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**JOSEPH AYO BABALOLA UNIVERSITY, IKEJI-ARAKEJI, OSUN STATE.**

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# THE IMPACT OF UNEMPLOYMENT AND POPULATION ON CRIME IN NIGERIA

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## Abstract

*The paper estimates panel regression models of supply elasticity of crime in Nigeria. The results of the classical pooled, weighted least squared and between group models are consistent, and revealed that higher unemployment and population lead to more crimes in the Nigeria society. However, results of fixed effect and random effects models are conflicting and not consistent with results of the aforementioned models. Meanwhile it is evidenced from the fixed and random effects models as well as the between group model that characteristics of crime, elasticity of supply of crime and determinants of the elasticity differ across states and over time. Therefore, individual state needs state specific policies to reduce the supply of crime and increase the demand for crime. However, classical pooled result suggests a nation-wide policies of fighting crime will reduce crime across all the states of the federation.*

**Keywords:** *Demand for Crime; Supply of Crime, Supply Elasticity of Crime; Fixed Effect Model and Random Effect Model*

## Introduction

Crime is one of the major public worries in Nigeria and the world over. Crime exacts tremendous costs on the society which affect welfare of the people. In recent state of insecurity in the country raised major concern among policymakers, investors and other stake holders. The cost of crime in any society is grievous, for example, in recent times banks and other business closed shops for days in some states in Nigeria. Similarly, in some states farmers could not go to their farms for days because of high level of insecurity. Usually, these costs are not factored into the official measures of well-being. Economists have known at least since Gary Becker's (1968) path-breaking work on the economics of crime that crime responds to economic conditions and incentives. However, the public seems to be largely unaware of the economics view of crime and its implications. The necessity to familiarize the public with research findings on economics of crime arises. It is equally important to investigate whether or not crime response to economic incentives in different societies. Therefore, this paper seeks to empirically investigate the impact of unemployment and population on crime in Nigeria.

Crime is assumed to be an economic good and perpetrators of crime are economic agents who try to make rational economic choices. In other words individual criminal has a Von Neumann-Morgenstern utility function which he/she tries to maximize. Becker (1968) specified the individual's expected utility function  $E(U)$  from committing a crime as:

$$E(U) = PU(Y - F) + (1 - P)U(Y) \text{----- (1)}$$

where  $P$  is the subjective probability of being caught and convicted,  $Y$  is the monetary plus psychic benefits from crime,  $F$  is the monetary equivalent of the punishment when caught and  $U$  is the utility,

while  $E$  is the expectation operator. The individual will commit the crime if the expected utility is positive, and he/she will not commit the crime if it is negative. In other words, criminals commit crime if the benefits from the crime is more than the associated costs. If it is assume that criminals are risk neutral agents, then equation (1) becomes:

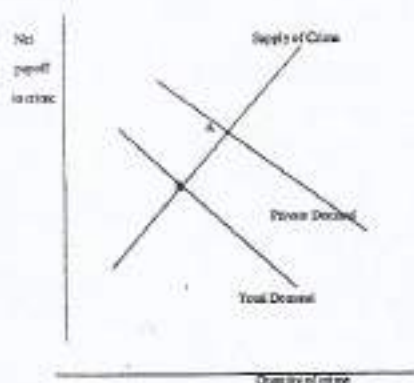
$$E(Y) = P(Y - F) + (1 - P)Y = Y - PF \text{ ----- (2)}$$

In this case crimes will not be committed if  $PF > Y$ , that is, if the expected fine is higher than the benefits of a crime, meaning if "crime does not pay".

The economic model of crime assumes that criminals are economic actors who try to make rational economic choices. In this paper three sets of actors are considered: first, the criminals; second, noncriminal households and legitimate businesses; and third, the government or law enforcement agents. The three actors play role in determining the rate of crime in the society. The criminals determine the supply of crime, the noncriminal sector (i.e. noncriminal household, legitimate businesses and government) of the society determine the demand for crime in form of private protection and government activities in crime protection. The criminals make choices between legitimate activities on one hand and criminal activities on the other hand. The choice depends on the net payoff to crime, which is the payoff of the criminal activity minus all costs associated with the crime. These costs include the foregone wages from legitimate activities, the direct cost of the crime (costs associated with the actual commission of a crime; advance research, transportation, the transactions' costs of disposing of illegally obtained goods) and the expected penalties from the crime (Ehrlich, 1996; Dilulio, 1996; Freeman, 1996). The supply of crime is positively related to the net payoff to criminal activities, in other words criminals will increase their activities when the net payoff rises. For example, fewer employment opportunities at a given wage and reductions in sanctions might lead to shift of the supply curve rightward. Education and welfare benefits might increase the opportunity cost of committing crime by increasing legitimate earnings.

The concept of demand for crime may sound eccentric, but according to Becsi (1999), there is an indirect demand for crime, which is an inverse demand for protection and insurance. Thus, the analysis of demand for crime in this paper follows Becsi (ibid.). The demand for crime is negatively related to the payoff of criminal activities. This means that, if people step up private efforts to protection (ranging from locking their doors, putting car securities, to hiring private security guards such as 'vigilante' and so on), the direct cost of criminal activity increases and therefore reduces the payoff to crime. The demand curve shifts to the left for any change to household conditions that decreases the payoff to crime. The diagram below illustrates these arguments:

**Figure 1: Demand and Supply of Crime**



The intersection of private demand for crime and supply of crime determines the laissez-faire equilibrium rate of crime and the equilibrium return to crime, this is point A in the diagram. The laissez faire equilibrium will not be optimal from social welfare perspective. Thus, a move toward the socially optimal level of crime requires some sort of legal or government intervention. Government intervention (public component of the demand for crime) add up the private demand, hence move the equilibrium toward a lower crime rate (point B) that has higher social welfare. This implies that government anticrime actions step up efforts to battle crime, crimes become more costly and the net return to crime falls. Hence the total demand curve lies below the private demand curve because combined public and private efforts at crime avoidance mean that there is less crime for a given payoff to crime than when private acted alone. An exogenous increase in the expected future costs to criminals of public sanctions will shift the total demand curve to the left, as for example, when tougher laws or sentencing arrangements are enacted.

In this background, this paper examines the impact of unemployment and population on crime. It is expected that society with more unemployed will experience more crime since legal source of income to the unemployed is low. However, empirically there are divergent conclusions, while some find correlation between the two other do not find any correlation. Therefore, this paper examines the relationship between crime and unemployment as well as population in Nigeria. The paper also examines whether or not the behaviour of crime differs across states in the country.

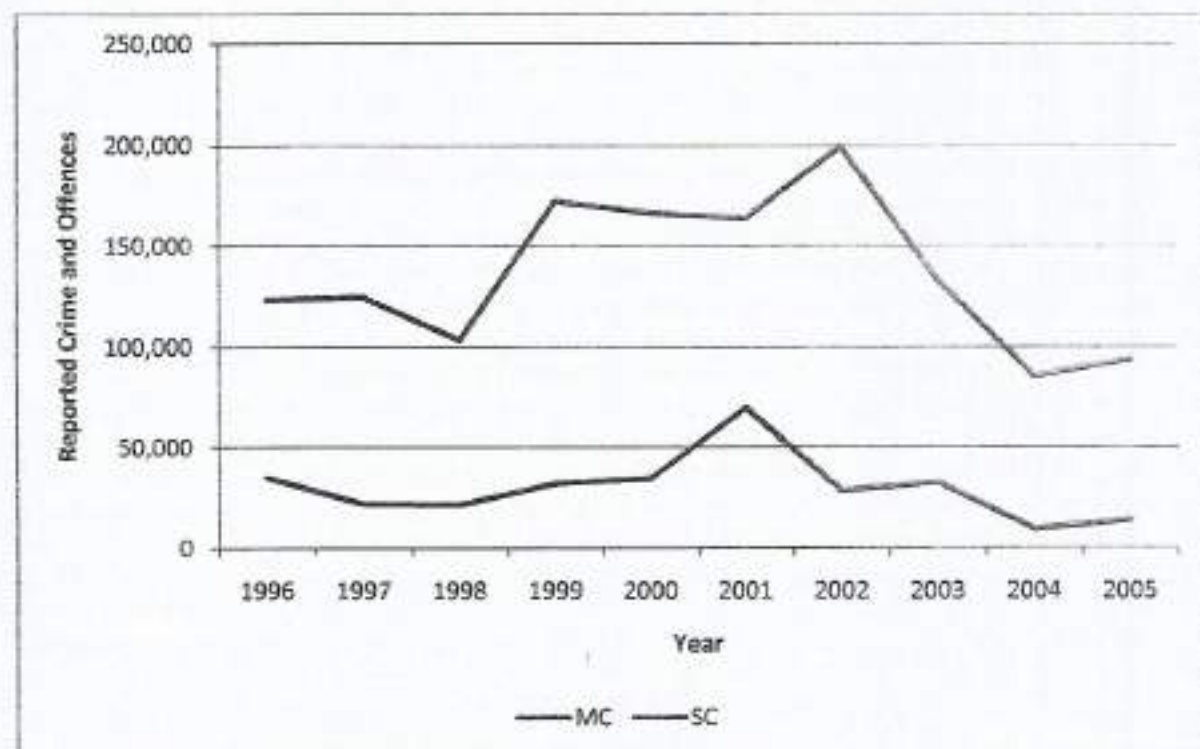
The paper is arranged to five sections; following this introduction is section two which presents the structure and trend of crime in Nigeria, section three is methodology and model specification. Section four presents and discusses the regression results and section five is the conclusion.

### **Structure and Trend of Crime in Nigeria**

The aggregate crime data, reported by NBS are obtained from the police authorities. These are crimes reported to the police, both the minor and serious crimes. Minor crimes include receiving stolen property, unlawful possession of items, arson, perjury, false pretence, gambling, breach of peace, escape from custody, and others. Serious crime on the other hand include murder, manslaughter, felonious wounding, assault, armed robbery, burglary, house and store breaking, forgery of currency, and bribery and corruption. Robbery, burglary, and larceny are often mistaken for each other. Robbery, which includes attempted robbery, is the stealing, taking, or attempting to take anything of value from the care, custody, or control of a person or persons by force, threat of force, or violence, and/or by putting the victim in fear. There are seven types of robbery: street and highway, commercial house, residence, convenience store, gas or service station, bank, and miscellaneous. Burglary is the unlawful entry of a structure to commit a felony or theft. There are three types of burglary: forcible entry, unlawful entry where no force is used, and attempted forcible entry. Larceny is the unlawful taking, carrying, leading, or riding away of property or articles of value from the possession or constructive possession of another. Larceny is not committed by force, violence, or fraud. There are nine types of larceny: items taken from motor vehicles, shoplifting, taking motor vehicle accessories, taking items from buildings, bicycle theft, pocket picking, purse snatching, theft from coin-operated vending machines, and all others.

However, there are many reasons to be wary of self-reported crime data. First, not every crime is reported to the police, and this under-reporting produces measurement error in the offense and arrest rates, which could vary by the type of crime or place of jurisdiction. Also, the methods of collecting and reporting data vary across local authorities. The inclusion of individual specific state effects in the model would eliminates the effects of (time-invariant) cross-states variations in reporting methods. Nevertheless, figure 2 shows the trend of crimes and offences reported to the police.

**Figure 2: Minor Crimes (MC) and Serious Crimes (SC) reported to police**

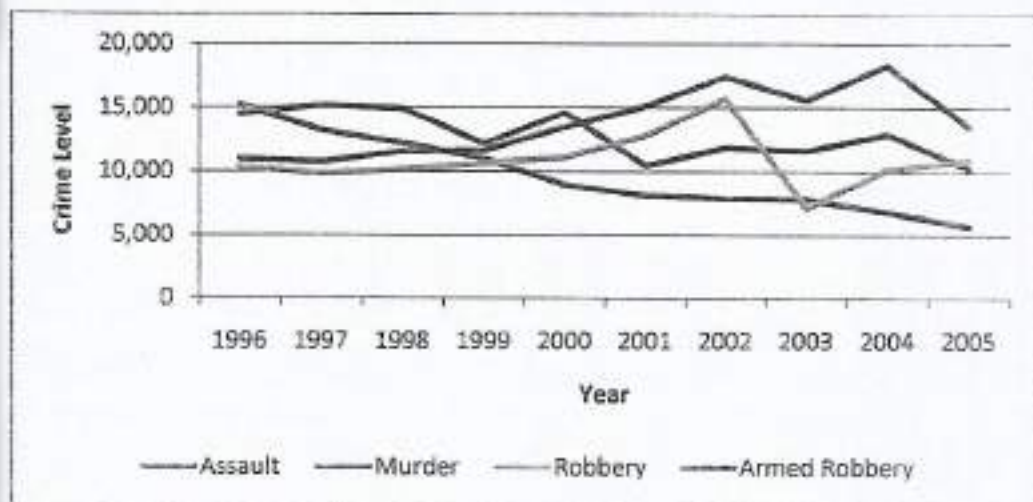


Source: computed by authors from NBS data

Figure 2 presents the trend of minor crime (MC) and serious crime (SC) in Nigeria from 1996 to 2005. The line of serious crime lied above that of minor crime which means reported serious crimes are far more than reported minor crimes. This may be due to the fact that many minor crimes are not reported to the police, rather they are settled outside the coffer of law. Minor crimes reduced for about 38 percent in 1997 from the level it was in 1996. It fell marginally in 1998 by about 2 percent. However, it increased by more than 50 percent in 1999, about 8 in 2000 and more than 100 percent in 2001. There was fall again in 2002 and 2004, though rose slightly in 2005. The trend and level of minor crime suggest that it is not actually a serious problem Nigeria. Serious crime are more pronounced in the country as shown in figure 2. The trend of SC also fluctuated over the period 1996 to 2005, it fell 1998, though begin to rise in 2001 and reached its all time peak in 2002 almost 200,000 cases. Thereafter, it started falling again and fell to less than 100,000 cases in 2004. Thus, both minor and serious crimes in Nigeria follow similar pattern, falling and rising over the period.

Considering the serious crimes in a more detail, figure 3 illustrates that the pattern of changes vary from crime to crime. Assault for instance decreases all over the period. Armed Robbery increases up to 2004 and decreases in 2005. Robbery on the other hand increases up till 2002, fell shapely in 2003 and latter rises again in 2004. Murder is on steady gradual decreases over the period with little rises in some periods.

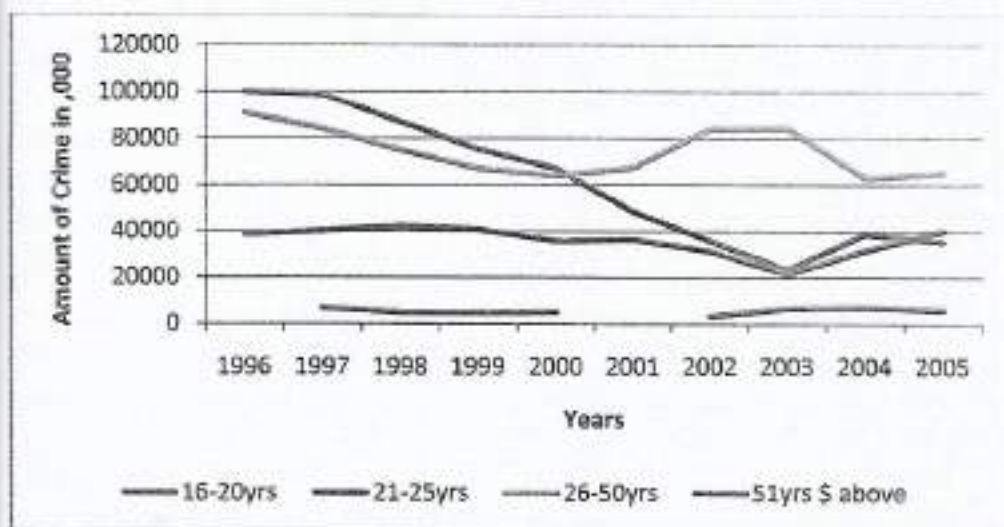
**Figure 3: Pattern of Serious Crimes**



Source: Computed by authors from NBS data

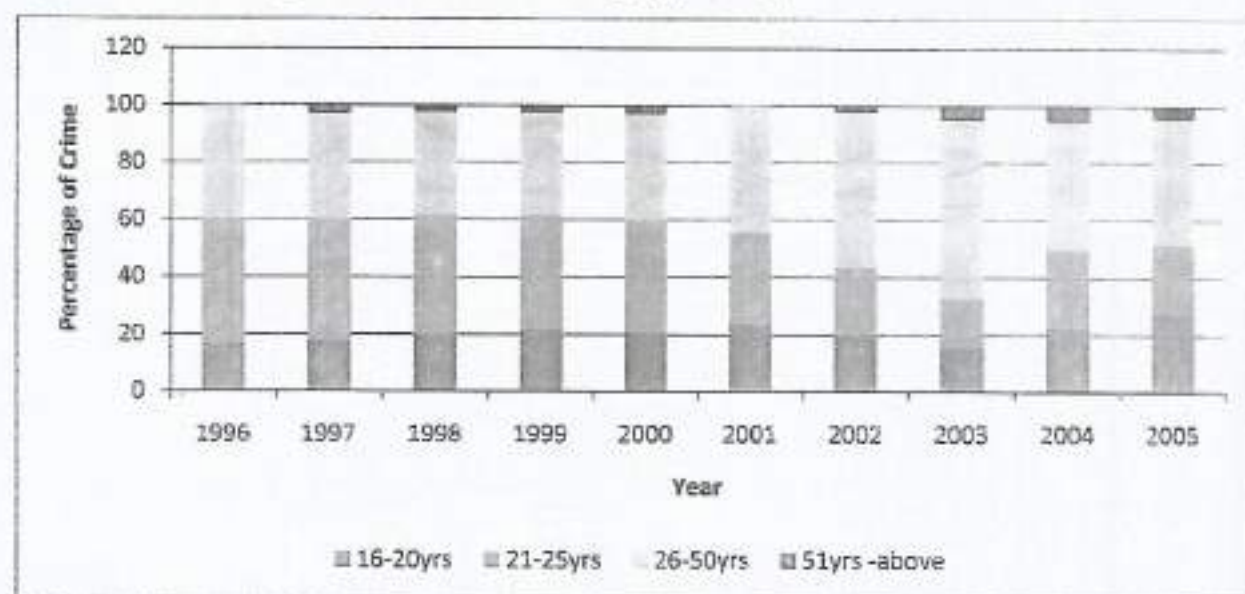
Distribution of crimes also differs across age groups. Figure 4 shows the trend of crimes by age group over the same period of time. Here the number of prison admission by age group is considered. Figure 4.A shows prison admission by age group, the trend here shows that crime between the age group of 21 to 25 years was highest over the period 1996 to 2000. From 2001 people in the age group of 26 to 50 years commit the highest number of crimes. Crime is low among teenage group of age 16 to 20, and lowest among older generation 50 years and above. Figure 4.B elaborate this further by showing the percentage of crimes committed by different age group in each year. In all the years display in figure 4.B, people in the age group 50 and above committed the lowest percentage of crime. The young age group, 16 to 20 years had the second lowest percentage of crime. From 1996 to 2000 crimes committed by people in the age group of 21 to 25 had the highest percentage but from 2001 to 2005 the crimes by age group 26 to 50 took over the highest place in term of percentage.

**Figure 4.A: Prison Admission by Age Group**



Source: Computed by authors from NBS data

**Figure 4.B: Percentage Distribution of Crime by Age Group**



Source: Computed by authors from NBS data

### Methodology and Model Specification

This paper analyzes a panel data of 36 states plus Federal Capital Territory (FCT) Abuja over a period of ten years. In each regression, state fixed effect is controlled for in order to correct for much of the cross-sectional variation crime activities. Time fixed effect is also controlled for so as to capture the variation of crime over time. The individual specific state effects is necessary in the model to deal with the unobserved state level heterogeneity that might be correlated with the state crime rate. There are many methods of estimating panel data, starting from the classical pooling regression (OLS) which assumes identical cross-sectional units, least squares dummy variable and entity demeaned least squares. The OLS estimator is consistent only when the orthogonal assumption holds. However, a number of reasons have been adduced for the possible violation of orthogonality assumption. First, the regression disturbance term may include some unobserved state effects that may be correlated with the regressors employed. Second, some of the regressors may be correlated with shocks that affect crime. Also, there is possibility of simultaneity biases resulting from the endogeneity of crime determinants. To overcome these econometric problems, we employ the fixed effects (FE) and random effects (RE). In this study, we report and compare results obtained from different estimators and we also conduct some diagnostic tests to complement the estimation techniques. Generally in a  $K$  variables model panel data model is specified as:

$$Y_{it} = \alpha_i + \delta_t + \beta_1 X_{1it} + \beta_2 X_{2it} + \dots + \beta_K X_{Kit} + v_{it} \quad (3)$$

Where  $\alpha_i$  is the individual fixed effects which capture factors that may differ among cross section units but are invariant over time such as demographic factors,  $\delta_t$  is time fixed effects. Time fixed effects capture factors that affect the different cross sectional units the same way at any given time but may vary over time such national regulatory policies.  $Y$  is the endogenous variable,  $X$ s are the exogenous variables and subscript  $i$  stand for  $i$ th unit while subscript  $t$  indicates the time period.

Thus, model to be estimated is specified as:

$$\ln Crime_{it} = \beta_0 + \beta_1 \ln UNE_{it} + \beta_2 \ln POP_{it} + \alpha Z_i + \delta W_t + v_{it} \quad (4)$$

Equation (4) is the estimable model for this study. Where  $UNE_{it}$  is unemployment in state  $i$  at time  $t$ ,  $POP_{it}$  is population. This model considers only the supply side of crime and it is expected that the supply of crime will be high with level of unemployment. Population is included to capture the impact of demography on crime across the states and over time. A double log model is specified, thus, the slope coefficients represent elasticity of crime supply. The variable  $Z_i$  captures individual fixed effect and  $W_t$  captures time fixed effect. The  $i = 37$  (that is, 36 states plus FCT) while  $t = 10$  (1996 to 2005). Finally,  $v_{it}$  denotes the error term that captures other determinants of supply of crime not included in the model.

### Presentation and Discussions of Results

The results are presented in Tables 1 and 2 respectively. The classical pooled, one way fixed effects, random effects and two way fixed effects results are reported in Table 1, while results of weighted least square and between group estimates are presented in Table 2.

**Table 1: Results of Pooled, Fixed Effects and Random Effects, dependent variable:  $\ln Crime_{it}$**

| Regressors     | Classical Pooled Model               | One Way Fixed Effects               | Random Effects Model   | Two Way Fixed Effects               |
|----------------|--------------------------------------|-------------------------------------|------------------------|-------------------------------------|
| Constant       | -0.9378<br>(0.3007)                  | 8.2108***<br>(5.99e <sup>-8</sup> ) | 4.97649***<br>(0.0001) | 7.0175***<br>(7.54e <sup>-6</sup> ) |
| $\ln UNE_{it}$ | 0.1267***<br>(6.20e <sup>-6</sup> )  | 0.0010<br>(0.9553)                  | 0.0140<br>(0.4498)     | -0.0100<br>(0.5867)                 |
| $\ln POP_{it}$ | 0.5143***<br>(1.48e <sup>-15</sup> ) | -0.0899<br>(0.3562)                 | 0.1243<br>(0.1395)     | 0.0022<br>(0.9825)                  |
| No. of Obs.    | 247                                  | 247                                 | 247                    | 247                                 |
| $R^2$          | 0.2879                               | 0.8727                              | 0.2865                 | 0.8876                              |
| F statistics   | 49.31767***                          | 38.74503***                         |                        | 37.26211***                         |
| $v_i = 0$      |                                      | 27.449***                           |                        | 29.6734***                          |
| Hausman test   |                                      | 22.2789***                          | 22.2789***             |                                     |

\*\*\* significant at 1%, \*\* significant at 5%, \* significant at 10%, p-values are in parenthesis.

Source: Computed by authors,

The classical pooled result presented in Table 1 shows that both the logs of unemployment and population are statistically significant and have positive impact on crime. Since the model is a double log specification the coefficients can be interpreted as elasticity. A 1% increase in the level of unemployment would lead to about 0.13% increase in crime. Similarly, 1% increase in population would results to 0.51% increase in crime. The variables are however not significant in both the fixed and random effects results. Meanwhile there is evidence that there is state individual fixed effects. In other words, there is heterogeneity in crime across states in Nigeria. The Hausman test also affirms, it shows that random effect is biased and that there is fixed effect.

Since the two variables are not significant in the fixed and random effects model, we considered alternative regressions within the framework of panel data analysis, that is, the Weighted Least Squares (WLS) and Between Group Model estimations. The results are reported in Table 2 below.

**Table 2: Weighted Least Squares and Between Group Model Results, dependent variable:  $\ln Crime_{it}$**

| Regressors     | Weighted Least Squares               | Between Group Model   |
|----------------|--------------------------------------|-----------------------|
| Constant       | 0.4524<br>(0.4741)                   | -1.6225<br>(0.4613)   |
| $\ln UNE_{it}$ | 0.1233***<br>(0.0033)                | 0.2330**<br>(0.0121)  |
| $\ln POP_{it}$ | 0.4242***<br>(3.01e <sup>-20</sup> ) | 0.5553***<br>(0.0006) |
| $R^2$          | 0.4400                               | 0.4200                |
| F statistics   | 95.8539***                           | 11.9474***            |

\*\*\* significant at 1%, \*\* significant at 5%, \* significant at 10%, p-values are parenthesis.

Source: Computed by authors,

The weights are based on per-unit error variances in WLS regression. The two models have significant and positive coefficients for both unemployment and population. The F statistics for the both models are also statistically significant. The WLS result suggests that 1% increase in unemployment would lead to 0.12% increase in crime, while a similar increase in population would lead to 0.42% rise in crime. On the other hand the Between Group Model result shows that 1% increase in unemployment would results to 0.23% rise in crime and 1% increase in population would lead to 0.56% increase in crime. The Between Group Model also suggests that the individual state characteristics of unemployment and population are what affect crime in each state and not the unemployment and population per-se.

Relatively, population has bigger effect on crime than unemployment. Thus, states with more population are more likely to experience more crime. In same vein, as population grows, more crimes will occur. As unemployment increases in the society there will be more crimes. Hence, states with more unemployed people are more likely to have more occurrence of crime. Therefore, control of population growth and rise in unemployment will reduce crime significantly in Nigeria. However, reduction in population would have more impact in crime fighting than reduction in unemployment.

## Conclusion

This paper empirical examines the impact of unemployment and population on supply of crime in Nigeria. The paper shows that crime will rise if the chance of getting legitimate job narrows down. It has been revealed that major crimes are more prevalence in Nigeria than minor crimes. Among the different kinds of major crimes, armed robbery is the dominant crime particular in recent time. It is equally shown that crime is more common among the middle age group of the society.

The empirical results show that unemployment and population have positive effects on crime. In other words fewer employment opportunities imply more crime. In the same vein larger population might also fuel crime in the society. It is however, individual state policies on control of population and reduction of unemployment will be more important than nationwide policy. Meanwhile national policies on crime control is also needed to augment the efforts of individual states. Evidence from the classical pooling result, national policy to reduce nationwide unemployment and population could reduce crime across all states. Different policies might work differently for different states of the

federation. There is also the need to be reviewing policies of fighting crime over time since there were evidences that the elasticity of crime varies over time.

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