

## **Demographic and Socio-Economic Determinants of Crimes in Nigeria (A Panel Data Analysis)**

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*This paper studies the demographic and socio-economic determinants of crimes in Nigeria. It estimates a crime equation using a pooled dataset of Nigerian states from 2002 to 2005 and applied a pooled ordinary least squares and pooled EGLS. Results indicate that lagged crime rate, per capita income and population density are significant and positively correlated to all forms of crimes. The paper also underscores the role of weak institutions particularly the law enforcement agencies in the control of crimes. The paper posits with a caution, that policy formulation in ameliorating crimes in Nigeria should anchor more on economic factors.*

### **INTRODUCTION**

Two most mentioned socioeconomic problems in recent times are crime and unemployment. However, in the economic literature, unemployment and its economic consequences including its determinants in the development process of nations is readily more studied than crime. Crime is an economically important activity which according to Becker (1968) is almost totally neglected by economists. This neglect makes economics of crime a relatively new field for economic investigation that has been aided by the fact that in the last four decades, there has been an outstanding increase in criminal activities as some reports and studies have confirmed in Nigeria (CLEEN, 2006; Omotor, 2009 among others).

Contemporary history of economic thought has it that the salvo on economics of crime was first fired by Fleisher (1963) in a published paper titled “The effect of unemployment on juvenile delinquency”. The paper which explores the relationships between unemployment and youth crime modestly sets to empirically identify economic determinants of individual’s criminal behaviour (Buonanno, 2003). The seminal paper of Becher (1968) instead, is adjudged as the radical attempt to architecturally construct a framework that built the first model of criminal choice in economic theory.

As cited in Buonanno (2003), Becker (1968:176) stressed that “some individuals become criminals because of the financial ... rewards from crime compared to legal work, taking account of the likelihood of apprehension and conviction, and the severity of punishment”. To put this more lucidly, the choice to commit crime is not made on account of being badly brought-up or mentally ill, rather it is a rational decision made on the basis of maximization framework in

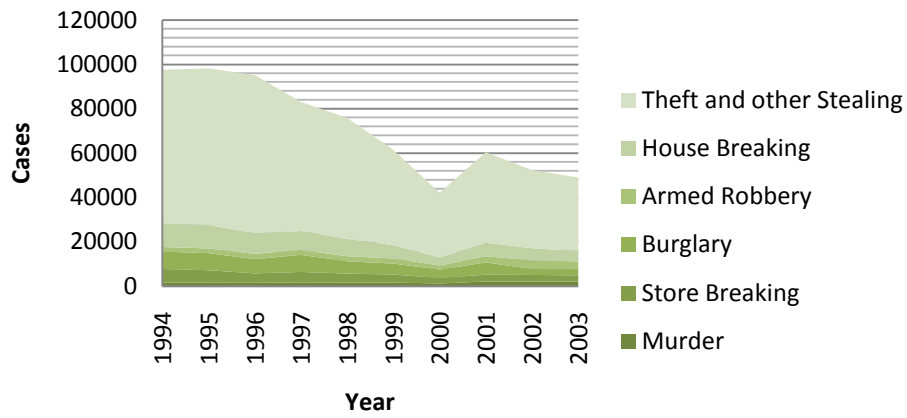
which economic agents compare costs and benefits of legitimate and illegitimate activities taking into cognisance the severity of the punishment when probably apprehended and convicted and the expected returns from crime. Such a behavioural tendency is multi-facet and hence its study must also cut across heterogeneous disciplines (economics, geography, law, psychiatry, psychology and sociology).

The study of crime and its determinants is closely related to poverty, social exclusion, income inequality, cultural and family background, religion, unemployment, education, age, gender, race, urbanization and a host of other economic and socio-demographic factors that influence the mind and behaviour of the individual in making decisions (Buonanno and Montolio, 2008; Gumus, 2004; Omotor, 2009; and, Kustepeli and Onel, 2006). As such, criminal activities are not restricted to economic systems or to leadership styles. In addition, crimes are also not peculiar to levels of economic growth and development. This is not to say however, that criminal activities are similar or same across countries.

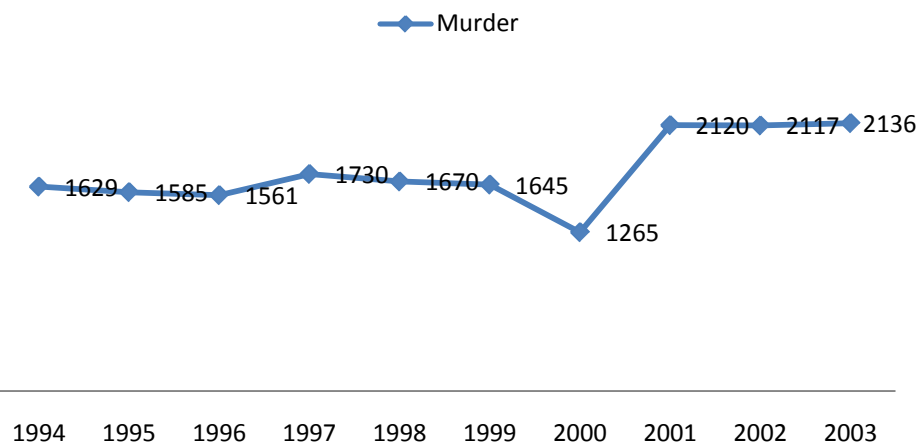
In recent times, there has been a growing concern over the modestly increasing trends of violent crimes and crimes against property in Nigeria. For instance, murder which is a clear example of violent crimes was 1,629 in 1994. This number steadily increased to 2,120 in 2001 and climbed to a record high of 2,136 in 2003 (CLEEN Foundation, 2007). Such a phenomenal increase of over 75 percent between 1994 and 2003 is worrisome. Armed robbery equally a violent crime was 2,044 in 1994. In 2002, it rose to 3,889 amounting to over a 52 percent increase in less than a decade. These are national level data.

A cursory look at some of the regional level (disaggregated) data in Nigeria is equally worrisome and contrasting. For instance in 2002, 52 cases of armed robbery were reported in Abia State; but in 2004, it rose to 176. In Edo State, 71 cases of armed robbery were reported to the police in 2002; the number steadily increased to 144 in 2005 and 163 in 2006. This is a clear rise of over 43 percent in less than 5 years. In contrast however, in Ondo State, 149 cases of armed robbery were reported to the police in 2002, while in 2006, the number of reported armed robbery cases to the police in the State fell to 70 (a decline of 200 percent). These contrasting heterogeneous reports of violent crime deserve being studied not only for academic purposes but also for the fact that the economists' aim at designing, exploring and cautiously prescribing effective policies is to among other things support policy players in implementing appropriate and adequate policies. If such policy objective is targeted at reducing crimes for example, then the academic economist should be able to identify its economic and socio-demographic determinants; a behavioural action that anchors beyond economic principles for the use of policy players and the good of society. Figure 1 graph's the trend of some crime indicators during the period 1994 -2006 while Figures 2(a-c) graphs some of the individual crime types. Some characteristics of the combined

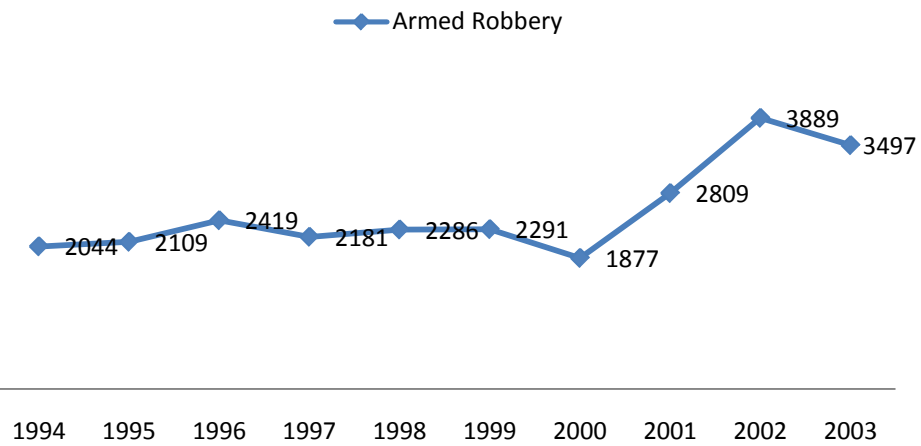
**Fig. 1: Trend of some crime indicators in Nigeria (1994-2003)**

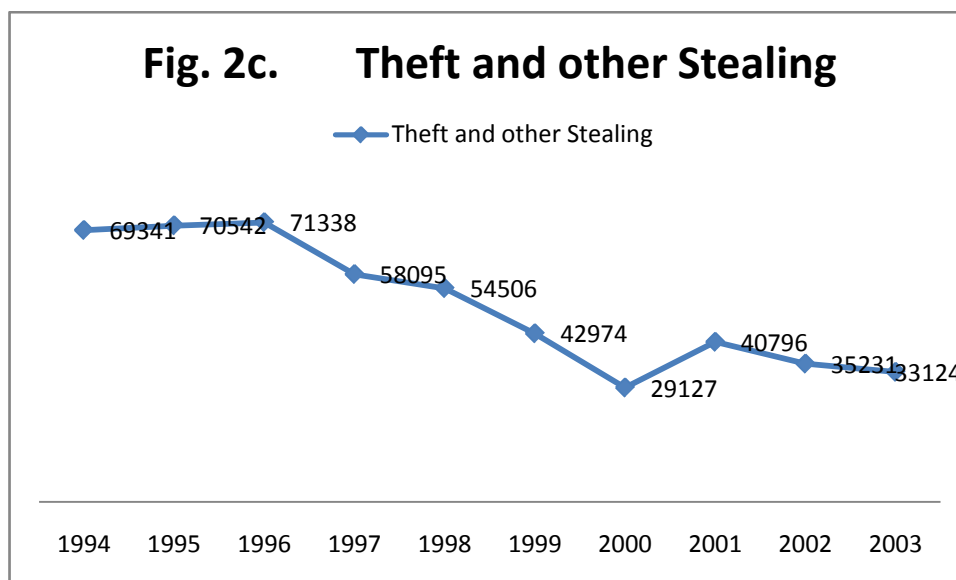


**Figure 2a. Murder**



**Figure 2b. Armed Robbery**





trend are, first; the implication of a likely multi-correlates of the indicators. Second, is the fact that theft and other forms of stealing are responsible for over 60 percent of crime during the period (1994-2003). Thirdly, cases of crimes were on the average higher during the era of military regimes. This implied that crime rates have been declining since the return to civil democracy in 1999. However, armed robbery cases were more during the latter period. And fourthly, the decline in theft and other forms of stealing which accounted for over 60 percent of crimes in Nigeria was sharper than other forms of crimes. For example, while a total of 69341 cases of theft were reported in 1994, this fell to 3134 in 2003. Armed robbery cases reported in 1999 were 2044 and increased to 3497 in 2003. All these have some implications for the socioeconomic and general development of Nigeria.

This paper sets out to study the economic and socio-demographic determinants of crimes in Nigeria. The theoretical framework anchors on Becker (1968) and Ehrlich (1973) economic models of crime as exemplified in Buonanno and Montolio (2008) and Haddad and Moghadam (2008). The paper also aims at determining among other things, the economic and socio-demographic determinants of crime in Nigeria paying attention to the role of regional (states) peculiarities. The study uses panel data techniques for the 36 states that make up the Nigerian nation and the Federal Capital Territory over the period 2002 to 2005.

This paper however differs from existing empirical studies of crime using Nigerian data in several ways. First, to the best of our knowledge, this is the first paper, in recent times on crime determinants in Nigeria that uses states level data (panel analysis). Such a heterogeneous study has the advantage of being able to capture the nature of crime given that criminal activities are likely to be related to some specifics and characteristics of the states under review. In addition, the use of panel data is more informative (more variability, less collinearity, more degrees of freedom) when compared to time-series analysis and descriptive statistics and hence its estimates are more efficient. Panel data allow for study of individual dynamics and control for individual unobserved heterogeneity (Bruderl, 2005). Moreover, the paper explicitly incorporates in its analysis, demographic factors after controlling for social and economic variables like income, unemployment, literacy rate or education, etc. Thus, it will be possible to isolate the effects of variables such as population density. Finally, unlike other previous studies of crime in Nigeria

that used aggregated crime rate to capture the level of criminal activity, (for example, Egunjobi, 2007, Odumosu, 1999; and Omotor, 2009) the present paper in addition to the use of such aggregated measure (in this case at regional/state level), also disaggregated total crimes into two broad crime types: property crime and violent crime against individuals.

The rest of the paper is organized as follows. Following the introduction, section 2 presents the economic model and discusses the potential causes of crime. The estimation procedure is outlined in section 3 while section 4 presents the estimated results and their discussions. Section 5 concludes the paper with some remarks.

## **ECONOMIC MODEL, DATA AND POTENTIAL DETERMINANTS OF CRIME**

In this section we provide a framework of the model that analyzes the factors which affect crimes. These factors are treated as explanatory variables in the specification of the model. As earlier noted, crimes which constitute the dependent variable are used both in their whole and disaggregative forms. In its disaggregative form, aggregative crimes are classified as property crimes and violent crimes against individuals. In all its forms, they are assessed empirically by econometric techniques. Further, an extensive discussion of the potential determinants of crime are equally made.

### **Economic Model**

As noted earlier, our economic model are based on the Becker-Ehrlich hypothesis and the amplification by Haddad and Moghadam, (2008) with some modifications. The seminal paper of Becker (1968) on “Crime and Punishment” sets out empirically to verify and study the economic variables that determine criminal choices and behaviour of agents. This may equally involve some public decision variables. Becker’s model is based on the assumption that, “...a person commits an offence if the expected utility to him exceeds the utility he could get by using his time and other resources at other activities” (Buonanno, 2003:5). The public decision variables are its expenditure on police, courts and the size and form of punishment. These determinant variables are the issues the individual would have to consider before committing a crime. The relationship between the determinant variables and the number of crimes constitute “supply of offences” in Becker’s descriptive study. According to Becker (1968), the supply of offences ( $Q_j$ ) relates the number of crimes by an individual to the probability of conviction ( $C$ ), the punishment if convicted ( $F$ ) and a portmanteau variable ( $u$ ), such as legal and illegal income opportunities:

$$Q_j = Q_j (c_j, f_j, \mu_j,) \quad (1)$$

Ehrlich (1973) extends the analysis of Becker by considering how income levels and distribution affect the propensity of crime and rate of crime. Ehrlich assumptions are based on the congruent that the individual can participate in two market activities:  $i$ , an illegal activity and  $l$ , a legal one. The returns on both activities are monotonically increasing functions of time.

The legal activities ( $l$ ) are safe with an assumed net returns given with certainty by the function  $Y_l(t)$ , where  $t$  is the time input. Activity  $j$  is risky and as such its net returns are conditioned upon two states: a probability of being apprehended and punished ( $p$ ) on the one hand and the probability of not being caught and punished ( $1 - p$ ). If the offender is not apprehended and punished, he reaps the entire value of the illegal activity  $Y_1(t)$ . If caught and punished, the return is a discounted value of the penalty for the illegal activity and other related

losses by an amount  $A_i$  ( $l_i$ ). Ehrlich further assumes that individuals are rational and their behavioural function for illegitimate activities can be stated as:

$$g_{ij} = g_{ij}(p_{ij}, f_{ij}, y_{ij}, u_{ij}, r_j) \quad (2)$$

where:

- $g_{ij}$  = number of offence  $i$  committed by individual  $j$
- $u_{ij}$  = risk of legal activity
- $r_j$  = other factors that may affect the supply of crime

Should all individuals be identical, the behavioural function of Equation (2) may be aggregated in a given time period as:

$$G_i = G_i(P_i, F_i, Y_i, Y_j, U_i, R_i) \quad (3)$$

where

- $P_i$  = probability of arrest (number of convicted cases to total reports of Police)
- $F_i$  = average years of prison
- $Y_i$  = illegal income opportunity (proxied by families' average income)
- $Y_j$  = legal income opportunity
- $U_i$  = economic risk of legal activity (proxied by unemployment rate)
- $R_i$  = other factors, that consists of demographic, economic and social determinants of crime. These factors are listed and symbolised as:  
  - $E$  = literacy rate or education
  - $D$  = relative density of population per square kilometre

Consequently, the aggregate supply function can be stated as:

$$G_{it} = K p_{it}^{a1} F_{it}^{a2} y_{it}^{a3} y_{it}^{a4} u_{it}^{a5} R_{it}^{a6} \quad (4)$$

Equation 4 will be modified given the availability of consistent data of Nigeria in the next subsection.

### Potential Determinants of Crime in Nigeria and Data Description

Nigeria operates a federal system of government and a bi-cameral legislature. The country is made up of the central government, 36 states and a Federal Capital Territory (FCT); and 774 local government councils. The disaggregated data used in this paper is state level data obtained for the FCT and 28 states out of the 36 states of the federation; thus making a total of 29 units. Crime data was recorded by the police and augmented by data compiled by Research Department of CLEEN FOUNDATION. The police data on crime is obtained from the National Bureau of Statistics (2007 *Annual Abstract of Statistics*). The publications also contain the disaggregated data on offences (crimes); apportioned into murder, manslaughter, assault, theft and others like stealing, armed robbery, burglary, house and store breaking,

In the literature, the determinants of crime are separated into three groups: deterrence variables, demographic variables and socio-economic variables (Buonanno and Montolio, 2008). Deterrent variables relate to the punishment, justice and court systems, and prison and jail conditions.

Deterrence determines the expected returns from crime and thus relates to the probability of apprehension and severity of punishment. One way of measuring this variable is the number of convicted cases to total reports of police (Haddad and Moghadam, 2008). This is the form of deterrence variable whose data is readily available for Nigeria at the state level and equally used

in the analysis. This ratio is obtained from the publications of the National Bureau of Statistics (2007 *Annual Abstract of Statistics*) and CLEEN Foundation (2008)<sup>i</sup>.

Individuals who commit crime are assumed to evaluate the likelihood risk of being caught and the associated punishment. Ehrlich (1973 and 1996) confirmed that in the United States both factors have negative effect on crime rates. Buonanno and Montolio (2008) have also established empirically that deterrence, also known as clear-up rate has significant negative effects on all typologies of crime (persons, property and total). The implication is that a higher level of crime cleared by police is associated with lower expected returns from crime.

Economic variables expected to have some impact on crime are income inequality index (IIEQ), unemployment rate, per capita income etc. For unemployment rate, it is expected to have a positive relationship. As noted by Gumus (2004:101) “The reason (behind the positive relationship) would be that, as people become unemployed they would in the short run search for new jobs. In the long run, if they do not find jobs they would tend to be criminal”. However, some studies have found a negative relationship between crime and unemployment rate. Mashi and Masih (1996) summarized existing literature on this issue. Of the series of studies, 33 of them found positive relationships while 19 studies found a negative or no relationships between crime and unemployment rate. Thus the empirical art behind this relationship remains ambiguous. Other detailed reviews of the empirical literature on these inconclusive relationships are Freeman (1999) and Masciandaro (1999). This variable (unemployment at state level) is also included in the model to be analyzed.

Another economic factor that affects crime is income variable. There exists several ways of capturing the income variable in economics of crime. Income could be measured as per capita income or even proxied and equally measured supplementarily by income inequality index (IIEQ), the *Gini* coefficient, etc. In Nigeria, there exists no state level (disaggregate) data on GDP, per capita income or the *Gini* coefficient (consistency). Consequent upon this, annual federal revenue allocation to states is used as a proxy for income and as a component measure of per capita income (since state level data on population and data on population per state exist). Consistent federal revenue allocation data for the period of the study is published by the Ministry of Finance. In relation to the expected relationship between per capita income (*PCI*) and crime, one strand holds it to be negative. According to this thought, as *PCI* increases on the average in the state, the well-being of everyone is expected to increase, thus the urge or incentive to commit crime is reduced. Should the *Gini* inequality index or poverty line be used, then a positive relationship may be argued as observed by the second strand of thought. This is because as number of persons under the poverty line increases, the crime rate will be expected to increase. In addition, income increases may also lead to higher number of goods to be stolen and so increases opportunities for potential offenders all things being equal (Kustepeli and Onel, 2006). Education could also influence the decision to engage in criminal activities via many ways. This is as a result of the role education plays in the economic development process of nations. For instance, higher literacy rate or levels of educational attainment could increase the opportunity cost of criminal behaviour. Some studies have empirically shown that criminals tend to be less educated and as such, it could be reasoned that education raises individuals’ skills and abilities, thus increases returns to legal activities (Wilson and Herrnstein, 1985; Gumus, 2004; Omotor, 2009; etc). Thus a negative coefficient relationship is *a priori* expected. Some other reasons why education may affect decision to commit crime are that, education perpetuates the values of society, acculturates people to serve their communities, promotes virtues of hard work and honestly, etc. (Buonanno, and Montolio, 2008: 9). The education variable or literacy level enters

the model in form of primary school enrolment at state levels. This is obtained from the National Bureau of Statistics publication (*2007 Annual Abstract of Statistics*). Some of the socio-demographic determinants of crime so far recognized in the literature are the age-structure of the state, growth rate of population and gender (percentage of male, or female in the labour force), urbanization, race, immigration, population density. In this paper the demographic variable used in the analysis is the population density (measure as the ratio of state and land area to its population). It is expected to be positively related to crime. All things being equal, the higher the population density, the higher should be the rate of crime. This ratio dataset is obtained from the National Bureau of Statistics publications. (*2007 Annual Abstract of Statistics and 2005 Social Statistics in Nigeria*). A summary list of variables used are presented in Table 1.

### THE EMPIRICAL PROCEDURE

In reference to the theoretical framework presented above, this sub-section specifies a panel data econometric model to analyze and test the socio-economic and demographic determinants of crime. The basic framework for this form of regression model is

$$X_{it}, i = 1, \dots, N t = 1, \dots, T \tag{5}$$

Where  $i$  is the individual dimension and  $t$  is the time dimension. The general panel data regression model can be stated as:

$$y_{it} = \alpha + \beta'X_{it} + u_{it} \tag{6}$$

Two important models can be discerned from Equation (6) based on the different assumptions that can be made about the precise structure of this general model. These are the fixed effects and random effects model. The fixed effects model can be denoted as:

$$\begin{aligned} y_{it} &= \alpha + \beta'X_{it} + u_{it} \\ u_{it} &= \mu_i + v_{it} \end{aligned} \tag{7}$$

where  $\mu_i$  are individual-specific, time-invariant effects (for example in our panel of states, this may include the geographical size of the states or land mass etc.). The random effects model assumes in addition that;

$$\begin{aligned} \mu &\sim i.i.d. N(0, \delta_\mu^2) \\ \text{and } v_{it} &\sim i.i.d. N(0, \delta_v^2) \end{aligned} \tag{8}$$

Equation (8) includes two error components that are independent of each other. In the analysis, the Hausman specification test shall be invoked in selecting either the fixed or random effects estimations since the data framework shares the characteristics of both effects.

**TABLE 1**  
**SUMMARY OF VARIABLES USED IN THE STUDY**

TCR	=	total number of crimes	}
PCR	=	property crime rate	
NCR	=	crime against individuals	
DEN	=	population density (State size/population)	
DET	=	deterrence variable (number of convicted cases/reports to police)	
UNIM	=	unemployment rate	
PCI	=	income per capita (federal government revenue allocation/population)	
EDU	=	education or literacy rate (primary school enrolment ratio)	



## ESTIMATED RESULTS

This section presents the estimated results for total crimes, property crime and crimes against individuals. For each, four annual sets of observations were used, namely 2002, 2003, 2004 and 2005. The fact that the period starts in 2002 is owed to a greater availability of consistent data. The sample of states used is listed in Table 2 while the summary statistics of the variables are presented in Table 3.

**TABLE 2**  
**STATES SAMPLE**

<b>Regions</b>	<b>States</b>
North	Adamawa, Bauchi, Benue, Borno, Kano, Katsina, Kebbi, Kogi, Kwara, Niger, Plateau, Sokoto, Taraba and Yobe.
South	Abia, Akwa Ibom, Anambra Lagos, Cross River, Delta, Edo, Enugu, Imo, Ogun, Ondo, Osun, Oyo, Rivers,
FCT	Abuja

Population density is measured in persons per square kilometre while deterrence is proxied using clearance rate. Clearance rate is the number of convicted cases reported to the police. Income per capita is measured in Nigerian naira (₦), while the level of education or literacy is captured by primary school enrolments.

**TABLE 3**  
**SUMMARY STATISTICS**

<b>Variables</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>	<b>N</b>
Total crimes	83.509	60.197	13	333	116
Property crime	48.02	20.14	62	274	116
Crime against individuals	42.11	19.34	3	143	116
Population density persons/square kilometre	331.191	426.40	37	2345.48	116
Deterrence (number if convicted cases/reports to police)	3872.233	431.223	11	3536	116
Income per capita (federal government revenue allocation/population)	6027.566	6593.07	1008.064	44895.249	116
Literacy rate (primary school enrolment)	1161.474	781.916	269	5060	116
Education	631,339	315,596	191,041	1,760,285	116

The income per capita level seems quite high in naira (₦) term. If converted to the US Dollar (\$) at a rate of ₦120/\$1 being the average for the period, it is painfully low. Income per capita ranges from a minimum ₦1008 (\$8.4) to a maximum of ₦44895 (\$374.12). One implication of this is that a minimum of \$8.4 and a maximum of \$374.12 income per capita tantamount to a value of \$0.151 and \$1.025 per day. Since a majority of the population are low income earners, it may mean that there are more Nigerians who live less than 9 points of \$1 per day and hence under the poverty line. Population density ranged from minimum of 37 (Taraba) people per square kilometre to a maximum of 2345 (Lagos) people per square kilometer. This reflects a relatively high density especially in the urban areas since the number of urban cities is low. The clearance rate is quite wide ranging with a minimum of 11(Kogi State) and the maximum being 353 (Lagos State). The literacy level is equally abysmally wide particularly when judged in relation to total population of the states. Primary school enrolment which is the measure of education level/literary rate recorded a minimum of 191,041 (FCT) followed by Kebbi (276,956) and a maximum of 1,766,285 (Kano). Incidentally, Kebbi and Kano are in the northern region of Nigeria.

As regards crime, a minimum crime of 3 cases was recorded in Oyo State, while the maximum number of 333 cases was recorded in Delta State. Both states are in southern Nigeria. National unemployment rate of Nigeria is averaged at 10.99. Niger State has the minimum rate of 0.2 (below the national average) while Bauchi recorded the maximum unemployment rate 29.7 (above the national average). Niger and Benue states are in the Northern region of Nigeria.

The panel data regression model previously presented is estimated using pooled least squares and pooled EGLS. This measures the relationship between the endogenous variables of total crimes, property crimes and crime against individuals; and the exogenous variables of education, deterrence, population density, unemployment and income per capita.

The endogenous variables are analyzed individually against the demographic and socio-economic determinants of crimes using EViews version 6 software. The results are presented in Tables 4, 5 and 6. The pooled ordinary least squares results are reported in column 2 of each Table while columns 3 and 4 report results of the fixed effects and random effects respectively. Save for crimes against property that is regressed on the determinants only the other measures of crimes are regressed against their lagged dependent variables and the other five determinants as earlier stated. The singular reason is a search for robust results. Another critical observation that can be made on the results as reported in Tables 4, 5 and 6 is that except for some minor and insignificant differences, the results are similar both in signs and statistical significance but certainly not in size. Consequent upon this, the discussion of the results will not be separated into total crimes, property crimes and crimes against individuals except for emphasis.

Economic determinants of crime in this paper are unemployment and average or income per capita. In all the measures of crimes, income impacted positively as a *priori* expected and statistically significant at 5 percent level in all the pooled (OLS) results. Similar studies that have found reported positive and significant association between income and crimes are Carmichael and Ward (2001) for Britain, Kustepeli and Onel (2006) for Turkey. In the Nigerian case as this paper posits, the positive and significant relationship between crimes and income is a mere reflection that more Nigerians live under the poverty line and as such a presumed increase in well-being of the affluent who possess and control the wealth of the states will lead to increased opportunities for potential offenders. The second economic factor used in the paper is unemployment. In all types of crimes, unemployment impacted negatively. Gumus (2004) study also reported negative relationship. However, statistical significance at 0.05 level was only

reported for crime against property. As regards total crime and crime against individuals, the unemployment coefficients were not statistically significant. It may thus imply that while unemployment in the long-run influenced property crime, it is not a significant determinant of total crimes and crimes against individuals.

The social factors used in the analysis are education and deterrence or clearance rate. Education and deterrence do not significantly explain total crime and property crime. Although a marginal and negative statistical significance is reported for crime against individuals, Buonanno and Montolio (2008) also reported same for the United States. The decrease (negative) and non-significance of social determinants of theft and threat has equally been reported by Haddad and Moghadam (2008) study of Iran. One implication of the non-significance of deterrence in explaining crimes in Nigeria despite its elaboration in the literature may be as a result of incomprehensive dataset on crime reporting and documentation.

The role of demographic factors in committing crimes using population density was equally investigated in the paper. As *a priori* expected, population density is positively related to all types of crime. This determinant is also statistically significant at 5 per cent level. This means that as population density increases, criminal activities also increase. This is not surprising because the high rate of unemployment in Nigeria is concentrated in the cities where there are no adequate jobs coupled with high population density due to rural-urban migration. The one period lagged crime variable is positive and statistically significant in explaining contemporaneous crimes in the analysis. This is a corroboration of the weak and insignificant behaviour of deterrence factor. As such, successes in previous crime spur offenders to commit further crimes. This may also connote the existence of weak institutions like the law enforcement agencies and judicial system in Nigeria.

The residuals of all the analysis are serially uncorrected since the Durbin-Watson coefficients are close to 2.0. The coefficients of determination range between 0.25 to 0.49; implying that there could be other factors which are significant in explaining the different forms of crimes in Nigeria that have been omitted in this paper.

The regression results for the fixed effects and random effects as earlier noted are not substantially different from those of the pooled ordinary least squares. The Hausman statistic reported in Tables 4, 5 and 6 are large suggesting that the fixed effects estimation is more appropriate and suitable for inference. Since the behaviour of the fixed effects results are similar in sign and significance mostly with those of the pooled ordinary least squares given that there are some variants with the random effects results, we can conclude that our previous discussion of the pooled OLS is not different from those of the fixed effects.

## **CONCLUDING REMARKS**

In this paper, crime equations were estimated using a panel dataset of 28 Nigerian states and the Federal Capital Territory (FCT). Applying annual dataset for the period 2002-2005, the pooled ordinary least squares was analyzed, while we also tested for the fixed and random effects. Our analysis differs from previous studies of crime determinants in Nigeria for several reasons. (1) the paper used a dataset at the state level; (2) we controlled for aggregation bias by analyzing the measure of total crime and further separating it into property crime and crime against individuals; (3) the paper in analyzing total crimes and crimes against individuals, explicitly accounted for dynamics in criminal activities by incorporating a one period lag

dependent variable; and (4), the use of socio-economic, demographic and deterrence as factors which account for criminal activities are captured in the analyses.

The main findings of this paper are as follows. First, majority of Nigerians live below the poverty line of US\$1 per day. Second, concentration of crimes is mixed in the two region of Nigeria (North and South) and crimes were more prevalent during the military authoritarian regimes than civilian democracy. Third, income per capita is positively and significantly correlated to all forms of crimes. Fourth, unemployment impacted negatively on all forms of crimes but only statistically significant with crime against property. Fifth, social factors do not significantly impact on crimes in Nigeria. Sixth, demography as captured by population density significantly increases crimes in Nigeria and finally, the role of weak institutions particularly the law enforcement agencies is highly underscored.

From the above it has been acknowledged that economic factors are more likely to determine all forms of crimes than social factors in Nigeria and as such, policy formulation in the amelioration of crimes should be anchored and targeted more on economic factors.

For policy purposes, the results of this paper may be used with some cautions. It should be noted that the extent of available data for this paper particularly crimes is highly limited and serves as a constraint for an analysis of this nature. In addition, some important variables like leadership styles, religion etc; have been omitted in the analysis. Although Nigeria is a secular nation, some states in the northern part of the country practice *Sharia Law*. This has not been controlled for in this paper.

**TABLE 4**  
**TOTAL CRIMES**  
**DEPENDENT VARIABLE: LTCR**

	Pooled OLS	FE	RE
LTCR(-1)	0.389 (3.464)	0.405 (3.820)	0.394 (2.87)
LEDU	-0.116 (-0.686)	-0.076 (-0.475)	-0.014 (-0.621)
L DET	0.086 (1.179)	0.078 (1.13)	-0.062 (1.08)
L DEN	0.149 (1.731)	0.172 (2.107)	0.046 (1.026)
LUNM	-0.019 (0.144)	-0.015 (-0.195)	-0.041 (0.0148)
LPCI	0.064 (2.465)	0.183 (2.335)	-0.091 (2.05)
C	3.281 (1.168)	1.800 (0.671)	5.09 (1.28)
Observation (N)	87	87	87
R-Squared	0.293	0.387	0.276
Serial correlation	2.165	2.163	2.04
Hausman statistic			106.24

*Note: Numbers in parenthesis are the t-statistic*

**TABLE 5**  
**PROPERTY CRIMES**  
**DEPENDENT VARIABLE: LPCR**

	Pooled OLS	FE	RE
LEDU	-0.139 (-0.820)	-0.146 (-0.721)	-0.128 (-0.600)
L DET	0.043 (0.607)	0.039 (0.542)	-0.025 (-0.325)
L DEN	0.261 (3.256)	0.421 (2.837)	0.301 (2.569)
LUNM	-0.138 (1.699)	-0.067 (1.873)	-0.012 (-1.724)
LPCI	0.423 (2.695)	0.393 (2.598)	0.384 (2.014)
Observations (N)	116	116	116
R-Squared	0.46	0.34	0.254
Serial correlation	2.06	1.987	1.832
Hausman statistic			90.99

*Note: Numbers in parenthesis are the t-statistic*

**TABLE 6**  
**CRIMES AGAINST INDIVIDUALS**  
**DEPENDENT VARIABLE: LNCR**

	Pooled OLS	FE	RE
LNCR (-1)	0.068 (2.10)	0.04 (1.94)	0.036 (1.89)
LEDU	-0.141 (-2.56)	-0.068 (-1.982)	-0.048 (-2.01)
L DET	0.214 (1.21)	-0.149 (1.06)	0.153 (0.896)
L DEN	0.063 (2.41)	0.046 (2.020)	0.038 (1.973)
LUNM	-0.943 (-1.09)	-0.852 (-0.783)	-0.683 (-0.682)
LPCI	0.205 (1.89)	0.191 (2.061)	0.162 (2.02)
Observation (N)	87	87	87
R-Squared	0.46	0.39	0.32
Serial correlation	1.87	2.01	1.97
Hausman statistic			89.64

*Note: Numbers in parenthesis are the t-statistic*

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