

**DETERMINANTS OF PASSENGER CAPACITY COMPLIANCE  
AMONG COMMERCIAL MOTORCYCLISTS  
IN KWARA STATE NIGERIA<sup>1</sup>**

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**ABSTRACT**

*Commercial motorcyclists often violate road traffic regulations where they operate. The traffic offences they commit include, but are not limited to carrying more than one passenger per trip, which is above the passenger capacity of a motorcycle as provided by law. The objective of this study is to examine the determinants of passenger capacity compliance among commercial motorcyclists in Kwara State, Nigeria. This study studied 1,178 randomly selected motorcyclists across the rural-urban divide of Kwara State. Logistic regression models were used as the tool for data analysis. Statistics showed that 62.19 percent of the motorcyclists operate on full-time basis while the rest operate on part-time basis. About 68 percent of the motorcyclists operate without a valid driver's license. It was found that only 25 percent of the motorcyclists comply with the regulation of carrying one passenger per trip.. The rate of compliance with the passenger capacity regulation stood at 38.3 percent for the urban areas while that of rural areas was estimated at 13.8 percent. The regression results revealed that license holding, operation mode, age, location, education, and earnings are factors that determine compliance with the passenger capacity regulation among commercial motorcyclists in Kwara State. The study recommends that traffic law enforcement agents should educate commercial motorcyclists on road safety issues and also enforce compliance.*

JEL classification: L91, R40, R41, R49

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<sup>1</sup> This paper is one of the series of publications from the author's Ph.D. thesis

## **1. Introduction**

Informal transportation is one of the most sought-after services due to the high demand for transportation caused by the non-functional urban transit system and land use planning defects. Within the informal transportation system is the Class IV category of transit providers which includes two- and three-wheel vehicles. The motorcycle, the two-wheel transport commonly called *okada*, *going*, *achaba* in different parts of Nigeria, has become one of the 'sights and sounds' of urban and rural towns (Arosanyin et al, 2013). Public opinion on the use of motorcycles as passenger transportation has been mixed, ranging from acceptance to outright ban. This is because previous studies (Oluwadiya, 2004; Adeyemo, 1998; Adesanya, 1998; Ojekunle, 1998; Ojugbana et al., 2010; Oni et al., 2011; Olubumehin, 2012) contend that commercial motorcyclists violate road traffic regulations with impunity, thereby causing road traffic accidents. These motorcyclists commit road traffic offences such as over speeding, wrong overtaking, operating without driver's license, and non usage of crash helmet. Most of the earlier studies paid little or no attention to overloading among commercial motorcyclists; that is, carrying more than one passenger per trip.

The National Road Traffic Regulations of the Federal Republic of Nigeria 2004 (page B199), clearly states "that the motorcycle shall carry only the rider and one passenger". Carrying more than one passenger per trip means outright non-compliance with the passenger capacity regulation; the motorcycles will be overloaded and this may lead to road traffic accidents. However, despite the existence of the law prohibiting commercial motorcyclists from carrying more than one passenger per trip, these motorcyclists still go ahead to carry two, three or more passengers per trip. The objective of this paper therefore, is to examine the determinants of passenger capacity compliance. The paper is divided into six sections. Following the introductory part is section 2 which is the literature review. Section 3 contains the methodology; section four presents the discussion of results; section five is the conclusion; while policy implication and recommendation make up the last section.

## **2. Literature Review**

The attitude towards and practice of helmet use among commercial motorcyclists in Dar es Salaam, Tanzania was examined by Emmanuel (2011). A cross sectional study was conducted in the urban and peri-urban areas of Dar es Salaam using 273

randomly selecting commercial motorcyclists as participants. Multiple regression analysis was used to analyse the data. The results showed that the majority of the motorcyclists were male and 64.8 percent of them had the primary school leaving certificate as their highest qualification. It was found that those who agreed with the protective ability of the helmet against head injuries were more likely to wear it than those who disagreed. About 52.7 percent of the motorcyclists wear safety helmets during operation. The study recommended strict enforcement of helmet usage among commercial motorcyclists during operation.

Driver's license compliance among commercial motorcyclists in Kwara State, Nigeria was examined by Arosanyin and Yakubu (2014). The study used a sample of 1,178 commercial motorcyclists popularly called okada riders across the rural-urban divide in Kwara State. Logistic regression models were used as the tool for data analysis. Results from the study indicate that compliance with license holding in the state stood at 32 percent. The rate of compliance with license holding in the urban and rural areas were estimated at 64.71 percent and 35.29 percent respectively. Factors such as age, household size, highway code awareness, and earnings determine license holding in Kwara State. The study concluded that only certified licensed commercial motorcyclists should be allowed to operate.

Yakubu et al. (2014) conducted a study on institutions and road traffic offences in Nigeria. The game theory was used as the tool for analysis. The study constructed a simple two-person game between road traffic police and road user. The results revealed that there was no pure strategy Nash equilibrium. However, the mixed strategy Nash equilibrium showed that the probability of obeying traffic regulations increases as the cost of monitoring decreases. It was recommended that the cost of contravening road traffic regulations should be increased to discourage road users from violating road traffic rules and regulations.

Olubumehin (2012) observed that the expansion in the use of commercial motorcycles as a means of transportation has increased the number of road crashes in the country which has led to loss of many lives; and in most cases, permanent disability for victims. Okada riders in Nigeria are fond of extreme violent acts, such as resorting to jungle justice in order to help one of their own escape justice when a member of the public is injured in an okada accident. This is similar to what obtains in Liberia where *phen-phen* riders are always involved in violent clashes with other road users. It has been estimated that more than 70 percent of crimes committed in Lagos are traceable to armed bandits operating with

motorcycles. Similarly, most of the attacks on the security agents in northern Nigeria are carried out by terrorists on motorcycles (Umar et al., 2013).

Commercial motorcyclists often operate without a valid driver's license and motorcycle particulars. These motorcyclists violate road traffic regulations with impunity. They ignore or are ignorant of traffic regulations and so engage in practices such as wrong overtaking, over speeding, lane hopping, and non usage of crash helmet during operation, among others. This is because most of them are always under the influence of drugs. Commercial motorcycles in Nigeria also contribute to environmental degradation in the form of pollution (Ogunrinola, 2011). This corroborates the findings of other studies both in Africa and Asia (see Cevero, 2000; Joewono et al., 2006; Kissalita, 2007).

Helmet use and associated factors among Thai motorcyclists during the Songkran Festival in Thailand was examined by Penprapa et al. (2012). Primary data, which was generated through a structured questionnaire administered to 18,998 motorcyclists, was used in the study. Descriptive statistics and regression techniques were used as tools to analyse the data. Results from the study revealed that 42 percent of the motorcyclists and 72.5 percent of the motorcycle passengers have not been using helmets. The regression results showed that variables such as demographics, environmental factors, helmet use experience, and attitude to road safety awareness, explain helmet usage among the motorcyclists in the study area.

### **3. Methodology**

The veritable tool for analysing issues on road safety regulations in the informal transport sector is compliance models. These are qualitative response models that tend to interface road safety regulations with some characteristics of the informal transportation system that are personal, operational, and environmental in nature. Two response options are open to the commercial motorcyclist. He is either complying with the regulation or not, i.e. compliance=1; 0, if otherwise (see Arosanyin et al., 2012; Arosanyin et al., 2013). The response variable analysed in this paper is passenger capacity regulation. This response variable or the regressand is qualitative and not quantitative. This suggests that the use of qualitative response models therefore becomes imperative (see Maddala, 1983; Williams, 2008). Drawing from the above, the study adapts the model of Arosanyin and Yakubu (2014). The generic model is therefore stated as follows:

$$\text{Log}\left(\frac{\pi}{1-\pi}\right) = \alpha + \beta_1x_1 + \beta_2x_2 + \dots + \beta_px_p \quad (1)$$

From Equation (1) we can derive:

$$\pi = \frac{e^{\alpha + \beta_1x_1 + \beta_2x_2 + \dots + \beta_px_p}}{1 + e^{\alpha + \beta_1x_1 + \beta_2x_2 + \dots + \beta_px_p}} \quad (2)$$

Equation (2) can further be stated as;

$$P(Y = 1|x_1, x_2, \dots, x_p) = \frac{e^{\alpha + \beta_1x_1 + \beta_2x_2 + \dots + \beta_px_p}}{1 + e^{\alpha + \beta_1x_1 + \beta_2x_2 + \dots + \beta_px_p}} \quad (3)$$

where:

$Y$  = passenger capacity compliance, and  $x_{1,\dots,p}$  is a vector of regressors that contains variables such as license holding, operational hours, mode of operation, age, household size, ownership type, location, highway code, educational attainment, and earnings. This implies that the nature of the response variables is binary (see Maddala, 1983; Williams, 2008; Gujarati, 2009).

### 3.1 Sample selection method

The study used primary data generated through the use of a questionnaire randomly administered to 1,178 commercial motorcyclists in Kwara State, Nigeria. This represents 10 percent of the 11,972 registered motorcyclists that were surveyed across the 16 local government areas of Kwara State. The random sampling method was used in order to give equal chance to all the okada riders in the target population to participate in the survey. Sixteen enumerators were employed to administer the questionnaires across the 16 local government areas. However, a total of 1,178 questionnaires representing 98.41 percent of the total

respondents were returned valid. This was due to the fact that some of the okada operators in the rural areas actually registered but do not reside there. The affected local governments include Baruten, Ekiti, Ifelodun, Irepodun, and Oyun.

### 3.2 Data measurement

Given the nature of data used in this study, measurements were both categorical and nominal (see table 1). Ilorin East, Ilorin South, Ilorin West, and Offa local government areas in Kwara State, Nigeria are defined as urban areas in this study while the remaining 12 local governments namely, Asa, Baruten, Edu, Ekiti, Ifelodun, Irepodun, Isin, Kaima, Moro, Oke-ero, Oyun, and Patigi are defined as rural areas. The classification of local governments into urban and rural did not follow the geographical classification based on population and economic activities but rather, the classification is based on the use of commercial motorcycles in these areas. Local governments where motorcycles are used for intra-city movement are categorized as urban areas while other local governments where commercial motorcycles are used for inter-village movement are referred to as rural areas. Variables such as education, household size, earnings, age, and operation hours were later converted in order to compute the probabilities of compliance/non-compliance with some road safety regulations.

**Table 1. Core Variables and their Measurement**

Categorical variables	Measurement
License holding	Licensed = 1, otherwise = 0
Motorcycle ownership	Owner-operator = 1, otherwise = 0
Mode of operation	Full-time = 1, otherwise = 0
Highway code awareness	Aware = 1, otherwise = 0
Educational attainment	No formal schooling = 0 Primary education (incomplete) = 1, completed = 2 Junior education (incomplete) = 3, completed = 4 Senior education (incomplete) = 5, completed = 6 Tertiary education (incomplete) = 7, completed = 8 Others = 9
Location	Rural = 0, Urban = 1
Motorcycle number plate	Have = 1, otherwise = 0

Nominal variables	Measurement
Age	In completed years
Household size	Number
Earnings	In Naira

Sources: Author's compilation.

### 3.3 The study area

Kwara State is one of the North Central states in Nigeria, which was created on the 27th May 1967. The population of the state stood at 2.6 million going by the 2006 national population census. It has an international boundary with the Republic of Benin to the west; it equally shares boundaries with Niger State to the north, Kogi State to the east, and Oyo, Osun, and Ekiti states to the south. The state is made up of 16 local government areas. The population is made up of *Yoruba*, *Batonu*, *Bokobaru*, *Hausa/Fulani*, and *Nupe* tribes who are mainly farmers, businessmen, petty traders, artisans, and civil servants.

## 4. Discussion of Results

The full logistic regression results on the passenger capacity regulation in table 2 is shown as follows. The probability of carrying more than one passenger per trip increases with license holding. This is because licensed motorcyclists are likely to have more patronage and as such violate the regulation of carrying just a passenger per trip. Another factor that could make motorcyclists carry more than one passenger per trip is the desire to make more money within a short period. The odds of motorcyclists who have a driver's license (license = 1) carrying more than one passenger per trip are 0.5919 times higher than for those without a driver's license (license = 0). In percentage terms, the odds of motorcyclists with a driver's license carrying more than one passenger per trip are 59.19 percent higher than those without a driver's license.

Mode of operation, age, ownership, location, education, and earnings were all significant. For mode of operation, the probability of carrying more than one passenger per trip reduces with full time okada operation. The odds of okada riders who operate on full-time basis (mode = 1) carrying more than one passenger per trip are 0.4539 times lower than for those who operate on part-time basis (mode = 0). This implies that the odds of full-time motorcyclists carrying

more than one passenger per trip are 45.39 percent lower than those of part-time motorcyclists. This indicates that full-time commercial motorcyclists are likely to obey the regulation of one passenger per trip, and that part-time commercial motorcyclists may be involved in carrying more than one passenger per trip in an attempt to earn more income in a short time.

The results also reveal that as the age of the commercial motorcyclists increases, the probability of violating the one passenger per trip regulation reduces. Using the odds ratio analysis, the odds that okada riders who are within the minimum age bracket will carry more than one passenger per trip are 0.0347 times less than for those who are below the minimum age limit. This probably means that compliance with this regulation increases with age. The results further show that the probability of violating permitted passenger regulation increases with motorcycle ownership. In terms of the odds ratio, the odds of motorcyclists who own motorcycles carrying more than one passenger per trip are 0.6030 times higher than for motorcyclists who rented the motorcycles; that is, the odds of owner operators carrying more than one passenger per trip are 60.30 percent higher than the odds of hired operators. The odds of urban commercial motorcyclists carrying more than one passenger per trip are 74.55 percent higher than those of the rural motorcyclists. The results show further that as the level of education of commercial motorcyclists increases, the probability of carrying more than one passenger per trip reduces. In terms of odd ratio, the odds of motorcyclists with secondary education carrying more than one passenger per trip are 0.1057 times lower than for those without formal education. This shows that the rate of compliance with safety regulations is likely to be higher among educated okada riders.

Earnings were significant and positive. This indicates that as earnings increase, the probability of carrying more than one passenger per trip tends to rise. In terms of odds ratio, commercial motorcyclists who earn above the industry average, have 0.0004 higher odds of carrying more than one passenger per trip than those who earn below the average. It then follows that the odds of motorcyclists who earn above the industry average carrying more than one passenger per trip are 0.04 percent higher than for motorcyclists who earn below. The probability that a commercial motorcyclist will carry more than one passenger per trip, given that he has a driver's license, operates on full-time basis, is within the minimum age limit, owns a motorcycle, resides in an urban area, has secondary education, and



earns above the industry average is estimated at 0.5634. In this way, the probability that a commercial motorcyclist will carry more than one passenger per trip, given that he has all the attributes above except education (with no formal education) is 0.7723.

**Table 2. Logistic Regression Results on Passenger Capacity Compliance** Reference category (Carry more than one passenger per trip = 1)

Variable	Analysis using coefficients				Odds ratio analysis		
	Coefficient	Standard error	t. value	P value	Odds Ratio	Std. error.	P.value
License	0.0836	0.0320	2.6100	0.0090	1.5919	0.2845	0.0090*
Operation. hrs.	0.0089	0.0072	1.2500	0.2110	1.0491	0.0444	0.2570
Operation mode	-0.1031	0.0327	-3.1500	0.0020	0.5461	0.1079	0.0020*
Age	-0.0065	0.0023	-2.8900	0.0040	0.9653	0.0127	0.0070*
Household size	-0.0005	0.0071	-0.0700	0.9450	0.9904	0.0407	0.8160
Ownership	0.0861	0.0496	1.7400	0.0830	1.6030	0.4377	0.0840**
Location	-0.2453	0.0310	-7.9100	0.0000	0.2545	0.0470	0.0000*
Highway code	-0.0471	0.0321	-1.4700	0.1430	0.7345	0.1334	0.0890
Education	-0.0185	0.0056	-3.2900	0.0010	0.8943	0.0302	0.0010*
Earnings	0.0007	0.0002	3.8000	0.0000	1.0004	0.0001	0.0010*
Cons.	0.9326	0.1037	9.0000	0.0000	Summary statistics		
					LR chi2	120.25	
No. of obs.	906				(10)		
F	12.8700				Pro > chi2	0.0000	
R-squared	0.1257				Psd0 R <sup>2</sup>	0.1129	
Adj R-squared	0.1159						

Source: Author’s computation. \* Significant at 5%; \*\* significant at 10%.

### 5. Conclusion

Commercial motorcycle transportation provides the transport needs of the people in Kwara State, Nigeria because of the non-functional or non-existent mass transit system. This informal mode of transportation has become one of the fastest growing means of conveying passengers in most Nigerian cities and villages. The paper revealed that factors such as license holding, operation mode (part-time or full-time), age, ownership type (owned or rented), location (urban or rural), education, and earnings determine the compliance with the passenger capacity regulation among commercial motorcyclists in Kwara State, Nigeria.

### **5.1 Policy implication and recommendation**

The findings from this study have some policy implications in the informal transportation sector. The traffic law enforcement agencies in the country need to be totally overhauled so that they can rise up to their responsibilities and not see traffic offences as money making opportunities. The study therefore recommends that traffic law enforcement agents should enforce compliance with road traffic regulations such as moving within the specified speed limit of 50km/hr, not carrying more than one passenger per trip, avoiding blind areas, etc. to reduce road traffic accidents which will in turn curb loss of lives and properties. To achieve this, government should establish a motorcycle inspection unit that would work in collaboration with motorcycle trade associations to ensure that operators are properly educated on safety issues. Driving schools should also be established where the motorcyclists can be trained and re-trained because it has been observed that there are no such driving schools in Kwara State and Nigeria at large.

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