EARNINGS FROM COMMERCIAL MOTORCYCLE OPERATIONS IN ILORIN, NIGERIA: A Study on Determinants

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ABSTRACT

*The use of motorcycles for urban passenger transport in Nigeria popularly called **okada** is a source of employment and earnings to operators. Studies have attested to this but no attempt has been made to empirically examine the determinants of earnings in this informal transport operation in Nigeria. This paper, using human capital earning function analysis, shows that apart from the core determinant, which is patronage index, others such as experience, mode of work, ownership status and number plates were found to be significant determinants of earnings in commercial motorcycle transport. Formal education was found not to be a significant variable, which further confirms the fact that in some activities in the informal sector, formal education does not affect earnings. The core determinant i.e. patronage index explained over 75 percent of the variations in earnings. Therefore for earnings to be improved upon, constraints to the patronage index must be addressed. These constraints, which require attention, are bad roads, police extortion, high running costs and harassment from other motorized traffic.*

KEY DESCRIPTORS: Informal transport; motorcycle; earnings; patronage; Nigeria.

INTRODUCTION

Commercial motorcycle transport in Nigeria is an informal sector activity. It is a self employment activity. Okada is the term for describing the use of motorcycles for passenger transport in Nigeria. It is a means of transport under the road mode. Road transport is the dominant mode of transportation in terms of both goods and passenger traffic within the country. The accessibility benefits and the production-consumption bridging role of road transport are usually accomplished with the use of trailers, trucks, buses, cars and motorcycles collectively called road vehicles.

The place of motorcycles as urban passenger transport mode has been investigated in some Nigerian studies (Ogunsanya and Galtima, 1993; Olamigoke, 1993; Kuyoro, 1995; Udoh, 1988; Adeyemo, 1998; Ojekunle, 1998; Adesanya, 1998; Fasakin, 1998; Okoko, 1998; Oyesiku, 2001). These studies examined their operational characteristics, employment and income issues, safety, financing and features of operators. However, one particular research gap seems obvious in these and other studies. In spite of the fact that they provide insight into the average earnings from the operation of this informal transport mode, there

is the absence of empirical investigation into the determinants of earnings from *okada* operation in Nigeria.

The need to provide an empirical investigation of earning determinants in this informal transport mode is the rationale for this paper. Secondly, the study examines the constraints to the earning capacity of the operators. The rest of the paper is structured into; motorcycles as urban passenger transport; research methodology; analysis of results and implications; and conclusion and the need for further research.

MOTORCYCLES AS URBAN PASSENGER TRANSPORT

The Development and Types of Motorcyles

Motorcycles are two-wheeled vehicles powered by an engine. They are one of the cheapest and most widespread forms of motorized transport in many parts of the world, particularly in cities in developing countries. Arguably, the first motorcycle was designed and built by the German inventors Gottlieb Daimler and Wilhelm Maybach in Cannstatt in 1885 (Wikipedia, 2006). Then the invention was called 'Reitwagen' i.e. riding car; which has a pair of stabilizing wheel powered by a petrol engine. Historically, however in terms of two wheels with a steam propelled engine, the earliest evidence was the one demonstrated by Sylvester Howard Roper of Roxbury in the United States of America in 1867 (Wikipedia 2006). The popularity of the motorcycle grew after 1910. During the First World War, it was used extensively by combatants for the distribution of mails. After the war, it became essentially used for sports. The importance of the use of motorcycles for long trips started declining with the advent of motor cars. By the 1970s, the use had been reduced to short routes. Almost all commercially available motorcycles are driven by conventional gasoline internal combustion engines, but there are few exceptions that run on electric motors and diesel (e.g. the USMC M1030 M1 design). Motorcycle engines range from 50cc (cubic centimeters) to 2294cc.

Two-wheel motorcycles belong to Class IV of the classes of para-transit vehicles that operate informally with variable routes and schedules (Cervero, 2000). In this category also are three-wheelers. Three-wheelers include small taxis such as the *auto-rickshaws* of India and Sri Lanka; *baby taxis* of Bangladesh; *Tuk-tuks* of Thailand; *Tempos* of Bangladesh; Nepal and India and; *Keke NAPEP* of Nigeria. Other two-wheelers apart from motorcycles are mopeds and scooters. Two-wheelers are mostly used for personal transportation but in many developing cities of Asia and Africa, they are used for public transportation or para-transit transporters, particularly the motorcycles.

Urban Transport Relevance of Motorcycles

Motorcycles are very relevant to urban passenger transportation like other modes of transport. The use of motorcycles as urban transport mode has various appellations across the world. For instance, in Western Uganda it is, called *boda boda* or *Machala and* in Mukono District of Uganda it is called *Zabala* (Leyland 1999, Howe and Davis 2002). Motorcycle transport is also called *Ojeks* in Indonesia, *moto-conchos* in Dominican Republic, *moto-dub* in Cambodia and *motorcycle rubjang* in Thailand (Cervero, 2000). In Nigeria, the

appellations are many depending on the part of the country. In Sokoto, it is called *kabukabu*; *achaba* in Bauchi, Jos, and Yola; *last flight* in Benin city; *express or going* in Kafanchan, Ilorin and Jege and; *akauke or alalok* in Cross Rivers and Akwa Ibom. In Nigeria however, *okada* is the commonest appellation across the country (Ogunsanya and Galtima, 1993; Adesanya, 1998; Okoko, 1998; Oyesiku, 2001).

The use of motorcycles for urban passenger transport is prevalent in many developing cities. The use of this mode is entrenched in their ability to provide door-to-door services and ability to "navigate" alleyways, footpaths and poor roads, which are inaccessible by other motorized modes as well as speed advantage in the face of congestions through jumping of traffic or zigzagging through traffic; the beeline advantage. Motorcycles offer feeder connections between bus/taxi routes and neighbourhoods. In some cases they compete with buses and taxis on taxi/bus routes. This form of transport plays the role of gap filler in urban passenger transportation like most informal transport services (Cervero, 1998). Motorcycle-taxi or *okada* as in the case of Nigeria is close to *laissez-faire* transportation as the invisible hand of the market mechanism operates. In the *okada* market, there are those that are *willing-to-pay* for *okada* services in exchange for rides by those who are *willing-to-provide*. The fare is the price regulator between the demand and supply of ride services. Although in some cases the unions determine fares. This implies that it is a pay-for-services transport mode.

The motorcycle taxi in particular and the two-wheeler market in general is a burgeoning one across developing countries. More than half of the motor vehicle fleet in China, Thailand and Malaysia consist of two-wheelers. In Indonesia, Vietnam and Taiwan, the figures exceed two third of the fleet. In Cambodia about 75 percent of all vehicles are motorized two-wheelers or three- wheelers. In the Lao Peoples Democratic Republic, the share is about 79 percent (Chin, et al. 2000; WHO, 2003; GTZ, 2004; WHO, 2004). In Ouagadougou, Burkina Faso, motorcycles account for 39 percent of all travel ahead of bicycles at10%, private cars at6%; and public transport at 3%. Only trekking surpassed motorcycles as it accounts for 42%. In terms of motorized travel, motorcycle topped the list with 67 percent travel mode (Godard and Ngabmen, 1998). An estimated 70 percent of Nigerian cities with over 250,000 inhabitants each rely on motorcycles for intra-city public transport services (Cervero, 2000). In spite of the increased usage of motorcycles as a vital transport mode and as a source of employment and income, it has its own negative effects not only on the users but also on the environment. Principally, these negative effects are in terms of crashes that is accidents, and pollution. Studies show that a substantial number of road injuries and deaths are among motorized two-wheel users (Mackay, 1985; BTE 2000; Pang, et al. 2001; Suriyawang, et al. 2003). The main risk factor for motorized two-wheel users is the non-use of crash helmets (Kulanthayan, et al. 2000; CEC, 2001; Radin Umar, 2002; Servadei, et al. 2003). The need to improve the safety of both operators and passengers of motorcycles provided the rationale for safety rules such as driver or rider licensing, use of crash helmet, motorcycle registration, etc. In terms of emissions, two-wheelers have been found to be a major source of pollution from road transport with adverse effects on human health and the environment (Faiz, et al. 1996; Iyer, 2000; GTZ, 2004).

In spite of the negative externalities of motorcycles as a means of urban passenger transport in developing cities, it has come to stay as a vital mode and as source of

employment and income for the teaming urban unskilled and semi-skilled labour and their families. Various studies have attested to this. The fact is that the employment in the sector could be on full time or part time basis. In terms of income, Ogunsanya and Galtima (1993) found in their study of *okada* in Yola town that the operators earn an average of N50.00 per day after deducting the cost of fuel. In a study conducted in Port Harcourt, Adeyemo (1998) shows that motorcycles as commercial passenger transport provided employment and income to the operators. He compared the average income of the operators before and after entering the business and found that the average income increased by 710.6 per cent.

On income levels, Ojekunle (1988) found in his study of *okada* in Agege Local Government Area of Lagos and found that 73 per cent of the operators earn an annual income between ₦10,001 and ₦20,000 while 15 per cent earn between ₦ 20,001 and ₦ 30,000 per annum. Only 4 per cent earn less than ₦10, 000 per annum while only 3 per cent of the operators earn between ₦30, 001 and ₦ 40,000 per annum. In a survey of *okada* in Ibadan, Adesanya (1998) found that 20.5 per cent of the operators earn less than ₦ 200 per day. Those who earn between ₦ 201 and ₦300;₦ 301 and ₦400; ₦ 401 and ₦ 500; ₦ 501 and₦ 600 and above ₦ 600 per day constitute 13.1, 23.8, 30.3, 10.7 and 1.6 per cent respectively.

The above studies show that *okada* is a major source of livelihood for thousands of Nigerians across the country particularly those in the urban centers. These studies however did not shed light on the crucial determinants of the earning capacity of the operators. This deficiency therefore creates a research gap, which necessitated this study.

THEORETICAL FRAMEWORK

The basic theoretical framework for earnings is found in the human capital theory (HCT). The major proposition of the HCT is that productivity is determined by the stock of human capital embodied in a person. This includes the total stock of one's knowledge, skills, competences and other attributes that are relevant to economic activity (OECD, 1998). The seeds of HCT can be found in the work of Adams Smiths' "Wealth of Nation". Human capital could be defined as any stock of innate or acquired knowledge or features an individual possesses that contribute to his/her productivity (Ricaurte, 2007). These attributes may include ability/talent, level of schooling (education), educational qualifications and on the job training. The classical HCT therefore suggests that earnings respond to general human capital in full and specific human capital partially (Stevens, 2000). Earlier studies in HCT can be found in Mincer (1958, 1974), Schultz (1961) and Becker (1964).

The HCT treats schooling or education as an investment good, similar to ordinary investment and capital theory. In arriving at the decision to invest in education, the individual weighs the cost and benefit of schooling through the discounted present value system (Ricaurte, 2007). The basic proposition of HCT assumed that schooling decision is determined by the fact that more education yields more human capital and hence, higher income, *ceteris paribus*. This accounts for the use of models particularly the standard Mincerian Function and its extensions emanating from the theory in the estimation of the rate of return to schooling (Ram, 1996; Psacharopolous and Mattson, 1996).

The ground breaking work on human capital and earning functions was done by Jacobs Mincer in 1974. At the empirical level, the Mincerian equation is probably one of the most often and widely used. Human capital earning functions (HCEF) are useful tools in research on wages, incomes and earnings; litigations involving earnings; and in making educational policy decisions based on estimates of the rate of return from schooling (Chiswick, 1997). The standard Mincerian earning function expresses earning as a function of schooling and experience. The standard function has however been expanded to include other variables and to control for other factors such as gender, race, location and employment sectors. One of the extensions of the use of the Mincerian equation is in the area of earning differential analysis. A very good attribute of the HCEF is that it is flexible and allows for easy incorporation of additional variables appropriate for the particular purpose of study. This seems to justify its usage in many employment sector and various circumstances. Various studies have been conducted on the determinants of earnings using the HCEF with adjustments to suit the area and purpose of study. These empirical studies include Becker (1964), Cervero (2000) and Arosanyin and Ipingbemi (2007).

Cervero (2000) examined the determinants of monthly net earnings for *Ojek* and *Becak* drivers in Jakarta, Indonesia. The result shows that the level of education (measured ordinally), age, location, experience, household size and working hours were significant at 5 percent. The model explained about 63 percent of the variation in monthly net earnings of the drivers.

RESEARCH METHODOLOGY

Scope and sample

The survey was conducted among *okada* operators in Ilorin, Nigeria. Ilorin is the state capital of Kwara State. Seventeen *okada* routes (zones) were randomly selected after the city was stratified along *Okada* Union Zones. The seventeen *okada* routes are Emir's road, Maraba – Sabo-Oke, Ola-Olu Hospital junction – Central Bank, Ganiki junction – Sango, Asa-Dam route, Ita-Alamu--Alagbede route, Opo-malu route, Gaa-Akanbi – Agbabiaka route, Unity – New Yidi route, Coca-Cola route, Iloffa – GRA route; Fate-Abdul Azeez- NTA-Federal Secretariat route and Pipeline-Offa garage route. The rest are Edun, Station– Ita Kure route, Agbo-oba-Adeta route, Pakata-Ita Imam route and Maraba-Amilegbe route. Within each *okada* route or zone, a minimum of fifteen operators were randomly selected for the survey. The survey was conducted with the use of structured questionnaires, which were personally administered in most cases to enhance understanding and high response rate. In all a total of 326 operators were randomly sampled for the survey on an odd-even number basis.

Earning Functions

The main method of analysis used in this study in examining the determinants of earnings from *okada* operation is the earning functions. These functions are sometimes called Mincerian equations (Rama, 2002). The function which hinges on the HCT links earnings with individual characteristics such as gender, educational attainment, work experience, ethnicity origins, marital status and race identity (Rodgers, 1999; Artecona and Cunningham,

2001; Rama, 2002; Bourguignon, et al. 2003). Earning functions are diverse and often reflect the features of the area and purpose of usage such as gender/sex, child labour and informal sector. The composition of the equation, most of the time, is often based on the peculiarity of the employment scenario. In the informal transport sector, the earning function is used to determine factors affecting the earning capacity of informal transport operators (Cervero, 2000).

The model adopted in this study of earnings of commercial motorcycle operators derives from the earning model of Cervero (2000) which was on the determinants of earnings for *Ojek* and *Becak* drivers in Jakarta, Indonesia. The variables used are age, education, location, mode, household size, experience and daily work hours. However the model was adjusted to incorporate patronage index and safety factors. The adoption of the model is justified in the sense that *okada* is an informal transport system. Secondly, the flexibility advantage of the Mincerian earning function allows the incorporation of safety factors.

In the informal transport sector such as the Okada, which is the focus of this paper, the earning function of operators is formulated as:

$$\text{In } E_d = f(X,Y,Z) \text{---------- (1)}$$

Where E_d is the gross earning per day

X is a vector of operators' characteristics

Y is a vector of operational and service delivery characteristics or variables and;

Z is a vector of safety characteristics or variables.

The X vector includes age (AG), marital status (MS) and educational attainment (ED) while the Y vector includes passengers carried per day (PC) or alternatively passenger per hour (PH), mode of work (MW), ownership status (OS), months in business i.e. experience (MB) and number of hours worked per day (NW). The safety vector i.e. Z is made up of license holding (LH), helmet usage (HU) and number plate (NP).

Given the above variables in the three vectors, the function can be written as:

$\text{In } E_d = f(AG, MS, ED, PC \text{ or } PH, MW, OS, MB, NW, LH, HU, NP)$ ---------- (2).

Estimation of earning functions using logarithm of earnings is a common practice (see Rama, 2002, Bourguignon, et al. 2003). The use of natural logarithm of earnings rather than earnings as the dependent variable makes the residual variance in the HCEF less heteroscedastic and the distribution of the residuals closer to normal (Chiswick, 1997:2).

The a priori expectations to eq.2 are shown below;

$f'_{AG} > 0$; $f'_{ED} > 0$; $f'_{LH} > 0$; $f'_{HU} > 0$; $f'_{NP} > 0$; $f'_{MS} < 0$; $f'_{NW} > 0$; $f'_{MW} > 0$; $f'_{PC} > 0$; $f'_{PH} > 0$; $f'_{OS} > 0$; $f'_{MB} > 0$.

Measurement of Data

The earnings of *okada* operators are measured in Naira- the Nigerian currency. The daily gross earning is used because it is more pragmatic given that the job is a daily paid job. The gross is preferred to the net due to the fact that the attempt to ask questions of operational

cost and levies at the pilot survey almost completely jeopardized the research through hostility and non-response. It therefore necessitated the use of gross earning. The age is measured in completed years, months in business are in completed months and work hours are in completed hours. Passengers carried are measured as the average number of people carried per day on the motor cycle that paid. Passenger hour is measured as average number of passengers carried per hour. The rest variables were measured in ordinal terms. The highest educational attainment was: no formal education = 0; Primary =1, Junior Secondary= 2, Senior Secondary/Technical=3 and post secondary = 4. The use of category for educational attainment became necessary due to the difficulty in getting the respondents to state their years of schooling during the pilot survey. Also, the use of ordinal measure of highest educational attainment in informal transport analysis is not new (Cervero 2000). For marital status, it is single = 0; and ever married =1; license holding- no license =0 and has license =1. Ownership status- rented =0, owned =1. Mode of work- part time=0, full time =1. Helmet usage- non usage =0, usage of helmet = 1. Number plate (indicator of motorcycle registration); - No number plate =0, has number plate =1. The data for the analysis were screened for outliers using scattergram, which could be a vital source of heteroscedasticity

ANALYSIS OF RESULTS AND IMPLICATIONS

Descriptive Statistics

The descriptive statistics of the variables used in the models are presented in Table 1 below. The difference between the means and standard deviations of individual variables when the sample sizes were 284 and 280 was very insignificant. This accounted for why they were not reported separately. The difference in sample size is accounted for by the fact that three models were fitted. The first two were fitted using 5 per cent criteria, with substitution of passenger carried per day (PC) with passenger carried per hour (PH). The third being the model fitted at 10 per cent criteria for selection. The average age was found to be about 38 years. Experience approximated by months in business was found to be 30 months. The average passengers carried per day was found to be about 40, while the average passengers carried per hour were found to be 3.53. The mean and standard deviation of the rest variables which were measured ordinally are shown in Table 1 below.

Table 1: Descriptive statistics of variables used

Variables	Mean	Standard Deviation
In earnings	6.55	0.417
Age	37.79	15.54
Highest Educational Attainment	1.65	1.27
Marital Status	0.78	0.41
Months in business (proxy for experience)	30.22	19.19
Mode of work	0.69	0.46
Ownership Status of Motorcycle	0.63	0.48
Passengers carried per day	39.56	16.39
License	0.56	0.49

Number plate	0.78	0.42
Helmet Usage	0.10	0.29
Passengers carried per hour	3.53	2.16
Total sample used	284	

Source: Extracted by the Author from SPSS analysis

Commercial Motorcycle Earnings Functions and Discussions

The main objective of this estimation is to identify the variables that are significant at both 5 and 10 per cent in explaining the variation in earnings from commercial motorcycle transport. The basic method used is the stepwise regression procedure based on its screening advantages. Two types of stepwise regression were fitted. The first used passengers carried per day as the proxy for patronage index. The second used passenger per hour as the proxy for patronage index. Both measures of patronage were used interchangeably. The use of patronage index as a variable is not new in informal sector studies dealing with a single employment, where the job is a daily earning-job (Arosanyin and Ipingbemi, 2008). The results of the stepwise regressions are shown in Table 2 below.

Three results of the stepwise regression are presented in Table 2 below. The first two are results using a 5 per cent criterion with the inter change of passengers carried per day with passengers carried per hour. The third one is the result at 10 percent criterion where passenger per hour is used. All the three results have good global fit as attested to by the F statistics. The first result (A) explains about 75 percent of the variation in earnings while the rest results (B and C) explain about 32 percent. It is important to note that the low R-Square is not important in cross sectional studies but the number and nature of the variables that are significant in explaining the variation in the dependent variable.

Based on the 5 percent criterion, four variables were found to be significant. These are the patronage index (measured either as passengers carried pay day or per hour); experience measured as months in business; mode of work; and ownership status. For both models using 5 per cent criterion the a priori expectation of the patronage index was met. It was positive, which is a reflection of the nature of daily-earning jobs in the informal sector. Months in business, that is experience, was found to be negative. This is contrary to a priori expectation because earnings are expected to increase as experience increases. This result could be justified on account of the mode of motorcycle acquisition.

Table 2: Stepwise Regression Results for Commercial Motorcycle Operators' Earnings in Nigeria*

Variables	5 per cent level of significance		10 per cent level of significance (C)
	(A)	(B)	
Constant	5.692	6.108	6.058
Passengers per day	0.002 (28.32)		
Passengers per hour		0.009	0.009

		(9.38)	(9.422)
Months in business	-0.0002 (-4.84)		
Mode of work	0.007 (2.58)		0.263 (5.684)
Ownership Status of motorcycle		-0.107 (-2.425)	-0.009 (-2.255)
Number plate (Motorcycle registration)			0.111 (2.173)
License holding			-0.008 (-1.785)
R^2	0.754	0.311	0.327
R^2 Adjusted	0.752	0.303	0.314
F statistic	286.41	41.48	26.595
N	284	280	280

The t values are in parenthesis.
*The use of 10 per cent criterion for selection of significant variables with passengers per day yielded the same significant variables as reported under 5 per cent. It was therefore not reported again.
Source: Extracted by the Author from SPSS analysis

The bulk of the operators purchased their motorcycle on loans or use rented motorcycles. There is therefore the tendency to work and earn more at the initial months of operation to repay the loan or save money to acquire own motorcycle if the operator were using a rented motorcycle.

Mode of work conforms to a priori expectation as the sign was positive. This is an indication that full time operators earn more than part time operators. The a priori expectation of ownership status was not met as the coefficient was found to be negative. The implication is that operators who rented their motorcycles tend to earn more than owner operators. This is quite plausible in the informal transport sector because, the users of rented motorcycles are more eager to earn more than owner-operators because they have to pay N300.00 a day on the rented motorcycle, fuel it and make enough money for themselves.

When the criterion for selection is relaxed to 10 percent, two additional variables were found to be significantly important in explaining the variation in earnings from motorcycle transport operations. These variables are shown as the third result in Table 2 above. The two variables namely number plate and license holding are within the safety vector. The a priori expectation of number plate was met as it was positive. This lend credence to the notion among users that unregistered motorcycle are likely to be used for dubious activities, therefore demand for their services is reduced, and consequently their earnings. In the case of license holding, although it was found to be significant, the coefficient was negative. This may indicate the lack of regulation and enforcement of road traffic rules.

The results presented in Table 2 above have implications for earnings from motorcycle transport operation. One of the implications is that the level of educational attainment was found not to be a significant variable. This seems to support the observed feature of most

self employment activities in the informal sector, where the nature of job requires little or no formal education. Also, the non-inclusion of education as a significant variable could be attributed to the fact that the operators are organized in parks where carriage of passengers is on rotational basis, except passenger carriage 'in between exit and entry of park' and contract services. The above have shown that motorcycle transport operation is a source of employment, where earnings are generated. The core determinant of earnings in this employment activity is the patronage index based on its share of explanation of the variation in earnings. The patronage index explained over three quarter of the variations in earnings. Therefore, all constraints to patronage index should be addressed.

The analysis of constraints militating against effective operation and earnings using weighted-factor rank technique shows that bad roads, police extortion, high running cost and taxi operators' harassment were the major constraints with scores of 20.3, 19.6, 19.1 and 15.3 per cent respectively. Other problems accounted for the rest percentage but individually could not account for up to 10 percent for inclusion as crucial constraints. The implication of the above is that the government should improve the conditions of the roads and check police extortions. Also, the government through careful road planning should provide segregated lanes for motorcyclists to reduce the frequent conflict and accident with cars and buses. The present system of mixed traffic is not proper – safety wise. The issue of registration and safety should be addressed. The above measures will help increase the patronage index, which is the core determinant of earnings in commercial motorcycle transport.

CONCLUSION AND FURTHER RESEARCH

The use of motorcycles for commercial passenger transport has come to stay in Nigeria. It is a vital source of employment and income for operators and their families, in a country plagued by poverty and high level of unemployment both skilled and unskilled. The government should regulate their activities and promote measures that will improve the patronage index and hence their earning capacity. This study has examined the determinants of earnings in commercial motorcycle transport. There is still need for further studies in terms of scope and measurement approaches to some of the variables, particularly the patronage index. Where data are available and can be collected a better measure would have been passenger-kilometres which can be per day or per hour.
The other area of further research is in the analysis of earning differentials in commercial motorcycle transport based on rural-urban divide, ownership status, and current license holding, among others. Although female participation is still very low, earnings differential analysis based on gender could be explored in the future when the female participation rate is statistically large enough.

REFERENCES

Adesanya, A. (1998).“The Use of Motorcycles for Public Transport: The Situation in Ibadan” NISER Monograph Series No. 6 .Ibadan: Nigerian Institute of Social and Economic Research (NISER).

Adeyemo, M.A. (1998). "An Appraisal of Motorcycle as a commercial Passenger Transport Mode in Port Harcourt Metropolis." Journal of Transport Studies 2, (1): 77-89.

Arosanyin, G. T. & Ipingbemi, O. (2007). "Car Wash Service in Nigeria Road Transport System: Evidence from Ilorin." The Nigerian Journal of Economic and Social Studies 49,(1) : 45-64.

Artecona, R. & Cunningham, W (2001). Effects of Trade Liberalization on the Gender Wage Gap in Mexico Washington, DC: The World Bank.

Becker, S. G. (1964). Human Capital: A Theoretical and Empirical Analysis with special Reference to Education (3rd ed.) Chicago: University of Chicago Press.

Bourguignon, F., Ferreira, F.H. & Leite, P.G (2003). "Conditional Cash Transfers, Schooling, and Child labour: Micro-Simulating Brazil's Bolsa Escola Program." World Bank Economic Review 17, (2) :229-254.

Bureau of Transport Economics (BTE) (2000). "Road Crash Cost in Australia" Report 102 Canberra: Bureau of Transport Economics: Ch. 11.

Cervero, R. (1998). "Para Transit: The Gap Filler." Habitat Debate 4, (2): 8-9.

Cervero, R.(2000). Informal Transport in the Developing World Nairobi, United Nations Centre for Human Settlement (Habitat).

Chamberlain, D. & van der Berg, S. (2002). 'Earnings Functions. Labour Market Discrimination and Quality of Education in South Africa' Paper delivered at the DPRU/FES Conference on Labour Markets and Poverty in South Africa, Johannesburg 22 -24th Oct. 2002.

Chiswick, B. R. (1997). 'Interpreting the Coefficient of Schooling in Human Capital Earnings Function' Washington DC: World Bank.

Chiu, W, et al. (2000). "The Effect of the Taiwan Motorcycle Helmet Use Law on Head injuries" American Journal of Public Health 90:793-796.

Commission of the European Communities (CEC) (2001). Motorcycle Safety helmet COST 327 Brussels: CEC.

Faiz, A., Weaver, C.S & Walsh, M.P (1996). Air Pollution from Motor Vehicles: Standards and Technologies for Controlling Emissions Washington DC.: World Bank.

Fasakin, J. (1998). "Operational Characteristics of Commercial Motorcycles in Nigeria: A Land Use Sensitivity Analysis for Akure Township, Akure, Nigeria" Federal University of Technology, Akure (Unpublished).

Godard, X. & Ngabmen, H (1998). "Urban Transport in Sub-Saharan African" Habitat Debate 4, (2).

GTZ (2004). 'Two-and Three-Wheelers,' Module 4c, Eschbarn, Germany: GTZ.

Howe, J. and A.S.C. Davis (2000). "Boda Boda-Uganda's rural and urban low capacity transport services", CODATUX Conference, Lome, Togo. November 2002.

Howe, J. & Oni, S.S (1996). "Nigeria Downsizes to Motorbikes." Sustainable Transport November 6, Summer.

Iyer, N.V. (2000). 'Emissions and Control Options for Two-Stroke Engines in India'. Paper presented at the Workshop on Pollution from Motorcycles-Issues and Options. March 9. Washington DC: The World Bank.

Kulanthayan, S. et al. (2000). 'Compliance of Proper Safety Helmet Usage in Motorcycles.' Medical Journal of Malaysia 55:40:44.

Kuyoro, F.S. (1995). "Planning Motorcycle Services in Ijebu Ode, Ogun State", NITP/TOPREC Dissertation, Lagos (Unpublished).

Leyland, J. (1999). "Rural Travel and Transport in Western Uganda – Scoping Study" DFID November, Uganda.

Mackay, M. (1985). 'Leg Injuries to MTW Riders and Motorcycle Design'. In 20th Annual Proceedings of the American Association for Automotive Medicine (AAAM) Washington D.C: 7-9 Oct. 1985. AAAM, Washington DC.: 169-180.

Mincer, J. (1958). Investment in Human Capital and Personal Income Distribution" Journal of Political Economy (66): 281 – 302.

Mincer, J (1974). Schooling, Experience and Earnings, New York: Columbia University Press.

Mincer, J. & Jovanovich, B. (1981). "Labour Mobility and Wages; In Rosen, S (ed) Studies in Labour Market. Chicago: University of Chicago Press.

Nejo, A. (2005). "Licenced Killers" Saturday Punch 29, (1245): 2.

OECD (1998). Human Capital Investment: An International Comparison. Paris: OECD.
Ogunsanya, A.A. & Galtima, M (1993). "Motorcycle in Public Passenger Transport Service in Nigeria: Case Study of Yola Town" In: S.G. Ikya ed. Urban Passenger Transportation in Nigeria Ibadan: Heinemann Educational Books: 190-207.

Ojekunle, J.A. (1998). "Operations and Use of Motorcycles as a Mode of Public passenger Transport" In Dange, H., Chikolo, I.V. and Ogunsanya, A.A. eds. Issues in Transport Planning and Management Zaria: Nigerian Institute of Transport Technology: 84-103.

Okoko, E. (1998). "The Demand for Para-transit Transport Services in Nigerian Town: The Case of Motorcycle Transport in Akure" Journal of Transport Studies 2, (1): 4 - 44.

Olamigoke, F. (1993). "Sharing the Road with Bikes: The Nigerian Experience" Transportation Research Record 1396:34-36.

Oyesiku, O.K. (2001). "City Poverty and Emerging Mobility Crisis: The Use of Motorcycle as Public Transport in Nigerian Cities." 9th World Congress of Transport Research, Seoul, South Korea 22nd–27th July.

Oyesiku, O.K. (2002). 'From Womb to Tomb' *24th* Inaugural Lecture Olabisi Onabanjo University, Ago-Iwoye.

Pang, T. Y., Radin Umar, R.S.& Azhar, A. (2001). "Relative Risk of Fatal Injury in the High-Performance Small Motorcycles (HPSM) in Malaysia." Journal of Crash Prevention and Injury Control 2:307-315.

Psacharopoulos, G. & Mattson, R. (1996). Estimating the Returns to Education: A Sensitivity Analysis of Methods and Sample Size. Washington DC: World Bank.

Psacharopoulos, G. & Tzannatos, Z. (Eds.) (1992) Case Studies Women's Employment and Pay in Latin America Washington, DC.: World Bank.

Radin Umar, R.S (2003). Helmet Initiative in Malaysia. In Proceedings of the 2nd World Engineering Congress, Institution of Engineer, Sarawak: 93-101.

Ram, R. (1996). "Level of Development and Rates of Return to Schooling: Some Estimates from Multicountry Data." Economic Development and Cultural Change 44, (4) : 839 – 857.

Rama, M. (2002). "The Gender Implications of Public Sector Downsizing: The Reform Program of Vietnam." The World Bank Research Observer 17, (2) :167-189.

Ricaurte, M. F. (2007). Human Capital and Earnings Department of Economics, University of Minnesota.

Rodgers, Y. (1999)."Protecting Women and Promoting Equality in the Labour Market: Theory and Evidence." Policy Research Report on Gender and Development Working Paper 6. Washington DC.: The World Bank.

Rosen, S. (1987). 'Human Capital' in John Eatwell, et al., (eds). The New Palgrave; A Dictionary of Economics London: Macmillan : 681 – 90.

Saturday Tribune (2005). "Riding Okada Doesn't Affect my Sex life" Saturday Tribune 568:2.

Schultz, T. W. (1961). "Investment in Human Capital" American Economic Review (5): 1-17.

Servadei, F. et al. (2003). "Effect of Italy's Motorcycle Helmet Law on Traumatic Brain Injuries" Injury Prevention 9: 257-260.

Stevens, M. (2000). Reconciling Theoretical and Empirical Human Capital Earnings Functions: Oxford :Nuffield College.

Suriyawang paisal, P. & Kanchanusut, S. (2003). "Road Traffic Injuries in Thailand: Trends, Selected Underlying Determinants and Status of Intervention." Injury Control and Safety Promotion 10: 95-104.

Udoh, U.O. (1988)."Para-transit Modes of Urban Transport: The Motorcycle Services in Calabar". Centre for Urban and Regional Planning, University of Ibadan, Ibadan: September (unpublished dissertation).

WHO (2003). 'Report of the Regional Director to the Regional Committee for the Western Pacific' Manila: WHO.

WHO (2004). World Report on Road Traffic Injury Prevention. Geneva.: WHO.

Wikipedia (2006*).* Motorcycle (http://en.wikipedia.org/wiki/motorcycles). Accessed on the 7th/13/2006.