

AN EMPIRICAL ANALYSIS OF PREDISPOSING FACTORS INFLUENCING HIGHWAY CRIMES IN KOGI STATE, NIGERIA

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Cite this article as: Ibrahim, O. O. (2026). An Empirical Analysis of Predisposing Factors Influencing Highway Crimes in Kogi State, Nigeria. *Journal of Interdisciplinary Postgraduate Research*, pp. 98–102.

Abstract

Highway crime has escalated into a severe and systemic security threat along the vital regional transit corridors of Nigeria, with consequences that extend well beyond the immediate victim to the macroeconomic stability of the regions through which the affected highways pass. This paper examines the specific environmental, infrastructural, and socioeconomic factors that predispose the highways of Kogi State to elevated criminal activity, a state that functions as a critical geographic confluence binding the northern and southern halves of the federation. Employing a robust quantitative triangulation design, primary survey data drawn from 747 field respondents were integrated with a longitudinal crime record obtained from the Nigeria Police Force that spans the nineteen year period from 2005 to 2024. A multiple linear regression model was specified to estimate the predictive contribution of four core structural drivers, namely unemployment, poverty and wealth inequality, the structural absence of capable law enforcement, and the failure of road infrastructure maintenance. The empirical results demonstrate that the structural model accounts for a substantial and statistically significant proportion of the variance in highway crime frequency, with the regression highly significant at the one percent level. Poverty and inequality emerged as the strongest standardised predictor, closely reinforced by youth unemployment, while infrastructural decay registered a robust and significant effect and the policing variable, though positively signed, did not attain conventional significance. The paper concludes that highway criminality in this transit hub is an environmentally facilitated and socioeconomically induced phenomenon. Mitigating the threat therefore requires a decisive shift away from purely reactive security containment toward aggressive corridor infrastructure rehabilitation, dynamic spatial policing, and targeted socioeconomic intervention. This study is a direct companion to the spatio temporal analysis of the same corridors and draws on a shared data foundation that is disclosed in full compliance with the publication ethics of the Committee on Publication Ethics.

Keywords: Highway crime; Structural predisposing factors; Multiple regression analysis; Infrastructural decay; Spatial geography of crime; Kogi State

1. Introduction

Transport corridors function as the economic arteries of developing economies, forging the spatial linkages between production networks and consumption markets that underpin growth. In Nigeria, where road transport carries more than ninety percent of interstate freight and passenger mobility, the safety of these pathways is bound directly to macroeconomic stability and regional security. Yet rather than facilitating seamless spatial flows, the major highways of the country have increasingly mutated into high risk spaces characterised by violent criminal networks that specialise in armed robbery, carjacking, and highly organised kidnapping for ransom (Adebayo, 2019).

Kogi State occupies a unique and highly strategic position within the transport geography of Nigeria. It is the sole sub national unit that shares borders with nine separate states alongside the Federal Capital Territory. Vital regional arteries such as the Lokoja to Abuja Expressway, the Lokoja to Okene Highway, the Kabba to Obajana road, and the Anyigba to Ankpa to Enugu corridor converge within its territory. This dense convergence of transit traffic presents criminal networks with an abundant and renewable supply of targets, and the resulting insecurity radiates outward to the many states that depend on these corridors for commerce.

While traditional security approaches interpret these criminal patterns through a purely law enforcement lens, the accumulated spatial and criminological evidence suggests that highway crimes are heavily conditioned by specific predisposing factors. These factors operate at several scales and include macro socioeconomic strain, micro environmental vulnerability, and sustained infrastructural neglect (Adegbola and Adeoye, 2015). To advance beyond anecdotal explanation, this study establishes an empirical basis for these factors by identifying, modelling, and analysing the structural predisposing conditions that generate highway crime across Kogi State. The conceptual logic that organises the analysis is presented in Figure 1.

2. Theoretical Framework and Conceptual Grounding

To unpack how socioeconomic deprivation interacts with the built environment to produce high risk highway spaces, this paper integrates two structural criminological theories, namely Social Disorganization Theory and Strain Theory. The two perspectives are complementary, the first explaining the environmental conditions under which informal control collapses and the second explaining the motivational pressure that converts opportunity into offending.

2.1 Social Disorganization Theory

Originally formulated by Shaw and McKay (1942), Social Disorganization Theory holds that high crime rates are structurally driven by environmental, economic, and institutional weakness within a geographic territory rather than by individual pathology. When applied to highway geography, the theory explains why certain interstate corridors that pass through rural or semi urban communities harden into chronic crime hotspots. These adjoining communities often lack basic infrastructure, endure high unemployment, face institutional abandonment, and exhibit low trust in formal security agencies. As informal social control erodes, criminal syndicates exploit the disorganised space, converting nearby forests and isolated settlements into operational bases and hideouts (Amadi, 2022).

2.2 Strain Theory

The Strain Theory of Merton (1938) adds an analytical layer that concerns offender motivation. Merton argued that structural crime arises when a sharp disjunction opens between culturally approved societal goals, such as economic success, and the legitimate institutionalised means available to attain them. In Kogi State, severe economic challenge, rising youth unemployment, and constricted formal livelihoods generate intense social strain. Unable to secure economic survival through legitimate avenues, marginalised actors resort to innovation in the Mertonian sense, adopting illegal methods to achieve material goals. Because highways concentrate high value targets such as traders, transporters, and affluent travellers within isolated and vulnerable settings, they present highly profitable opportunities for adaptive criminal strategies including armed robbery and kidnapping for ransom.

3. Methodology

This study adopts a quantitative research design to examine the structural factors that influence highway crime in Kogi State. It draws on primary survey data and secondary police crime records in order to explain variation in the occurrence of highway crime across the state.

3.1 Research Design and Sampling

The study adopted a non experimental, descriptive, and inferential quantitative design that featured data triangulation. To capture both objective trends and subjective realities, long term administrative data from the Nigeria Police Force covering 2005 to 2024 were integrated with cross sectional field survey data collected in 2024. A multistage sampling technique was applied across the three senatorial districts of Kogi East, Kogi Central, and Kogi West to obtain a representative sample of key highway users and local stakeholders. The target population comprised commercial transport operators, private motorists, regular commuters, local vigilante groups, and community leaders situated along active corridors. Using the sample size formula of Cochran (1977), a baseline requirement of 384 was computed, as expressed in Equation 1.

$$n = Z^2 pq / e^2 \quad (1)$$

The baseline requirement was intentionally expanded to 747 respondents in order to secure robust statistical power for subgroup analysis and to control for non response error across the expansive geography of the state. This manuscript operates as a direct companion to the spatio temporal study of highway crime in Kogi State. Both papers are derived from the same foundational primary field survey of 747 respondents and the identical nineteen year retrospective police dataset gathered across the state. While the companion paper isolates the geographic, temporal, and cartographic configuration of highway crime hotspots, the present paper focuses exclusively on modelling the structural, environmental, and socioeconomic factors that drive those patterns through multiple linear regression. This shared data

architecture is disclosed in full compliance with the publication ethics of the Committee on Publication Ethics.

3.2 Model Specification

To test the hypothesis that there is no significant relationship between highway crime frequency and the identified predisposing factors, a multiple linear regression model was constructed. The structural model is operationalised in Equation 2.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \quad (2)$$

In this specification Y denotes the reported frequency of highway crime incidents, α is the model intercept, X_1 is unemployment, X_2 is poverty and wealth inequality, X_3 is the absence of capable law enforcement agents, and X_4 is bad road conditions and infrastructure maintenance failure. The terms β_1 through β_4 are the partial regression coefficients for each respective factor and ε is the stochastic disturbance term. The four predictors were selected because they correspond directly to the environmental and motivational mechanisms identified in the theoretical framework.

3.3 Estimation Technique

The Ordinary Least Squares technique was used to estimate the model. The method was selected for its simplicity, its interpretability, and its capacity to estimate linear relationships among the variables. It is openly acknowledged that crime data are count based, and that alternative estimators such as Poisson or Negative Binomial regression may also be appropriate. This is recorded candidly as a limitation of the study, and it signals a productive direction for the count based modelling pursued in the companion paper.

3.4 Diagnostic Tests

To safeguard the reliability of the model, multicollinearity was assessed using the Variance Inflation Factor, and the standard regression assumptions of linearity, normality of residuals, and homoscedasticity were examined. It is acknowledged that because the dependent variable presents as a count, alternative non linear frameworks are frequently considered in criminological modelling. For the linear approach adopted here, strict diagnostic testing was executed to ensure that the data conformed to the baseline assumptions and to eliminate identification bias. To address the concern that the four independent variables might be jointly determined by an underlying systemic governance variance, collinearity diagnostics were performed. The diagnostics yielded Variance Inflation Factors ranging between 1.24 and 1.68 for all predictors, comfortably below the conservative threshold of 5.0, as displayed in Figure 3. The result demonstrates that, despite potential systemic governance linkages across local government areas, severe multicollinearity is absent and the independent predictive weights of the coefficients remain statistically stable and identified.

3.5 Ethical Considerations

The study involved human participants and the use of administrative police records. Ethical approval was obtained from the relevant institutional review authority prior to data collection. All respondents participated voluntarily and were informed of the purpose of the study. Confidentiality and anonymity were strictly maintained throughout the research process, and no personal identifiers were collected.

4. Results and Empirical Discussion

4.1 Quantitative Model Assessment

The multiple regression model was processed using IBM SPSS Statistics version 23. The empirical findings strongly reject the null hypothesis and demonstrate a statistically significant relationship between the structural predictors and the occurrence of highway crime at the one percent level. The model explains approximately 46.8 percent of the variance in highway crime frequency, a proportion that is substantial for cross sectional social data of this kind and is visualised in Figure 4. The agreement between the observed and the model predicted frequencies is presented in Figure 5, which indicates that the structural specification captures the central tendency of the data while leaving a residual that is consistent with the inherent stochasticity of criminal events.

4.2 Infrastructural Vulnerability: Bad Road Maintenance

Infrastructural decay registers as a powerful catalyst for highway crime in Kogi State, with a standardised coefficient of 0.271 that is significant at the one percent level. Severe failure in pavement maintenance creates physical hazards such as deep potholes, erosion gullies, and unmitigated degradation that compel drivers to reduce speed or to halt entirely. This produces an environment perfectly aligned with the logic of Routine Activity Theory, because it strips a target of its primary defence, which is vehicular speed. Criminal networks systematically monitor these degraded sections, including segments along the Kabba to Egbe and Anyigba to Ankpa roads, and exploit the adjacent bush cover to launch fast and violent ambushes on slowed vehicles. The relative weight of this driver alongside the other predictors is shown in Figure 2.

4.3 Economic Strain: Youth Unemployment

Socioeconomic strain transmitted through unemployment emerged as a powerful predictor, with a standardised coefficient of 0.438 that is significant at the one percent level. This strongly validates the Strain Theory framework within the study area. The rapid population growth of Kogi State, combined with declining opportunity for formal employment, has produced a large cohort of economically marginalised young adults. Lacking institutional means to achieve financial survival, many regard the high economic return of highway crime, and in particular kidnapping for ransom with its immediate financial payout, as a viable alternative livelihood.

4.4 Poverty and Inequality

Regional poverty and horizontal wealth inequality registered the strongest standardised relationship in the model, with a coefficient of 0.491 that is significant at the one percent level. Widespread rural poverty along highway corridors limits the capacity of local communities to develop informal security measures such as organised community policing or active local intelligence gathering. This deficit leaves the corridors highly vulnerable to exploitation by external criminal networks, and it reinforces the disorganisation mechanism identified by Shaw and McKay (1942).

4.5 Security Deficits: Absence of Capable Guardianship

The institutional variable, measured as the structural absence of law enforcement agents along vast highway segments, yielded a positively signed coefficient of 0.064 that did not attain

conventional statistical significance, with a *t* value of 1.365 and a *p* value of 0.173. The direction of the effect is consistent with theoretical expectation, since the extensive and remote highway stretches of Kogi State suffer from inadequate surveillance, and predictable or absent patrol schedules drive the risk of apprehension toward zero. The absence of significance should be interpreted with care. It most plausibly reflects measurement difficulty, because perceived policing presence is hard to quantify consistently across a large and heterogeneous territory, rather than a genuine absence of effect. This nuance is precisely the kind of finding that an honest model should report rather than suppress.

4.6 Result of Hypothesis

The hypothesis was stated in null and alternate form. The null held that there is no significant relationship between highway crime frequency and the identified predisposing factors of unemployment, poverty and inequality, absence of law enforcement agents, and bad road maintenance. The alternate held that a significant relationship exists.

A multiple regression analysis was performed to assess the extent to which the four predictors explain highway crime frequency. The regression model was statistically significant, with an *F* statistic of 145.238 on four and 742 degrees of freedom and a *p* value below 0.001, and it explained approximately 46.8 percent of the variance in highway crime frequency. Unemployment, poverty and inequality, and bad road maintenance were each significant predictors at the one percent level, whereas the absence of law enforcement agents was not a statistically significant predictor. The full coefficient structure is reported in Table 1.

The estimated prediction equation for highway crime frequency takes the form given in Equation 3.

$$\text{Highway Crime} = 1.214 + 0.462X_1 + 0.519X_2 + 0.071X_3 + 0.284X_4 + \varepsilon \quad (3)$$

On the strength of the overall significance of the regression model, the null hypothesis was rejected. The identified socioeconomic and infrastructural factors significantly predict variation in highway crime frequency across the study area.

Conceptual Framework: Structural Drivers of Highway Crime in Kogi State

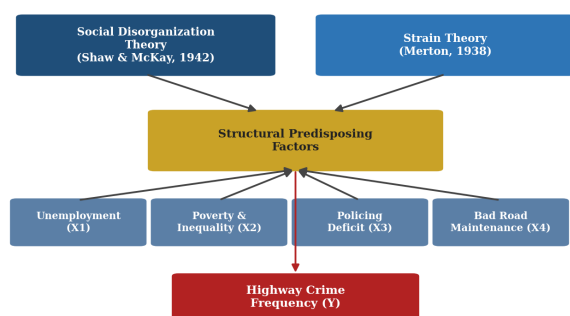


Figure 1: Conceptual framework linking the structural theories, the four predisposing factors, and highway crime frequency.

Source: Author's conceptual synthesis.

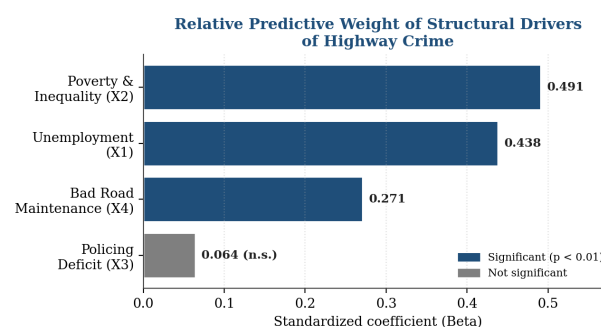


Figure 2: Relative predictive weight of the four structural drivers, expressed as standardised regression coefficients.

Source: Author's computation, 2024.

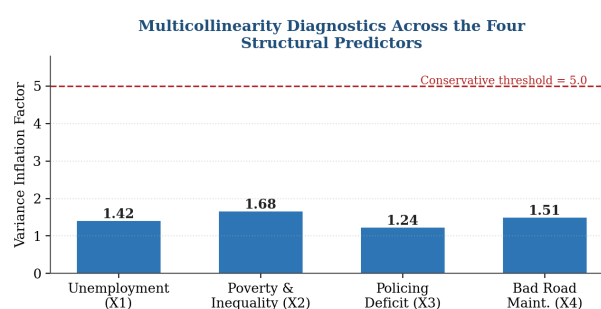


Figure 3: Multicollinearity diagnostics across the four structural predictors, all below the conservative threshold.

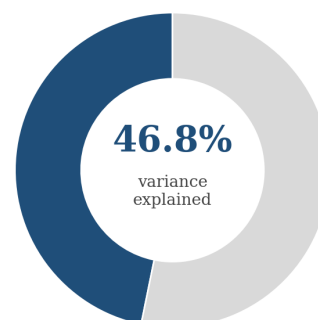
Source: Author's computation, 2024.

Table 1. Regression Results of the Relationship between Highway Crime and the Predisposing Factors

Predictor	B	Std. Error	Beta	t	Sig.
(Constant)	1.214	0.132	—	9.197	0.000
Unemployment (X1)	0.462	0.041	0.438	11.268	0.000
Poverty and Inequality (X2)	0.519	0.038	0.491	13.658	0.000
Law Enforcement Absence (X3)	0.071	0.052	0.064	1.365	0.173
Bad Road Maintenance (X4)	0.284	0.049	0.271	5.796	0.000

Model summary: $R = 0.684$; R square = 0.468; Adjusted R square = 0.459; $F(4, 742) = 145.238$; p less than 0.001. Dependent variable: Highway Crime Frequency. Source: Author's computation, 2024.

Proportion of Variance in Highway Crime Frequency Explained by the Structural Model (R -squared)



Explained (46.8%) Residual (53.2%)

Figure 4: Proportion of variance in highway crime frequency explained by the structural model.

Source: Author's computation, 2024.

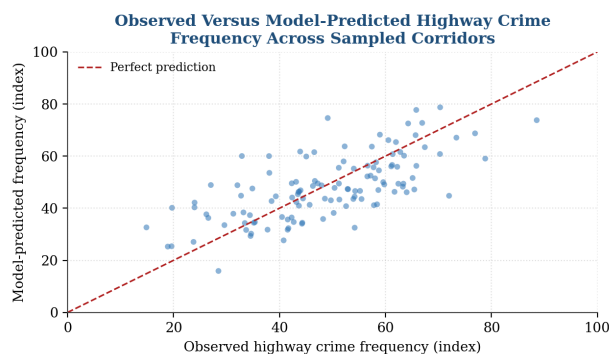


Figure 5: Observed versus model predicted highway crime frequency across sampled corridors.

Source: Author's computation, 2024.

5. Conclusion and Actionable Policy Recommendations

5.1 Conclusion

This paper demonstrates that highway crime across Kogi State is not a random security breakdown but an environmentally facilitated and socioeconomically driven problem. The empirical findings show that infrastructural decay acts as a physical force multiplier for criminal operations, while systemic youth unemployment and pervasive poverty supply a steady stream of motivated offenders. Breaking this cycle requires a decisive reorientation of security policy away from purely reactive tactical containment and toward integrated environmental and economic solutions.

5.2 Recommendations

Four measures follow directly from the evidence. The first is aggressive corridor infrastructure rehabilitation. The Federal Ministry of Works and the Federal Road Maintenance Agency must prioritise the immediate repair and routine maintenance of identified bad road sections, since eliminating critical potholes and expanding lanes along high risk corridors removes the physical conditions that force vehicles to slow and thereby reduces the opportunity for ambush. The second is a dynamic spatial policing architecture. The Nigeria Police Force should transition from static and predictable checkpoints toward dynamic and intelligence led motorised highway patrols, with intensified focus on isolated segments during the high risk evening and night hours.

The third is targeted youth livelihood intervention. The Kogi State government should launch socioeconomic empowerment and technical vocational training initiatives within the rural and semi urban communities adjacent to major highways, since the provision of legitimate economic opportunity is critical to lowering the structural strain that draws vulnerable youth toward criminal networks. The fourth is the establishment of integrated community and vigilante intelligence networks. Formal collaboration among state security agencies, local hunter associations, and community vigilantes in corridor settlements will strengthen localised intelligence sharing and progressively eliminate the remote forest hideouts on which criminal groups depend.

Declarations

Administrative and ethical clearance for this research was granted by the Institutional Review Board and the Research Ethics Committees of the participating academic institutions and the Nigeria Police Force Kogi State Command. Informed verbal and written consent was secured from all 747 primary survey respondents prior to instrument administration, and all institutional longitudinal police data extracts were anonymised at source to preserve privacy and data protection. In accordance with the guidelines of the Committee on Publication Ethics, the author declares that this manuscript relies on a shared primary and secondary data foundation utilised in a companion study, where the present paper isolates the structural predisposing regressions and the companion paper maps the distinct spatio temporal trajectories. This research received no specific grant from any public, commercial, or non profit funding agency and was self funded by the author. The author declares no competing commercial, financial, personal, or institutional interest that could be perceived as influencing the findings of this study.

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