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Growth-youth unemployment nexus in upper-middle-income countries in Sub-Saharan Africa

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Abstract. The issue concerning growth-youth unemployment nexus has not been verified with respect to upper middle-income countries (UMIC) in Sub-Saharan Africa (SSA). The importance of this paper is to ascertain the relationship between economic growth and youth unemployment based on panel and individual countries data in term of annual series data from 1991 to 2017. To achieve the objective of this paper, data were sourced from the World Bank development indicators, for GDP growth rate and youth unemployment rate. Several statistical and econometric tests were conducted, the results obtained revealed that the average GDP-growth rate was 6.36% while youth unemployment rate was 32.30% for UMIC in SSA. The individual countries statistics indicated that Gabon has the highest GDP-growth rate of 21.01% while the highest youth unemployment rate was in South Africa with 47.30%. The lowest GDP-growth rate was observed in South Africa while the lowest youth unemployment was observed in Equatorial Guinea with 11.69%. The empirical results indicated that there exists a long-run and positive relationship between the variables of GDP-growth rate and youth unemployment rate in UMIC in SSA and that Okun's law is not applicable in these countries. Based on the results obtained statistically it revealed high rate of youth unemployment and low rate of GDP-growth within the period of study, hence this paper suggest that individual countries in the UMIC in SSA should implement youth employment scheme in order to reduce the level of unemployment with respect to this age cohort. Creation of jobs for youth will help to reduce the economic and social costs associated with youth unemployment especially in countries like South Arica, Namibia, Botswana and Gabon. The UMIC in SSA are encouraged to boost their level of economic activities through investment in order to stimulate employment of young-able body persons in UMIC in SSA.

Keywords. Economic growth, Youth unemployment, Upper middle-income countries, Sub-Saharan Africa, Okun's coefficient.

JEL. O40, O57, J64.

1. Introduction

The World Bank development indicators report for 2018 indicated that six countries in Sub-Saharan Africa were classified as upper middle income countries (UMIC). These countries are: Botswana, South Africa, Gabon, Namibia, Mauritius and Equatorial Guinea. Forty

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eight countries make up the Sub-Saharan Africa (SSA) region located south of the Saharan Desert (United Nations, 2011; World Bank, 2018).

Kamgnia (2006) observed the importance of the growth-unemployment nexus, stating that a strong and steady economic growth is needed to create more employment more than ever before. In line with this the United Nations (2015) in its 2030 Agenda for sustainable development goals (SDGs) encouraged countries to sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 percent gross domestic product growth per annum in the least developed countries; to achieve full productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.

With respect to SSA, empirical evidence on the relationship between growth and unemployment is rather weak in some of the countries. Hence, a lot of effort is needed in this area in order to achieve the goal of sustained economic growth and reduce the level of all forms of unemployment in 2030.

In SSA according to World Bank Development Indicator (WDI) (2018), only 12.5% of its total number belong to the upper middle income group in 2018 while in 2015 only one country was classified as a high-income, 12 countries were in the lower income and 23 were low income.

ILO (2017) indicated that the number of unemployed persons worldwide will hit over 201 million persons in 2017, with additional 2.7 million persons expected in 2018. The survey indicated that the third world countries, especially Africa is expected to be worst hit, where the number of the unemployed and poverty are high. The challenges of high unemployment rate and slow output growth are not only experienced it does occure in the developed countries as well. However, the developed countries over the years have adopted good economic and political policies to reduce the level of unemployment. Unemployment challenges generally does not only constitute a high private cost for the individual, it is a huge cost to the government (Sachis-i-Marco, 2011; Abel, Bernanke & Croushore, 2008; Ihensekhien & Ovenseri-Ogbomo, 2017).

Below are some basic economic facts of the upper middle in countries of SSA: Botswana is ranked as the 2nd among forty eight of SSA with high income, it has a population of 2.2 million people with an average GDP growth rate of 4.52%, average youth unemployment rate of 33.29%, inflation rate of 2.8%. Equatorial Guinea has a population of 1,324,762 million people with an average GDP growth rate of 20.19, average youth unemployment rate of 11.69%, a median age of 22.2 years and her life expectancy at birth is 57.68. Gabon has a population of 1.5 million, inflation rate of -0.01%, average youth unemployment rate of 37.38%, crime index of 47.69 and safety index of 52.3 and GDP growth rate of 21.0%. Mauritius is made up of a population of 1.3 million with average GDP growth rate of 4.03 %, average youth unemployment rate of 22.47% and inflation rate of 1.0%. Namibia has a mean youth unemployment rate of 41.38%, inflation

rate of 6.5%, a human population of 2.3million and GDP growth of 4.52%. South Africa is the second largest economy in SSA; it is an industrialized economy, with a population of 55.9 million, an average youth unemployment rate of 47.30 %, inflation rate of 6.3% and a mean GDP growth rate of 2.13%. South Africa has a safety index of 23.37 that is considered low but with a high quality of life index of 135.57 (World Bank, 2018).

The economic conditions of the upper middle income countries in SSA are likely to be marred with high incidence of crimes, poverty, and low quality of life, severe economic and social costs of all kinds that are associated with high rate of youth unemployment. However, the empirical study of Okun's has been verified in many countries, but this has not been examined in UMIC in SSA based on the recent classification of countries into income group by the World Bank (2018) with respect to youth unemployment and growth. Therefore, there seems to exists a gap in literature with respect to the nexus between changes in youth unemployment and growth in UMIC in SSA. A study in this direction is significant in that it helps to ascertain the nature of economic growth and specially, it will help to establish whether or not the growth in SSA is inclusive. Therefor, the objective of the study is to evaluate the empirical nexus between youth unemployment and economic growth in UMIC in SSA and to ascertain the levelof influence of youth unemployment on growth, using annual time series data for the period 1991-2017.

The timeframe of the paper covers a period of 1991-2017. The paper is therefore divided into the following sections: section (i) is the introduction, review of literature and theoretical issues is in section (ii), section (iii) contains the methodology applied, section (iv) is the analyses of results and section (v) contains the conclusion.

2. Review of literature and theoretical issues

The theoretical connection between economic growth and unemployment began with the works of Harrod (1939), Domar (1947) and Solow (1956) in their investigation of the issue of the long-run unemployment and how it influences the level of economic growth. The extension of the Keynesian model could be found in the studies of Okun (1962). Theoretically Okun's law establishes the linkages between economic growth rate and unemployment rate, which he ascertained empirically to be negative. Okun's law is seen as a benchmark for determining the economic well-being of a country.

Okun (1962) in his study based on quarterly data of the USA from 1947-1957, he observed that there exist an inverse relationship between economic growth and unemployment rate. Specifically, he found that a 1% reduction in the unemployment rate would result in about 3% increase in economic growth. This empirical study became known as Okun's law which continued to be verified in different forms in different countries. The Okun's coefficient is seen as a useful "rule of thumb" in predicting as well

as in policy investigation in term of economic growth and employment level.

The discovery of a strong empirical relationship between output growth (economic growth rate) and changes in the unemployment rate as postulated by Okun's seminal paper of 1962 has become one of the most consistent relationship in macroeconomics (Adachi, 2007).

The theoretical linkage between economic growth and unemployment rate could be traced to several schools of economic thought. The classical economist's school of thought believed that the connection between economic growth and unemployment is a one-way linkage that exists between the inputs of labour to economic growth. Kaldor (1967) as cited in Obadan & Odusola (2000) in invoking the Verdoorn's law states that faster growth of output is responsible for a faster growth of productivity. The positive relationship that exists between employment and economic growth was also confirmed by Dernburg & McDougall (1985). Also from the view of the classical economists referring to Cobb-Douglas production function based on the technical links between output and the inputs such as labour and capital. The model indicated that the level of labour force assuming other variable is assumed to be constant help to determine the growth rate of output with other variable held constant.

From the Keynesian economists' angle, the issue of output and unemployment is explained in terms of aggregate demand. The Keynesians believed that the demand for labour is a case of derived demand. The Keynesian theoretical linkages of economic growth and unemployment as analyzed by Hussain & Nadol (1997), Thirlwal (1997) and Grill & Zanalda (1995) implies that increase in employment, technological change and investment are largely endogenous.

In a nut-shell, the growth of employment/unemployment is the determinants of long term increase/decrease in economic growth of a country.

Table 1. *Summary of empirical evidence on the relationship between growth rate and unemployment rate and the methodology adopted*

S/N	Authors and year of studies	No. of Countries	Period	Dependent variable(s)	Independent variable(s)	Methodology	Okun's Coefficient Obtained
1	Prachowny (1993)	United States	1975Q1-1988Q4	Output growth gap	Capacity utilization gap, unemployment gap Labour-supply gap and hours gap	OLS (first difference and production method)	-0.62 and -0.67
2	Weber (1995)	United States	1948Q1-1988Q4	Unemployment gap and output gap	Output gap and unemployment gap	OLS, ARDL, VAR and rolling OLS	-0.32; -0.22 and -0.26
3	Moosa (1997)	United States, France, Japan, United Kingdom, Canada, Italy and Germany	1960-1995	Unemployment gap	Lagged unemployment gap and output gap	OLS, rolling OLS and SUR	-0.49 and -0.09
4	Lee (2000)	16 OECD countries and Germany	1955-1999, 1960-2006	Output gap	Unemployment gap	Panel least squares(PLS) (first difference and HP filter	-0.22
5	Harris & Silverstone (2001)	Canada, Japan, US, Australia, New Zealand and UK	1978Q1-1998Q3	Unemployment rate	Output rate	ECM(first difference)	-0.09 and -0.5

6	Geldenhuys & Marinkov (2007)	South Africa	1970-2005	Output gap	Unemployment gap	HP, BN and BP filters	-0.24, -1.09, -0.17 and -0.78
7	Amassoma & Nwosa (2013)	Nigeria	1986-2010	Productivity growth	Unemployment, labour force, capital, inflation and government expenditure	Co integration and ECM	1.12 and 1.35
8	Akeju & Olanipekun (2014)	Nigeria	1980-2012	Unemployment gap	Output gap	Co integration and ECM	0.097 and 0.069
9	Adachi (2007)	Japan and US	1969-2000	Output	unemployment	OLS(first difference)	-6.18 and -1.81
10	Tombolo & Hasegawa (2014)	Brazil	1980Q1-2013Q3	Unemployment	Output	OLS (first difference)	-0.1878; -0.2055
11	Kargi (2013)	34 OECD countries	1987- 2012	Unemployment	Output	OLS(first difference)	-0.27
12	Boulton (2010)	Poland, Romania, Slovakia, Slovenia, Bulgaria, Czech Republic, Hungary, Latvia and Lithuania	1991-2008	Real GDP	Unemployment	OLS (first difference)	0.83; -4.2; -3.44; -4.54; 2.71; 0.26 -5.44; 1.87 and -2.74
13	Madito & Khumalo (2014)	South Africa	1967Q1-2013Q4	Economic growth rate	Unemployment rate	VECM(first difference)	-0.618
14	Ho (2002)	Macau	1993-2001	Output	Unemployment	OLS(first difference)	-1.6951
15	Andrei (2009)	Romania	24Q000Q1-2008	Output gap	Unemployment gap	OLS	-0.493
16	Hutengs & Stadtmann (2012)	Euro zone		Unemployment	GDP	OLS(first difference	-0.034, -0.91, -0.75 and -0.234
18	Zanin & Marra (2012)	Spain, Portugal, The Netherlands, Italy, Ireland, Greece, Finland, Austria and France	1996-2009	Unemployment	Real GDP growth	OLS and rolling OLS(first difference)	-0.34, -0.14, -0.19,-0.05,-0.31,-0.07,-0.12, -0.32 and-0.10
19	Barreto & Howland (1993)	Japan	1953-1982	Unemployment Output	Output Unemployment	OLS(first difference)	-0.032 -9.46
20	Tatoglu (2011)	19 European countries	1977-2008	Unemployment Output	Output Unemployment	Panel co integration and Panel ECM	0.003; 0.007; -0.087; -0.075
21	Ozel & Sezgin (2013)	7 Industrial countries(G7)	2000-2011	Unemployment rate	Growth rate and Productivity	Panel least squares, Fixed and Random effects	-0.351; -0.250
22	Khemraji, Madrick & Semmler (2006)	US, France, UK and Germany	1961-2000	Output	Unemployment	OLS(first difference)	-9.83; -3.12; -4.36; -5.67
23	Elshamy (2013)	Egypt	1970-2010	Output	Unemployment	OLS,ECM(Gap model)	-0.021
24	Salman (2012)	Sweden	1993Q1-2011Q2	GDP growth rate	Total unemployment, Female and male unemployment	OLS(first difference)	-0.076; -0.084; -0.079
25	Ihensekhien (2016)	42 SSA countries	1991-2013	Unemployment	GDP growth rate	Panel Least Squares and OLS	-0.049
26	Ihensekhien & Erhi (2016)	Nigeria	1991-2015	GDP growth rate	Total unemployment rate, Youth unemployment rate, Male unemployment rate and Female unemployment rate	OLS	53.45; 1041; 26.23; 14.03
27	Ihensekhien & Asekome (2017)	23 Low income countries in SSA	1991-2013	Youth unemployment rate	GDP growth rate	Panel Least Squares and OLS	-0.171
28	Ihensekhien& Ovenseri-Ogbomo (2017)	23 Low income countries in SSA	1991-2013	Total unemployment rate	GDP growth rate	Panel Least squares and OLS	-0.075
29	Mojica, & Tatlonghari, (2017)	Philippines economy	1990Q3-2014Q3, 1990Q3-2005Q3, 2005Q3-2014Q	Unemployment rate	GDP growth rate	OLS	-0.85; -0.92; -0.70
30	Ihensekhien & Aisien (2018)	6 upper middle income countries in SSA	1991-2017	Unemployment rate	GDP growth rate	Panel least squares and OLS	-0.142, -0.135, -0.131, -0.127, -0.120, -0.113, -0.071

3. Methodology

This paper employed the use of annual data series for a cross-section of six countries categorized as UMIC in SSA by the World Bank development indicators for 2018. A quasi-experiment research design was used to ascertain the variation in dependent variable due to change in the independent variable. The study covered a period of 1991 to 2017 based on youth unemployment and GDP-growth rates to verify whether Okun's law exists in the UMIC in SSA.

Several statistical and empirical analyses were conducted to ascertain whether Okun's law is applicable in the UMIC in SSA in terms GDP growth- youth unemployment nexus. Unit root test, Co-integration, Granger causality, Panel least squares (PLS) and Ordinary least squares (OLS) analyses were conducted. Descriptive statistics were also computed to explain the distributional data employed.

Unit Root Test

Unit root analyses by Dickey & Fuller (1979) was applied to determine whether there exist unit root problem that will lead to spurious results. A variable is considered to have a unit root, when at first difference if the ADF critical value is higher than the time value (critical values at either at (1%, 5% or more). The equation for the test is represented as:

$$\Delta YUE_t = \alpha_0 + \alpha_1 \Delta YUE_{t-1} + E_t \quad (1)$$

Where: YUE = youth unemployment variable under consideration
t = a linear time trend
Δ = the first difference operator
α_0 = refers to the constant
$t-1$= the time lags and E_t refers to the white noise

The second variable used in the unit root test is given as:

$$\Delta GGR_t = \theta_0 + \theta_1 \Delta GGR_{t-1} + \psi_t \quad (2)$$

Where: GGR = GDP growth variable under consideration
t = a linear time trend
Δ = the first difference operator
θ_0 = refers to the constant
$t-1$= the time lags and ψ_t refers to the white noise

Co-integration Test

Co-integration test is to determine whether the variables employed in the analysis have long-run relationship (Granger, 1981; Johansen, 1988; and Johansen & Juselius, 1990). The co-integration equation is represented as:

$$Y_t = \Delta_1 Y_{t-1} + \Delta_2 Y_{r-2} + ... + \Delta Y_{t-k} + \xi_t \quad (3)$$

Where: Y_t is an $n\times1$ vector of variables that are integrated of order indicated 1(0), 1(1) or 1(2) etc. ξ_t is an $n\times1$ vector innovations. The above equation (3) can be respecified as:

$$\Delta Y_t = \psi + \theta Y_{t-1} + \sum Q_i \Delta Y_{t-1} + \xi_t \quad (4)$$

Granger Causality Test

The direction of effect between two variables is ascertained by Granger causality test. The result obtained from the test could be bidirectional, unidirectional and independence causality. In this paper the test was done for growth and youth unemployment in terms of cross-section and individual countries basis. The equation for Granger causality is estimated as follows:

$$YUE_t = \sum_{t-1}^{n} \beta_1 GGR_{t-1} + \sum_{t-1}^{n} \delta_1 + \mu_t \quad (5)$$

Model Specification

The paper adopted the first difference form of equation of Okun's. The equation for this paper is represented as:

$$YUE_t - YUE_{t-1} = \alpha + \beta(GGR_t - GGR_{t-1}) + e_t \quad (6)$$

The cross section form of equation (6) is written as:

$$YUE_{i,t} - YUE_{i,t-1} = \alpha + \beta(GGR_{i,t} - GGR_{i,t-1}) + e_{i,t} \quad (7)$$

Where $_i$ = 1, 2, 3, 4 - - - m, countries.

t = 1, 2, 3, - - - n, years.

Where: $YUE_{i,t}$ = the observed youth unemployment rate of countries i.

$GGR_{i,t}$ = the GDP growth rate of UMIC in SSA.

α = the intercept, which indicates the average output growth of full-employment output (potential output). β = the Okun's coefficient, which was estimated by Okun to be negative ($\beta<0$).

The term β shows the variation in changes in output growth rate as a result of a unit change in unemployment rate.

$e_{i,t}$ = stochastic error term (white noise). Variables not considered specification error and inherent randomness in human attributes (Hilmer & Hilmer, 2014).

4. Analyses of results

The results in table 1 shows the descriptive statistics for six UMIC in SSA that indicated that within the period of study that the average youth unemployment rate stood at 32.30% and that of the mean value of GDP growth rate was 6.36%. A comparison of the cross section means with that of the individual countries mean revealed that South Africa had a mean value of 47.30%, Namibia (41.38%) Botswana (33.92%), and Gabon (37.38%) that were observed to higher than the mean for youth unemployment for cross section in UMIC in SSA. However, Equatorial Guinea had the lowest youth unemployment rate of 11.69% on average as shown in Table 2.

Table 1. *Descriptive Statistics for Upper Middle Income Countries in SSA*

	GGR	YUE
Mean	6.36	32.30
Median	3.93	35.66
Maximum	149.97	54.83
Minimum	-9.09	11.23
Standard Deviation	14.56	12.44
Skewness	6.89	-0.35
Kurtosis	62.76	2.07
Jarque-Beta	25391.74	9.39
Probability	0.0000	0.0000
Number of Observations	162	162
Number of Countries	6	6

Source: Author's Estimation Result (2019).

Table 2. *Individual Descriptive Statistics for Upper Middle Income Countries in SSA: Youth unemployment variable*

country	mean	median	maximum	minimum	Std.Dev	skewness	Kurtosis	Jarque Beta	Obs.
Botswana	33.92	35.16	43.47	24.19	4.59	-0.25	2.73	0.35	26
Gabon	37.38	36.01	42.17	34.96	2.63	0.93	2.35	4.22	26
South Africa	47.30	49.04	54.83	32.19	5.79	-1.06	3.26	4.90	26
Namibia	41.38	41.56	46.62	34.32	3.50	-0.20	1.91	1.47	26
Mauritius	22.47	23.15	26.00	17.86	2.24	-0.45	2.33	1.37	26
Equatorial Guinea	11.69	11.53	14.16	11.23	0.59	3.08	12.99	1.49	26

Source: Author's Estimation Result (2019)

Table 3. *Individual Descriptive Statistics for Upper Middle Income Countries in SSA: GDP growth variable*

country	mean	median	maximum	minimum	Std.Dev	skewness	Kurtosis	Jarque Beta	Obs.
Botswana	4.52	4.56	11.34	-7.65	3.91	-0.98	4.75	7.80	26
Gabon	21.01	15.98	149.97	-9.09	32.34	2.65	10.93	98.68	26
South Africa	2.13	3.08	7.09	-8.93	3.79	-1.05	3.94	5.73	26
Namibia	4.52	4.11	9.03	1.24	1.80	0.73	3.51	2.60	26
Mauritius	4.03	4.06	12.27	-1.58	2.91	0.43	3.97	1.80	26
Equatorial Guinea	2.59	2.85	5.60	-2.14	1.90	-0.68	3.40	2.15	26

Source: Author's Estimation Result (2019)

A look at the average GDP growth rate indicated that Gabon had a mean value of 21.01% which was observed to be greater than the mean value for cross section of UMIC in SSA of 6.36% while had the lowest mean value of 2.13% within the group. In general the mean value for group of UMIC in SSA of 6.36% for GDP growth was observed to be greater than the following countries mean values such as: Botswana (4.52%), South Africa (2.13%), Namibia (4.52%), Mauritius (4.03%) and Equatorial Guinea (2.59%) as shown in Table 3.

Table 4. *Correlation Matrix for 6 Upper Middle-Income Countries in SSA (1991-2017)*

	YUE	*GGR*
YUE	1	0.11
GGR	0.11	1

Source: Author's Correlation Result (2019)

Based on the correlation matrix results presented in Table 4 indicates correlation among the variables. Not as expected, the youth unemployment and GDP growth rate variables revealed a positive relationship which therefore shows that there exist positive link between youth unemployment rate and GDP growth rate in UMIC in SSA and this contrary to Okun's law (1962).

Table 5. *Results of Panel Unit Root Tests*

Method (At levels)	*GGR*	*YUE*
Levin, Lin & Chut**	-5.33(0.000)*	-0.736(0.231)
Im, Pesaran and Shin W-Star	-5.38(0.000)*	-1.065(0.143)
ADF-Fisher Chi-Square	51.39(0.000)*	15.159(0.233)
PP-Fisher Chi-Square	89.70(0.000)*	21.681(0.041)**
Method (At first difference)	*GGR*	*YUE*
Levin, Lin & Chut**		-2.495(0.001)**
Im, Pesaran and Shin W-Star		-3.431(0.000)*
ADF-Fisher Chi-Square		34.073(0.000)*
PP-Fisher Chi-Square		90.580(0.000)*

Source: Author's Estimation Result (2019).

Notes: *&** represents significance at 1% & 5% level respectively. Where: YUE = youth unemployment, GGR= GDP growth

The result in Table 5 indicates that t-statistic values obtained in the unit root test for a cross section of UMIC in SSA were all found to significant as shown in the table confirmed by the probability values in parentheses. The GGR was observed to be statically significant at levels indicating that there no unit root problem hence it was stationary, however, that of YUE did not passed the test at levels but was found to be statistically significant and stationary at first difference as shown in table 5. The unit root result therefore indicated that the variables are free from the problem of spuriousity and that the variables could be used for further empirical analyses hence, the null hypothesis of the presence of non stationarity in the panel data series is rejected.

Co-integration Test Result

The result in table 6 indicated that at the 5% probability level, that there exists co-integration among the panel data used and that there exists a long-run relationship between variables used in the model. The individual countries result as shown in Table 7 however indicated some deviation in some countries such as South Africa, Namibia and Mauritius where the null hypothesis of no co-integration is accepted while this was not so in Botswana, Gabon and Equatorial Guinea where it was observed that co-integration exist on individual country basis.

Table 6. *Johansen Co-integration Test Result (Panel co-integration) Series: YUE, GGR*

No deterministic Trend			
Eigen value	Trace statistic	Critical value (0.05)	Prob.
0.562	20.70*	12.32	0.002
Linear deterministic Trend			
Eigen value	Trace statistic	Critical value (0.05)	Prob.
0.562	29.47*	15.50	0.000

Source: Author's Estimation Result (2019).

Table 7. *Co-integration Test Result (Individual Countries) Series: YUE, GGR*

Country	Hypothesized No. of CE(s)	Eigen value	Trace Statistic	Critical value (0.05)	Prob.
Botswana	None*	0.562	29.48*	15.50	0.000
	At most 1*	0.297	8.81*	3.34	0.003
Gabon	None*	0.514	29.97*	15.50	0.000
	At most 1*	0.410	12.67*	3.34	0.000
South Africa	None*	0.284	11.38	15.50	0.189
	At most 1*	0.131	3.37	3.34	0.670
Namibia	None*	0.391	15.27	15.50	0.540
	At most 1*	0.132	3.38	3.34	0.660
Mauritius	None*	0.354	13.01	15.50	0.115
	At most 1*	0.132	2.51	3.34	0.113
Equatorial Guinea	None*	0.427	15.86*	15.50	0.044
	At most 1*	0.098	2.49	3.34	0.015

Source: Author's Estimation Result (2019)

Notes: *significant at 5% level.

Granger Causality Test Result

In order to ascertain the direction of the effect between youth unemployment and GDP growth rates, the pair wise Granger causality test was conducted and verified at both 5% and 10% levels of significant. The result obtained in table 8 indicated that there is no causality between variables used except only in Gabon that indicated a unidirectional causality between YUE and GGR, meaning that GGR Granger causes youth unemployment. In general the overall Granger causality result indicated a case of independence in causality that YUE does not Granger cause GGR and vice versa.

Table 8. *Pair wise Granger causality Test Result*

Categories of countries	Null Hypothesis	Observation	F-statistic	Prob.
Six UMIC in SSA	YUE does not Granger cause GGR	150	0.336	0.715
			0.600	0.550
Botswana	YUE does not Granger cause GGR	24	0.263	0.771
			0.951	0.404
Gabon	YUE does not Granger cause GGR	24	1.698	0.209
			3.538*	0.049
South Africa	YUE does not Granger cause GGR	24	0.130	0.879
			0.177	0.839
Namibia	YUE does not Granger cause GGR	24	0.663	0.939
			0.004	0.997
Mauritius	YUE does not Granger cause GGR	24	0.108	0.898
			1.161	0.334
Equatorial Guinea	YUE does not Granger cause GGR	24	1.911	0.175
			0.532	0.596

Source: Author's Estimation Result (2019)
Notes: *significant at 10% level.

Table 9. *Panel Least Squares (PLS) and Ordinary Least Squares (OLS) Estimation Result for UMIC in SSA. Youth unemployment rate (YUE) as the dependent variable and GDP growth rate (GGR) as the independent variable.*

Category of Countries	*Average GGR*	*Average YUE*	β (Okun's coefficient)	Std. error	t-statistic	Prob. Value
6 UMIC in SSA	6.36	32.30	0.897	0.157	5.71	0.000*
Botswana	4.52	33.29	4.329	0.747	5.80	0.000*
Gabon	21.01	37.38	0.564	0.162	3.38	0.002**
South Africa	2.13	47.30	5.560	1.861	2.99	0.006**
Namibia	4.52	41.38	7.943	0.621	12.791	0.000*
Mauritius	4.03	22.47	3.697	0.482	7.670	0.000*
Equatorial Guinea	2.59	11.69	2.960	0.435	6.805	0.000*

Source: Author's Estimation Results (2019)
Notes: */** represents significance at 5% and 10% levels.

The PLS and OLS estimation result for UMIC in SSA based on the first difference model of Okun's to ascertain whether Okun's is applicable in the UMIC in SSA based on Growth-Youth unemployment nexus, the result indicated in table 9 revealed a contrary case which indicated a positive relationship instead of the negative relationship ascertained by Okun (1962). The t-statistic values for both PLS and OLS cases were found to be statistically significant hence this result indicated that Okun's relation does not exist in terms of the growth-youth unemployment nexus in UMIC in SSA within the period of study. The above result also confirmed the previous result for the relationship between total unemployment and output growth in UMIC in SSA in countries such as South Africa, Equatorial Guinea, Gabon and Mauritius within the period of 1991 to 2017 (Ihensekhien & Aisien, 2018). The result obtained agreed with the arguments of Davis & Haltiwanger (1992), Saint-Paul (1993), Bean & Pissarides (1993), Ihensekhien (2016), Ihensekhien & Erhi (2016) and Ihensekhien & Asekome (2017).

Aghion & Howitt (1994) indicated that the case of either positive or negative outcome between unemployment variable and growth variable is as results of high rates of growth are negatively correlated with unemployment while low rates of growth are positively correlated with unemployment. The positive correlation between youth unemployment and growth in UMIC in SSA is due to the high rate of youth unemployment figures in these countries compared to the low rate of GDP growth within the period of study.

The implication of the above findings is that economic growth experienced in the selected countries does translate into employment generation activities. This shows that the growth is a non-incusive growth in terms of youth population. The findings revealed that the economic is not labour intensive which resulted in the high level of youth unemployment as high as 47.30 in South Africa and the mean rate of youth unemployment in UMIC in SSA was 32.30. It is a sign of an economy under experiencing high level of discomfort as a result of social vices due youth unemployment. The result also indicated that young able-body persons in these countries are likely to be vulnerable to the threat of hunger, poverty and low human capital development, When the situation is not corrected and resolved on time this might result in social threats/crisis which would result in huge economic cost on the economy of the UMIC in SSA.

5. Conclusion

The paper examined the growth-youth unemployment nexus in UMIC in SSA. The timeframe was from 1991 to 2017 based on six countries in the upper middle income categories in SSA. The objectives of the study were to determine the relationship between GDP growth and youth unemployment as well as to ascertain the influence of youth unemployment on growth in terms of a cross section of countries and individual country analyses.

To achieve the set objectives, several statistical and empirical tests were conducted, such as descriptive statistics, unit root test, co-integration test, Granger causality test, Panel and Ordinary Least Squares. The result obtained were quite revealing indicating that there exist a long-run relationship between the variables used and that Okun's law is not applicable in UMIC in SSA. The average values for youth unemployment and GDP growth rates varies a cross countries within the group and that the highest youth unemployment within the period was observed in South Africa (47.30%) while that of the group average was 32.30%.

The paper therefore concludes that there is high rate of youth unemployment and low rate of GDP growth in UMIC in SSA within the period and that Okun's relation is not applicable in terms of the variables of youth unemployment and GDP growth.

Based on the statistical and empirical findings of this paper, it is therefore recommended that individual countries in the category of upper middle income countries in SSA should establish youth employment scheme for all categories of employment with the aid of the private sector

especially in countries with high incidence of youth unemployment such as South Africa, Namibia and Gabon. The governments of these countries concerned are encouraged to boost their level of economic activities in order to stimulate investment that will create more jobs.

References

Abel, A.B., Bernanke, B.S., & Croushore, D. (2008). *Macroeconomics*. Boston: Pearson Education Inc.

Adachi, H. (2015). Economic growth and unemployment: Theoretical foundations of Okun's Law. in H. Adachi, T. Nakamura &Yasuyuki Osumi (Eds), *Studies in Medium-Run Macroeconomics*, (pp.69-85), World Scientific. doi. 10.1142/9789814619585_0003

Akeju, K.F., & Olanipekun, D.B. (2014). Unemployment and economic growth in Nigeria. *Journal of Economic and Sustainable Development*, 5(4), 138-144.

Amossoma, D., & Nwosa, P.I. (2013). The impact of unemployment rate in productivity growth in Nigeria: An error correction modeling approach. *International Journal of Economics and Management Sciences*. 2(8), 1-13.

Barreto, H., & Howland, F. (1993). There are two Okun's Law relationships between output and unemployment. Wabash College *Working Paper*, [Retrieved from].

Bean, C., & Pissarides, C. (1993). Unemployment, consumption and growth, *European Economic Review*, 37(4), 837-854. doi. 10.1016/0014-2921(93)90093-P

Boultom, T. (2010). Test of Okun's Law for the 10 Eastern European countries, London Metropolitan Business School, and Economics Subject Group. [Retrieved from].

Davis, S.J., & Haltiwangerk, J. (1993). Gross job creation, distribution and employment reallocation, *Quarterly Journal of Economics,* 107(3), 819-864. doi. 10.2307/2118365

Derngurg, T.F., & McDougall, D.M. (1985). *Macroeconomics*, 7 Ed. New York: McGrew Hill.

Dickey, D.A., & Fuller, W.A. (1997). Distribution of the estimators for autoregressive time series wth a unit root. *Journal of the American Statistical Association*, 74(366), 427-431. doi. 10.2307/2286348

Elshamy, H. (2013). Okun's Law and its validity in Egypt. *Journal of Emerging Issues in Economics, Finance and Banking*, 1(2), 67-74.

Geidenhuys, J., & Marinkov, M. (2007). Robust estimates of Okun's coefficient for South Africa. Department of Economics, University of the Frees State, *Working Paper*, No.55. [Retrieved from].

Hilmer, C.E., & Hilmer, M.J. (2014). *Practical Econometrics (Data Collection, Analysis and Application)*. McGraw-Hill International Edition, New York.

Ihensekhien, O.A., & Erhi M.A. (2016). Economic growth and unemployment categories: Evidence from Nigeria. *West African Social and Management Sciences Review*, 7, 1-24.

Ihensekhien, O.A., & Aisien, L.N. (2018). Unemployment and output growth: Evidence from upper middle-income countries in Sub-Saharan Africa. *American Economic & Social Review*, 3(1), 32-43.

Ihensekhien, O.A., & Asekome, M.O. (2017). Youth unemployment and economic growth: Lesson from low-income countries in Sub-Saharan Africa. *European Journal of Economics, Law and Politics*, 4(2), 1-15.

Ihensekhien, O.A. (2016). A cross country empirical analysis of the relationship between Economic growth and Unemployment in Sub-Saharan Africa, *An unpublished Ph.D. Thesis* of Benson Idahosa University.

Ihensekhien, O.A., & Ovenseri-Ogbomo, F.O. (2016). Unemployment and economic growth: Evidence from low income countries in Sub-Saharan Africa. *Journal of Finance, Banking and Investment*, 4(2), 1-15.

International Labour Organization (2017). *Global Employment Trends for Youth*.

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inflerence on co-integration with application to the demand for money. *Oxford Bulletin of Economics and Statistics*, 52(1), 169-210. doi. 10.1111/j.1468-0084.1990.mp52002003.x

Johansen, S. (1988). Statistical analysis of co-integration vector, *Journal of Economic Dynamics and Control*, 12(2-3), 231-254. doi. 10.1016/0165-1889(88)90041-3

Kargi, B. (2013). Okun's law and long term co-integration analysis for OECD countries (1987-2012), *International Research Journal of Finance and Economics*, 119, 77-85.

Kamgnia, B.D. (2006). Growth-employment nexus: the specificities in Africa. Acceleratind Africa's development five years in the 21st century. Tunis: African Development Bank. [Retrieved from].

Khemraj, T., Madrick, J., & Semmler, W. (2006). Okun's Law and jobless growth. *New School for Social Research*, [Retrieved from].

Lee, J. (2000). The Robustness of Okun's Law: Evidence from OECD Countries, *Journal from Macroeconomics*, 22(2), 331-356. doi. 10.1016/S0164-0704(00)00135-X

Madito, O., & Khumato, J. (2014). Economic Growth-Unemployment Nexus in South Africa: VECM Approach. *Mediterranean Journal of Social Sciences*, 5(20), 79-84.

Mankiw, N.G., Romer, D., & Weil, D.N. (1992) A Contribution to the empirics of economic growth. *Quarterly Journal of Economics*, 107(2), 407-437. doi. 10.2307/2118477

Mojica, M.A., & Tatlonghari, V.M. (2017). The relationship between output growth and unemployment in the Philippines economy (1990-2014): An empirical analysis of variants of Okun's Law. *Journal of Emerging Economies and Islamic Research*, 5(1), 49-68.

Moosa, I.A. (1997). A cross-country comparison of Okun's coefficient, *Journal of Comparative Economics*, 24(3), 335-356. doi. 10.1006/jcec.1997.1433

Moosa, I.A. (1999). Cyclical output, cyclical unemployment and Okun's coefficient, structural time series approach, *International Review of Economics and Finance*, 8(3), 293-304. doi. 10.1016/S1059-0560(99)00028-3

Obadan, M.I., & Odusola, F.A. (2000). Productivity and unemployment in Nigeria. Ibadan: National Centre for Economic Management and Administration (NCEMA). [Retrieved from].

Okun, A. (1962). Potential GNP: Its measurement and significance, *Proceedings of the Business and Economic Statistics section of the American Statistical Association*, pp.98-104.

Ozel, H.A., Sezgin, F.H., & Topkaya, O. (2013). Investigation of economic growth and unemployment relationship for G7 countries using regression analysis. *International Journal of Business and Social Sciences*. 4(6), 163-171.

Pissarides, C. (1990). *Equilibrium Unemployment Theory*, Oxford, Blackwell.

Pissarides, C. (1992). Loss of skills during unemployment and persistence of employment shocks, *Quarterly Journal of Economics*, 107(4), 1371-1391. doi. 10.2307/2118392

Prachowny, M.F.J. (1993). Okun's Law: Theoretical foundation, and revised estimates, *Review of Economics and Statistics*, 75(2), 331-336. doi. 10.2307/2109440

Saint-Paul, G.J. (1992). Productivity growth and the structure of the business cycle, *European Economic Review*, 37(4), 861-883. doi. 10.1016/0014-2921(93)90095-R

Salman, A.K. (2012). Testing the causal nexus between output and unemployment: Swedish data. *International Business Research*. 5(10), 29-45. doi. 10.5539/ibr.v5n10p29

Sanchis-i-Marco, M. (2011). *Falacias, Dilemas y Paradojas, La Economia Espanola: 1980-2010*, Publicaciones de la Universidad de Valencia.

Semmler, W., & Zhang, W. (2005). The impact of output growth, labour market institution and macro policies on unemployment, SCEPA *Working Paper*, No.155.

Tatoglu, F.Y. (2011). The long and short term effects between unemployment and economic growth in Europe, *Journal of Dogus University*, 12(1), 99-113.

Tombolo, G.A., & Hasegawa, M.M. (2014). Okun's Law: Evidence for the Brazilian economy, [Retrieved from].

United Nations, (2011). *World Population Prospect, The 2010 Revision*, New York, UN Population Division. [Retrieved from].

United Nations, (2015). Tranforming our World: the 2030 sustainable development goals, New York: UN Department of Economic and Social Affairs. [Retrieved from].

Weber, C.E. (1995). Cyclical output, cyclical unemployment and Okun's coefficient. A new approach. *Journal of Applied Econometrics*, 10(4), 433-445. doi. 10.1002/jae.3950100407

World Bank, (2014). *World Development Indicators*, Washington D.C: World Bank. [Retrieved from].

World Bank, (2018). *World Development Indicators*, Washington D.C: World Bank. [Retrieved from].

Zanin, L., & Marra, G. (2011). Rolling regression versus time-varying coefficient modeling: An empirical investigation of the Okun's Law in some Euro Area Countries. *Bulletin of Economic Research*, 64(1), 91-108. doi. 10.1111/j.1467-8586.2010.00376.x