EMERGENCE OF COMMERCIAL MOTORCYCLE OPERATIONS, ECONOMIC WELFARE AND CHALLENGES

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ABSTRACT

The emergence of motorcycle taxi in modern economy is look upon as an externality and a call for concern by most citizens. We used the 2014 Cameroon household consumption survey via 2SLS and control function models to determine the contribution of motorcycle taxi on household economic welfare and the associated constraints involved in motorcycle taxi business. The result shows that, motorcycle operation is strongly correlating with household welfare. Municipal tax and interdiction, police security, quantity of cars in circulation and extreme precipitation are the major constraints of motorcycle business. Policy should be oriented towards rigorous regulation of the sector to promote income gains.

Keywords: *Emergence, Commercial, Motorcycle, Household, Economic Welfare, Cameroon*

1. INTRODUCTION

The emergence of motorcycle taxi in Cameroon is look upon as a mixed blessing and a call for concern for most citizens. Motorcycle taxi as a means of transport started to gained grounds in Cameroon since late 1990s period known as economic recovery. Tambi (2015) revealed that Cameroon has experienced all the possible business cycle phases: economic prosperity (until 1985), economic and social crisis (1986-1994), and renewed

economic growth (after 1995). After the period of economic crisis, most youths began devising different means of recovery from the downturn, one of the principal economic activities that emerge during this period is the involvement of youths in motorcycle taxi, since then this activity has grown to employ more than three percent of both old and young Cameroonians. Kumar (2011) revealed that in Lagos over 200,000 commercial motorcycles, provides direct employment to over 500,000 people, he assume one public transport worker per household considering an average household size of 5 then, over two million people will receives their sustenance from the sector or 15 percent of the total population.

Olawo et al (2014) in discussing of the relevance of the motorcycle transportation business cited Olvera (2007) who noted that in Tombel-Cameroon, employment crises have pushed many into motorbike taxi riding. At this time, most of the youths switch from their primary activity agriculture to motorcycle riding, today the motorcycle taxi business has become their primary activity of most riders in Tombel who live from this activity (Olvera, 2007). This situation implies that farming of cash crops has been relegated to a second position due to its instability of prices. Riding is the main source of income for many youths who use the activity as a base in the construction of their future lives while part time riders (students and farmers) use the income generated from this activity to sustain their livelihood (Olawo et al., 2014; Olvera, 2007). Olvera (2007) further demonstrated that motorbikes as a means of public transport has led to the creation of related jobs such as motorbike spare part retailers and motorbike mechanics. He revealed that motorbikes as a means of locomotion have become flexible in the transport of goods from one place to another, penetrating into enclave areas; all these have major consequences in the economic, social and cultural functioning of the Bakossi society; it's used in

personal transport, as taxi, it's also a new activity and a source of revenue that goes a long way to influence the way of life of the population of Tombel.

Motorcycle taxi popularly known in French Cameroon as *'Bend Skin'* and in English Cameroon as *'Okada'* or moto-bike are the quickest and most economical way to get to one's destination, the riders of the motorcycles are ready to transport their passengers even to the remotest villages and interior neighbourhood of the cities. By this, they have attracted most passengers and in Cameroon it seems they are rank highest in terms of means of transportation, it's easier to find motorcycle taxis form queues outside office buildings, public markets, and near the corners of residential streets in waiting for passengers. Porter (2013) complemented that although fares tend to be higher in long distances than for other transport services, motorcycle-taxis are not only reaching remote villages where there is no alternative service, but services are being stationed within those villages. Porter continued that motorcycle taxi is now changing the face of rural transport services in many parts of Africa due to the introduction of cheap motorcycles from China and improved connectivity provided by the spread of mobile phone networks and handset ownership, to the extent that even the old poor people may patronize motorcycle taxi services in areas where these services have only been recently introduced (Porter, 2013).

SITRASS (2004) motorcycle taxis first appeared in Douala in the early 1990s and their numbers have steadily increased with an estimated current number at 22,000, directly accounting for some 30,000 jobs. SITRASS noted that the emergence of motorcycle have cause factories to sprung up in Douala-Cameroon to assemble small-engine motorcycles, given that these motorcycles are primarily operated by youth outside the school system and former drivers of taxis or other vehicles (Ngabmen, 2002). Khan et

al (2009) confirmed that Chinese bikes are increasing the supply of taxi services, creating jobs, and generating government revenue. According to these author, the main factors of motorcycle taxis' success have been identified as: crisis of public transport supply that obligated people to find an alternative; rapidity and door to door service, which are elements of quality of service even if other elements are negative (comfort and safety) and affordable fares due to low gasoline.

However, SITRASS (2004) underscore that in the opinion of motorcycle operators themselves, the boom in motorcycles is due to their ability to reach places inaccessible to four-wheel vehicles, their low and the proliferation of traffic jams which make them quicker than other modes of travel at peak hours. However, SITRASS (2004) underscore that in the opinion of motorcycle operators themselves, the boom in motorcycles is due to their ability to reach places inaccessible to four-wheel vehicles, their low and the proliferation of traffic jams which make them quicker than other modes of travel at peak hours.

Despite the role played by motorcycle taxi in public transport, many decision makers and some citizens are still in the opinion that commercial motorcycle should be abolishing from public circulation. Oluwaseyi et al (2014) classified the factors that may lead to abolishing motorcycles in Cameroon into human and environmental factor. According to them, environmental factors include the condition and nature of the roads, traffic flow, poor visibility at night, while human factors include amongst other things: the attitude and behaviour of cyclists on the roads, ignoring safety measures like speed limit, traffic sign, not wearing of crash helmets and protective clothing, alcohol and substance abuse prior to riding, carrying more than the stipulated number of pillion passengers. In fact, the activities of commercial motorcycle in Cameroon are

consider to be that of an externality in the sense that the number of people dying on daily on the Cameroon highway and unpaved rural roads is on a serious rise, whereas the same time motorcycles have facilitated movement among businessmen, public and private workers as well as school children.

Government policies towards the functioning of commercial motorcycles in public transport are not yet clearly defined, in some major cities like Yaounde, Douala and Buea motor bikes are interdict from accessing certain neighbourhoods. This might be cause by the policy of liberalisation of public transport by the government of Cameroon in the 1990s. In most cases motorcycle taxis are only expected to serve only in places that public taxis cannot access while most of the bikes are even operating in an illegal manner without licences, insurance and tax payment. These have increase the entrance of illegal goods like drugs as well as increase the crime rate among people in the sector. Kumar (2011) noted that despite the important role of commercial motorcycles in public transport, little is known about their origin, the political economy, service patterns, ridership characteristics, cost structure, environmental and other impacts.

Many studies both in Cameroon (Kumar, 2011; SITRASS, 2004) and other parts of the world (Oluwaseyi et al., 2014; Olawo et al., 2014; Oluranti, 2010; Olvera, 2007) have attempted to approach this study based on information from literature review, primary data and four group discussion. Most of their studies are limited to specific neighbourhoods like towns and big cities like Yaoundé and Douala in the case of Cameroon; Lagos and Abuja in the case of Nigeria; Nairobi and Lusaka in the case of Kenya and Zambia. Most of these studies are not only limited in their sample size, limited to descriptive and inferential statistics, but they are also bias, they neglect the potential bias that may arise due to omission of important variables

or missing values that may be originating from missing values on the main variable. We equally observed that most of the literature on commercial motor bikes and transport in general are either in geography or sociological approach. Further, none of these studies actually quantify the impact of motorcycle taxi on household welfare, meaning that this is a long neglected subject, yet the number of youths' entering this sector is increasing on daily basis.

Our study attempt to use the control function approach to determine the contribution of motorcycle taxi on household economic welfare in Cameroon; to do this we have as objectives: investigate the contribution of motorcycle taxi on household economic welfare in Cameroon, analyze the determinants of motorcycle taxi in the public transport sector of Cameroon, examine the household economic welfare effect by place of residence, determine the constraints and challenges associated with commercial motor bikes as well as to proposed possible policies to ameliorate the economic benefit of motorcycle taxi business.

2. RELATED LITERATURE

Since the emergence of commercial motorcycles many and different categories of bikes are moving on the Cameroonian soil. There are about seven categories or types of motorcycles: cruiser, sport, touring, standard, dual-purpose and dirt bike associated to this are smaller ones such as mopeds, scooters and under-bones which constitute another category. These bikes are classified according to: their modes of functioning, the designer's intent or some combination of the two. There are also special motorcycles adapted to job functions such as ambulances, police, military, dernys use in track cycling events and motorcycles used for towing cars. Generally, as of now, there are no universal systems for classifying the different

types of motorcycles, there is no strict classification system that is in terms of sport, legal jurisdiction, registration, road traffic safety rules, emissions or licensing. Not all the motorcycles can be use for taxi business, in Cameroon, there is a particular mark known as 'Nanfang from China that have dominated the market and that most riders used; this type of motorcycle is under the category of standard motorcycles. Before now, most riders use to use the cruiser with the mark 'Honda' and 'Suzuki'; however these marks are not still popular in Cameroon.

Olawo et al (2014) in trying to determine the effect of increased investment in motorcycle (known in their study as bodaboda) business on economic empowerment in Kisumu West District noted that in the last fifteen years the numbers of motorcycles per capita in many developing nations has doubled, they provide an affordable mobility option that is not otherwise available. Despite the limited information points to the potential benefits of this mode of transport and limited information on the effect of increasing investment in motorcycle business in Kisumu West District, they established that the level of bodaboda business activities was very high in the district and that these activities had a positive significant effect on economic empowerment. In Cameroon, motorcycles have a lot of advantages over other means of road transport; bikes are cheaper per trip, easily affordable and more flexible in terms of spatial coverage, bend-skins elicit much more positive opinions (SITRASS, 2004). In terms of cost, proximity of loading points, waiting time, temporal and spatial availability, and speed, this mode gathers the most favourable opinions. However, SITRASS (2004) in their focus group study, stress that motorcycles are only good for short distances, such as to go into the neighbourhoods and hinterland with negotiated affordable prices, especially for the poor households of Cameroon.

In another study, Olawo et al (2014) noticed that the coefficients for financing of bodaboda business, employment of riders and motorcycle assembly and maintenance points are all significant as well as the coefficient for employment of riders, they concluded that every time employment of riders increases by one unit, improvement in living standards will increase on average, other factors being constant. In another result, they also observed that the employment of rides is the most significant predictor of improvement in the living standard, with a high magnitude of coefficient. In the same study, Ogunsanya and Galtima (1993) cited Olawo et al (2014) who identified economic depression and inadequate transport facilities as some of the factors that gave rise to the use of motorcycles as means of public transportation in Nigeria. Given that the multiple regression analysis of bodaboda business activities gave a positive significant coefficient, Olawo et al (2014) established that the rise in investment in motorcycle business has led to economic empowerment of people in Kisumu west District. From their study, it is evident that as you increase investing in bodaboda business economic empowerment also increases as a result of employment which results to increase in income. Hence, increased investment in bodaboda business increases the level of economic empowerment.

Analysing the situation of motorcycle taxi business in Douala, Kumar (2011) revealed that market entry jobs for drivers deprived of other jobs opportunities resort to motor bike taxi business. This explains why motorcycle taxis drivers are relatively young and educated, Kumar (2011) intimated that about 70 percent have had secondary education, 14 percent higher education (same in Lagos) and running a motorcycle taxi is for most of them a temporary job. According to Kumar, on average, motorcycle taxi drivers ply their trade for only 5 years, as working conditions are rather strenuous, remuneration is low and

uncertain, mostly self regulated with easy entry and exit and an absence of fare controls. On the other hand, Oluranti (2010) in examining the role of an urban informal transport sub-sector; the motorcycle taxis with respect to self-employment and income-generating opportunities for many of the urban unemployed in South West Nigeria and revealed that the subsector is a high employer of young school leavers in the accident-prone job of okada riding.

According to them, earnings analyses show that 86 percent of the operators earn above the minimum wage level while human capital variables explained earnings distribution. Not-with-standing, Kumar still emphasis that the compromise safety standards in Douala vis-a-vis motorcycle taxi business such as at least 60 percent of moto-taxi drivers carry unaccompanied young children less than 10 years old and two thirds of motorcycle taxi passengers being victim of road traffic accidents makes the job unfavourable on the young folks. Further, urban roads and highways have become increasingly unsafe as drivers who are neither cautious nor knowledgeable about traffic rules and regulations compete on the street for customers also the growth of motorcycles has in addition to safety, brought some undesired effects like crime, health and environmental problems.

Oluwaseyi et al (2014) in an attempt to assessed motorcycle operation as a means of urban mobility in Lokoja, first of all intimated that motorcycles are the major means of urban mobility in Lokoja due to the fact that the available taxies within the town operate within a designed route only. This led to high increases in the number of motorcycle operators and patronages in Lokoja. In terms of findings, they revealed that unemployment situation in the state have led many people, particularly the youth, into the commercial motorcycle operation in the city and the ability to provide door-to-door service have made many people patronize commercial motorcycle in the area. They later

recommended that the government should create more job opportunities, introduce the use of three wheel cycles and improve on the operational efficiencies of city taxies which will go a long way in reducing road accidents and thus reducing the influx of commercial motorcycles.

3. METHODOLOGY

Motorcycle taxi can affect household wealth for bike operators positively or negatively depending on the nature of the rider; better riding also implies increased investments and savings in households. As previously argued, these factors positively affect household welfare and hence this is expected to improve household wellbeing as a result of economic upturns.

In this study, we are interested to use the theoretical framework of the new household economics model of the family as it's increasingly being used to derive the analysis of demand and supply in household economic issues. The households also derive utility from goods and services that are produced at home or for which there is no market. The application of this the framework to motorcycle taxi operations is well known and applied in many studies (Handa, 1999). In a simple version of this framework, the household is typically seen as maximizing a utility function defined over leisure, market-purchased goods and home produced goods such as motorcycle and faces four main constraints: a budget constraint, a time constraint, a distance constraint and a household welfare production function. Welfare production function will depend on market-purchased inputs such as food (nutrients) and health services, the time and characteristics of the main household worker, environmental features and community characteristics of the household such as access and proximity to public goods (Thomas et al., 1997).

Empirical Specification

Dwelling on Rosenzweig and Schultz (1983) proposition and particularly Baye (2009) demonstration, the hypothetical mechanism linking motorcycle taxi to household economic welfare in Cameroon can be express in the following welfare structural simultaneous equations:

$$HEW = \alpha_1 d_{HEW} + \beta_1 MT_i + \varepsilon_1 \quad (1)$$

$$MT_i = \alpha_2 d_{mt} + \beta_2 HEW + \varepsilon_2 \quad (2)$$

Whereby HEW is household economic welfare, MT is the motorcycle taxi operation of the rider, α_1 is a vector of exogenous control variables that determine the economic welfare of the family, while α_2 is a vector of exogenous control variables that determine motorcycle taxi operation and d, β are parameters to be estimated while ε_1 and ε_2 are error terms as they appear in the structure equation. From equation (1) we observed that both the outcome and endogenous variable are determine simultaneously.

It's likely that factors positively affecting motorcycle taxi operation positively (for example; male household head, marital status, father's education, employment, household residence, access to credit, household size, region of origin, entrepreneur, household has a motorcycle and age of household head) may like also influence economic welfare of motorcycle taxi operators positively. This simply means that motorcycle taxi operation can be hypothesized to correlate with some of the omitted inputs that enhance the household welfare of the motorcycle taxi operators. In other words MT is expected to correlate with ε_1 which leads to bias and inconsistency in OLS estimates and in the same way HEW is correlated with ε_2. So if the right-hand side of equation (1) is plugged

in for household welfare in equation (2); it will result to equation (3) of motorcycle operation thus:

$$MT_i=\alpha_2 d_{mt}+\beta_2(\alpha_1 d_{HEW}+\beta_1 MT_i+\varepsilon_1)+\varepsilon_2 \quad (3)$$

From the above equation, to solve for MT we assume that $\beta_2\beta_1\neq 1$, not-with-standing, no matter our assumption, this is a practical issue (Wooldridge, 2002) from equation (3) we can derive equation (4) and (5) as indicated below:

$$(1-\beta_2\beta_1)MT_i=\beta_2\alpha_1 d_{HEW}+\alpha_2 d_{mt}+\beta_2\varepsilon_1+\varepsilon_2 \quad (4)$$

$$MT_i=\alpha_1 X_{HEW}+\alpha_2 X_{mt}+\varepsilon_3 \quad (5)$$

Considering that $X_{HEW}=(\beta_2 d_{HEW})/(1-\beta_2\beta_1)$;

$X_{mt}=(d_{mt})/(1-\beta_2\beta_1)$ and $\varepsilon_3=(\beta_2\varepsilon_1+\varepsilon_2)/(1-\beta_2\beta_1)$

In equation (5) we expresses motorcycle taxi in terms of the vector of exogenous control variables X_{HEW} and X_{mt} and the error terms, is the reduced form equation for motorcycle taxi also the vectors of parameters α_1 and α_2 reduced form parameters they are nonlinear functions of the structural parameters in equation (1) and equation (3). The reduced form error, ε_3 is a linear function of the structural error terms ε_1 and ε_2. Since ε_1 and ε_2 are each uncorrelated with α_1 and α_2. ε_3 is also uncorrelated with α_1 and α_2. Thus, the vectors of parameters X_{HEW} and X_{mt} can be consistently estimated by the OLS, this is input in to 2SLS estimation.

As we are dealing with simultaneous equation, there will obviously going to be reverse causality between motorcycle taxi and economic welfare (Jamison et al., 2004). This will result to two principal problems: (a) there is going to be an endogeneity problem as motorcycle taxi is endogenous in the economic welfare function as revealed in

equation (3), to consistently estimate our endogenous and outcome variable, we need to apply the conventional method of resolving the problem of endogeneity that is the instrumental variable (IV) method; (b) the second problem is that of heterogeneity bias due to the non linear interaction of motorcycle taxi with unobservable or omitted variables that could bias the estimated structural coefficients. According to Baye (2009) to account for the potential endogeneity and heterogeneity of responses of unobservable that are complementary with motorcycle taxi operations, equation (3) can be augmented to equation (6) which is the control function model:

$$HEW = \lambda_0 + \alpha_1 d + \gamma_1 MT_i + \lambda_1 \hat{\varepsilon}_3 + \tau IMR + \ell \quad (6)$$

From the control function equation, Wooldridge (1997) revealed that in this case, the instrumental variable of equation (6) are unbiased and consistent only when: (i) the expected value of the interaction between immunisation and its residual is zero or the interaction between tetanus immunisation and its fitted residual is linear and (ii) there is no sample selection problem. If the correlation is non-linear, the control function approach is required to purge the estimated coefficients of the effects of unobservable variables (Card, 2001). Basing on the above equation; $\hat{\varepsilon}_3$ is fitted residual of motorcycle taxi derived from equation (5) while *IMR* the is the hazard rate obtained after estimating the probit selection (P_s) model; ℓ is the error term, γ_1, λ_1 and τ are parameters to be estimated.

Using the constructed wealth index from Cameroon Demography and Health Survey (DHS), we observed that some of the households did not declare their assets and so there are missing values. This means that from the whole sample, we need to select those households with wealth index in other to avoid selectivity bias, unfortunately our estimates of equation (6) does not capture households that

were not registered. To address this sample selection problem we introduced equation (7).

$$P_s = 1(v\delta_s + \varepsilon_4 > 0) \quad (7)$$

P_s is a dichotomous indicator function for selection of the observations into the sample. $P_s \leq 0$ if welfare is unobserved and $P_s = 1$ if welfare is observed, v is a vector of exogenous control variables, comprising of v_1 explanatory variables that belong to the welfare production function and a vector of variables that instrument for the sample selection indicator while δ and ε are parameters to be estimated and error term respectively. Literature holds that one way of proceeding with the selectivity problem is to apply the Heckman approach (Mwabu, 2009; Statacorp, 2001) that jointly estimates the probit for sample selection (equation 7) and the structural parameters (equation 6) by the maximum likelihood estimation procedure to purge the structural estimates of sample selection bias. The coefficient of the resulting hazard rate (inverse of the Mills ratio) which controls for sample selection bias is the product of the correlation coefficient and the standard deviation. The sample statistics are generated automatically upon convergence of the log-likelihood function (Baye, 2009).

Data Presentation

We used the 2014 household consumption survey (HCS) realized by the Ministry of Economic Affairs, Programming and Regional Development under the national institute of statistics agency with a sample size of 11391. Associated to the HCS, we equally used data from the ministry of transport as well as collect information of a random sample of 200 commercial bike riders to determine the actual challenges faced by the riders in this form of business. The potential endogenous variable is the

motorcycle taxi. The motorcycle taxi variable imported from records of Ministry of transport is practically the monetary value of using motorcycle taxi capture at the cluster level. This variable is imported in to HCS data set from the department of statistics of Ministry of transport. The instrument for the potential endogenous variable are: member of a friendship association and member of a professional association. The control exogenous variables are: sex of household head, marital status, father unskilled job, father's education, place of residence, access to credit, household size, entrepreneur and age of household head.

4. EMPIRICAL RESULT

4.1 Descriptive Statistics

Information relating to commercial motorcycle taxi reveals that in 2007, the least monetary value of using motorcycle taxi is 1728 USD and a maximum of 2880 in relation to Cameroon; this is much money for an individual bike rider to meet up with family exigencies. Generally in Cameroon, motorcycles are use for many purposes such as: personal transportation, sport, agriculture to plough the ground such as off-road motorcycles also known as dirt bikes designed for off road events, touring and tourism e.g. sport touring, training of people, business e.g. carrying of bread and other consumable products and distributing to consumers households every morning or sales of newspapers by newspaper vendors using bikes; for these reasons we cannot use this variable to compute our results.

Table 1: ***Factors influencing Commercial Motorcycle Operations and its effect on Economic Welfare***

Variables	Mean	SD	Min	Max
Economic Welfare (log of household expenditure)	12.66661	0.7519603	11.18517	16.24382
Commercial Motorcycle_MPU (log of monetary value of using motorcycle taxi in 2007 and in USD)	44.0822678	0.0794984	1728	2880
Male Household head	0.7437664	0.4365715	0	1
Household size	4.393024	3.025335	1	43
Access to credit from financial institutions (in USD)	31.84249	1027.308	0	1000
Bike rider had primary education	0.3360917	0.4723914	0	1
Bike rider had secondary education	0.3210247	0.4668907	0	1
Bike rider had higher education	0.0668798	0.2498248	0	1
Bike rider is less than 30 years	0.2356156	0.4244016	0	1
Bike rider is in age group 30 and 39 years	0.2568366	0.4369077	0	1
Bike rider is in age group 40 and 49 years	0.2038819	0.4028999	0	1
Bike rider belonging to a financial Association	0.1240548	0.3296585	0	1
Bike rider belonging to a solidarity Network	0.3755685	0.4842906	0	1
Commercial Motorcycle Residual	5.63e-12	0.0764076	-0.1173117	0.301073
Commercial Motorcycle Interaction	0.0058376	0.0203756	-0.0051735	0.098149
Correlates of Household head Gender				
Married	0.5777995	0.4939318	0	1
Single	0.4222005	0.4939318	0	1
Correlates of Geographical place of Residence				
Urban	0.3701806	0.4828741	0	1
Rural	0.6298194	0.4828741	0	1
Number of observation	**11,391**			

Source: Computed by the author

There are about 74.37 percent of household heads involve in motor taxi business with some of them being potential riders and others are just owners, simply functioning in strict business either by renting, leasing or use for the sale of goods and services. A typical household has on average 4 persons, with a low rate of access to credit and a maximum of 1000USD. Most bike riders are primary

school leavers with only 6.68 percent of with tertiary education. A majority of the riders falls between 30 and 39 years dwelling in the rural part of the country. About 37.55 percent are benefiting from solidarity network, while 12.4 percent are benefiting from financial associations. The most interesting issue here is that 37 percent of the bike riders are either married or living with a woman in their households, this enables them to be more responsible.

4.2 Determinants of Commercial Motorcycle Operations

Principally, male headed households, household size, primary, secondary, tertiary education, bike rider is in age group 30 and 39 years and bike rider belonging to a solidarity network are significantly correlating with commercial motorcycle operations. Many more male youths of the age group of 30 to 39 years are gradually fuelling the growth of commercial motorcycle operations. The employment situation in Cameroon especially among the male youths stands out at 4.2 percent in 2017. As poverty rates across the globe continue to fall, urban centers continue to grow and people increasingly have access to education, Cameroon seems to be slipping in the wrong direction. Rural poverty, inadequate infrastructure and a struggling school system continue to hinder the lives of people across Cameroon, contributing to a rising poverty rate in the last 10 years.

This lack of infrastructure, which limits transportation, cuts off those who live in rural areas. Rural citizens do not have access to fundamental resources and are marooned from diversified labor opportunities. Education seem to be playing a major role in commercial motorcycle operations, given that it is a new business in the Cameroon business market every smart interested individual will want to derived maximum profit. Therefore irrespective of the level of education, there is a higher probability to affect commercial motorcycle operations.

Furthermore, the education system has failed to develop alongside market demands. As the World Bank found, "the country's tertiary education continues to focus on traditional academic disciplines and is not positioned to respond to economic transformation." In Cameroon, 43 percent of the population has little or no formal and primary education. What's more, 67 percent of the population that is of working-age has received no further training in developing job sectors, leading to a significantly higher level of unemployment among youth especially those living in rural areas. From the foregoing, the youths had to obligatorily gets into motor cycle operations.

Table 2: ***Factors influencing Commercial Motorcycle Operations and its effect on Economic Welfare***

Variable	**Reduced Form**	**OLS**	**IV 2SLS**	**Control Function**	
				[a]	**[b]**
Commercial Motorcycle Operations	-	-0.290*** (4.51)	0.450*** (4.25)	0.454*** (6.15)	0.644*** (6.31)
Male household head	0.008*** (4.13)	0.087 *** (6.64)	0.145*** (6.13)	0.145*** (8.87)	0.142*** (8.82)
Married household head	-0.025*** (14.01)	-0.115*** (9.15)	-0.298*** (6.17)	-0.298*** (8.93)	-0.296*** (8.91)
Household size	0.001*** (4.22)	-0.099*** (52.73)	-0.092*** (27.79)	-0.092*** (40.23)	-0.092*** (40.22)
Bike rider obtained credit from financial institution	-0.000 (0.59)	-0.000 (0.35)	-0.000 (0.76)	0.000** (2.09)	-0.000* (1.79)
Bike rider had primary education	0.017*** (8.80)	0.218*** (16.36)	0.313*** (9.78)	0.333*** (14.15)	0.332*** (13.99)
Bike rider had secondary education	0.033*** (15.01)	0.437*** (29.09)	0.664*** (11.16)	0.664*** (16.15)	0.662*** (16.05)
Bike rider had higher education	0.032*** (9.45)	0.941*** (40.56)	1.159*** (18.44)	1.159*** (26.69)	1.159*** (26.50)
Bike rider is less than 30 years	-0.026*** (11.63)	-0.115*** (7.55)	-0.295*** (5.99)	-0.295*** (8.68)	-0.293*** (8.66)
Bike rider is in age group 30 and 39 years	0.016*** (7.83)	-0.096*** (6.73)	0.209*** (6.06)	0.209*** (8.77)	-0.209*** (8.75)
Bike rider is in age group 40 and 49 years	-0.006 *** (3.02)	-0.071*** (4.85)	-0.117*** (4.90)	0.117*** (7.09)	0.115*** (7.08)

Table 2, continued					
Bike rider belonging to a financial Association	-0.010*** (4.46)	n/a	n/a	n/a	n/a
Bike rider belonging to a solidarity Network	0.003** (2.02)	n/a	n/a	n/a	n/a
HH urban Residence	-0.039*** (23.75)	0.511*** (44.45)	0.219*** (3.23)	0.249*** (4.67)	0.229*** (4.65)
Commercial Motorcycle Residual	n/a	n/a	n/a	7.180*** (5.91)	7.187*** (5.89)
Commercial Motorcycle Interaction	n/a	n/a	n/a	n/a	0.051** (2.05)
Constant term	0.096*** (44.09)	12.729*** (800.87)	13.406*** (80.14)	13.406*** (116.01)	13.406*** (115.95)
R^2 /Pseudo- R^2	0.7062	0.5136	0.9964	0.5151	0.5251
Wald χ^2 *(p*-value*)/* F-Stat [df; p-val]	72.24 [13, 11377; 0.0000]	1001.30 [12, 11378; 0.0000]	479.47 [12, 11378; 0.0000]	929.73[13 , 11377; 0.0000]	863.24[14, 11376; 0.0000]
F test of excluded instruments/ Joint F / χ^2 (p-value) test	n/a	n/a	15.98 [2, 11377; 0.0000]	n/a	n/a
Angrist-Pischke multivariate F test	n/a	n/a	31.902 [0.0000]	n/a	n/a
Sargan statistic test	n/a	n/a	15.918 (0.0001)	n/a	n/a
Cragg-Donald F-Stat	n/a	n/a	15.976 [19.93]	n/a	n/a
Durbin-Wu-Hausman χ^2 test	n/a	n/a	34.913 (0.0000)	n/a	n/a
Number of observation	**11,391**	**11,391**	**11,391**	**11,391**	**11,391**

Source: Computed by the author

4.3 Household Economic Welfare and Motorcycle Operations

The household economic welfare and commercial motorbike operations revealed that the weighted ordinary least square result shows that commercial motorcycle

operations are negatively correlating with household wellbeing. The 2SLS and control function A and B (CFa and CFb) results revealed that motorcycle operations is strongly correlating with household welfare, all significant at one percent level. Considering these results, we observed that the control function result of column B has a strong magnitude effect as compare to the others. Considering further that, the residual and interaction term of control function B are positive and significant, the parsimonious result of CFb is preferred to others and this is the result discuss here.

From CFb we observed that commercial motorcycle operations on a probability of 64.4 percent is influencing household economic well-being and significant at one percent. Motorcycles are often times describe in Cameroon as '*passe par tout*' meaning movement without limit. The motor bikes have the ability to go even to the most remote part of the country, they can make their way even to the most remote part of the neighbours and the operators prefer such areas because, that is where they maximized profits. Many operators makes use of this characteristics to earn supernormal profits, this explains why motorcycle operation is strongly influencing household economic well-being.

The factors complementing the commercial motorcycle business to influencing household economic well-being are as follows: male household head, level of education (primary, secondary and tertiary education), Bike rider is in age group 40 and 49 years and urban residence. Over the years, the motor cycle business seems to be an activity of the male counterparts, very rare do you find women either riding or trading in the activity. The purpose of the male involvement in this activity is to take care of their families, it is true that unemployment is on a rise in Cameroon, and hence, many young and old folks get to self employment to get life going. Due to unemployment,

almost all levels of education are influencing wellbeing the more; however, we observed that the primary education is more influencing. Operators with primary education absolutely depend on the motor bike business whereas those with secondary and tertiary education have an alternative financial source.

The Durbin-Wu-Hausman χ^2 test for exogeneity of variables (34.913[0.0000]) shows that there is no problem of endogeneity in our result, while the Cragg Donald test of 15.976[19.93] and Sargan Statistics test of 15.918[0.0001] revealed that our result is valid and relevance. This confirms the fact that our result is robust and therefore appropriate for inference.

4.4 Motorcycle Operations by Correlates of Gender and Place of Residence

Considering the correlates of gender, we observed that commercial motorcycle business is more of single household phenomenon though married households are also influence but at a marginal rate. Most married couples in association to motor cycle business also get themselves to other sources of finance to sustain their family as they do have a greater charge of responsibility. On the contrary, most singles are either bachelors or spinsters and are susceptible to be having less responsibility and so they focus on motor bike business without much stress of seeking other avenues of finances. The factors motivating married household activities in this business are: male household head, all levels of education, bike rider is in age group 30 and 39 years, bike rider is in age group 40 and 49 years and urban household residence. The factors motivating single household activities in this business are: male household head, all levels of education, bike rider are in age group 30 and 39 years and bike rider are in age group 40 and 49 years.

Focusing on the correlates of residence, we observed that the emergence of commercial motorcycle business is an issue of both urban and rural Cameroon. Owing to the importance of this business, most second class and third class citizens have gotten in to this business and it has become a their principal livelihood. The result is shown in Table 3.

Table 3: ***Factors influencing Commercial Motorcycle Operations and its effect on Economic Welfare***

Variable	Correlates of Gender (CFb)		Correlates of Residence (CFb)	
	Married	**Single**	**Urban**	**Rural**
Commercial Motorcycle Operations	0.007*** (4.41)	0.304*** (6.23)	0.063*** (4.95)	0.168*** (3.94)
Male household head	0.050* (1.94)	0.120*** (5.43)	0.117*** (5.35)	0.161*** (6.48)
Married household head	n/a	n/a	-0.273*** (6.08)	-0.314*** (6.27)
Household size	-0.073*** (25.48)	-0.145*** (37.26)	-0.104*** (31.33)	-0.087*** (26.14)
Credit from financial institution	-0.000 (0.98)	-0.000 (0.66)	-0.000 (0.74)	0.000*** (2.97)
Bike rider had primary education	0.299*** (9.86)	0.485*** (13.17)	0.254*** (6.95)	0.347*** (10.16)
Bike rider had secondary education	0.634*** (11.90)	0.842*** (13.30)	0.621*** (10.78)	0.655*** (10.71)
Bike rider had higher education	1.130*** (19.95)	1.315*** (19.85)	1.102*** (19.05)	1.181*** (15.98)
Bike rider is less than 30 years	-0.314*** (6.97)	-0.380*** (7.33)	-0.344*** (7.31)	-0.275*** (5.44)
Bike rider is in age group 30 and 39 years	0.251*** (8.27)	-0.168*** (4.42)	-0.244*** (7.40)	0.195*** (5.51)
Bike rider is in age group 40 and 49 years	0.133*** (6.41)	-0.120*** (4.52)	0.112*** (4.68)	-0.126*** (5.23)
HH urban Residence	0.257*** (4.00)	0.064 (0.88)	n/a	n/a
Commercial Motorcycle Residual	6.942*** (4.37)	10.949*** (6.01)	7.620*** (4.67)	6.903*** (3.79)
Constant term	13.089*** (115.96)	13.888*** (80.06)	13.806*** (146.78)	13.346*** (77.12)
R^2	0.4560	0.5365	0.3787	0.3647
F-Stat [df; p-val]	450.78[12 , 6453; 0.0000]	473.85[12, 4912; 0.0000]	322.61[12, 6352; 0.0000]	239.78[12, 5013; 0.0000]
Number of observation	6,466	4,925	6,365	5,026

Source: Computed by the author

4.4 Constraints and Challenges faced in Commercial Motorcycle Operations

Following a primary survey of 200 commercial bike operators, 20 percent of those interviewed revealed that

municipal council tax and the restriction of authorities to prohibit operators from circulating in certain areas of the urban zones is a major hindrance to this type of business. Those interviewed reveal that the tax they pay is higher than the profit they are making, moreover, they restrict the operators to move to areas they can make more money. It appears in the commercial bike business does not obey the canons of taxation such as: canon of equality or equity, certainty, economy and canon of convenience. Principally, even the modern canons of taxation as proposed by contemporary economist are not well followed in this business. They include: canon of productivity, elasticity, simplicity and the canon of diversity.

Other obstacles to motorbike businesses are: police security, presence of vehicles (taxi, personal cars, commercial buses, trucks,...,), presence of thieves and constant theft as well as extreme climatic conditions. Normally, the police force is suppose to serve as a protective mechanism to commercial motorcycle operators, however, 63 percent of the operators underscored that police officers controlling traffic circulation have instead constituted a major cost of managing the motor cycle business. The traffic police place heavy charges on road defaulters and so increasing the cost. The presence of traffic cars, heavy duty cars and other transport vehicles have augmented the number of accidents on high that have resulted to major injuries as well as death. The presence of thieves and extreme weather conditions are all stumbling blocks to this type of business. The detail of this result is demonstrated in Table 4.

Table 4: ***Constraints and Challenges faced in Commercial Motorcycle Operations***

Variables	Values				
	Observation	**None Contraint**	**Contraint**	**Ratio**	**%**
Council tax and interdiction	200	0.400 (80)	0.600 (120)	1: 1.500	(20)
Acquisition of legal documents	200	0.910 (182)	0.090 (18)	1:0.098	8.09
Police Security	200	0.425 (85)	0.635 (127)	1: 1.494	(63.075)
Presence of vehicles (taxi, personal cars, commercial buses, trucks, ...,)	200	0.490 (98)	0.560 (112)	1: 1.143	(55.51)
Cost of motorcycle and accessories e.g. helmet, boots, globes,	200	0.670 (134)	0.380 (76)	1: 0.567	29
Time Consuming	200	0.750 (150)	0.250 (50)	1: 0.333	50
Strenuous	200	0.600 (120)	0.400 (80)	1: 0.667	20
Presence of thieves and constant theft	200	0.390 (78)	0.610 (122)	1:1.564	(60.61)
Extreme Climatic conditions	200	0.055 (11)	0.945 (189)	1:17.181	(94.445)

Source: Author, from field Data. N/B: Ratio = None constraint/Constrain, Values in parenthesis represent the absolute frequencies of variables

5. CONCLUSION

The emergence of motorcycle taxi in Cameroon is look upon as an externality and a call for concern by most citizens. Our study is focus on the emergence of commercial motorcycle operations and household economic welfare in Cameroon. We have attempted to use the control function approach to determine the contribution of motorcycle taxi on household economic welfare in Cameroon; to do this we have as objectives: investigate the contribution of motorcycle taxi on household economic welfare; analyze the determinants of motorcycle taxi in the

public transport sector; examine the economic welfare effect by place of residence as well as to determine the constraints and challenges associated with commercial motor bikes and propose possible policies to ameliorate household economic benefit of motorcycle taxi business. The data is from Demographic and Health Survey and from records of Ministry of Transport while estimates are from STATA.

The result shows that, male headed households, household size, primary, secondary, tertiary education, bike rider is in age group 30 and 39 years and bike rider belonging to a solidarity network are significantly correlating with commercial motorcycle operations. The household economic welfare and commercial motorbike operations revealed that the weighted ordinary least square result shows that commercial motorcycle operations are negatively correlating with household wellbeing. The 2SLS and control function A and B (CFa and CFb) results revealed that motorcycle operations is strongly correlating with household welfare, all significant at one percent level. Considering the correlates of gender, we observed that commercial motorcycle business is more of single household phenomenon though married households are also influence but at a marginal rate. Focusing on the correlates of residence, we observed that the emergence of commercial motorcycle business is an issue of both urban and rural Cameroon. Finally, we observed that, the obstacles to motorbike businesses are: municipal tax and interdiction, police security, presence of vehicles (taxi, personal cars, commercial buses, trucks,...,), presence of thieves and constant theft as well as extreme climatic conditions. In terms of policy, we recommend that, there should be more rigorous regulation of the sector to promote income gains.

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