, the accumulation of physical capital, K can be expressed following the simple accelerator capital accumulation process:

$$\dot{K} = I - \delta K \quad (6)$$

In Equation 6, \dot{K} is the growth rate of physical capital, I is investment and δ is the rate of depreciation of capital stock. Unemployment in the model is accounted for by a non standard equation of human capital that builds on the functional process in Equation 1. Accumulation of schooling human capital through education is a function of the invested output and the flow of resources invested in education, I_e increases human capital according to the function in which unemployment rate u enters the model; hence the growth of human capital can be expressed as follows:

$$\dot{H} = f(I_e, u) - \delta H f_u < 0 \quad (7)$$

Equation 7 shows the functional argument of the accumulation human capital which is an increasing function of the flow of resources invested in education and decreasing function of the rate of unemployment.

It is assumed that the growth of human capital takes the following form

$$\dot{H} = \omega I_e - \delta H \quad (8)$$

Where ω in Equation 8 is a parameter that shows the rate of investment in education; it can further be expressed as:

$$\omega = a(1 - u) = aL \quad (9)$$

⁶ AL also refers to h in Equation 2.

In Equation 9, parameter α is referred to as the stochastic efficiency index and it takes the form $\alpha \in (0, 1)$.

Where $\alpha = 1$ shows the case of maximum stochastic efficiency and the economy attains full employment (Mauro and Carmeci, 2003).

3.2. Methodology

This study employs a panel data procedure to investigate the effect of youth unemployment and human capital on long run growth in Africa. The novelty of the procedure used in this study are twofolds; first, unemployment is bifurcated into male and female; second, human capital development is adequately captured by primary enrollment, secondary enrollment and tertiary enrollment. The one step system GMM technique will be used in this study following Blundell and Bond (1998). All variables in level form would be instrumental by their lagged values. In addition to the correction of problems emanating from unobserved heterogeneity of firms, the systems GMM will also enable to solve endogeneity problem associated with systems of equation. The GMM estimator is consistent and asymptotically normally distributed. Besides, the GMM technique uses the lag of dependent variable which enables the dynamic operation of the model. Hence, a system GMM suggested by Blundell and Bond (1998) is more appropriate for this study. The standard GMM has a weakness of generating large finite sample bias and very low precision. Blundell (2000) argued that a system GMM not only improves the precision but also reduces the finite sample size. The empirical model for this study can be expressed as follows:

$$gdppc_{it} = f(youtht_{it}, youthm_{it}, youthf_{it}, pen_{it}, sen_{it}, ten_{it}, gcf_{it}, fdi_{it}, to_{it}) \quad (10)$$

The one-step system GMM for the expression in Equation 10 can be estimated in three different empirical models as follows:

$$gdppc_{it} = \alpha_0 + \alpha_1 gdppc_{it-1} + \alpha_2 youtht_{it} + \alpha_3 pen_{it} + \alpha_4 sen_{it} + \alpha_5 ten_{it} + \alpha_6 gcf + \alpha_7 fdi + \alpha_8 to + u_{it} \quad (11)$$

Equation 11 shows the effect of total youth unemployment rate $youtht$ and human capital indices (pen, sen, ten) as well as gross fixed capital formation gcf , Foreign Direct Investment FDI and trade openness to on growth $gdppc$:

$$gdppc_{it} = \alpha_0 + \alpha_1 gdppc_{it-1} + \alpha_2 youthm_{it} + \alpha_3 pen_{it} + \alpha_4 sen_{it} + \alpha_5 ten_{it} + \alpha_6 gcf + \alpha_7 fdi + \alpha_8 to + u_{it} \quad (12)$$

Equation 12 is an expression that shows the impact of male youth unemployment and other explanatory variables mentioned earlier on growth:

$$gdppc_{it} = \alpha_0 + \alpha_1 gdppc_{it-1} + \alpha_2 youthf_{it} + \alpha_3 pen_{it} + \alpha_4 sen_{it} + \alpha_5 ten_{it} + \alpha_6 gcf + \alpha_7 fdi + \alpha_8 to + u_{it} \quad (13)$$

Equation 13 depicts the effect of female youth unemployment and other explanatory variables on growth:

Where the dependent variable is GDP per capita ($gdppc_{it}$); explanatory variables are the total youth unemployment ($youtht$), male youth unemployment ($youthm$), female youth unemployment ($youthf$), primary school enrollment rate (pen), secondary school enrollment rate (sen), tertiary enrollment rate (ten). Other variables included as control variables are gross fixed capital formation (gcf), foreign direct investment (fdi) and trade openness (to).

3.3. Data Sources and Measurement

This study employs data covering the period of 1991 to 2018. These data were based of 45 African countries. Youth unemployment refers to share of the labour force between the ages of 15-24 without work but available and seeking for employment. Both male and female youths' unemployment data were collected from the International Labour Organization statistics database. Other variables, namely, primary school enrollment, secondary school enrollment, tertiary enrollment, gross fixed capital formation and trade openness were obtained from the World Bank's World Development Indicator. Gross fixed capital formation and foreign direct investment were expressed as percentages of GDP.

4. DISCUSSION OF FINDINGS

Table 1 presents the descriptive statistics of the variables under investigation. The average values of the variables ranged between 93.04 and 1.84. The growth rate of GDP per capita has the lowest minimum value while trade openness as a share of GDP recorded the highest maximum value. Similarly, trade openness has the highest standard deviation with a value of 32.58. The normality of the distribution is assessed by skewness and kurtosis. Most of the variables have positive skewness except primary school enrollment that exhibit negative skewness. Hence, almost all the variables are skewed to the right. A large number of the variables of interest have kurtosis that is greater than the normal distribution. Specifically, GDP per capita, primary school enrollment, tertiary enrollment, gross fixed capital formation, foreign direct investment and trade openness have kurtosis greater than 3. These variables are referred to as leptokurtic distribution which implies they have heavier tails than normal distribution.

Table-1. Descriptive statistics.

Statistics	Gdppc	Youthm	Youthf	Youtht	Pen	Sen	Ten	Gcf	Fdi	To
mean	1.844	16.502	19.878	17.721	93.038	41.471	9.060	20.827	3.792	68.403
p50	1.843	11.713	13.797	12.684	97.401	38.108	5.467	50.477	1.994	60.261
min	-62.378	0.580	0.112	0.392	21.623	5.217	0.309	-2.424	-8.589	11.466
max	140.371	57.134	68.039	62.100	152.216	107.589	60.507	60.018	161.824	311.354
sd	8.022	13.604	17.754	14.975	24.511	24.584	9.887	8.781	9.126	32.584
skewness	6.674	0.906	0.862	0.869	-0.454	0.608	1.947	0.880	8.832	1.696
kurtosis	123.114	2.715	2.499	2.597	3.031	2.484	7.124	5.103	112.726	9.590

The correlation matrix of the relationship among the variables utilized in the study is presented on Table 2. The p-values of the coefficients that indicate their statistical significance are expressed in parenthesis. Expectedly, a strong positive correlation exists between unemployed male youths and unemployed female youths. Primary school enrollment shows a positive but weak correlation with GDP per capita, unemployed male youths and unemployed female youths. Similarly, secondary school enrollment has strong and significant relationship with unemployed male youths, unemployed female youths and primary school enrollment. Further, tertiary enrollment exhibits weak

but significant relationship with unemployed male youths, unemployed female youths and primary school enrollment. However, a strong and statistically significant correlation exists between tertiary enrollment and secondary school enrollment. Gross fixed capital formation has weak but statistically significant relationship with variables employed in the study. Accordingly, foreign direct investment (FDI) has positive correlation with GDP per capita, primary school enrollment and gross fixed capital formation. The relationship among trade openness and other variables used in the study is weak but statistically significant.

Table-2. Correlation matrix.

Variables	GDPPC	Youthm	Youthf	PEN	SEM	TEN	GCF	FDI	To
gdppc	1.0000								
youthm	0.0085 (0.7636)	1.0000							
youthf	0.0253 (0.3725)	0.9361 (0.0000)	1.0000						
pen	0.1622 (0.0000)	0.3215 (0.0000)	0.3079 (0.0000)	1.0000					
sem	0.0700 (0.0617)	0.5728 (0.0000)	0.5871 (0.0000)	0.4977 (0.0000)	1.0000				
ten	0.0286 (0.4633)	0.3822 (0.0000)	0.4662 (0.0000)	0.3043 (0.0000)	0.8249 (0.0000)	1.0000			
gcf	0.1596 (0.0000)	0.1200 (0.0001)	0.1157 (0.0001)	0.1529 (0.0000)	0.1220 (0.0018)	0.1551 (0.0001)	1.0000		
fdi	0.2237 (0.000)	0.0001 (0.9978)	0.0018 (0.9504)	0.0863 (0.0070)	-0.0319 (0.3971)	-0.0333 (0.3932)	0.2524 (0.0000)	10000	
to	0.0369 (0.2096)	0.2987 (0.0000)	0.2479 (0.0000)	0.2614 (0.0000)	0.1811 (0.0000)	0.1005 (0.0000)	0.2577 (0.0000)	0.2816 (0.0000)	1.0000

The results of the one-step system Generalized Methods of Moments (GMM) are presented in Table 3. The dependent variable is GDP per capita. One lagged of the dependent variable is used as one of the regressors for the entire model. The first regression is the estimation of the effect of total unemployed youths, human capital indices (namely primary school enrollment, secondary enrollment and tertiary enrollment) on GDP per capita. In this regression a negative and statistically significant effect of total unemployed youths on GDP per capita was obtained. The coefficient of the regression indicate that a 10 percent increase in total unemployed youths would lead to 0.3 percent decline in the growth of GDP per capita. This result is consistent with theory of growth and employment and a number of empirical studies; for instance Ali and Jabeen (2016) and Alatas and Cakir (2016). Additionally, primary school enrollment shows a positive and significant relationship with GDP per capita. Evidence from the coefficient of the regression shows that a 10% increases in primary school enrollment rate would increase GDP per capita by 0.2%. However, both secondary and tertiary enrollment rates have no statistically significant effect on GDP per capita. Other major determinants of GDP used as control variables in the study exhibit statistical significant effect on GDP per capita. However, while the effect of gross fixed capital formation is negative, the effect of net FDI inflows is positive. A plausible explanation for this could be as a result of the low level of domestic investment in Africa. The model is tested for the first and second lags autocorrelation and it was revealed that serial correlation of errors is corrected in the second lag. Sagan test authenticate the appropriateness of the instruments utilized in the regression. The next line of discussion is the one-step system GMM based on the unemployed male youths. Evidently, the effect of unemployed male youths on GDP per capita is negative and statistically significant. The figure of the coefficient reveals that a 10 percent rise in male youth unemployment would result to 0.5% decrease in GDP per capita. Accordingly, primary school enrollment has a positive and statistically significant effect on GDP per capita. The coefficient suggests that a percentage rise in primary school enrollment rate would lead to 0.2% increase in GDP per capita. Similar to the result obtained under the all youths model, while FDI promotes GDP per capita, domestic investment cause decline in it in Africa. The last column expresses the effect of unemployed female youths, human capital indices on GDP per capita. Contrary to the

previous findings male youth regression, a statistically insignificant effect of the coefficient of unemployed female youths on per capita GDP was obtained. This statistically insignificant result could be as result of the fact that most female youths in Africa engages in informal jobs. Also, some African cultures do not support female participating in formal education. The robustness of the results is confirmed by the autocorrelation and Sargan tests.

Table-3. One step system GMM of the effects of youth unemployment and human capital on growth in Africa.

Variables	All Youths		Male Youths		Female Youths	
	Coef	t-statistics	Coefficients	t-statistics	Coefficients	t-statistics
Gdppc L1.	-0.044	(-0.64)	-0.047	(-0.68)	-0.036	(-0.52)
Youtht	-0.039	(-2.15)				
Youthm			-0.046	(-2.39)		
Youthf					-0.023	(-1.53)
Pen	0.022	(2.57)	0.021	(2.57)	0.023	(2.70)
Sen	0.014	(0.84)	0.154	(0.93)	0.006	(0.39)
Ten	0.015	(0.45)	0.012	(0.36)	0.026	(0.79)
Gcf	-0.091	(-3.22)	-0.090	(-3.22)	0.089	(3.14)
Fdi	0.180	(3.43)	0.177	(3.38)	0.186	(3.54)
To	0.012	(1.74)	0.013	(1.89)	0.100	(1.40)
-cons	0.810	(0.93)	0.777	(0.89)	0.807	(0.91)
AR(1)	-5.27	(0.000)	-5.21	(0.000)	-5.27	(0.000)
AR(2)	1.16	(0.246)	1.09	(0.274)	1.16	(2.246)
Sargan	-1.93	[0.221]	0.79	[0.374]	0.77	[0.381]

5. CONCLUSION

Available statistics from the World Bank had revealed high rate of youth unemployment and low human capital development in Africa. This study empirically investigated the effects of youth unemployment and human capital development on GDP per capita in Africa. Unemployment was bifurcated into male and female youths' population. Additionally, human capital development was measured by primary enrollment, secondary enrollment and tertiary enrollment. A system generalized method of moments was adopted to estimate the parameters of the regression.

The findings indicated that youth unemployment had resulted to a detrimental effect on growth in Africa. However, the results of these findings were mixed when male and female youths' unemployment was separated. While, male youths unemployment was found to have a negative and statistically significant effect on growth female youths' unemployment shows no statistically significant effect on GDP per capita in Africa. Also, among the human capital development indices used in the regression, only primary school enrollment was found to have a positive and statistically significant effect on GDP per capita. This shows the rate of underdevelopment of the secondary and tertiary education in Africa. Some policy implications of the findings are discernible; first, findings of this study has shown that youth unemployment has detrimental effect on GDP growth in Africa, hence, appropriate policies geared towards job creation for the youths would reduce the detrimental effect of youth unemployment on long run growth. Second, since the effect unemployed male youth on growth was found to be statistically significant, government could pursue policies that could train unemployed male youths in Africa on entrepreneurial skills. Third, although government efforts towards providing basic and primary education in Africa has been productive which is evident in the positive effect of primary enrollment on growth in this study, appropriate policies through provision of scholarship and funds to facilitate secondary and tertiary education are necessary to increase Africa's GDP.

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