Unemployment and Crime Rate Nexus: An Empirical Evidence from Nigeria

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Abstract
Unemployment undoubtedly results in inadequate necessities in the immediate family, which cascades into poverty in the community and the economy as a whole. To this end, so many Nigerians have lost trust in the government. Therefore, Nigeria's high crime rate has ultimately been caused by the country's high unemployment rate. The purpose of this study is to ascertain how unemployment has affected Nigeria's crime rate spanning from 1990 to 2020. The study used secondary data time series sourced from the World Development Indicator. The study used the Augmented Dickey Fuller test to show variable stationarity, the ARDL Bound test was equally used to assess the long run nexus between the variables, and the Autoregressive Distributed Lag Model (ARDL) was adopted as an estimating technique to analysis the data of the study. The outcome results reveals that in Nigeria, a high percentage of unemployment induced a high rate of crime, with a 1% rise in unemployment resulting in a 0.0830 increase in crime rate in Nigeria. To this end, the study concludes with the following policy recommendations: that government should endeavour to create jobs in order to reduce unemployment, and also government should create enabling environment in which people are encouraged to learn hand work, ready to become an entrepreneurs on their own and the like. More so, government should make sure whosoever proven guilty of a crime should face decisive penalties that commensurate the offence.

Keywords: Unemployment, Crime Rate, ARDL Model

JEL Classifications: L11, K42, C50

Introduction

A popular adage says, an idle hand is a devil's workshop. This implies that only an inactive individuals will imagine evil all of the time because he or she is not actively engaged. However, every society, on the other hand, has its own set of issues and challenges. Nigeria is no different. As a developing country, it faces its own set of social, political, economic, and cultural issues. All of which have a significant impact on the population's well-being. Unemployment and a rising tide of crime are two such issues plaguing

the country, both of which have major repercussions for national growth, security and soon (Anthony, 2013). Also, there is a high rate of crime in Nigeria today, which has caused the society to be restless, insecure and fearful, to name but a few. Raphael Winter-Ebmer (2001) asserts that unemployment behaviour is the main factor influencing how people respond to compensation.

Additionally, to make matters worse on the ground, a group of extremely wealthy Nigerian politicians and businessmen logically developed expansionism. The government's social and economic policies are in no way advantageous to the majority of Nigerians. Due to the widespread unemployment, capable citizens with a variety of skills, credentials, and energy have absolutely nothing to contribute but to follow the lead of the politicians, who in turn exploited them to influence, rig, and destabilise elections, to name a few (Akan, Egbo & Owoseni, 2022).

Thus, individuals are typically ditched or left to their destiny whenever the law finally caught up on them after being manipulated by the politician. The limited positions that are open to the numerous of capable job seekers from Nigeria are politicised. The job applicant might not succeed without ties to a political godfather (Alemika, 2012).

Unemployment is the one of the major causes of the rise in crime in Nigeria. Nigeria has a 21.14% unemployment rate in 2010. In 2011, it rose to 23.9%, and also by 2012, it had significantly risen to 27.4%. However, the unemployment rate decreased to 24.7% in Q4 2013 and increased up to 25.1% in Q4 2014. As of Q4 2015, this was 10.44%, 14.23% by Q4 2016, 20.42% by Q4 2017, 23.13% by Q3 2018, and 33.30% by Q4 2020 according to the report from National Bureau of Statistics, 2015, 2019 and 2020. Thus, Nigeria's unemployment rate was 27.10% as of the second quarter of 2020, and it increased to 33.30% by the fourth quarter that same year. Particularly, as of Q1-2021, unemployment was 30.7%.

Furthermore, the degree of employment a country has recorded is one of the predictors of that country's standard of living. A higher unemployment rate indicates a lower standard of life, whereas a higher employment rate indicates a better quality of life. People without jobs are unable to contributing to the economy's production of goods and services. Nevertheless, in an economy with thousands of enterprises and millions of workers. A certain percent of unemployment is a common occurrence. A greater level of GDP can be prevented by inserting workers as fully employed as feasible. Whenever the bulk of the workforce is idle, however,

civil upheaval may result since people rely on labour earnings to improve their standard of living and sense of self-worth (Garba, Ahmed & Sunday, 2019).

Paradoxically, despite Nigeria is wealthy and endowed with natural resources, the rate of unemployment among its citizens is highly worrisome as such a condition described by the World Bank as "unemployment in the middle of plenty" (World Bank, 1996). On this note, attention has been drawn, especially researchers the way out to this nagging and persistent problem in Nigeria (Anthony, 2013; Garba, Ahmed & Sunday, 2019; Kilishi et al., 2014; Alabi, 2020; Eji-Orusa, 2019).

Succinctly, the focus of this research is on the impact of unemployment on crime rates in Nigeria from 1990 to 2020, with the goal of advocating policies that, if the unemployment rate in Nigeria is reduced, will have the potential to curtail these horrendous trends that pose a serious threat to our society. Thus, this study further divided into review of related literature, methodology, presentation and discussion of results and conclusion and policy recommendations.

Literature Review

Conceptual Review

Mainly, on the definition of unemployment, there appears to be agreement. Generally, unemployment refers to the state of unemployed persons. The International Labour Organization, 2018, describes the unwaged as a percentage of the total labour force that has no job at hand presently but is available and actively looking for work, which includes persons who have lost their jobs in the past and as well those who have willingly quit theirs also (World Bank, 1993). More so, National Bureau of Statistics (2009), a country's labour force is a group of people or inhabitants ready to make available their efforts for gainful employment at any specific moment in time. In contrast, job seekers are those who are unemployed but trying to look for work at the time any given time.

Due to their relative denial and profound logic of neediness, unemployed people are compelled to commit crimes. However, the unemployed socioeconomic situation frequently leads to criminality. According to the Oxford Dictionary Fourth Edition, a crime is defined as an act that is illegal and can be punishable by law, as well an illegal action as whole which deals with the fight against organized lawful thing. To be recognized as a crime, it must be brought to the attention of, and investigated via, an administrative system or law enforcement agency. The police must be notified, and the

incident must be documented (or investigator). Crime is regarded as a violation of the law, which must be adhered to by all individuals. The threat of crime to public safety is enormous. It produces a lot of human pain, a lot of material destruction and puts a lot of strain on the victims. Below are some of the causes of unemployment in Nigeria. These include:

Unemployment and Crime Rates in Nigeria: Causes of Unemployment in Nigeria

Nigeria, which is the largest population in Africa and biggest black in the world with enormous natural resources endowment, ought to have a very strong economy capable of employing almost employable and able citizen. But unfortunately, the rate of unemployment in Nigeria is alarming. Below are some of the causes of unemployment in Nigeria; they include the following.

Ghost Workers: When individuals who are not workers of a company are added to the payroll department, this is an illegal practise. This is typically accomplished by adding a made-up employee to the payroll, or even an actual employee with or without that employee's consent. The eventual goal of this practise is typically to collect the money owed to the ghosted individual, even though they do not actually work for the company. People in high positions within an organisation may even use their children as a front for themselves in order to acquire ghost employment and collect their pay. For example, a company might have 50 workers listed on its payroll system, but only roughly 30 of them are actually present in the office. The result of this illegal activity is that it provides the workers who are physically familiar to the company more work while occupying for free positions that should be open to more people. Thus, In Nigeria, ghost employment is a significant and frequently ignored source of unemployment. In order to eradicate ghost employees and create chances for genuine persons to assume the positions, businesses' payroll systems should indeed be carefully examined.

Lack of Skills: The Nigerian educational system is set up to emphasise theory more than application. Students who want to advance in the practical component of their course of study may need to go above and beyond to find these chances. Students can do this by participating in internship opportunities and part-time technical training. Of course, such an experiment does not provide everything that is needed in the real world. Most work opportunities after graduation don't have the time, money, or motivation to provide a trainee programme. Thus, they frequently request experienced workers with a minimum of three years of relevant experience, and only those under the age of 26 are eligible for the position. This is not the case in many other nations, where the academic system emphasises application above theory. This

presents a problem and, as a result, is one of the factors raising Nigeria's high rate of joblessness. People without the necessary skill might not be able to find employment.

Demand and Pay: demand here indicating the absence of open positions. It would not be necessary to add more staff if the demand for work was satisfied. Another factor contributing to unemployment in Nigeria is a lack of available slots. Pay, in contrast hand, refers to the sum that employees are entitled to in exchange for their labour. Individuals may decide to remain unemployed rather than accept a lower-paying job if the pay is poor which does not commensurate with the efforts put into the work.

Overpopulation: This is becoming a threat to Nigeria's economy and national security. This undoubtedly affects Nigeria's unemployment rate. The size of the economy has grown out of ratio to the growth of the people. There is not enough employment to accommodate a percentage of the population.

Corruption: This has crept into every aspect of government. The objective of government funds is defeated by the acquisition of resources by a small number of people, and this feeds Nigeria's unemployment ember.

Figure 1 below combines arrows that show the extremely direct impact of unemployment on crime rate in Nigeria in order to highlight the potential direct effect nexus between the aforementioned points between unemployment and crime rate.

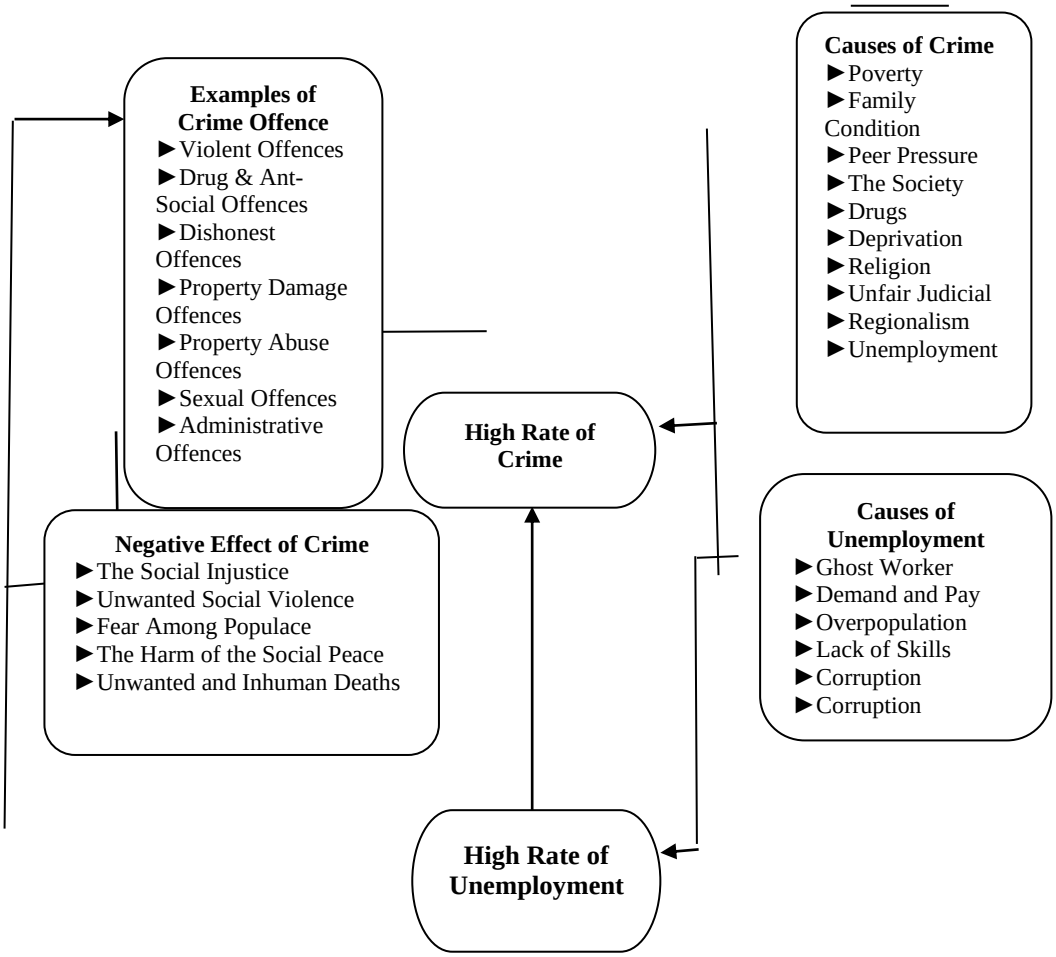

Figure 1: The Nexus Between Unemployment and Crime Rate
Source: Authors' Construct, 2021

As can be seen from Figure 1 above, there are numerous factors that contribute to unemployment, including ghost workers, demand and pay, population growth, a lack of skills, and corruption. These elements frequently lead to Nigeria's high unemployment rate. As a result, it was also noted from the information above that these factors include unemployment, level of poverty, family circumstances, peer pressure, the society, drugs, politics, and deprivation. Additionally, a high crime rate would lead to social inequality, unwelcome violence, public dread, the destruction of social peace, and unwelcome inhumanity. As a result, this will undoubtedly manifest in the form of violent crimes, drug-related and antisocial offences, dishonest offences, property crimes, property abuse offences, sexual crimes, and administrative offences. However, the relationship between the unemployment rate and the

crime rate has the potential to influence a wide range of social and economic aspects.

Empirical Review

Akujobi and Ebobo (2022) examined the nexus between poverty, unemployment, and crime in modern Nigeria. The study used an explanatory, cross-sectional approach. Secondary sources provided the data used in this investigation. However, it was discovered that in Nigeria, there is a direct correlation between unemployment, poverty, and crime. Additionally, there is a two-way connection between the variables. The results showed that unemployment had a negative impact on poverty and crime rates. Poverty also has a negative impact on crime and unemployment rates. This shows a connection between rising crime rates and rising unemployment and poverty. The report continues with suggestions based on its findings, saying that if poverty and crime are to decline, the unemployment rate must do the same. By creating jobs, it is also possible to lower the unemployment rate, which will eventually lower the poverty rate and deter crime on the whole.

Between 2005 and 2012, Anwer (2015) used panel data analysis to investigate the socioeconomic and demographic factors that influence crime in Punjab, Pakistan. To identify the existing link, both fixed and random effects were used. Deterrence variables were found to have a positive significant connection with all crime genres.

The study, conducted in the USA and conducted by Raphael and Winter-Ember (2001) examined the state level with a panel from 1970 to 1997 and found that the unemployment rates had a large positive effect on property crime. In the 1990's property crime dropped drastically, with employment dropping and much more legal career possibilities. The 2SLS techniques used to isolate the causal influence by measuring oil price shocks at the national level and annual primary contract awards were key determinants in unemployment.

Omotor (2012) used a panel data set from 2002 to 2005 to explore the drivers of crime in Nigeria. Variables such as per capita income, crime rate, and urban sprawl are taken into account. The result was calculated using the ordinary least square approach. The findings reveal that per capita income and population density have a considerable impact on crime. Another major cause of rising crime, according to the report, is law enforcement agencies' poor performance. The author advocated that law enforcement agencies' performance, as well as the basic requirements of the populace, be improved in order to reduce crime.

The study by Ayhan and Bursa (2019) looks at the relationship between crime and unemployment in EU nations. A panel data analysis covering the years 1993 to 2016 was employed. The Panel Granger Causality Test was used as the analysis's estimation method. The results showed that unemployment and crime rates had a long-term relationship. The coefficients also show that higher unemployment rates have a significant impact on crime rates. In other words, efforts to tackle unemployment can also result in lower crime rates, as seen in the case of the EU-28 countries. This further supports the idea that safer and more wealthy communities will result from lower crime rates.

Gillani, Rehman, and Gill (2009) looked into the relationship between unemployment, poverty, inflation, and crime in Pakistan. The study spans the years 1975 to 2007. The Augmented Dickey-Fuller (ADF) test is used to determine whether the time series data have stationary qualities. Johansen Maximum Probability To determine the long-term association as well as causation among some of the variables, cointegration and Granger Causality tests are used. The results of the tests show that crime, unemployed, poverty, and inflation have a long-term cointegration connection. The Toda-Yamamoto approach has been used to test the Granger causality. The causation findings demonstrate that unemployment, poverty, and inflation in Pakistan are causes of crime.

In Lagos State during the Covid-19 during the years of 2019 and 2021, Ndubuisi (2021) looks into the evaluation of the relationship between crime and unemployment. The study used a descriptive survey research design to compile questionnaires and 386 participants from the 989,000 residents of Lagos state's Ikorodu Local Government Area. As an estimating strategy for the investigation, the researchers used the Pearson Product Moment Correlation (PPMC) and Analysis of Variance (ANOVA). As a result, the research found a significant link between Covid-19 restriction policies and unemployment, a significant link between joblessness and cybercrime, and a significant link between layoffs and crime in Lagos state.

Tukur and Aguiyi (2022) analysed poor education, unemployment, and national security in Nigeria. This information came from both primary and secondary sources. To collect the data, structured questionnaires were employed as the instrument. 94 of the 100 questionnaires that were given to the respondents were found and used in an analysis utilising Chi-square statistic. The study's findings revealed that unemployment and low levels of education have social, economic, and political repercussions on national security, namely in the areas of health, education, and social safety nets, to name a few. It was also determined that high crime rates, increased social

unrest, increased cybercrime, and undermined economic security were difficulties for national security brought on by low levels of education and unemployment.

An evaluation of the relationship between Youth Unemployment and Crime in Obudu Local Government Area of Cross River State, Nigeria was conducted by Akan, Egbo, and Owoseni, (2022). The study used a survey design and adopted both quantitative through the help of questionnaires and qualitative data gathering methodologies, employing the Statistical Package for Social Sciences as an estimation tool. The research found a link between teenage unemployment and criminal activity. It was determined that young unemployment has the potential to drive them into deviant and illegal behaviour.

The relationship between youth unemployment and the rate of crime in Kenya was examined by Abdi (2022). Descriptive survey and correlational research designs were combined in the study's mixed research methodology. The study used structured questionnaires to collect data from 235 respondents, and quantitative data was analysed using numerous correlations and both descriptive and inferential statistics. It was discovered that there is a connection between youth unemployment and the type of crime that is most common in Wajir County. The study comes to the further conclusion that youth-related criminal activities in the County were considerably addressed by government initiatives surrounding young unemployment.

Furthermore, numerous researches have been conducted to establish the impact of unemployment on crime rates. Existing research suggests that higher unemployment is linked to increased crime. Studies that identified a negative nexus between unemployment and crime include Anthony (2013); Garba, Ahmed and Sunday (2019); Alabi (2014); Nwigbo and Imoh-Ita (2016); Kimberley (2019); Orruam and Abur (2014). While other demonstrate positive between unemployment and crime rate (Kilish et al., 2014; Sanam, Munir & Asghar, 2017).

Research Methodology

Theoretical Framework

The framework for this study was anchored on Becker's (1968) and Ehrlich's (1973) model, Elrlich's model, which states that when people have a variety of market activities to choose from, they should maximize their utility. Individuals in the Ehrlich model choose between two possibilities for allocating their time. The first option is to engage in illegal work while the second alternative is to engage in legal job. A breach of the law can also be

perceived as something that will boost the perpetrator's monetary prosperity, physical well-being, or both. Ehrlich takes this into account and broadens his model to encompass time. Because time is short, deciding between working and committing crimes is a matter of finding the best use of one's time. The model suggests that there are no costs to enter the activity and that there are no costs to move between activities. As a result, the individual is not deciding solely between two possibilities; rather, he or she is selecting the best combination of the two options. Both activities provide a monotonically growing return as a function of worktime. The function $M_t(t_i)$, where t is the time input, gives the net returns from the legitimate activity, L, with confidence. The net return from illicit behavior, i is dependent on two possible world states: σ, in which the offender is caught and convicted with probability ρ_i, and b, in which the perpetrator gets away with probability $1-\rho_i$. If the criminal gets aside with it, the benefit is the whole value of the illegal activity's output, minus the expense of the purchased inputs, $M_i(t_i)$. If the offender is identified and reprimanded, the rates of return will be decreased with the amount of $H_i(t_i)$, which is the value of the penalty for the fraudulent activity and other losses. We make the assumption that the aim of the person is to be trying to maximize his or her total utility. The function determines the utility in any given state of the worlds.

$$U_s = U\left(K_s t_c\right) \tag{1}$$

Where Ks, which signifies stocks composites market commodity that is conditional on states occurring. tc stands for consumption time, and U stands for the indirect utility function that turns Ks and tc into consumption flow. With respect to K, there are only two states in the world under these hypotheses.

$$K_b = M^{'} + M_i\left(t_i\right) \tag{2}$$

and obtained with probability $1-\rho_i$, or

$$K_\sigma = M^{'} + M_i\left(t_i\right) - H_i\left(t_i\right) \tag{3}$$

M$^{'}$ suggests market worth of the person's asset, which is derived with probability ρ_i. The predicted utility is calculated as follows:

$$EU\left(K_s t_c\right) = \sum_{s=\sigma}^{n} \lambda_s U\left(K_s t_c\right) \tag{4}$$

and λ_s equals probability of $\boldsymbol{s}$, in reduction to the case as stipulated in the equation below:

$$EU\left(K_s t_c\right) = \left(1-\rho_i\right)U\left(K_b t_c\right) + \rho_i U\left(K_\sigma t_c\right) \tag{5}$$

Let maximize equation (4) with in respect of the variable's t_i t_1, and t_c while keeping in mind the wealth limits imposed by equations (2) and (3), as well as a time constraint.

$$t = t_i + t_1 + t_c \tag{6}$$

Hence, nonnegativity requires

$$t_i \geq 0; t_1 \geq 0; t_c \geq 0 \tag{7}$$

Let substitute (2) and (3) into (4) equation, then, we Kuhn-Tucker first-order optimality condition as follows:

$$\frac{\partial \Sigma U}{\partial t} - \phi \leq 0.,$$

$$\left(\frac{\partial \Sigma U}{\partial t} - \phi\right) t = 0.$$

$$t_i \geq 0 \tag{8}$$

Thus, t denotes the most favourable values of each t_i, t_l, t_c and ϕ represents marginal utility in time consumption. however, the equation (8) examines the range of possible illegal and legal behaviors. Considering the length of time spent on consumption t_c, and event of an interior solution, the best allocation of time between i and 1 must meet the following first order condition:

$$-\frac{M_i - M_1}{M_i - h_i - M_1} = \frac{\rho U'\left(K_\sigma\right)}{\left(1-\rho\right)U'\left(K_b\right)} \tag{9}$$

That is;

$$m_i = \left(\frac{\partial M_i}{\partial t_i}\right), h_i = \left(\frac{\partial H_i}{\partial t}\right) \text{ and } m_1 = \left(\frac{\partial M_i}{\partial t_i}\right). \; jdjd$$

From above equation, the LHS represents opportunity boundary while RHS denotes indifference curve slopes. However, the methodology was built by using different world states, but it may also be applied to n world states. Ehrlich shows an example where the gains in i and l are each subject to a binomial probability distribution based on whether the person would be able to get away with committing a felony in i while being unemployed or working in l for a given period of time. The requirement for an interior solution that maximizes the equation in terms of the allotment of working time between I and l. (5). Consequently,

$$\begin{aligned}&(1-\rho_i)(1-\delta_i)U_\sigma(m_i-m_1)+(1-\rho_i)\delta_i U_b m_1\\&+\rho_i(1-\delta_i)U_c(m_i-h_i-m_1)+\rho_i\delta_i U_d(m_i-h_i)=0\end{aligned} \tag{10}$$

Therefore, δ_1 represents unemployment's probability in l, and σ, b, c and d are world states. Succinctly, (8), (9) and (10) equations were used to detect the aspects that examine the best involvement in lawful and unlawful activities. If all other factors remain constant, a rise in the likelihood of being caught committing crimes or the value of the penalty will diminish the motivation to engage in illegal dealings since the estimated marginal cost of penalty would rise. Increasing the marginal return on unlawful activity will also enhance the motive to commit crimes.

Model Specification

Nevertheless, in order to evaluate the association between unemployment and crime, this study uses Becker's (1968) crime supply function, which is shown in the equation below. It is because illegal activities can induce anxiety in society by instilling fear, specifically when they result in a person's death. According to Becker, criminals may be offered incentives to encourage them to commit acts of violence. People who commit crimes are frequently linked to poverty or locations with limited possibilities and a low economic background. This is due to the fact that poor neighborhoods and people from low-income families have restricted access to police, which may encourage violence in these locations Fajnzylber et al, (2002).

In order to examine the unemployment and crime rate nexus in Nigeria, a model anchored on the theory as used by Fredrik (2018) is adapted and specified as follows:

$$CRIME_{it} = \sigma + \beta_1 UNEM_{it} + \beta_2 HED_{it} + \beta_3 FBG_{it} + \beta_4 MEN1524_{it} + \beta_5 MEN2534_{it} + \beta_6 DIVORCED_{it} + \beta_7 INCOME_{it} + \beta_8 POPDEN_{it} + \nu_{it} \quad (11)$$

Equation (11) can be explicitly expressed as

$$CRIME_{it} = \sigma + \beta_1 UNEM_{it} + \beta_2 HED_{it} + \beta_3 POP_{it} + \nu_{it} \quad (12)$$

Where CRIME represents violent crime, UNEM represents unemployment rates, HED represents higher education, FBG represents share with foreign background, MEN1524 represents share of men 15 – 24, MEN 25- 34 represents share of men 25 – 34, DIVORCED represents share of divorced, INCOME represents mean income, and POPDEN represents population density. However, the model is modified to UNEM, CRIME, HED and POP as in equation 13.

$$CRIME_{it} = f\left(UNEM, HED, POP\right) \quad (13)$$

Expressing equation 13 in linear form yields equation 14

$$CRIME_{it} = \beta_0 + \beta_1 UNEM_{it} + \beta_2 HED_{it} + \beta_3 POP_{it} + \sigma_i + \sigma_t + \varepsilon_{it} \quad (14)$$

Where β_0 = constant. β_1 to β_4 represents various slope coefficients while UNEM, HED and POP remain as defined above. Equation 15 below is obtained by putting the variables on a sane scale of measurement and adding the stochastic disturbance term.

$$CRIMEL_{it} = \beta_0 + \beta_1 LUNEM_{it} + \beta_2 LHED_{it} + \beta_3 LPOP_{it} + \varepsilon_{it} \quad (15)$$

The natural log of the variables is represented by L. This is important in order to keep the variables from fluctuating too much. All other variables remain the same as they were before.

$$t_i \geq 0; t_1 \geq 0; t_c \geq 0 \quad (16)$$

On a-priori that is increase in unemployment supposed to have positive relationship with crime rate, meaning, a rise in long-term unemployment will lead to increase in crime rate, and vice-versa. This is in line with Fredrik, (2018), thus Whenever it comes to unemployment, an increase in the possibility of unemployment has a partially favourable effect on illicit activity participation. Thus, the risk of becoming unemployed increases the temptation

to commit crimes. The data used for this research were sourced from World Development Indicator, while time series data which include CRIME, UNEM, HED, and POP.

Thus, in this study, the granger causality model is based on:

$$\Delta LnCRIMEL_t = \sum_{j=1}^{n} \alpha_{ij} LnCRIME_{t-1} + \sum_{j=1}^{n} \alpha_{ij} LnUNEM_{t-j} + \sum_{j=1}^{n} \alpha_{ij} LnPOP_{t-j} + \sum_{j=1}^{n} \alpha_{ij} LnHED_{t-j} + \mu_{1t} \quad (17)$$

$$\Delta LnUNEM_t = \sum_{j=1}^{n} \alpha_{ij} LnUNEM_{t-1} + \sum_{j=1}^{n} \alpha_{ij} LnCRIME_{t-j} + \sum_{j=1}^{n} \alpha_{ij} LnPOP_{t-j} + \sum_{j=1}^{n} \alpha_{ij} LnHED_{t-j} + \mu_{1t} \quad (18)$$

$$\Delta LnPOP_t = \sum_{j=1}^{n} \alpha_{ij} LnPOP_{t-1} + \sum_{j=1}^{n} \alpha_{ij} LnCRIME_{t-j} + \sum_{j=1}^{n} \alpha_{ij} LnUNEM_{t-j} + \sum_{j=1}^{n} \alpha_{ij} LnHED_{t-j} + \mu_{1t} \quad (19)$$

$$\Delta LnHED_t = \sum_{j=1}^{n} \alpha_{ij} LnHED_{t-1} + \sum_{j=1}^{n} \alpha_{ij} LnCRIME_{t-j} + \sum_{j=1}^{n} \alpha_{ij} LnUNEM_{t-j} + \sum_{j=1}^{n} \alpha_{ij} LnPOP_{t-j} + \mu_{1t} \quad (19)$$

Presentation and Discussion of Results

Table 1: Descriptive Statistics

Variable	CRIME	UNEM	POP	HED
Mean	11.415	4.5710	8.1448	1.9605
Median	8.9800	3.8300	8.1428	1.9585
Maximum	33.980	9.0100	8.3141	2.0072
Minimum	2.3800	3.5900	7.9789	1.8946
Std. Dev.	0.7135	0.7217	0.1019	0.0257
Skewness	1.4773	1.8352	0.0335	-0.1618
Kurtosis	4.1995	4.5508	1.7896	3.0534
Jarque-Bera	13.136	19.847	1.8980	0.1389
Probability	0.0014	0.0000	0.3871	0.9328
Observations	31	30	31	31

Authors' computation, 2021

We employed descriptive statistics in this investigation are presented in table 1. The average and median values of CRIME, as well as other variables like total unemployment, population, and higher education, are between the maximum and minimum values, indicating that there are differences. With a score of 33.98, CRIME came in first, while higher education came in last with a score of 2.007. It is also the most volatile variable, with a standard deviation of 0.713. As a result, the data contains both positive and negative skewness. Except for higher education, which is positively skewed, every other variable is positively skewed. Peakedness is the result of a combination of platykurtic and leptokurtic influences. The Jaque-Bera statistics suggest that all of the variables are normal because they are all inconsequential at a 5% significance level. According to the results of the foregoing descriptive statistics, the reason why the order of the observations varied was because the variables were different in terms of their years of availability when they were retrieved.

Table 2: Correlation Matrix

Correlation	CRIME	UNEM	POPDEN	HED
CRIME	1			
UNEM	0.900	1		
POP	0.678	0.672	1	
HED	-0.044	-0.065	-0.0009	1

Authors' computation, 2021

Table 2 shows the correlation matrix that was used to ensure that the model was accurately described, that there was no multi-collinearity, and that there was no serial correlation. The correlation matrix demonstrates that none of the variables is collinear because they are all within the permitted range.

Unit Root Test

The stationarity status of the variables was determined using the Augmented Dickie Fuller in this study (ADF). It's worth noticing that the variables in both tests have unit roots.

Table 3: ADF Unit Root Test

Variables	Levels	First Difference	Order
CRIME	-1.1926	-9.3866	I(1)
UNEM	-3.3894	-4.6459	I(1)
POP	-15.9858		I(0)
HED	-2.4535	-5.1495	I(1)

Authors' Computation, 2021

Table 3 shows that the ADF reported crime rate, unemployment rate, and higher education are all stationary at first difference, with the exception of

population density, which has level stationarity, all were statistically significant at 5% significance level. Due to this result, we now move on to the ARDL Bound test cointegration in order to fine-tune the long run nexus among the variables used for the study.

Cointegration Test

The next step is to determine whether the variables under examination have any long-run convergence, which is the study's initial purpose. The long-term outcomes of our variables are shown in Table 4, and the results of this analysis are presented in the discussion of the findings.

Table 4: ARDL Co-Integration Estimate Result

F.stat.	k	Significance	I (0)	I (1)
12.480	3	10%	2.72	3.77
		5%	3.23	4.35
		2.5%	3.69	4.89
		1%	4.29	5.61

Authors' Computation, 2021

Table 4 demonstrates that the empirical variables have a long run relationship. This is because the f-stat. (12.480) exceeds both the lower and upper bound critical values I(0) and I(1) at any level of significance, i.e. 1 percent. The presence of co-integration is confirmed by the fact that the f-stat. (12.480) is greater than both the lower bound and upper bound of the critical value at I(0) or I(1), at 1%, 5% and 10% level of significance.

Table 5: ARDL Model Estimate Result

Variables	Coeff.	Std. Error	t-Static.	Probability
CRIME(-1)	0.0830	0.1707	-1.0718	0.2949
UNEM	0.0560	1.2168	1.1966	0.2436
UNEM(-1)	0.0364	1.5871	2.2911	0.0314
POP	0.5794	9.4216	2.6088	0.0157
HED	-0.5362	24.8805	0.5842	0.5647
C	-238.430	90.0921	-2.6465	0.0144
F. Prob.		0.0000		
R-squared		0.8865		
Durbin-Watson stat.		2.2921		

Authors' Computation, 2021

Based upon the minimum Akaike information value, the most suited ARDL model is selected. The ARDL order is the optimum delay length (1, 1, 0, 0). Table 5 shows the outcomes of the ARDL.

Table 6: Pairwise Dumitrescu-Hurlin Causality Estimate Test

Sample: 1990 2020	**Lags: 2**			**Results**
H_0:	W-Stat.	Zbar-Stat.	P. Value	
CRIME does not granger cause UNEM	5.81150	11.4245	0.0000	↔
UNEM does not granger cause CRIME	14.9086	38.5811	0.0000	
POP does not granger cause CRIME	5.84646	8.65335	0.0000	↔
CRIME does not granger cause POP	17.2432	41.9693	0.0000	
HED does not granger cause CRIME	4.02906	4.70194	0.0000	↔
CRIME does not granger cause HED	19.5263	49.49267	0.0000	

Where: Bidirectional causality = (↔), unidirectional causality = (→) & no causality = (χ)
Authors' Computation, 2021

From the table the causality findings equally show causality effect of the variables as such unemployment rate does granger cause crime due to the fact that the value of probability that 0.000 which is less than 5 percent of the level of significance while crime does cause granger to unemployment owing to the value of probability that 0.0000 which is greater than 5 percent level of significance. And this assertion to correspond with our apriori expectation. Also, population is granger induce crime rates because of the value of probability which is 0.0000 that less than 5 percent level of significance. the same way crime is granger reason population. And lastly, higher education is granger cause crime rate, this means the lower of educational attainment the greater the rate of crime a nation experience, whereas crime does granger cause higher education owing to the value of probability which is 0.0000.

Decisively, one explanation for the difference in results between the core variables in Table 7 could be that higher unemployment rates may have a negative impact on crime rates while there are many other factors that can greatly affect unemployment rates and change crime rates in Nigeria.

Results of Post Estimate

To confirm the robustness of the results, more diagnosis and reliability tests have been employed. In table 7 below, the diagnostic and uniformity tests are presented and addressed.

Table 7: Estimation of Post Diagnostic Analysis

Heteroskedasticity Test			
F-statistic	2.641181	Prob. F (5, 23)	0.1870
Obs* R-squared	10.57759	Prob. Chi-Squared (5)	0.2962
Scaled explained SS	8.622965	Prob. Chi-Squared (5)	0.0236
Serial Correlation Test			
F-statistic	0.898753	Prob. F (2, 21)	0.4222
Obs* R-squared	2.286552	Prob. Chi-Squared (2)	0.3188
Jarque Bera stat	1.07 (0.59)		

Authors' Computation, 2021

From the table 7, we fail to accept null hypothesis owing to the fact that corresponding p-values for F-statistics and chi-square are 2.641181 and 0.2962, respectively, which are less than 0.05, therefore, we do consider this against alternative hypothesis and thus, conclude that the residual is homoscedastic. Moreover, because probability (Chi-square) and probability are both 0, the null hypothesis indicates that there should not be any heteroskedasticity.

In addition, Correlation test results against the null hypothesis that there is no self-correlation of residuals produced by the autoregressive model, with significant probability values of 0.422 2 and 0.328, for F and observed R-Squared, respectively. Thus, we therefore conclude that the test is valid because there are serial correlations in the estimated series. The results of the normalcy test are shown in the table above. Since the probability value (0.59) is negligible, then the null hypothesis is accepted, and the alternative hypothesis that this research model is normal is rejected. This confirms that the model is suitable for the estimate

Discussion of Findings

The study attempts to look at the link between unemployment and rates in Nigeria using an auto-regressive distributed lag approach. The results of findings indicate that crime rate coefficient is positive and statistically significant at lag 1, with a value of 5%, implying that, a 1% increase in unemployment result in 0.0830 increase in crime rate as there will be so much violence in the system, which will eventually lead to the loss of jobs, properties abuse offences, sexual offences, and many others. Similarly, the current period's coefficient of unemployment rate is 0.0560, which is positive and statistically significant. This simply means that a unit increase in the unemployment rate will result in a 0.0560 increase in the crime rate, which is in line with our a priori expectation that an increase in unemployment will result in an increase in crime rate. Furthermore, the coefficient of unemployment rate at lag 1 is 0.0364, implying that a 1% increase in unemployment will result in a 0.0364 increase in crime rate. It is equally obvious that population has a 0.5794* coefficient, which means that a unit

increase in population will also result in a 0.5794* increase in crime rate. More importantly, increased educational attainment will result in a decrease in crime rates. Therefore, the higher education attainment coefficient is -0.5362, indicating that an increase in educational attainment reduces the number of people who want to commit crime in a country. This also explains why a 1% increase in educational attainment leads to a 0.5362 reduction in Nigeria's crime rate.

Conversely, R-squared shows that all explanatory variables together account for around 88.65% of the variation in crime rate in terms of the model's appropriateness, and it also shows that the analysis has less than 12% error. The Durbin-Watson value of 2.2921 indicates that the problem of serial correlation in the model is less severe. The value of F-stat (Prob) of 0.0000, shows that the model has a good fit and it exhibits a joint significance among the variables.

Thus, Ayhan and Bursa (2019), looks at the relationship between crime and unemployment in EU nations; Gillani, Rehman, and Gill (2009), examines the relationship between unemployment, poverty, inflation, and crime in Pakistan; Ndubuisi (2021), looks at an evaluation of the relationship between crime and unemployment in Lagos State between COVID-19 (2019-2021); Tukur and Aguiyi (2022), analyses poor education, unemployment, and national security in Nigeria; Egbo, and Owoseni, (2022), investigates an evaluation of the relationship between youth unemployment and crime in Obudu Local Government Area of Cross River State, Nigeria; Garba, Ahmed, and Sunday (2020), investigates the impact of unemployment on crime rates in Nigeria; Kilishi et al. (2014), examines the rate of crime has a significant impact on economic growth and development and the relationship between youth unemployment and the rate of crime in Kenya was examined by Abdi (2022).

Nevertheless, from the outcome the study demonstrates that there is a positive relationship between the crime rate and unemployment in Nigeria. This implies that an increase in unemployment result a rise in crime rates. Accordingly, it was found that the majority of the review studies as mentioned above are consistent with the current study, that is., there is positive connection between unemployment and crime rate.

Conclusion and Policy Recommendation

This study investigates at the impact of unemployment and crime rates in Nigeria spanning from 1990 to 2020. The study's findings demonstrate a connection between Nigeria's high crime rate and the aforementioned unemployment rate. From this study, the following conclusions have been

made. The study of the findings yielded the conclusion that unemployment increases crime in Nigeria. Because a nation's unemployment rate serves as a complementing measure of earning prospects on the legitimate labour market, this is the case. Consequently, as the unemployment rate rises, fewer people have the opportunity to find work, which encourages people to turn to crime.

In light of the foregoing, it was also discovered that there is a connection between population and crime rate. Therefore, population growth is positive and statistically impact crime rates. This shows that an unrestrained population growth resulted in a rise in crime rates. Also, it was observed that the greater education attainment coefficient is -0.5362, meaning that a country's desire for criminal activity decreases as educational attainment rises. Additionally, this explains why a 1% increase in educational attainment causes a 0.5362 decrease in crime in Nigeria.

To this end, government should generate jobs so that qualified citizens who are looking for work can find one in order to reduce crime and insecurity in Nigeria. The government should equally foster an environment that encourages businessmen to explore with and excel in their chosen business ventures. In order to meet the nation's employment needs, the government should also provide grant funding to business owners who will use their SMEs to expand the number of opportunities for employment. Government should effectively exploit the growing population and if unregulated population expansion or improper utilisation of population management, this may result in crime. In order to establish a fair playing field for all job seekers, the ministries and stakeholder in Federal recruitment drives should reform the recruiting process, particularly for the Government parastatals and agencies. This would help eliminate the sense of disempowerment that many job seekers experience and which has led them to lose their sense of patriotism as a result of injustice. The practical component of entrepreneurial studies at universities should be incorporated into the curriculum so that fresh graduates have the necessary business skills to support themselves when there are no government-paid positions available.

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