YOUTH UNEMPLOYMENT AND VIOLENT CRIME: EVIDENCE FROM DEVELOPING COUNTRIES IN AFRICA

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Abstract

This paper examined the link between youth unemployment and violent crime, as available data sourced from 2006-2016 for ten developing countries in Africa (Botswana, Morocco, Mauritius, Namibia, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, and Zambia). Analysis of the data is done using the Panel Corrected Standard Error Approach. This study found that youth unemployment and population increase violent crime. But income per capita and employment in agriculture reduce violent crime. The result suggests to the policy makers to invest in agriculture, as it is capable to provide income-employment to the large youth population. This serves as discouragement tool to engage in violent crime, thereby reducing violent crime in the region.

Keywords: Violent crime, youth unemployment, income, agriculture.

JEL Classification: K42, E24, E64, O13.

1. INTRODUCTION

Violent crime increases in Sub-Saharan Africa in the post-2000 years. For instance, it increases from 125 per 100,000 populations in 2003 to 300 per 100,000 populations in 2015. This represents an increase of 39.53%. Figure 1 presents the trend of violent crime in Sub-Saharan Africa from 2000 to 2015. Increase in violent crime susceptible to various channels. The channels include kidnapping, insurgency and militants operations. Also, civil violence and conflict generated from ethnic hatred and marginalisation. Various instances noted across the region in Mali, Nigeria, Congo, and South Africa. The cry of marginalisation over resources led to civil war between the South Sudan and Sudan. This led to killings of innocents souls. Civil conflict and violence spread through the region became a challenged, as the number of battled-related death in 2014 stood at 3,793 in Nigeria, 1,674 in South Sudan and 1,103 in Somalia (The United Nations Development Programme, UNDP 2016). Over 5,000 civilians killed between 2009

and 2014 in Nigeria due to insurgency, as the militants' activities destroyed properties and murder of citizens (Osawe, 2015). Also, high number of extrajudicial killings took place in Northern Mali by the ally Islamic group. Conflict in Africa generated the killings of household head and children (Justino and Verwimp, 2013).The increased in violent crime in the region is susceptible to some activities.

Criminologists in crime literature ascribed violent crime as a cost to society, as it reduces human capital accumulation among the youth (Brown & Velásquez, 2017). It forestalls earning income and high contribution to productivity (Cabral, Mollick & Saucedo, 2016). Further, environment becomes unsafe and insecure for investment (Onwuka, 2015). Also, it destroys properties and causes force migration (Badiora, 2017).

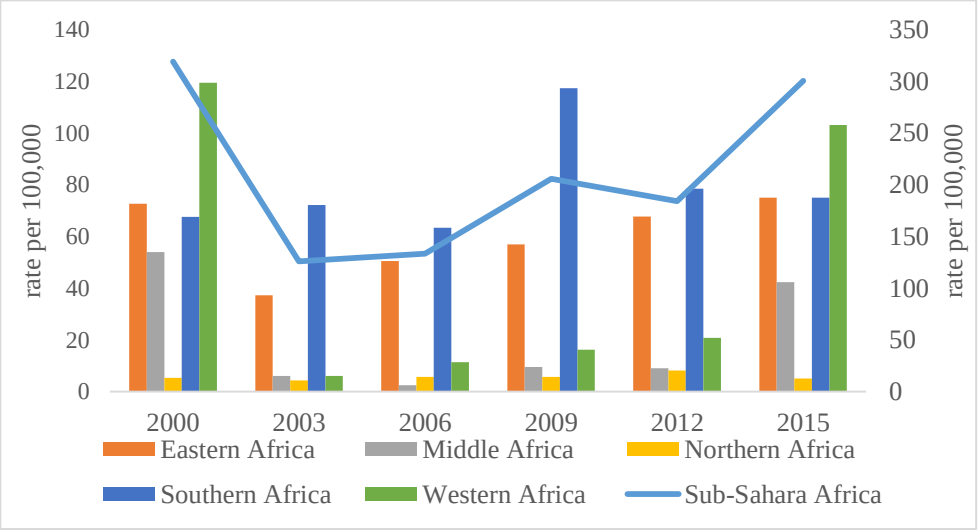

Figure 1. *Violent crime (homicides) rates per 100,000 populations in Sub-Saharan Africa i Source: Author compilation based on United Nations Office on Drugs and Crime (UNODC) statistics.*

But, what could possible led to occurrence of violent crime remains ongoing debate. The crime literature had it that the breakdown of socio bond and norms led to anomie in society (Shaw & McKay, 1942). Also, people are deviant due to inability to achieve their goal as laid down by the society (Merton, 1938). Becker (1968) affirmed that economic incentives factors motivate people to commit crime. The divergent views have identified related socioeconomic conditions as channels to violent crime.

Among these socio-economic conditions investigated is unemployment on violent crime (Raphael & Winter-Ebmer, 2001; Ochsen, 2010; Halicioglu, Andrés & Yamamura, 2012; Baumann & Engelhardt, 2016 and Jawadi, Mallick, Cheffou & Augustine, 2019). Further studies focused on male unemployment (Narayan & Smyth, 2004 and Saridakis, 2011). These mentioned studies are not based on Sub-

Saharan Africa but supports Becker, (1968). Also, this study is distinct from studies based on terrorism, political violence and conflict (Urdal, 2006; Caruso & Schneider, 2011; Azeng & Yogo, 2013; Annan, 2014 and Chisadza & Bittencourt, 2018). In this group of studies, only Urdal (2006), Caruso and Schneider (2011), and Azeng and Yogo (2013) examined youth unemployment, and these were cross country studies. They affirmed that youth unemployment causes terrorism, political violence and conflict. Thus, the interest of this paper is to examine the relationship between youth unemployment and violent crime in Africa. (Botswana, Morocco, Mauritius, Namibia, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, and Zambia).

This study contributed to the ongoing debate on youth unemployment and violent crime. Since governments and international agencies seek solution to youth unemployment problem in African. (The Global Economic Monitoring, 2019). Firstly, the finding supported that youth unemployment is positive related to violent crime. Further, employment in agriculture provided a better measure for policy formulation. As this variable has not used in any of the previous study to control violent crime. Secondly, it novel in examining youth unemployment and violent crime in Sub-Saharan Africa. Thirdly, a robust estimation found and reliable for policy formulation and implementation. Fourthly, this study provided a policy in the model. The policy has two double-edged swords because it is a policy that is capable to reduce violent crime. Also, it has the power to minimise youth unemployment in the model.

To solidify these contributions, this paper tested two hypotheses. One, youth unemployment increases violent crime. And two, employment in agriculture reduces violent crime. Hence, the remaining part of this paper divided into four parts. Section two focuses on empirical findings as Section three discuss the method. While Section four presents the findings Section five provide the conclusion.

2. LITERATURE REVIEW

This section reviewed crime theories and the existing available literature on youth unemployment and violent crime. In most of the existing studies, unemployed youths are susceptible to criminal activities. But none of the studies considered violent crime.

The social disorganisation theory contended that mobility of population happens because of the search for education and job. As a result, people change their environment and instability occurs in family. This further makes people to abandon the norms in community and thus, weaken the control ability of the society. Continuous inability to exert control in the community led to disruption or disorderliness in the society. Violent crime is an example of disruptions or disorderliness (Shaw & McKay, 1942). Similarly, the rational choice theory stressed that criminals weigh their likely returns to the cost of committing a crime. This is because a criminal would engage in crime provided the likely returns

outweigh the returned to legal means. That is criminal is also economic agent who react to incentives in the market. But, to reduce the illegal returns from the market, the risk of crime should increase. Through deterrence measures which include arrest, conviction and punishment (Becker, 1968).

Azeng and Yogo (2013) examined the link between youth unemployment and political instability in 24 developing countries among five regions in the World using a time and cross section data from 1980 to 2010. Political instability was proxy by internal conflict and political stability, and data was analysed using fixed-effects regression with instrumental variables approach. They found that youth unemployment causes internal conflict but reduces political stability. These results informs that nations with political stability with low economic opportunity for the youth are bound to have internal conflict and further political instability since the youth find it difficult to get employed, and where employments were available they are underemployed. Urdal (2006) internationally studied how youth bulges determined political violence using a panel data from 1984 to 1995. This data estimated by negative binomial regression and found that youth bulges increase internal armed conflict, terrorism and civil unrest being the measurement for political violence. The result indicated that high unemployment situation make the high number of youth to have with low opportunity costs, this serves as motivation to cause increase in political violence. Also, he found that increase in population encourages political violence as desire to have income by the youth triggered political violence. He concluded that with high education and low fertility, there is possibility for large youth bulge to be absorbed in the labour market which would decline political violence.

Caruso and Schneider (2011) studied socio-economic factors with terrorism and political violence in 12 countries in Western Europe from 1994 to 2007. While analysing the data with the fixed effect estimator in a negative binomial regression panel; they found that youth unemployment increases political violence using terrorist activity; also, income per capita reduces political violence using terrorist activity but increases number of victims per incident as a measure of political violence. Their result affirmed that unemployed youth can be frustrated by poor changing economic environment, and thus provided motivation to them to engage in terrorist activity which includes murder.

Chisadza and Bittencourt (2018) examined globalisation and conflict in 46 African countries between 1970 and 2013, and used logit regression to estimate the data. Their result showed that globalisation reduces conflict in the region; increase in population was positive to cause conflict while income per capita showed weak positive impact on conflict as education was significant to conflict. This study considered because conflict generate murder and intentional homicides. The findings here suggested that in spite the high income that comes with globalisation, it still led people to engage in conflict. Since the openness of the economy is difficult to take care of the needs of the population, increase in population thus became a source of conflict in the region. Annan (2014) considered causes of violent conflicts and civil strife in West Africa. This study is not empirical but

concluded that violent conflicts are cause by various factors which includes poverty, human rights violations, bad governance and corruption, ethnic marginalization and small arms proliferation. These factors according to Annan encouraged frustrations among the population in the region; upon which they find little or no trust in the leadership and others ethnic people apart from their own, and thus engaged in violent conflict.

Badiora (2017) study focused on Sub-Saharan Africa with special attention on civil unrest, insurgences and the challenges in Nigeria. He found that high income disparity between the poor and rich with the encouragement of corruption among government officials fuelled the unrest in the country. This further motivated by poor environmental solution used to tackled natural disaster occurrences as people/communities have no choice than to leave their home having lost their means of livelihood. Topping it is the activities of the militants and insurgences that have led to destruction of properties and death of many innocent souls. He concluded that internal crisis, natural disasters and insurgences causes displacement of people from their original homes and forces them to reside at the internally displaced person's camp. Oyefusi (2010) examined unemployment and civil unrest in the Niger Delta region in Nigeria using a survey method. The study divided civil unrest into three- a peaceful protest, oil crimes and arms struggle. It was found that unemployment was not significant to peaceful protests but positive for arms-struggle. But unemployment was negative significant to low-level violence and oil crimes; also, when interacted education with unemployment, the result became positive and significant. Further, the result showed that earnings have a reducing effect on low-level violence and oil crimes, but to a certain limit, increase in earnings have a marginal impact on the predicted probability of participation in violence.

3. METHODOLOGY

3.1. THEORETICAL FRAMEWORK

The discussion paper of Becker (1968) generated the model for crime supply function found in most studies. It considered economic factor as an incentive to motivate crime and used deterrence factors to discourage crime. The model expressed in equation 1. In the model, $PR\ and\ PA$ are prosection of arrests and punishment for the offenders respectively. Deterrence variables helped to reduce or discourage people from committing crime. U is unemployment rate and it is an economic incentive factor motivating people to commit crime.

$$VCR_{it} = f(PR_{it}, PA_{it}, U_{it}) \quad (1)$$

Ehrlirch (1973) extended the model in 1 to include socioeconomic and environmental factors to determine crime as presented in equation 2. In equation 2, $PR\ and\ PA$ deterrence variables; Y is the returns from illegal activities, as an incentive to commit a crime; Yl is the legal existing gap in income; U is

unemployment rate; V the vector of environmental variables; while Z captures the psychological effect and other unquantifiable variables on the rate of crime.

$$VCR_{it} = f(PR_{it}, PA_{it}, Y_{it}, Yl_{it}, U_{it}, V_{it}, Z_{it}) \quad (2)$$

Following Becker (1968) and Ehrlirch (1973), Oschen (2010) used the model to study violent crime (VCR_{it}) which include intentional homicides, assault and armed robbery presented in equation 3. In equation 3, LMP_{kit} is the labour market policy measured by benefit replacemnt rate, benefit duration, active labour market policy and education. $GINI_{kit}$ is the income inequliaty, $GDPPC_{kit}$ is the GDP per capita, U_{kit} is unemployemnt rate, EPR_{kit}, employemnt population ratio and SOF_{kit} is share of foreigners.

$$VCR_{it} = f(LMP_{kit}, GINI_{kit}, GDPPC_{kit}, U_{kit}, EPR_{kit}, SOF_{kit}) \quad (3)$$

This study followed Oschen (2010) because it is determining violent crime and considering labour market factor as control variables. But, the labour market here is more specific to employment in agriculture because it is a means to engage the high number of youth population in Africa. Also, this study narrowed the unemployment to youth unemployment. The model is presented in equation 4 where YU_{it} is the youth unemployment rate, POP_{it} is the total population, INF_{it} is the inflation rate to reflect the price instability, Y_{it} is the GDP per capita or income for the whole population and $EMAG_{it}$ is the employemnt in agricultural sector.

$$VCR_{it} = f(YU_{it}, POP_{it}, INF_{it}, Y_{it}, EMAG_{it}) \quad (4)$$

3.2. ESTIMATED MODEL AND APPROACH

To analyse the panel data for youth unemployment and violent crime. The study employed the crime model in Ochsen (2010). This is a standardised model as found in other crime based literature. Also, this kind of data employed in the study required a panel estimator. Since it controls for unobserved heterogeneity in the cross-section units and the period (Ochsen, 2010). The model tested is thus expressed as presented in equation 5. In equation 5, the *apriori* expectations of the coefficients are: $\beta_1 > 0, \beta_2 > 0, \beta_3 > 0,\ \beta_4 < 0, \beta_5 < 0$.

$$VCR_{it} = \beta_0 + \beta_1 YU_{it} + \beta_2 POP_{it} + \beta_3 INF_{it} + \beta_4 Y_{it} + \beta_5 EMAG_{it} + \alpha_i + \gamma_t + \epsilon_{it} \quad (5)$$

$where\ VCR_{it} = violent\ crime;\ \beta_0 = constant; \beta_1, \beta_2, \beta_3, \beta_4, \beta_5\ are\ coefficients;\ YU_{kit} = youth\ unemployment; POP_{kit} = total\ population;\ INF_{kit} = inflation;\ Y_{kit} = income\ of\ the\ total\ population;\ EMAG_{kit} = employment\ in\ agriculture;\ \mu_i = the\ error;\ k = 1, \dots, J.;\ \alpha_i\ and\ \gamma_t\ are\ fixed\ crosssection\ and\ time\ effects.$

In analysing the data, the study used Pooled OLS in the first instance and furthers the Random Effect and Fixed Effect models. But these models could not be accepted because of problems of serial correlation and heteroscedasticity.

Although, there is no multicollinearity in the models as the vif is below the limit of 10 (see Table 3) (Chatterjee & Hadi, 2006). Therefore, a robust model is required for two reasons; one, to resolve the problem of endogeneity between youth unemployment and crime (see Raphael & Winter-Ebmer, 2001) and two, to ensure estimates are reliable for policy suggestions. In view of these reasons, results of the estimates based on the panel corrected standard error model presented in Table 3.

3.3. DATA

In examining the link between youth unemployment and violent crime; cross-section and time series data obtained from the World Development Indicator (2019) and it covers 11 years (2006-2016) for 10 African countries (Botswana, Morocco, Mauritius, Namibia, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, and Zambia). The number of countries was limited to 10 African countries because limited data exist for homicides proxy for violent crime. The variables defined in Table 1.

Table 1. *Definitions of variables*

Variables	Definition	Expected sign	Source
Violent Crime (VCR_{it})	Natural logarithm of intentional homicide rates per 100,000		United Nations Office on Drugs and Crime (UNODC)
Youth Unemployment (YU_{it})	Unemployment, youth total (% of total labour force ages 15-24) (modelled ILO estimate)	+	World Development Indicator
Population (POP_{it})	Natural logarithm of the whole population	+	World Development Indicator
Inflation (VCR_{it})	Inflation, consumer prices (annual %)	+	World Development Indicator
Income per capita (Y_{it})	Natural logarithm of annual per capita GDP growth	-	World Development Indicator
Employment in Agriculture ($EMAG_{it}$)	Employment in agriculture (% of total employment) (modelled ILO estimate)	-	World Development Indicator

Source: Author's compilation

3.4. VARIABLES JUSTIFICATION

Violent crime is the dependent variable in this study. It is proxy by log of intentional homicides (per 100,000 people) based on what exist in the literature (Fajnzylber et al., 2002; Coccia, 2018). The intentional homicides involved both assault and killing at the same time. This illicit action is at times based on profit-seeking which is line with Becker's economic approach to crime. Further, it is reliable and yield better regression estimates (Fajnzylber et al., 2002).

Youth unemployment has connection with crime (Narayan & Smyth, 2004) as unemployment considered to study labour market in Ochsen (2010) and

Baumann and Engelhardt (2016). This data measured by youth unemployment as a % of total labour force ages 15-24.

In line with the existing previous studies, this study included control variables to reduce the effect of youth unemployment on violent crime. These variables are population measured by the logged of total population, inflation proxy by inflation consumer prices (annual percent), income measured by the logged of income per capita of the whole population and employment in agriculture (% of total employment).

4. RESULTS

The results in Table 2 are the descriptive statistics for the variables in the model. Mean values for all the variables lies between the minimum and maximum values. It portrays the suitability of the data for regression. As the standard deviations not too distant to the mean values. In Table 3, the correlation matrix showed youth unemployment correlate with violent crime. But, the result for multicollinearity (vif) in Table 4 is still lies within the acceptable limit of 10 (see Chatterjee & Hadi, 2006). Moreover, the results indicated there is problem of serial correlation and heteroscedasticity. The serial correlation suggest endogeneity problem exist between youth unemployment and violent crime. Using the PCSE approach, the problems of serial correlation and heteroscedasticity minimised. Thus, estimates from the PCSE interpreted.

In Table 4, it is found that result between youth unemployment is positive ($\beta_1 = 0.2498, \rho < .010$) to increase violent crime Africa. Similar results obtained in Europe by Ochsen (2010) and in Japan by Halicioglu, Andrés and Yamamura (2012). Among the control variables inflation is not significant in the model. Population is positive ($\beta_2 = 4.6149, \rho < .000$) to cause violent crime, this result supported Demombynes and Özler (2005), Wu and Wu (2012). Moreover, showing the effort to minimise impact of youth unemployment on violent crime, income per capita is negative ($\beta_4 = -3.5631, \rho < .011$) to reduce violent crime as Ochsen (2010), Baumann and Engelhardt (2016) found similar result. Also, employment in agriculture is negative ($\beta_2 = -0.3443, \rho < .000$) to reduce violent crime in Africa, this supports Poveda (2011).

Table 2. *Descriptive Statistics*

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
VCR_{it}	110	8.8392	9.7593	1.0344	38.7038
YU_{it}	110	21.7779	15.1007	1.885	53.36
POP_{it}	110	0.5028	0.7575	-2.6776	1.1963
INF_{it}	110	6.2792	3.9726	-2.2480	17.8697
Y_{it}	110	7.7898	1.0151	5.8750	9.1935
$EMAG_{it}$	110	39.6359	22.9069	4.6	84.569

Source Author's computation

Table 3. *Correlation Analysis*

Variables	VCR_{it}	YU_{it}	POP_{it}	INF_{it}	Y_{it}	$EMAG_{it}$
VCR_{it}	1.0000					
YU_{it}	0.6796*	1.0000				
POP_{it}	-0.0327	-0.3202*	1.0000			
INF_{it}	0.0394	-0.0726	0.2599*	1.0000		
Y_{it}	0.4734*	0.8014*	-0.6121*	-0.1666	1.0000	
$EMAG_{it}$	-0.5318*	-0.7829*	0.6679*	0.1669	-0.9261*	1.0000

N = 110.
**p < .05.*
Source Author's computation

Table 4. *Result of the link between Youth unemployment and violent crime*

Violent Crime (VCR_{it}) as DV	Pooled OLS	Random Effect	Fixed Effect	Estimation of Panel Corrected Standard Error
YU_{it}	0.3691*** (4.63)	0.1140 (0.81)	-0.1082 (-0.60)	0.2498** (2.57)
POP_{it}	4.751*** (3.72)	0.7927 (0.43)	-0.687 (-0.33)	4.6149*** (4.19)
INF_{it}	0.0877 (0.53)	0.1497 (0.98)	0.1449 (0.87)	0.0419 (0.38)
Y_{it}	-0.43631** (-2.48)	1.8353 (0.53)	0.8808 (0.15)	-3.5631** (-2.53)
$EMAG_{it}$	-0.3225*** (-3.90)	-0.0724 (-0.65)	-0.0603 (-0.49)	-0.3443*** (-4.44)
Breush-Pagan LM test	chibar2(01) = 137.80 Prob> chibar2 = 0.000			
Hausman test		chi2(6) = 5.90 Prob>chi2 = 0.3161		
Observations	110	110	110	110
R-squared	0.5653	0.4068	0.0026	0.3507
F-test (Wald chi square)	27.05	6.27	0.34	354.01
F-test (prob>chi square)	0.0000	0.0000	0.8875	0.0000
Multicollinearity vif)			4.82	
Heteroscedasticity ($\boldsymbol{x^2 - stat}$)		chi2 (15) = 12641.83 Prob>chi2 = 0.0000		-
Serial Correlation ($\boldsymbol{F^2 - stat}$)		F(1, 9) = 15.229 Prob> F = 0.0036		-

Source Author's computation

5. CONCLUSION

This paper examined the relationship between youth unemployment and violent crime in Africa (Botswana, Morocco, Mauritius, Namibia, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, and Zambia). The analysis based on panel data from 2006-2016 using robust estimation approach. Results obtained support the social disorganisation crime theory and economic approach to crime. In the results, increase in youth unemployment and population causes violent crime. This means that the population explosion among the youth in Africa idled and not working. A situation that has remained as a challenge in Africa. Since, youth are not engaged in legal work but they engaged in an illegal activity. Moreover, income per capita and employment in agriculture reduces violent crime in Africa.

For policy implication, the paper suggested viable agricultural programs put in place. Such programs serve as a weapon to increase youth productivity in Africa. As the youth population has the potentials to enhance productivity capacity in Africa. Thus, the investment in Agriculture would drive youth employment, revenue, food production and manufacturing input raw materials. As agriculture is possible to generate revenue to sustain the region. Employment in agriculture would discourage the rural youth moving to the urban area. Further, it attracts the youth in urban area to rural area. Thereby stepping down the youth unemployment rate. Also, it boosts the food production in the region. As it provided food security which reduce the region dependency on developed nations.

Hence, the outcome of the policy suggested will achieved reduction in youth unemployment. Also, it discourages youth from engaging in violent crime. Further, the income and agriculture have the consequence to improve economic growth. Also, employment in agriculture in the model enhances revenue and food security. Thereby providing enabling room for peace and development in Africa. But, this study has not been without limitation in the area of data on violent crime. Although the limitation provided no setbacks to the estimation. Future studies suggested to consider a long time series and cross-section data. Authors can also add any chapters and subchapters designed to help the relevance of the paper.

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