

Unemployment and Crime in Nigeria: A Panel Data Analysis

Abstract

The rising trend of crime in Nigeria is usually blamed on the high rate of unemployment. There is need therefore, to empirically investigate the relationship between unemployment and crime. Hence, this paper examined the impact of unemployment on different types of crime in Nigeria. A panel data consisting 36 states and Federal Capital Territory (FCT) spanning from 1996 to 2005 was used. Different estimation techniques ranging from OLS, WLS, Between estimator, Fixed effect and Random Effect were employed to estimate economics models of crime. The findings show that though employment was found to have significant impact on total crime and armed robbery, there no evidence that it causes kidnapping and vehicle theft. Prison, policing injuring or killing criminals were not found to be significant deterrent variables in the country but quick trial and prosecution of criminals particularly armed robbery would significantly reduce rate of crime. Thus, it is recommended that police should get criminals arrested instead of killing them so that they can be tried and prosecuted if find guilty. The prisons should be restructured to serve as rehabilitation centers.

Key word: unemployment, crime, panel data, Nigeria

JEL Classification: E24, F52

1. Introduction

The rising trends of levels crime and unemployment in Nigeria of recent time called for concern among policymakers, business men, investors and researchers as well as other stake holders. Generally, people easily blame the rising level of insecurity (level of crime) in the country on the mass unemployment of young people. Can all kinds of crime be blamed on unemployment? Answering this question necessitate rigorous analysis to unravel the exact relationship between unemployment and different types of crimes. Therefore, this paper aims at empirically investigating the effects of unemployment on different kinds of crimes in Nigeria.

Becker (1968) seminar paper formally established the foundation on the theory of economics of crime, though a number of extensions have been made since then. According to the theory, a criminal is assumed to be a rational being who indulges in crime if the benefits of such act outweigh the costs. Meaning that individuals become criminals because the expected monetary

and non-monetary benefits are more than the costs associated to the crime. The cost of crime include the probability of arrest and conviction as well as the severity of punishment. Becker argues that, the economic and social environment created by public policies such as expenditures on police, the nature of punishment, opportunities for legal jobs, schooling and training programs determine the amount of crimes in a society. The types and amount of legal jobs available, the law and order, and nature of punishment, all matter in economics of crime. Thus, at the level of theory, it is expected that an increase in legal job opportunities would lead to reduction in crime, while decrease in availability of such opportunities (that is rise in unemployment) would lead to more crimes because the opportunity cost of crime decline with wide spread unemployment.

The empirical literature on crime behavior has also grown so voluminous over time since Becker's paper. Empirical papers on crime can broadly be grouped in to two, those that focus on the link between deterrent factors and crime rate (examples include: Ehrlich 1973, 1996; Avio and Clark 1978; Wolpin 1978; Levitt 1997) and those that focus on the availability or none availability of legal opportunities. Studies such as Gould, Weinberg and Mustard (2002) and Machin and Meghir (2004) examined the effect of wages on crime (impact of legal opportunities). A number of other studies examined the effect of none availability of legal opportunities such as the impact of unemployment on crime, among them are Cantor and Land (1985), Chiricos (1987), Thornberry and Christenson (1984), Entorf and Spengler (2000), Raphael and Winter-Ebmer (2001), Levitt (2001) and Denis, Francis and Julien (2009).

Despite the theoretical prediction of positive relationship between unemployment and crime, there is no consensus in the empirical literature on the nature of relationship between unemployment and crime. The link between unemployment and crime is at best inconclusive, some studies find significant positive relationship between unemployment and crime, while some find insignificant relationship and some find negative effect of unemployment on crime (see Chiricos, 1987; Entorf and Spengler, 2000; Raphael and Winter-Ebmer, 2001; Gould et al, 2002; Lee 2009;). Lee (2009) specifically argued that the relationship between unemployment and crime is ambiguous because it tends to be negative at a lower rate of apprehension but positive at a higher rate of apprehension. This paper therefore contributes to the literature on economics of crime by examining the effect of unemployment on different types of crimes in Nigeria.

This is not the first time that issues of crime are studied in Nigeria, a number of studies on crime in Nigeria do exist (for example: Marenin and Reisig, 1995; Odumosu, 1999; Klein 1999; Smith

2001; Anyanwu 2006; and Yakubu et al 2011 among others) but none of these studies examined the economic model of crime except Yakubu et al (2011). Even Odumosu (1999), who used anomie theory to analyse the indirect effect of unemployment through poverty on crime did not consider the economic model of crime. However, Yakubu et al (2011) do not consider any deterrent variable in their model. In addition, empirical study of crime using state level data is equally scarce in Nigeria. Yakubu et al (2011) used state level data to study the impact of unemployment and population growth on crime. Their paper also studied only the behavior of total crime in Nigeria without disaggregating it to different types of crime. This paper fills this vacuum by estimating an economic model of crime with emphasis on the effect of unemployment (none availability of legal opportunities) on crime. This study is even more timely because of the recent rising trends of both unemployment and crime in the country. Crime rates in the country are not only increasing but they are also widening in scope. Generally, people easily blame the rising level of crime in the country on mass unemployment of young people. Given that there is no consensus in the literature on the effect of unemployment in crime, understanding the extent to which this general view correctly presents the true relationship between unemployment and crime in Nigeria calls for rigorous empirical investigations. This paper therefore specifically attempt to: (i) analyse the demographic distributions of unemployment and crime across the states in Nigeria and (ii) examine the effect of unemployment on crime using state panel data.

The paper is arranged in five sections, following this introduction is section two which presents stylize facts on crimes and unemployment in Nigeria. Section three consists of model specification, measurement of variables, data issues and estimation techniques. The results are presented and discussed in section four, while section five concludes the paper.

2. Stylize Facts on Crimes and Unemployment in Nigeria

Figures 1 to 8 present some stylized facts about crime and unemployment in Nigeria. Figure 1 displays total serious and minor crimes in the country. Serious crimes include assault, armed robbery, burglary, house and store breaking, larceny and forgery of currency, while minor crimes include false pretence/cheating, unlawful possession, receiving stolen property, arson, perjury, gambling, breach of peace and escape from custody. As shown in Figure 1 the total of serious crimes are more than the total of minor crimes in Nigeria. This may be due to the fact that not all

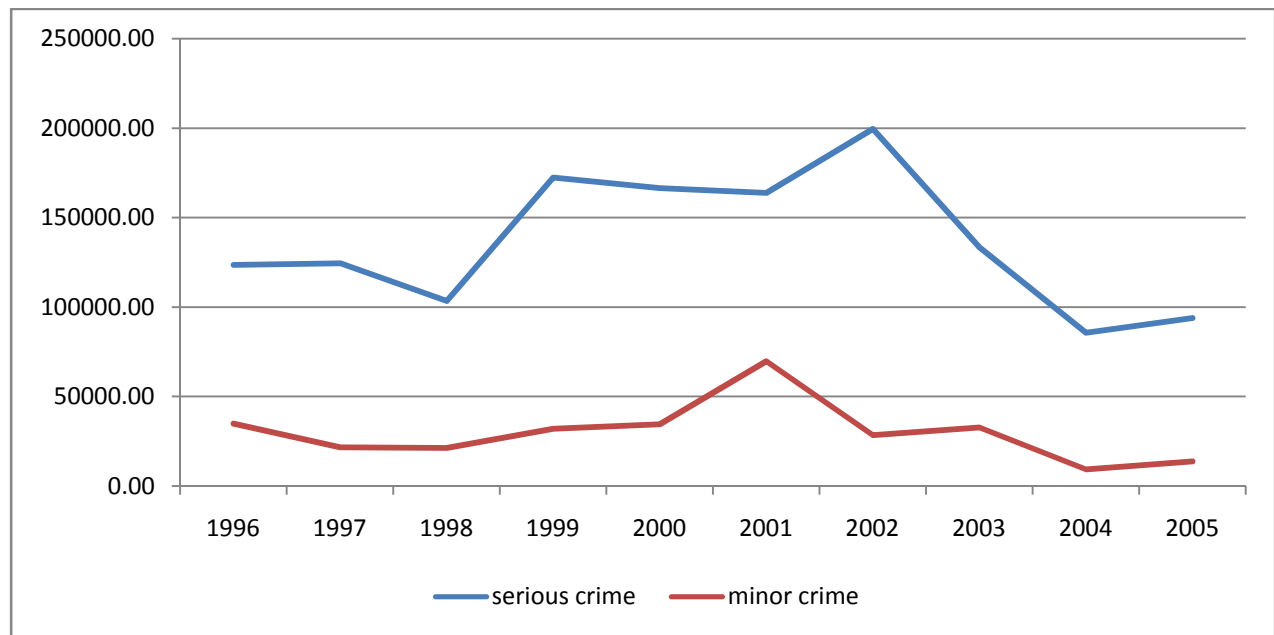
95 minor crimes are reported to the police, people prefer to resolve some of the criminal cases
96 informally without involving the police. The trend shows that the rate of serious crimes was
97 increasing till 2001 when it begins to fall and start rising again in 2004. Minor crime is relatively
98 stable over the period considered except the upsurge experienced in 2002.

99 Ten averages of different types of serious and minor crimes are presented in Figures 2 and 3.
100 Among the serious crimes, assault constitutes 35 percent of the total serious crimes, larceny
101 make up 32 percent while felonious wounding, burglary, armed robbery and murder constitute
102 15, 13, 3 and 2 percents respectively. Unlawful possession, cheating, breach of peace constitute
103 34, 32 and 22 percents of minor crimes while receive of stolen property, arson as well as escape
104 from custody constitute 6, 5 and 1 percents respectively.

105 Figures 4, 5 and 6 present total crime, armed robbery and unemployment rate across the states in
106 Nigeria. Total crime is highest in Lagos state, followed by Anambra, Borno, Delta, Edo, Ogun,
107 Ondo, Oyo and Rivers states. Crime is low in states like Jigawa, Gombe, Sokoto, Zamfara,
108 Kebbi and Kwara states. Similarly, armed robbery is highest in Anambra, Delta and Lagos states.
109 It is moderate in Abia, Bauchi, Edo, Imo, Ogun, Ondo, Oyo and Rivers states, while it low in
110 states like Jigawa, Kebbi, Kwara, Osun, Plateau, Sokoto and Zamfara. Unemployment on the
111 other hand is highest in Abia, Akwa Ibom, Bayelsa, Imo, Rivers and Anambra states. It is
112 moderate in Cross River, Delta, Edo, Enugu, Kaduna, Kogi, Lagos and Abuja. Zamfara, Jigawa,
113 Kebbi, Taraba, Oyo and Osun states have the lowest unemployment rates respectively.

114 Rough idea of the relationship between unemployment and total crime as well as between armed
115 robbery and unemployment are presented in figures 7 and 8. Though there are a number of
116 outliers, the relationships displayed in the two figures show positive relationship between
117 unemployment and crime as well as armed robbery.

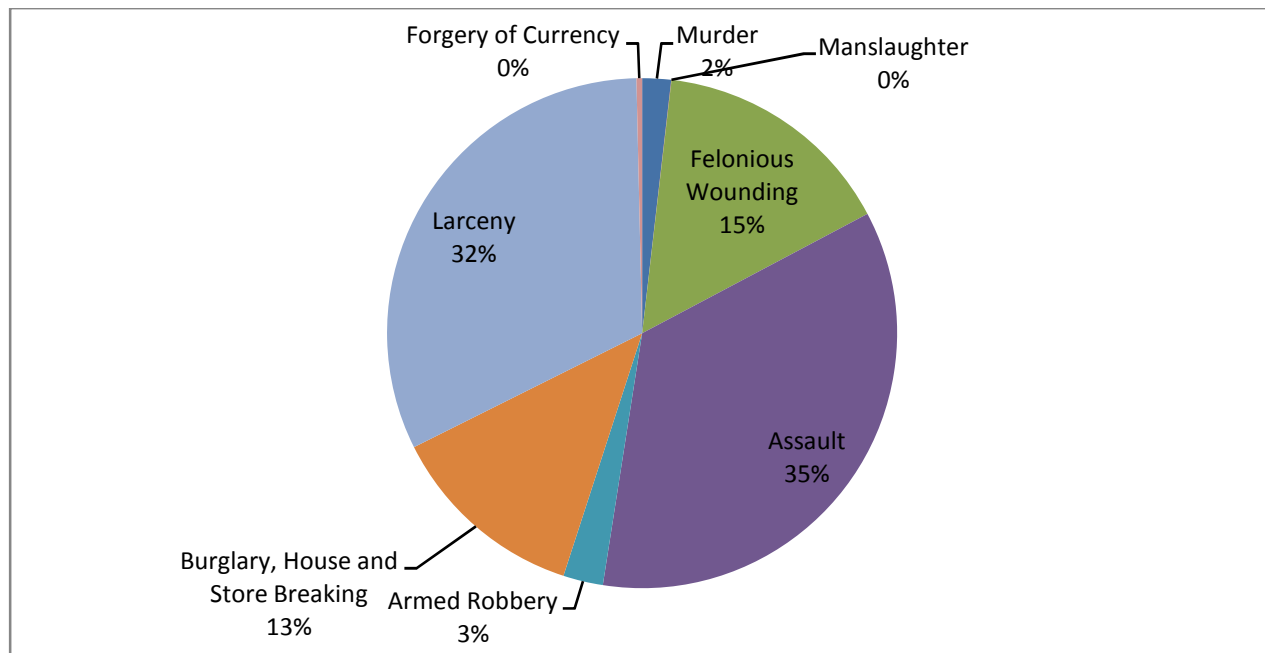
123 **Figure 1: Trend of Total Crimes in Nigeria**



124

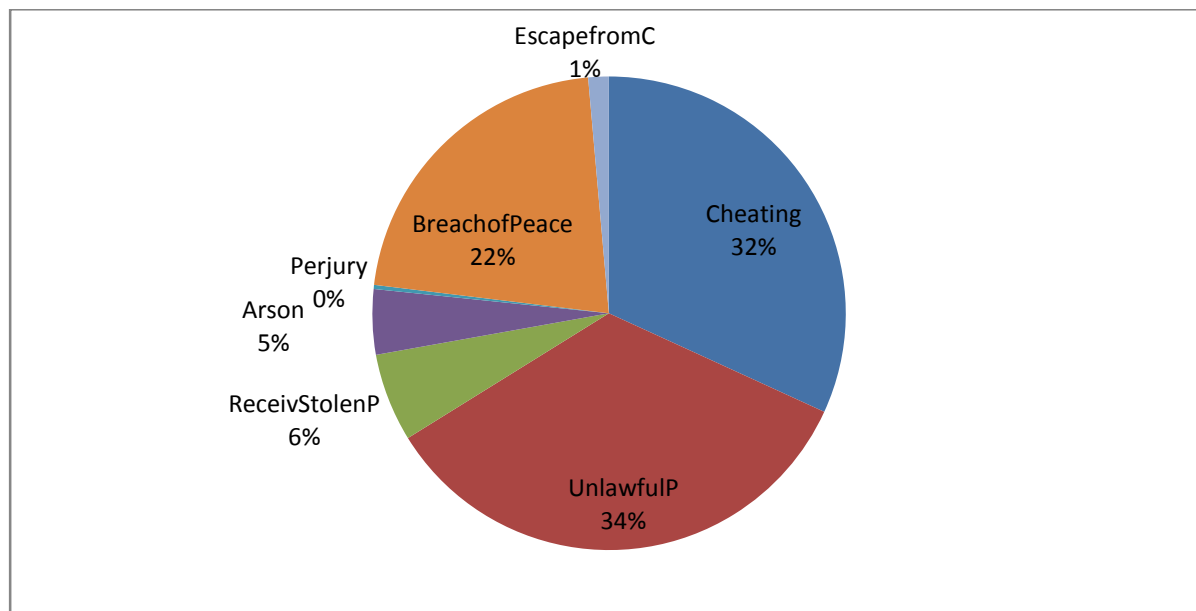
125 **Source:** computed by authors from NBS database

126 **Figure 2: Ten Years Average of Serious Crimes in Nigeria, 1996 – 2005**



127
128 **Source:** computed by authors from NBS database

129 **Figure 3: Ten Years Average of Minor Crimes in Nigeria, 1996 – 2005**

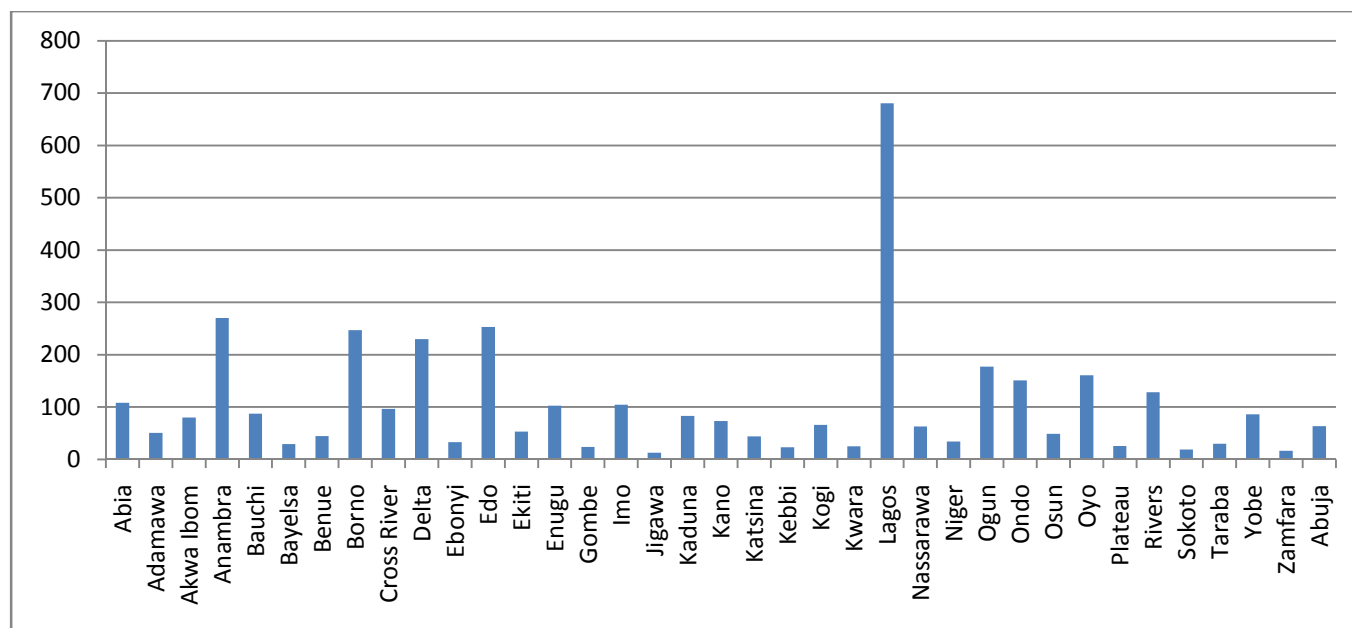


130
131 **Source:** computed by authors from NBS database

132

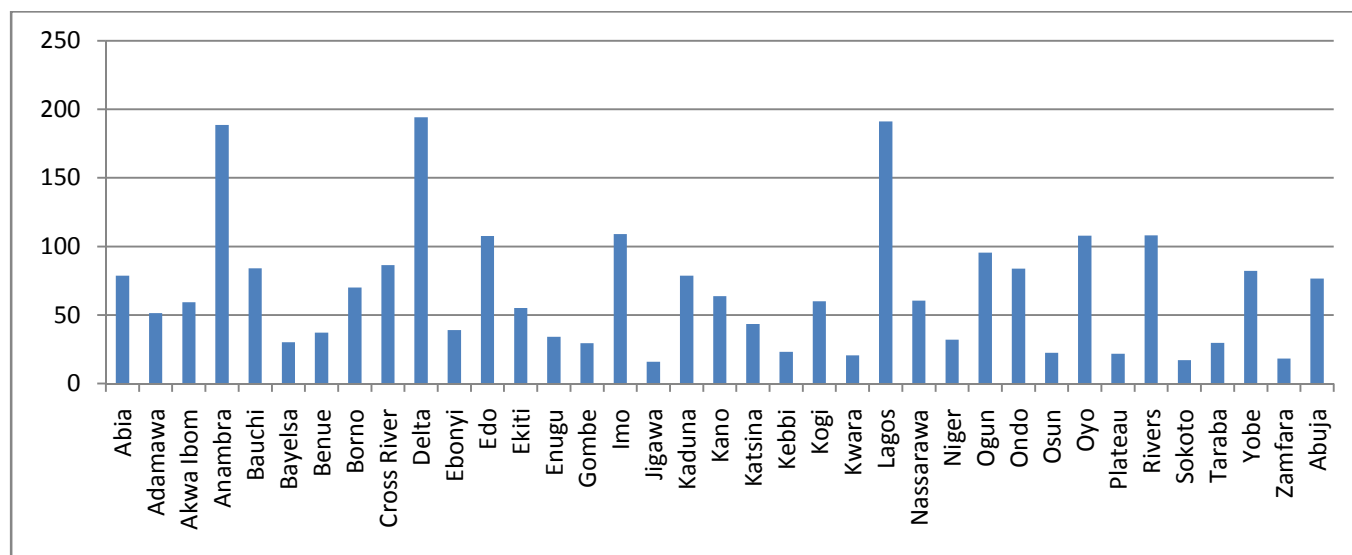
133

134 **Figure 4: Ten Years Average of Total Crime Across Sates, 1996 – 2005**



135
136 **Source:** computed by authors from NBS database

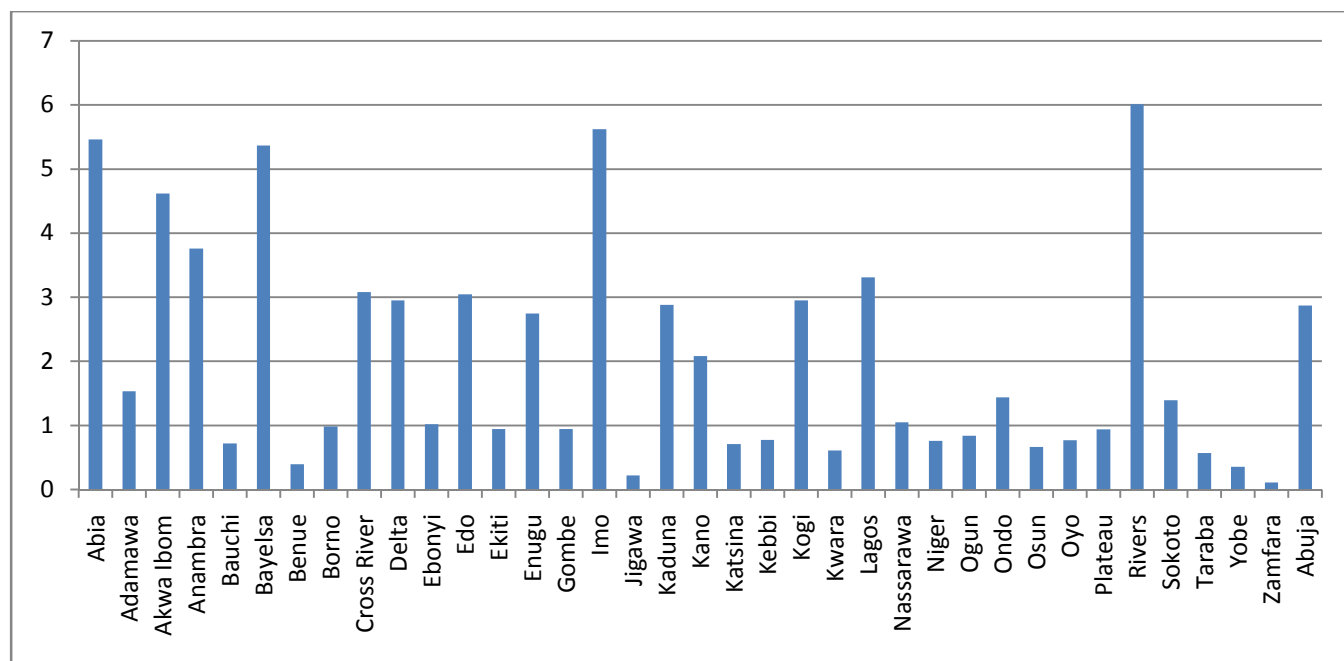
137 **Figure 5: Ten Years Average of Armed Robbery Across Sates, 1996 – 2005**



138
139 **Source:** computed by authors from NBS database

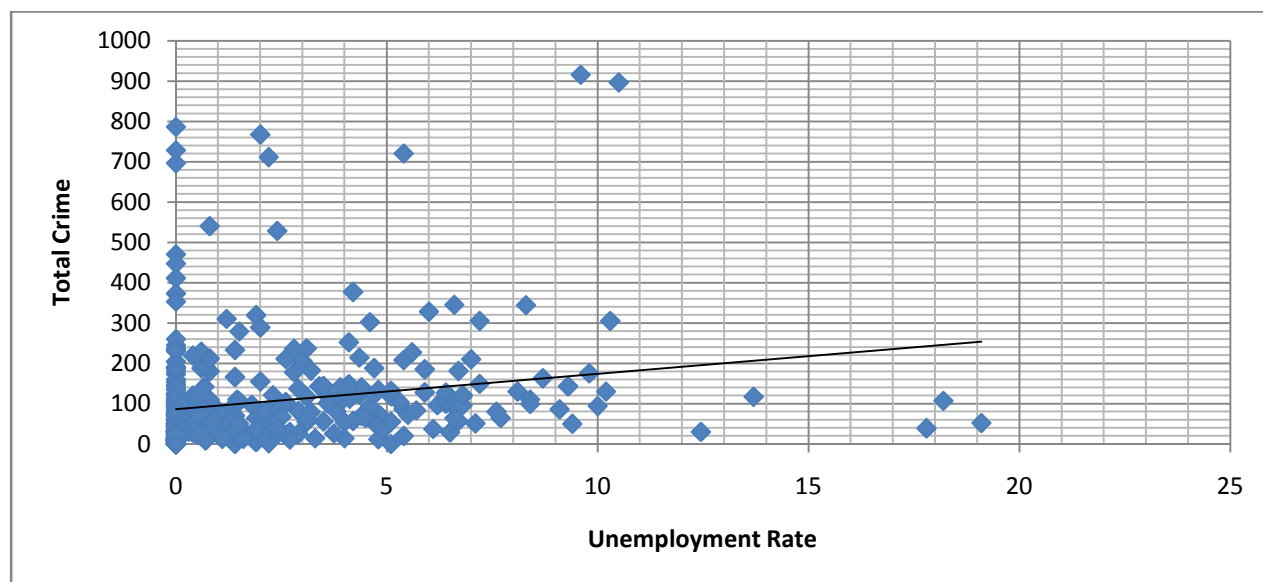
140

141 **Figure 6: Ten Years Average of Unemployment Across States in Nigeria, 1996 – 2005**



142
143 **Source:** computed by authors from NBS database

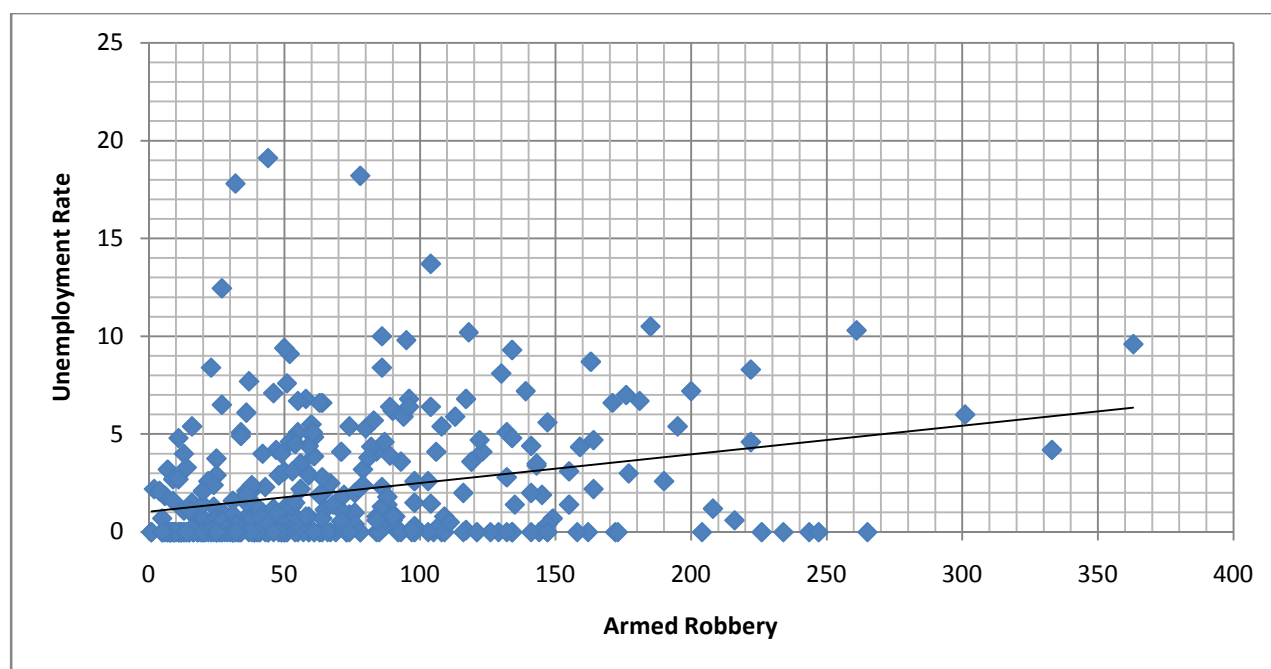
144 **Figure 7: Correlation Between Unemployment and Total Crime**



145
146 **Source:** computed by authors from NBS database

147
148

149 **Figure 8: Correlation Between Unemployment and Armed Robbery**



150

151 **Source:** computed by authors from NBS database

152

153 **3. Data and Methodology**

154 The use of aggregate data or national level time series data in the study of crime have been
 155 widely criticized in the literature. Cornwell and Trumbull (1994), Levitt (2001), Raphael and
 156 Winter-Ebmer (2001), Cherry and List (2002) among others have argued that aggregating crime
 157 data would lead to bias result and inferences drawn from such will be misleading. This is due to
 158 the fact that crime is an individual behavior that exhibit tremendous differences across localities,
 159 aggregating data of such activities could be misleading. The use of aggregate data will equally
 160 not allow unobserved heterogeneity to be accounted for in the model. Cornwell and Trumbull
 161 (1994), Cherry (1999), Levitt (2001) and Baltagi (2006) argued that ignoring unobserved
 162 heterogeneity in estimating economic model of crime would lead to bias result. Similarly,
 163 unemployment also varies across different local areas. These two types of variability are evident
 164 in figures 4, 5 and 6 respectively, where crime and unemployment are shown to be different
 165 across the states in Nigeria. Using state panel data would therefore make it possible to capture
 166 this variability. Hence, this paper makes use of panel data consisting of thirty six (36) states of

the federation plus the Federal Capital Territory (FCT) over the period 1996 to 2005. This also gives the opportunity of controlling for unobserved heterogeneity.

3.1 Model Specification

The basic empirical model used in this paper is specified as:

$$Crime_{st} = \alpha_1 une_{st} + \alpha_2 X_{st} + \beta_s + \delta_t + \delta_s time_t + \gamma_s time_t^2 + \varepsilon_{st} \quad (1)$$

Where s and t are states and years respectively. $Crime_{st}$ is a measure of crime, une_{st} is unemployment rate, X_{st} is set of control variables which include population density, inmate population and education proxy by secondary school enrolment, β_s is state fixed effect, δ_t is year fixed effect, $time_t$ and $time_t^2$ are linear and quadratic time trends, δ_s gives the state specific coefficient on the linear trend while γ_s gives the state specific coefficient on the quadratic time trend and finally ε_{st} is the error term that is $iid(0, \sigma^2)$.

Unobservable state level covariates are extensively controlled for so as to mitigate omitted variable bias. Inclusion of β_s eliminate the effect of not including factors that vary across states but are constant over time, δ_t eliminates the effect of factors that cause year to year changes in crime rate which are common to all states, and the linear as well as the quadratic time trends eliminate variation in within – state crime rates caused by factors that are state specific over time.

Four different measures of crime were used in the regressions, these are total crime proxy by total number of criminal (major and minor) cases reported to the police; kidnapping measured by total number of reported cases of missing persons; vehicle theft measured as total number of stolen vehicles reported to the police; and armed robbery which is measured as cases of armed robbery reported to the police. Total unemployment rate by state is used to capture the unemployment rate in the model. Following Baltagi (2006) and Cornwell and Trumbull (1994) population density is measured as state total population divided by state land area (in km^2). The total number of inmates by state is used to captured deterrent variable. In addition, other variables such as number of people prosecuted for robbery, cases of robbery awaiting trial, cases of robbery pending investigation, number of armed robbers killed by police and number of armed robbers injured by police are controlled for in armed robbery model to capture more deterrent variables as well as police effectiveness. Number of vehicles recovered is also

introduced in vehicle theft model to capture police effectiveness. Thus, the final estimable equations are:

$$\ln TC_{st} = \alpha_1 + \alpha_1 \ln UNE_{st} + \alpha_2 \ln PD_{st} + \alpha_3 \ln SSE_{st} + \alpha_4 \ln IP_{st} + \beta_s + \delta_t + \delta_s time + \gamma_s time^2 + v_{st} \quad (2)$$

$$\ln KIDNAP_{st} = \alpha_1 + \alpha_1 \ln UNE_{st} + \alpha_2 \ln PD_{st} + \alpha_3 \ln SSE_{st} + \alpha_4 \ln IP_{st} + \beta_s + \delta_t + \delta_s time + \gamma_s time^2 + v_{st} \quad (3)$$

$$\ln VT_{st} = \alpha_1 + \alpha_1 \ln UNE_{st} + \alpha_2 \ln PD_{st} + \alpha_3 \ln SSE_{st} + \alpha_4 \ln IP_{st} + \alpha_5 \ln VRC_{st} + \beta_s + \delta_t + \delta_s time + \gamma_s time^2 + v_{st} \quad (4)$$

$$\ln AR_{st} = \alpha_1 + \alpha_1 \ln UNE_{st} + \alpha_2 \ln PD_{st} + \alpha_3 \ln SSE_{st} + \alpha_4 \ln IP_{st} + \alpha_5 \ln PPR_{st} + \alpha_6 \ln CAT_{st} + \alpha_7 \ln CPI_{st} + \alpha_8 \ln ARKP_{st} + \alpha_9 \ln ARIP_{st} + \beta_s + \delta_t + v_{st} \quad (5)$$

Table 1: Variables Definition and their expected signs:

Variable	Definition	Expected Sign
TC	Total Crime	Dependent Variable
KIDNAP	Kidnapping	Dependent Variable
VT	Vehicle Theft	Dependent Variable
AR	Armed Robbery	Dependent Variable
UNE	Unemployment	Positive
PD	Population density	Positive
SSE	Secondary School Enrollment	Negative
IP	Inmate Population	Negative
VRC	Vehicles Recover	Negative
PPR	People Prosecuted for Robbery	Negative
CAT	Cases Awaiting Trial	Positive
CPI	Cases Pending Investigation	Positive
ARKP	Armed Robbers Killed by Police	Negative
ARIP	Armed Robbers Injured by Police	Negative

Source: compiled by authors from literature

3.2 Estimation Techniques

Several estimation techniques were used in the literature to estimate crime models, these include, the Ordinary Least Square (OLS), the Fixed and Random Effects, the Two Stage Least Square (2SLS), Instrumental Variable (IV), the Between Estimator, the GMM and Weighted Least Square (WLS) among others. In this paper equations 2 to 5 are estimated using OLS, WLS, Between estimator, Fixed effect and Random effect respectively. GMM, IV and 2SLS could not

be used due to scarcity of good instruments. All the variables are logged in all the regressions as is the usual practice in crime study. The data for all the variables are sourced from National Bureau of Statistics database.

4.1 Presentation and Discussion of Results

The regression results on total crime are reported in tables 2a and 2b, results of kidnapping are reported in tables 3a and 3b, results of vehicle theft are in tables 4a and 4b, while table 5 reports results of armed robbery regressions. Models with linear trends are reported in 2a, 3a, and 4a, while those with quadratic trends are presented in 2b, 3b and 4b respectively. In table 2a, unemployment rate is positive and significant in three out of five regressions. Population density is significant and negative only in the Between regression. Inmate population is significant in all the regressions except random effect model but it came out positive, secondary school education is also significant and positive in three of the regressions. Similarly in quadratic trends models reported in table 2b unemployment and secondary school education are significant and positive in all the regression except in the Between regression. Inmate population is significant in all the regressions while population density is significant only in the Between regression. In these two tables it is evident that unemployment leads to crime which conforms with expectation. In other words, total crime increases as more people becomes unemployed in any state. The most surprising results are coefficients of inmate population. It is expected that crime will reduce as more people are imprisoned but the results here are contrary. Inmate population leads to more crimes, this could be that prisons in Nigeria do not reform inmate. Hence, one who has been an inmate once is likely to commit another crime. Therefore, as inmate population increases, total crime increases. Secondary school education does not reduces crime in Nigeria rather leads to more crime. Though this finding contradict apriori expectation, it is not surprising since the most educated unemployed are the people with secondary education. There is no evidence that population density causes total crime in Nigeria.

In the results of kidnapping model, unemployment came out negative, significant twice in linear trends models and significant in all the regressions in quadratic trends models. This is contrary to expectation, however, it could be said that unemployment does not leads to more kidnapping in Nigeria rather more unemployment is associated with less kidnapping. This result is a reflection of characteristics of unemployment and kidnapping across the states in Nigeria. As shown in

245 section two of this paper, states with the highest rate of unemployment records few cases of
 246 kidnapping. Population density is positive and significant in three regressions with linear trends
 247 and four regressions with quadratic trends. This implies that places with high population density
 248 are likely to witness more kidnapping. Like in the total crime regressions, prison positively and
 249 significantly affect kidnapping. Coefficient of secondary education is not consistent, it is positive
 250 and significant in the OLS, WLS, Fixed Effect and Random Effect results with linear and
 251 quadratic trends, but significant and negative in the Between regressions. While all the result
 252 show that secondary education leads to more kidnapping, the Between regression results show
 253 that 1 percent increase in secondary school education would lead to reduction in kidnapping by
 254 about 66 percent.

255 There is no evidence that unemployment leads to vehicle theft. The result show a very weak
 256 negative impact of unemployment on vehicle theft. Population density is significant and positive
 257 in all the regressions except the Between estimation for linear trends models, it is not significant
 258 in the Between and Random Effect regression for quadratic trends models. This could possibly
 259 be explained by the likelihood of having more vehicles in more densely populated places as well
 260 as the ease of escaping with stolen vehicle in such places. Secondary education came out again
 261 positive and significant in all the regressions. Prison is not significant in all the regressions,
 262 meaning that prison does not significantly impact vehicle theft. Number of stolen vehicles
 263 recovered which was used in the model to capture police effectiveness came out positive and
 264 significant in all the regressions. Since recovery of stolen vehicles does not involve punishment
 265 to the criminal, this may not deter those who steal vehicles, hence it is possible to have
 266 coexistence of high rate of vehicle theft with high recovery of stolen vehicles.

267 In the armed robbery models population density, armed robbers killed by police and armed
 268 robbers injured by police are not significant in all the regressions. Implying that population
 269 density does not lead to armed robbery. Similarly, police men killing or injuring armed robbers
 270 does not reduce the cases of armed robbery in Nigeria. However, unemployment is significant
 271 and positive in three of the regressions, meaning that more unemployment can lead to more
 272 armed robbery. Rate of prosecution is significant once and negative which is evident in the fact
 273 that prosecutions serve as deterrent to armed robbery. The more people are prosecuted for armed
 274 robbery, the lesser would armed robbery in the country. Armed robbery cases pending

275 investigation as well as awaiting trial are positive where they are significant. Delaying
 276 investigation and trial of armed robbery cases would lead to more armed robbery cases in
 277 Nigeria.

278 **4.2 Policy Implications**

279 The findings in this paper have a number of policy implications. First, solving the problem of
 280 unemployment may not be the solution to all kinds of crimes, therefore, policymakers should
 281 look beyond unemployment in order to tackle the problem of crime. Second, police brutality
 282 against armed robbers is never a solution to armed robbery rather armed robbers should be
 283 arrested, tried and prosecuted if found guilty. Third, it seems prisons in Nigeria do not deter
 284 criminals from further committing crime. The prison services need to be restructured such that
 285 inmate are reformed and trained to become self-employed because it could be difficult for ex-
 286 convicts to secure job. Hence, they are must likely to return to criminal activities if legal
 287 opportunity is not forthcoming.

288 **4. Concluding Remarks**

289 This paper studied the impact of unemployment on total crime, kidnapping, vehicle theft and
 290 armed robbery. State panel data was employed and a number of unobservable characteristics
 291 were controlled for. Different estimation techniques were used to gauge the models. The results
 292 show that unemployment is an important determinant of total crime as well as armed robbery but
 293 this is not consistent in the cases of kidnapping and vehicle theft. Findings equally show that
 294 prisons in Nigeria do not result to reduction in crime, while prosecution of armed robbers can
 295 significantly reduce armed robbery in the country.

296 Base on these findings, the following recommendations become critical in the fight against crime
 297 in Nigeria: first, the problem of unemployment particularly at lower levels of education should
 298 be addressed. Second, cases of armed robbery and other serious crimes should be investigated
 299 and tried without delay. Third, people found guilty of armed robbery (as well as other crimes)
 300 should be prosecuted appropriately. Finally, prisons in the country should be restructured so that
 301 inmates can be rehabilitated as well as trained for self employment. This could be done by giving
 302 them intensive training of different vocational skills.

303 Table 2a: Linear Trends Model on Total Crime

VARIABLES	OLS	WLS	BETWEEN	FIXED EFFECT	RANDOM EFFECT
Const	-5.6333*** (0.7754)	-5.4607*** (0.7352)	-7.3224* (4.1185)	-5.6692*** (0.8667)	-5.6533 (0.8387)
$\ln UNE_{st}$	0.0389** (0.0157)	0.0284** (0.0140)	0.0743 (0.0571)	0.0369** (0.0180)	0.0389 (0.0173)
$\ln PD_{st}$	0.0233 (0.0726)	0.0536 (0.0540)	-0.5152* (0.2977)	0.0161 (0.0651)	0.0233 (0.0623)
$\ln PL_{st}$	0.4949*** (0.0965)	0.4626*** (0.0789)	2.1467*** (0.5047)	0.4465*** (0.0913)	0.4949 (0.0890)
$\ln SSE_{st}$	0.5607*** (0.0737)	0.5552*** (0.0669)	-0.1507 (0.2776)	0.5968*** (0.0792)	0.5607 (0.0756)
R-squared	0.4064	0.4700	0.5557	0.4689	
F- stat	37.1912***	48.1806***	6.2531***	6.0965***	
Akaike criterion	840.0476	957.9453	6.5061	874.9635	840.0476
No obs	333	333	37	333	333
Hausman test					12.629**

304

305 ***significant at 1%, **significant at 5%, *significant at 10%, standard error in parenthesis

306 Table 2b: Quadratic Trends Model on Total Crime

VARIABLES	OLS	WLS	BETWEEN	FIXED EFFECT	RANDOM EFFECT
const	18802.4 (22880.5)	21850.7 (22470.3)	51103.4 (277664)	21946.9 (26365.8)	18802.4 (26112.6)
unempt	0.0370** (0.0157)	0.0257* (0.0143)	0.0787 (0.0628)	0.0345* (0.0182)	0.0370** (0.0175)
In pop	0.0208 (0.0723)	0.0537 (0.0539)	-0.5170* (0.3028)	0.0128 (0.0652)	0.0208 (0.0624)
In prison	0.4962*** (0.0963)	0.4661*** (0.0792)	2.1502*** (0.5134)	0.4482*** (0.0914)	0.4962*** (0.0624)
In ss	0.5710*** (0.0740)	0.5650*** (0.0677)	-0.1511 (0.2816)	0.6098*** (0.0808)	0.5710*** (0.0770)
R-squared	0.4073	0.4718	0.5562	0.4702	
F- stat	31.9052***	41.4661***	5.1921***	5.9645***	
Akaike	841.5165	959.8566	0.5562	876.1657	841.5165
No obs	333	333	37	333	333
Hausman test					12.8585*

--	--	--	--	--	--

***significant at 1%, **significant at 5%, *significant at 10%, standard error in parenthesis

Table 3a: Linear Trends Model on Kidnapping

VARIABLES	OLS	WLS	BETWEEN	FIXED EFFECT	RANDOM EFFECT
const	-934.905*** (131.134)	-548.477*** (56.7405)	-340.626 (490.078)	-959.731*** (143.716)	-934.905 (87.8716)
unempt	-3.2775 (2.0072)	-1.9574** (0.9611)	-13.2142* (6.6601)	-2.6565 (1.9757)	-3.2775 (1.8201)
In pop	25.6669*** (9.1861)	21.0281*** (3.8849)	-20.3966 (30.1323)	24.8529*** (8.6086)	25.6669 (6.5350)
In prison	71.4216*** (12.6409)	29.4488*** (5.7259)	179.532*** (51.4495)	68.6462*** (12.6048)	71.4216 (9.3747)
In ss	30.8154*** (4.6877)	24.5357*** (4.5561)	-65.8317** (30.5017)	35.174*** (6.0252)	30.8154*** (7.9123)
R-squared	0.3681	0.3382	0.4611	0.4360	
F- stat	32.2322***	28.2723***	4.2789***	5.4491***	
Akaike	4014.976	893.4524	351.9326	4048.409	4014.976
No Obs	339	339	37	339	
Hausman test					13.6339**

***significant at 1%, **significant at 5%, *significant at 10%, standard error in parenthesis

Table 3b: Quadratic Trends Model on Kidnapping

VARIABLES	OLS	WLS	BETWEEN	FIXED EFFECT	RANDOM EFFECT
Const	6.4618** (2.7218)	2.6805* (1.6115)	1.4689 (3.0876)	6.5600** (3.1141)	6.4618** (2.7218)
Unempt	-3.9105** (1.8271)	-2.2317** (0.9919)	-12.6194* (6.8625)	-3.3511* (1.9554)	-3.9105** (1.8271)
In pop	24.714*** (6.5022)	21.0765*** (3.8515)	-21.8233 (30.6755)	23.8089*** (8.4511)	24.714*** (6.5022)
In prison	72.029*** (9.3134)	30.1912*** (5.8060)	181.763*** (52.3365)	69.2616*** (12.6204)	72.029*** (9.3134)
In ss	34.332*** (7.9959)	25.5997*** (4.5473)	-65.4227** (30.9148)	38.9702*** (6.5420)	34.332*** (7.9959)
R-squared	0.3787	0.3485	0.4653	0.4468	
F- stat	28.8190***	25.2958**	3.6054***	5.5418***	
Akaike	4011.251	895.7295	353.6450	4043.858	4011.251
No Obs	339	339	37	339	339
Hausman test					14.1628**

***significant at 1%, **significant at 5%, *significant at 10%, standard error in parenthesis

313

314

315 Table 4a: Linear Trends Model on Vehicle Theft

VARIABLES	OLS	WLS	BETWEEN	FIXED EFFECT	RANDOM EFFECT
Const	-2.8950*** (0.8931)	-2.9069*** (0.5539)	-2.1073 (2.3458)	-3.2413*** (0.9396)	-2.8950*** (0.8662)
Unempt	0.0013 (0.0098)	-0.0162* (0.0082)	-0.0147 (0.0306)	0.0031 (0.0138)	0.0013 (0.0128)
In pop	0.0856** (0.0371)	0.0993*** (0.0324)	0.0333 (0.1173)	0.1034* (0.0550)	0.0856* (0.0491)
In ss	0.3648*** (0.0638)	0.3665*** (0.0473)	0.5031** (0.2452)	0.3666*** (0.0789)	0.3648*** (0.0738)
In prison	0.0238 (0.0794)	0.0135 (0.0501)	-0.3433 (0.2394)	0.0590 (0.0745)	0.0238 (0.0711)
VRECO	0.7199*** (0.0329)	0.7421*** (0.0245)	0.7221*** (0.0795)	0.7186*** (0.0375)	0.7199*** (0.0341)
R-squared	0.8942	0.9610	0.8936	0.9131	
F- stat	246.2838***	718.6494***	34.7873***	41.0283***	
Akaike	331.8359	610.6311	-7.2486	362.2104	331.8351
No Obs	212		37		
Hausman test					9.4715

316 ***significant at 1%, **significant at 5%, *significant at 10%, standard error in parenthesis

317 Table 4b: Quadratic Trends Model on Vehicle Theft

VARIABLES	OLS	WLS	BETWEEN	FIXED EFFECT	RANDOM EFFECT
Const	35598.1 (31136.8)	48753.4** (20835.1)	94656.6 (165963)	26420.9 (31984.3)	35598.1 (31125.4)
Unempt	0.0013 (0.0096)	-0.0147* (0.0083)	-0.0140 (0.0310)	0.0030 (0.0138)	0.0013 (0.0128)
In pop	0.0808** (0.0362)	0.1013*** (0.0320)	0.0378 (0.1190)	0.0980* (0.0554)	0.0808 (0.0493)
In ss	0.3803*** (0.0691)	0.3886*** (0.0475)	0.4894*** (0.2493)	0.3806*** (0.0808)	0.3803*** (0.0750)
In prison	0.0217 (0.0794)	0.0015 (0.0500)	-0.3266 (0.2440)	0.0570 (0.0747)	0.0217 (0.0711)
l_VRECO	0.7182*** (0.0320)	0.7468*** (0.0241)	0.7367*** (0.0844)	0.7164*** (0.0376)	0.7182*** (0.0341)
R-squared	0.8949	0.9617	0.8948	0.9134	
F- stat	215.9875***	636.6676***	29.7714***	40.0355***	

Akaike	332.4741	611.0762	-5.6760	363.3457	332.4741
No Obs	212	212	37	212	
Hausman test					9.2613

***significant at 1%, **significant at 5%, *significant at 10%, standard error in parenthesis

Table 5: Models on Armed Robbery

VARIABLES	OLS	WLS	BETWEEN	FIXED EFFECT	RANDOM EFFECT
const	-4.4169*** (1.1460)	-4.9435*** (0.7061)	-3.9736 (3.2462)	4321.5 (5244.49)	-3.1413 (1.4402)
unempt	0.0666*** (0.0238)	0.0428*** (0.0135)	0.1973** (0.0767)	0.0251 (0.0196)	0.0335 (0.0185)
l_popperkms	-0.0635 (0.1037)	-0.0769 (0.0487)	-0.2141 (0.1578)	-849.697 (1030.86)	0.0387 (0.1140)
l_NoSinSS	0.5699*** (0.1240)	0.6248*** (0.0698)	0.5281** (0.2446)	0.3577** (0.1639)	0.4674 (0.1249)
l_Prisoners	0.2738** (0.1187)	0.2942*** (0.0680)	0.2489 (0.2128)	0.0688 (0.2373)	0.2128 (0.1345)
PPforR	-0.0048** (0.0023)	-0.0034 (0.0029)	0.0125 (0.0285)	-0.0062 (0.0043)	-0.0064 (0.0041)
C_PAT	0.0057** (0.0027)	0.0040 (0.0036)	-0.0227 (0.0439)	0.0070 (0.0054)	0.0075 (0.0052)
CPI	0.0028* (0.0017)	0.0024** (0.0010)	0.0120 (0.0100)	0.0026 (0.0020)	0.0020 (0.0017)
ARKbyP	0.0022 (0.0029)	0.0003 (0.0025)	0.0268 (0.0395)	0.0019 (0.0040)	0.0018 (0.0039)
ARlbyP	-0.00356 (0.0023)	-0.0018 (90.0028)	-0.0386 (0.0628)	-0.0021 (0.0044)	-0.0023 (0.0043)
R-squared	0.3776	0.6468	0.5808	0.7114***	
F- stat	8.8249***	26.6310***	3.0223**	6.9024***	
Akaike	386.8541	503.9561	69.2442	322.6597	393.0833
No Obs	172	172	36	172	
Hausman test					10.8428

***significant at 1%, **significant at 5%, *significant at 10%, standard error in parenthesis

References

- Anyanwu E. O. (2006), “Crime and Justice in Postcolonial Nigeria: The Justifications and Challenges of Islamic Law of Shari’ah” *Journal of Law and Religion*, vol. 21, No. 2, pp: 315 – 347
- Avio K. L. and Clark C. S. (1978), “ The Supply of Property Offenses in Ontario: Evidence on the Deterrent Effect of Punishment” *Canadian Journal of Economics*, vol. 11, pp: 1 – 19

- 328 Baltagi H. B. (2006), “Estimating an Economic Model of Crime using Panel Data from North
329 Carolina” *Journal of Applied Econometrics*, vol. 21, pp: 543 – 547
- 330 Becker, G.S. (1968), “Crime and Punishment: An Economic Approach” *Journal of Political*
331 *Economy*, vol. 76, pp: 169 – 217
- 332 Cornwell C. and Trumbull W. N. (1994), “Estimating the Economic Model of Crime with Panel
333 Data” *Review of Economics and Statistics*” vol. 76, pp: 360 – 366
- 334 Cantor D. and Land K. (1985), “Unemployment and Crime Rates in the Post-World War II
335 United States: A Theoretical and Empirical Analysis”, *American Sociology Review*, vol.
336 50, pp: 317 – 332
- 337 Cherry L. T. (1999), “Unobserved Heterogeneity Bias when Estimating the Economic Model of
338 Crime” *Applied Economics Letter*, vol. 6, pp: 753 – 757
- 339 Cherry L. T. and List A. J. (2002), “Aggregation Bias in the Economic Model of Crime”
340 *Economics Letters*, vol. 75, pp: 81 – 86
- 341 Chiricos G. T. (1987), “Rates of Crime and Unemployment: An Analysis of Aggregate Research
342 Evidence” *Social Problems*, vol. 34, No. 2, pp: 187 – 212
- 343 Denis F., Francis K. and Julien P. (2009), “Youth Unemployment and Crime in France” *IZA*
344 *Discussion Paper*
- 345 Ehrlich, I. (1973), “Participation in Illegitimate Activities: A Theoretical and Empirical
346 Investigation”, *Journal of Political Economy*, vol. 81, pp: 521 – 565
- 347 Ehrlich, I. (1996), “Crime, Punishment and the Market for Offenses” *The Journal of Economic*
348 *Perspectives*, vol. 10 No. 1, pp: 43 – 67
- 349 Entorf H. and Spengler H. (2000), “Socioeconomic and Demographic Factors of Crime in
350 Germany: Evidence from Panel Data of the German States” *International Review of Law*
351 *and Economics*, vol. 20, pp: 75 – 106
- 352 Klein A. (1999), “Nigeria and the Drugs War”, *Review of African Political Economy*, vol. 26, pp:
353 51 – 73
- 354 Gould D. E., Weinberg A. B. and Mustard D. (2002), “Crime Rates and Local Labour Market
355 Opportunities in the United States: 1979 – 1995” *The Review of Economics and Statistics*,
356 vol. 84, No. 1, pp: 45 – 61
- 357 Levitt D. S. (2001), “Alternative Strategies for Identifying the Link Between Unemployment and
358 Crime” *Journal of Quantitative Criminology*, vol. 17, No. 4, pp: 377 – 390

- 359 Levitt, D. S. (1997), “Using Electoral Cycles in Police Hiring to Estimate the Effect of Police on
360 Crime”, *American Economic Review*, vol. 87, No. 3, pp: 270 – 290
- 361 Machin S. and Meghir C. (2004), “Crime and Economic Incentives” *Journal of Human*
362 *Resources*, vol. 39, No. 4, pp: 958 – 979
- 363 Marenin O. and Reising D. M. (1995), “A General Theory of Crime and Patterns of Crime in
364 Nigeria: An Exploration of Methodological Assumption”, *Journal of Criminal Justice*,
365 vol. 23, No. 6, pp: 501 – 518
- 366 Odumosu F. O. (1999), “Social Costs of Poverty: the Case of Crime in Nigeria” *Journal of*
367 *Social Development in Africa*, vol. 14, No. 2, pp: 71 – 85
- 368 Raphael S. and Winter-Ebmer R. (2001), “Identifying the Effect of Unemployment on Crime”
369 *Journal of Law and Economics*, vol. XLIV, pp: 259 – 283
- 370 Smith J. D. (2001), “Ritual Killing, 419, and Fast Wealth: Inequality and the Popular
371 Imagination in Southeastern Nigeria” *American Ethnologist*, vol. 28, No. 4, pp: 803 – 826
- 372 Thornberry T. and Christenson L. R. (1984), “Unemployment and Criminal Involvement: An
373 Investigation of Reciprocal Causal Structures” *American Sociological Review*, vol. 56,
374 pp: 609 – 627
- 375 Yakubu T. A., Kilishi A. A. and Yaru M. A. (2011), “The Impact of Unemployment and
376 Population on Crime in Nigeria” *JABU International Journal of Social and Management*
377 *Sciences*, vol. 3, No. 1, pp: 81 – 89
- 378 Wolpin, I. K. (1978) “An Economic Analysis of Crime and Punishment in England and Wales,
379 1894-1967”, *Journal of Political Economy*, vol. 86, pp: 815 – 839