RICHTMANN
PUBLISHING

Research Article

Fiscal Policy Option for Abatement of Free Rider Society:
The Role of Institutional Quality in Nigeria

Silva Opuala Charles

Jonah O. Orji*

Garden City Premier Business School,
Plot 13 Herbert Macaulay Street, Old G.R.A,
Port Harcourt, Rivers State,
Nigeria
*Corresponding Author

Abstract

The government revenue downward trend across the globe has a serious implication on provision of public good. And the consequences of free riding manifested by tax evasion impedes social progress. In this study, we examined the Fiscal Policy Option for Abatement of Free Rider Society: The Role of Institutional Quality with special focus on Nigerian economy. We deployed Quantile Regression Technique to assess the median impact of free-riding using government expenditure on economic and social services; comprised of: defense, health, road and construction, and education. Our finding shows that expenditure on defense reduces free riding when strategically managed but encourages free riding in the long run. Same result is shown with the government expenditure on health. Whereas, expenditure on education as well as road and construction discourages free riding. Also, the moderating role of institutional quality specifically, control of corruption decreases free riding and improve tax revenue generation. Growth of free riders in any society which comes in the form of tax evasion is effectively controlled by expenditure techniques of government guided by quality of institutions. The study recommended that: A special purpose vehicle from Federal Inland Revenue Service should be created as a 'fiscal control unit', to monitor electronic cash registers to be connected in hospitals, public schools and social services related departments in order to curb tax leakages due to free riders. Also, government should strengthen the campaign in favour of control of corruption as well as building strong institutions; rather than building strong private individuals who posed as sacred cow in punishment for tax evasion.

Keywords: Free rider, Tax Evasion, Government Expenditure, Quantile Regression, Fiscal Policy

1. Introduction

The quality of government institution is crucial to furthering governance through implementation of people's oriented policy, which results in socio-economic wellbeing of the citizenry. A well-functioning state provides public service that is rudimental to speed up economic and social developments. This economic development generally does not only translates to changes in the quantity of goods and services produced and made available in the society, rather "it also involves

the distribution of the social product, and the manner in which the distribution process affects the life chances of members of the society" (Kalu, 2022;p.16).The developmental aspects of human life measured by the growth of human capital index is attained by the provision of facilities that reduces poverty and closes income gap; provides affordable health care services; increase life expectancy and reduce infant mortality. To that extent (Sachs, 2005) in his study argued that, the end of poverty cannot be achieved without investments in schools, hospitals and other public goods. Being that, "the bottom line of underdevelopment is poverty manifested in the ramification low per capita income, high infant mortality; poor housing conditions and inadequate government expenditure on social services" (Okowa, 1996; p.75).

Essentially, government provides certain commodities that defiled the effective functioning of the market system. These items allow third party consumers, that is, once the commodity is introduced in a society, none is neither excluded from consumption nor denied the benefits. Hence, it is strictly a combination of non-rivalry with non-excludability in consumption (Musgrave, 1959; Samuelson, 1954). The provision of public good does not imply public policy, by the reason of inability of market to sufficiently produce and allocate public good, does not mean government is duty bound to provide them. The scholarly publication of Pigou, which assumed that governments should always correct market failures by taxing negative externalities and subsidizing public goods has some exceptions. As he further clarified that," it is not sufficient to contrast the imperfect adjustments of unfettered private enterprise with the best adjustment that economists in their studies can imagine" (Pigou, 1932; p. 332). It can be gleaned from the study (Angel, 2021) who affirmed the provision of public good as ability of government to fulfil promises of the constitutional state. Indeed, the allocation function of government in public sector finance deals with public social good. (Salawu, 2005; Dought, 2003) explained the free - rider concept under social goods[2] consumption. Thus, 'free riders society' include consumers of publicly made - available infrastructures that contributed little or nothing for the cost. They are classified to the group of society members who consumes collective goods without contributing to the cost of their production. It follows that, the availability of public good enhances social inclusion, as it serve the public by generating spaces of civilized interaction, and the sense of shared citizenship. This public good includes national defense and public protection, street lights, road networks, national radio station and entertainments, vaccinations and free public health services. In order to provide these services, public sector determine the budget requirements and charges most efficient taxes lower than cost. But, the cost of provision of public good is usually borne by governments as more consumers are unwilling to partake in the shared cost. Therefore, benefits derivable from public good without contribution to the cost of its provision is the reason for 'free riders society'.

The concept of 'free riders society' which formed the fulcrum of our intellectual discourse, has been studied within the purview of an organization. Kerr and Bruun (1983) initialization of the concept within organization suggests that, achievement of group assigned task, where the efforts of every member of a team is needed to accomplished a goal; usually creates a specific free-riding impact on the individual's contribution. It is interesting to say that, some individuals may work harder to achieving a set goal, while others within the team may contribute little or nothing believing to reap the benefits or team rewards at equal proportion. This concept been experimented in workplace, studies the perception to work and rewards. It is believed that, when a role is considered dispensable on an assigned group task; it will determine the level of personal effectiveness to performing an expected task. Members of the group will reduce their contributions and engage in free-riding if they believe their efforts are unnecessary and that of the other members have been successful, according to Kerr and Bruun (1983). Additionally, Ashraf (2004) found in his study 1 that when free-riding occurs in a classroom, it may not only encourage more free-riding by some group members but also reinforces those behaviors, making free-riders much more skilled at it.

However, one of the theories that has received the most support in the literature on the provision of public goods by organizations is the free rider hypothesis (Hardin 1968; Olson 1968). This acceptance has been mostly based on the validity of the theoretical justification. But not much of

empirical studies has been conducted about free-rider discourse. Marwell & Ames (1981) descriptively selected eleven closely related experiments testing groups to model the free rider hypothesis under different conditions, and sampling various subpopulations. The finding showed that people voluntarily contribute substantial portions of their resources usually, an average of between 40 and 60 percent to the provision of a public good. To this end, the need to experiment the concept within social sciences set the tune for the empirical investigation of 'free - rider society' in Nigerian context.

1.1   The Problem Statement

The free riders society in the Nigerian context can be studied from the side of tax evasion rate. Indeed, tax evasion and fiscal corruption have been long existent in the financial history of Nigeria. The term "tax evasion" encompasses a wide range of activities by those who are unwilling to pay their fair share of taxes (Muhrtala & Ogundeji, 2013; Owusu et al., 2019). This is supported by study of Frey and Torgler (2007), who strongly reported that, people on average, are not willing to pay tax especially when they believe some other persons are paying for what they consume freely. Whereas, government is expected to provide exactly what the citizen wants by   way of public programs, making it   usually rational for the individual to free ride and not pay taxes especially when they expect they can get away with it Gërxhani and Wintrobe (2021).

Moreover, free rider problem may show up in the form of tax dodging which limits the revenue streams of government. Tax evasion and avoidance pose a threat to government revenue across the globe. The United States' Senate attributed revenue decline due to tax losses to approximately $100 billion each year as a result of tax evasion Whalen (2020). It was also reported that billions of euros are accounted for by tax evasion. As a result, infrastructure and services like education and health receives less funding, decreasing living standards in both developed and emerging nations (OECD, 2022). The Nigerian case is peculiar to what experts described as bad tax administration and weak regulation of tax laws. The institutional quality based challenge resulted in Nigeria loss of $15 billion to tax evasion yearly; the $15 billion lost was close to half of the 2021 $35 billion budget Jeremiah (2021).

The tax revenue receipt and government spending has a significant impact on provision of social good and adjustment of free riders' benefits. Blanchard and Perotti (2002) reported a positive government spending shocks as having a positive effect on output of public good, and positive tax shocks as having a negative effect on consumption. Whereas, Friedman argues that higher taxes lead to higher spending and Barro lend credence to this argument that more government spending leads to more taxes (Friedman, 1972; Barro, 1974).But, there have not been enough empirical evidence to showed that cutting taxes will lead to reduction in expenditure of government rather, some theoretical constructs have been put forward by proponents of 'starve - the - best' hypothesis. "If the beast is starved of current tax revenues, it may compensate with deficit financing and debt issuance" Lemieux (2015).When these fiscal policy drawback exist, it creates a question mark on the effective fiscal option at government disposal to curtail free - riders tendency.

The provision of public good which creates problem of free riding under auspices of tax evasion in Nigeria can be studied with quantiles of government expenditure on defense, works and housing, and other key ministries that is responsible to providing social good in Nigeria.

The gap created by lack of empirical study on 'free- riders society' and how fiscal policy tools can be used to address the problem of 'free - riders society' motivated the study of this magnitude.

2. Literature Review

The quasi - novel concept of 'free -riders society' has been discussed largely on purely theoretical standpoint. To that extent, limited extant literature stalls the richness of the topic exposition. However, the literature is clearly discussed with proxies used in the study. Tax theories as it relates to tax evasion is a mirror image of free - riders' behavior. In his research, Lemieux (2015) made

reference to the conventional public finance tax theory, commonly referred to as the orthodox public finance theory. In this concept, everyone who avoids paying taxes puts an additional load on other taxpayers. He claimed that the tax system creates incentives for people to cheat. According to his line of argument, increased tax rate is enough incentive for individuals to cheat. The long-term increase in tax revenues coupled with increasing tax evasion and repression has led to criticism of this model, suggesting that traditional public finance does not provide a true representation of how government function. The emphasis on revenue downward trend hypothesis is re - echoed by the **Laffer Curve Theorizing.** In Authur Laffer's (1972) testament to studying the implications of government revenue and spending growth through changes in tax rate over period of time showed that: government revenue and spending increases with increase in tax rate to an optimum point, and began to decrease steadily due to the constraint taxation posed on disposable income. This income lag is posed as strong disincentive for tax payers, and creating avenue for tax evasion in the long run. Marginal tax rate increase, from zero point, as it approaches optimal rate bestows incentive to pay; motivating private production and consumer to live within the rate below optimum. Any rate above optimum allows for tax evasion, and decreasing government revenue. Application of laffer curve has been tested in empirical fashion in JSanz-Sanz (2022). Furthermore, the clear cut from Laffer's optimum point as explained in his theory, which separated regions of increasing tax revenue and lower tax rate; and decreasing government revenue and high tax rate re-emphasizes the **Lorenze Curve.** The degree to which tax payer income differs could be causative to tax evasion. Consumer of public good tends to vary the cost of public good subject to the income/ wealth level. This perception is attuned with Max Lorenze in his 1905 postulations. In this theory, inequality prevail in income distribution, given gap in consumption level in the society. Although income level varies significantly, consumers of public good is driven by tax incentive to pays tax liability at government equilibrium rate of tax.

Similar argument followed in the study (Roberts, 2018; Foley, 1970) who deployed **Lindahl's hypothesis,** purporting that, people are willing to pay taxes based on how much public property they obtain or use. If government provides more public advantages than a person is willing to pay for, the overall value of the benefits will be less than what people are willing to pay for. The linkage of Lindahl's hypothesis to tax evasion is better understood from the point of Lindahl's equilibrium. The Lindahl equilibrium is important because it shows how productivity can be achieved in an economy by equating individual benefit assessment for a public good to the cost of the same public good.

In the equilibrium state, everyone consumes the same amount of public goods, but because different people may value different public goods differently, prices will vary under the Lindahl tax (Lindahl, 1919; Muench, 1972). The amount of personal value that each person derives from a public good determines how much of the total tax income they provide on a relative basis.

And, given that utility of public good is financed by government expenditure, Samuelson (1955; p.356) intuitively described the relationship between tax evasion and government expenditure. He strongly believed government transfers expenditure and tax are tool in income redistribution, but differ extensively by attributing government expenditure as inefficient tool to avoid free – riders, albeit, significantly contributes to curb tax evasion when properly channeled. This argument reinforces the duties of government to provide social welfare through spending on economic- social sectors. Samuelson summed up the notion in his speech, "Governments provide or regulate services that are incapable of being produced under the strict conditions of constant returns that go to characterize optimal self-regulating atomistic competition". Recall, Lindahl's proposition on tax payers behavior, enjoying same benefits, while paying different tax rates; creating revenue leakages. Besides, government revenue leakages can be reverse through good tax administration achievable through institutional quality. Cordelia et al (2022) alluded the factors of effectiveness and efficiency in tax administration as having an increment changes in the revenue generated by government; which helps the government in the provision of amenities for citizens and even execution of capital projects. Revenue generation and public spending sums to measure up the fiscal policy option available to government in carrying out social services as well as meeting developmental objectives.

Most challenging circumstances upon which free ridding occurs is in a weak institutionalized

system with utilization of public office for private gain Rodriguez et al (2005).This statement is buttressed by empirical findings (Montenegro, 2021; p.4), who discovered that " the higher the country levels of government effectiveness, rule of law, regulatory quality and control of corruption, the lower the tax evasion". Furthermore, Doan (2019) reported the crucial role of institutional quality in improving public consumption, welfare and living standards across his empirically tested models.

3. Data and Methodology

The empirical strategy of explaining public good integration with utility is associated with social welfare function. Only an individual's utility or well-being may affect social welfare. Sen (1977, 1979). The distribution of public goods implies that expenses are incurred in order to provide them. Taxes becomes an instrument for benefit transfer that consumers of public goods can enjoy. Given the integral, an additive social welfare function that considers a continuous population

$$SW(\chi) = \int W\ (\mu_i\ (\chi)) f(i)\delta i \qquad\qquad 3.1.$$

Where μ_i is a utility function, and the subscripts is the index of individuals' types, and $f(i)$ is the density of type i individuals in the population Kaplow (2008).But Stern (1976) heighted the importance of distributive justice in public goods utilization, transforming equation 3.1 to $SW(\chi) = \int \frac{\mu_i\ (\chi)1-e}{1-e}\ f(i)\delta i \qquad e \neq i,$

$$3.2.$$

Where e $\gtrless$ i demonstrates the level of resistance to inequality in the utility level distribution. Thus, e $=$ i demonstrates that social welfare is equal to the total of utilities, taking the limit as e $\longrightarrow \infty$ produces the strongest formulation according to Rawls (1971), which gives the utility of the least wealthy individuals the most weight. But, the eqn 3.2 is not Pareto optimum, yielding $\int lin\ \mu_i\ (\chi)\ f(i)\delta i \qquad\qquad e = 1 ,$

$$3.3$$

Considering that, ceteris paribus, the larger e, the greater the improvement in social welfare as a result of a particular redistribution from a person with higher utility to a person with lower utility. However, Henderson and Quandt (1958), who heavily drew on the Lindahl equilibrium, emphasized that public commodities could not be acquired in the same way as private ones. Hence, no single consumer can purchased more bundles than another, yielding equilibrium

$$f_i(\ p_1, \alpha p_2) = f_j\ [p_1, (1-\alpha)p_2] = g_2\ (p_1,\ p_2\ ) \qquad 3.4.$$

Where the first equality expresses the requirement that each consumer consumes the same amount of the public good, and the second implies that the amount demanded equal the amount supplied.

The assumption that taxes and transfers are a function of people's incomes, which are thought to be observable, is what causes the distortion. The selection of a tax-transfer schedule $T(wl)$ to optimize social welfare is seen as the government's issue. The maximization of t and g by the government can be expressed in Lagrangian form.

$$\int [W(1-t)w((w)+g, i(w)\ )) + \lambda(twl(w) - g - R\ ]\ f(w)\delta w \qquad 3.5$$

Where, R is government revenue ; λ is the shadow price of revenue, referring to the constraint, Taxation, which is here defined as the "shadow price of revenue," is a limitation on how much government may provide in the way of public goods to maximize the utility of its residents. Moreover, taxes are assessed based on how much an individual's income is worth (w).

$$\alpha(w) = \frac{W'\ u_i\ (w)}{\lambda} + tw\ (\frac{\sigma l(w)}{\sigma g}) \qquad\qquad 3.6$$

$\alpha(w)$ is the net social marginal valuation of income of individuals of ability. $\sigma l(w)$ Indicates how much additional (lump-sum) income to an individual of ability w contributes to social welfare. u_i Indicates how much utility rises per consumption and W' indicates the extent to which social welfare increases per unit of utility. $\frac{\sigma l(w)}{\sigma g}$, accounts for the income effect, namely that giving additional lump-sum income to an individual of ability w ,will reduce labor effort $l(w) \frac{\sigma l(w)}{\sigma g\ <0}$, which in turn reduces government tax collections by $t(w)$ per unit reduction in $l(w)$.

The theoretical construct of free rider society leverages on the institutional quality mirrored by the role of government to ensure provision of public good, tax collection and income redistribution.

3.1 Estimation Techniques

The quantile regression is used in this study to model the effects of potential changes in government spending in the social - economic sectors, and budgeted tax revenue to provide public goods. The quantile regression model is a defined solution to minimize the equation for the φth regression quantile, a proxy for free riders' society, such that $0 < \varphi < 1$. This techniques is patterned after the empirical study of [1]Adeleye et al (2022) who synthesized that :

$$Min._{b \in R^k} \left[\Sigma_{t \epsilon(t: \, y_{t \geq x'_{t \, \beta}})} \right] \varphi |y_t - x_{t'} \, \beta_q| + \Sigma_{t \epsilon(t: \, y_{t < x'_{t \, \beta}})} 1 - \varphi |y_t - x_{t'} \, \beta_q| \qquad 3.7$$

Where, y_t = dependent variable; x_t = a $k \times 1$ vector of independent variables

3.2 Empirical Model

The quantile regression is deployed to detect heterogeneous effects of covariance of government expenditure on social - economic services, a proxy of fiscal policy option to explaining different quantiles of free - riders within our sample population. The specification assumes a summary of eqn 3.7, particularly the absolute mean deviation that minimizes over – prediction and under- prediction errors e_t . The median is produced by taking the absolute value and, maybe, minimizing the sum of the asymmetrically weighted absolute residuals. The quantiles would be produced by simply applying different weights to the positive and negative residuals. The validity of the approach won the backing of an empirical investigation (Koenker et al, 2001; Musa et al, 2023).

$$y_t = x_{t'} \, \beta_q \qquad \because Q_q (y_t|x_t) \qquad\qquad 3.8$$

Where y_t is tax evasion proxy of free rider society[2]; $x_{t'}$ is the government expenditure on social services; β_q is a vector of unknown parameter related to the qth quantile. But, the baseline model specification for this study is represented as:

$$Q \ln FRS \, (y_t| \, FPO * ISQ) = \alpha + X' \, (FPO * ISQ)\beta_q + e_t \qquad 3.9$$

The percentage change in median score of free riders' society is explained by fiscal policy option and the interaction effect. In specific terms, a vector of FRS is specified thus:

$$Q \ln FRS \, (y_t| \, T_X Ev \, , \, BT_X \,) = \alpha + X' \, (T_X Ev \, , BT_X \,)\beta_q + e_t \qquad 3.10$$

Where, $Q \ln FRS$ is the natural log of free riders' society measured by tax evasion ($T_X Ev$); and budgeted tax (BT_X) $diferential$

While, the vector of FPO follows:

$$Q \ln FPO \, (y_t| \, GDF, GHT, GRC, GED) = \alpha + X' \, (GDF, GHT, GRC, GED)\beta_q + e_t \quad 3.11$$

Where $GDF \, is$ government expenditure on defense, GHT is government expenditure on health, GRC is government expenditure on road & construction, GED and is government expenditure on education.

The moderating function of ISQ comprised of:

$$Q \ln ISQ \, (y_t| \, CoC, RQ, GE) = \alpha + X' \, (CoC, RQ, GE \,)\beta_q + e_t \qquad 3.12$$

Where $CoC \, is$ control of corruption, RQ is regulatory quality, and GE is government effectiveness.

Adeleye BN, Ogede JS, Rabbani MR, Adam L S, Mazhar M (2022) Moderation analysis of exchange rate, tourism and economic growth in Asia. PLoS ONE 17(12): https://doi.org/ 10.1371/journal.pone.0279937

Free rider society comprised of population of individuals in Nigeria who evade tax liabilities, or indulge in similar act that causes government revenue leakages to provision of public goods.

3.3   Variable explanation, and a priori expectation

Table 1:

Variable	Description	Data Source & measurement	Signs
Tax Evasion (TxEv)	The amount of expected taxes not remitted or received by the tax authority	Computed by the author using data from OECDS for Nigeria (₦' Billion)	N/A
Budgeted Tax (BTx)	The amount of tax revenue proposed in one fiscal year	CBN statistical bulletin, 2019(₦' Billion)	-
Government Expenditure on Health (GEH)	Nigerian expenditure on Health is meant to provide free medical services, and healthcare support .It is therefore a public good	CBN statistical bulletin, 2019.Federal Government Recurrent Expenditure (social & community service) (₦' Billion)	-
Government Expenditure on Education (GED)	Nigerian expenditure on education is meant to provide free schools and academic infrastructure .It is therefore a public good	CBN statistical bulletin, 2019.Federal Government Recurrent Expenditure (social & community service (₦' Billion)	-
Government Expenditure on Road & Construction(GRC)	Nigerian expenditure on road and construction is meant to provide basic infrastructures, it is therefore a public good	CBN statistical bulletin, 2019.Federal Government Recurrent Expenditure (economic services) (₦' Billion)	-
Government Expenditure on Defense (GDF)	Nigerian expenditure on defence is meant to provide social services, it is therefore a public good	CBN statistical bulletin, 2019. Federal Government Recurrent Expenditure (economic service) (₦'Billion)	-
Control of Corruption (CoC)	Extent to which public office holder exploit opportunities of their position for private gain	The Worldwide Governance Indicators (WGI). Percentile rank among all countries (ranges from 0 (lowest) to 100 (highest) rank	+
Regulatory Quality (RQ)	Index of government's ability to formulate and implement private sector friendly policies	The Worldwide Governance Indicators (WGI). Percentile rank among all countries (ranges from 0 (lowest) to 100 (highest) rank	+
Government Effectiveness (GE)	Index of independence of public institutions to make and enforce just and fair policies.	The Worldwide Governance Indicators (WGI). Percentile rank among all countries (ranges from 0 (lowest) to 100 (highest) rank	+

Source: Authors Compilation with data from OECDs (2023); CBN bulletin, WGI, and World development indicator

4.   Results and Discussion

The demonstration of relationship between 'free-rider society' proxy of tax evasion and its explanatory variables is presented at the upper part of Table 4.1 in the form of correlation matrix. The result revealed that degree of association in the principal diagonal is unity, and the off – diagonal relationships depicts an inverse relationship between tax evasion (free - riding) and budgeted tax. Implying that, increasing number of tax evaders decreasing the amount of government budget in Nigeria. Whereas, a positive relationship exist between total government expenditure on social – economic services and tax evasion, implying that increase in government spending on providing

public good create avenue for the growth of free - riders in Nigeria. An inverse relationship exist between tax evasion and institutional quality, suggesting that, increase in control of corruption, regulatory quality attainment, and government effectiveness reduces tax evasion hence, curtailing the growth of 'free – riders society' in Nigeria.

Table 2: Pairwise correlation analysis and summary statistics

	TXEV	BTX	GDF	GHT	GED	GRC	CoC	RQ	GE
TXEV	1								
BTX	-0.701***	1							
GDF	0.839***	0.617***	1						
GHT	0.855***	-0.667***	0.978***	1					
GED	0.882***	-0.673***	0.976***	0.983***	1				
GRC	0.823***	-0.681***	0.867***	0.931***	0.909***	1			
CoC	-0.362***	-0.488***	0.294***	0.361***	0.330**	0.472***	1		
RQ	-0.410***	-0.236***	0.059***	0.127***	0.154***	0.254***	0.477***	1	
GE	-0.031***	-0.075***	-0.060***	-0.039***	-0.024***	-0.115***	0.033***	0.023***	1

Table 3: Summary Statistics

Mean	4004.641	2.24E-06	225.579	154.894	254.110	84.001	11.034	19.672	14.344
Maximum	8679.676	9.12E-06	642.011	423.328	646.745	206.105	19.410	27.010	21.000
Minimum	434.000	2.08E-06	43.402	15.2108	39.880	4.995	0.500	7.800	8.600
Std. Dev.	2778.414	2.47E-06	183.728	120.563	181.663	64.658	4.250	5.538	2.801
Observations	21	21	21	21	21	21	21	21	21

Note: $***\ p < 0.1$; TXEV = tax evasion; BTX= budgeted tax; GDF=government expenditure on defense; GHT= government expenditure on health; GRC= government expenditure on road and construction; CoC= control of corruption; RQ= regulatory quality; GE= government effectiveness. 2.24E-06= 2,240,000.00; 9, 12E-06 = 9,120,000.00; 2.08E-07= 2,080,000.00; 2.47E-06=2,470,000.00.

Source: Authors' Computations.

The lower part of the Table 4.1 showed the summary behavior of explanatory variables to variation in tax evasion. The report revealed a widening gap between mean score of tax evasion (TxEv) and scores of budgeted tax, government expenditure on economic and social services, as well as institutional quality proxies. Likewise, the between standard deviation, suggesting a larger differential in conditional median expectations of sample variables.

4.1 Empirical Result and Discussion

Table 4.2 demonstrates the computed summary result of quantile regression, quantile slope equity test; and quantile process estimate respectively. The computation result assumed a norm at 25th, 50th and 75th quantile across the sample variables.

Table 4: Quantile Regression Result. (Dep Var.: TxEv.)

Variable	Location	Scales	q 25	q 50	q 75
BTx	-1.016***	0.097***	-0.952*	-1.016*	-0.981**
	(0.0000)	(0.4180)	(0.0000)	(0.0000)	(0.0000)
GDF	-3.810***	-4.040**	-3.370**	-3.810**	-1.430**
	(0.9620)	(0.7506)	(0.7224)	(0.9620)	(0.8561)
GHT	7.540***	-2.880***	3.170***	7.540***	9.040***
	(0.7383)	(0.9304)	(0.7532)	(0.7383)	(0.6874)

Variable	Location	Scales	q 25	q 50	q 75
GRC	-1.010****	4.420***	-4.840**	-1.010**	-1.100**
	(0.3496)	(0.7739)	(0.4898)	(0.3496)	(0.3129)
GED	-1.160***	4.980***	4.580***	-1.160**	-1.910**
	(0.8720)	(0.6507)	(0.4862)	(0.8720)	(0.7739)
CoC	1.950***	-1.690**	-1.930**	1.950***	4.160***
	(0.5910)	(0.7582)	(0.6886)	(0.5910)	(0.2620)
RQ	1.940***	-5.110***	3.580***	1.940***	-1.590**
	(0.5524)	(0.4801)	(0.9644)	(0.5523)	(0.6482)
GE	-1.660***	-8.670***	-2.510**	-1.660**	-1.680**
	(0.6647)	(0.9074)	(0.7670)	(0.6647)	(0.6544)
FPO	-4.340***	-9.270***	-5.270***	-4.340***	-4.040***
	(0.1209)	(0.7096)	(0.0709)	(0.1209)	(0.0890)
Interaction (A*B)	1.730***	3.690***	2.100***	1.730***	1.480***
	(0.1015)	(0.6924)	(0.0555)	(0.1015)	(0.1034)
Constant	-1.110***	3.160***	-1.150**	-1.110**	2.100***
	(0.8855)	(0.8192)	(0.9359)	(0.8855)	(0.78950)
Observations	21	21	21	21	21

Note: $*** \ p < 0.01; ** \ p < 0.05 \ ; and \ p < 0.1$; TXEV = tax evasion; BTX= budgeted tax; GDF=government expenditure on defense; GHT= government expenditure on health; GRC= government expenditure on road and construction; CoC= control of corruption; RQ= regulatory quality; GE= government effectiveness. (A*B) = (GDF*GHT*GRC*GED)*(CoC*RQ*GE); Fiscal Policy Option (FPO) = GDF*GHT*GRC*GED.

Source: Authors' Computations

The budgeted tax coefficient significantly decreases with increase in tax evasion (TxEv) at 25th, 50th and 75th quantiles; depicting growth of free- riders, on average, ceteris paribus. Table 4.2 also confirmed increased government expenditure on defense (GDF) significantly reduces tax evasion at 25th and 50th quantiles but decreases in impact at 75th quantile. The finding suggest that consumers of public good through national defense considers to pay tax so as to enjoy more benefits of it at the short run; and decreases their tax liability commitments as more money are devoted to ensuring national security stability. Likewise, the government expenditure on health which was reported to have a positive insignificant relationship with tax evasion at 1 percent significant level indicates the greater the increase in expenditure on health, the more the tax evasion at 25th, 50th and 75th quantile. People believed, on average, the burden of provision of public health in the form of primary health care services, free medical services and social insurance should be strictly borne by government. Our finding is consistent with empirical evidence of Greenspan and Vogel (1980).

Also, the Table 4.2 indicates a negative significant relationship of government expenditure on road and construction at 10% significant level. But, the coefficients of GRC decreases across 25th and 50th quantiles, and marginally increases at 75th quantile. Hence, government expenditure on road and construction decreases the degree of tax evasion. Since, provision of good road network creates avenue for road workers union, and other formal and informal road tax collectors to increase tax collection on the road. But, the remittance to the national tax authority, known as, Federal Inland Revenue Services create a distortion where most road taxes are either not remitted or partially remitted.

Government expenditure on education is positive at 25th quantile, and negative at 50th and 75th quantiles respectively. This implies, early expenditure on education creates greater chances of free riding particularly, when the education services is made free, citizens may not see the burden of paying for the cost of education , and evade taxes. Whereas, when less of expenditure is endowed for free education, people will pay more to get better education , by so doing, reduces tax evasion as well as free riding.

The coefficient of control of corruption were negative at 25th quantile, positive at 50th and 75th quantiles, implying that extent to public office holders perform their legitimate duties without

regards to undue private advantages decreases the chances of tax evasion and free ridding. But, the moment control of corruption diminishes, tax evasion and free ridding increases. This report corroborate with findings of Němec et al (2021), who affirmed that control of corruption significantly diminishes tax evasion

Additionally, the coefficient of regulatory quality were positive but decreasing in the 25th and 50th quantiles except, the 75th quintile which was negative. Implying that increase in regulatory quality is favourable for tax evasion since government's private sector friendly policies may result in private sector tax dodging .But when such policies are moderate and growth driven, private sector will be motivated to pay up their tax liabilities.

As for the government effectiveness, the finding revealed a negative relationship across the quantiles. Indicating the effectiveness of government policy implementations to curbing tax evasion, and free - riding. Ahmed Bani-Mustafa et al (2022) study also reported that government efficiency through control of corruption decreases the tax evasion.

Furthermore, Table 4.3 demonstrate the additive impact of fiscal policy option on curbing free ridding proxy of tax evasion. The coefficient of fiscal policy option inversely impact tax evasion across all the quantiles. Indicating that, the combine effect of government expenditure on economic – social services adversely impact on tax evasion. Aumeerun et al (2016) reported a negative relationship of tax evasion and government spending in sub Saharan Africa.

But, the coefficient of interaction were positive in all quantiles. Implying that the nexus between fiscal policy option and free riders' society is effectively moderated by institutional quality though with specific focus on control of corruption as a major challenge. Simply because, Nigeria's economy needs to focus more on building strong institution free of corruption to be able to effectively curtail the growth of free riders via tax evasion. Corollary to our finding is the study of Temsumrit (2022) who argued that the level of institutional quality determines the extent of fiscal policy success and accounts for why most developing countries are challenged by unstable democratic governments and weak institutions.

The figure 1 comprised of 10 panels showing the trend lines of variables and constant used in our analysis. The budgeted tax received (BTx), government expenditure on deference (GED), government expenditure on road & construction (GRC), and the summation of fiscal policy option show consist negative impact in all quantiles, and decreasing trend with free rider. The figure also denote inconsistent positive impact across quantiles with respect to government expenditure on health (GHT),government expenditure on education (GED), and government effectiveness (GE).
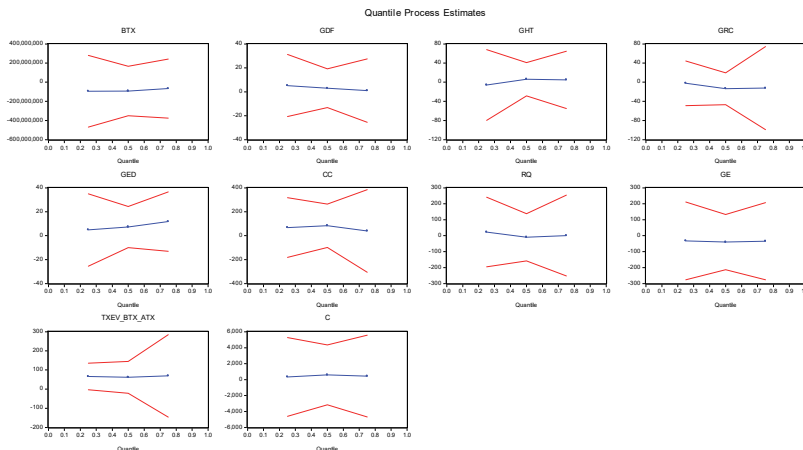
Figure 1. The Impact of fiscal policy option, and institutional quality on free rider society
Source: Authors' Computation (2023).

4.2 Post Diagnostic Robustness Check

The post estimation check is conducted with Jacque – Bera test of normality. Our sample distribution across different quantiles may not be subject to assumption of normality as in OLS. But for the sake of credibility, we hypothesized normality at 0.05 level of significance.
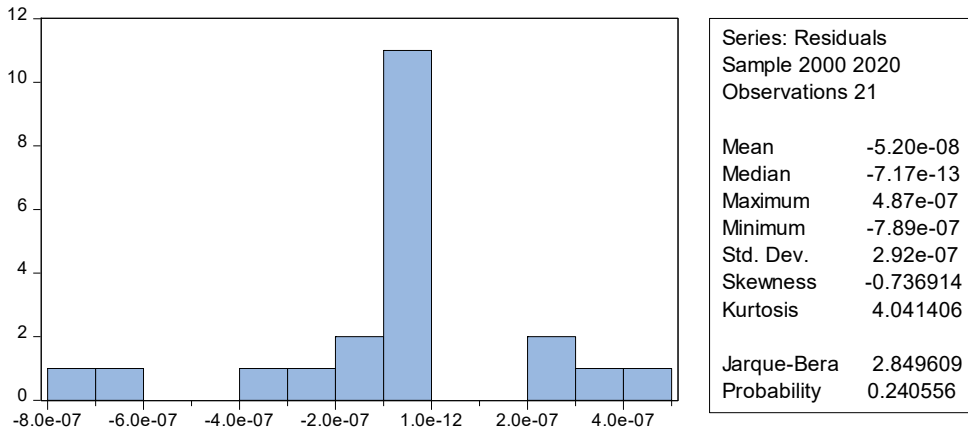
Figure 2. Test of Normality using Jarque –Bera Statistic
Source: Authors' Computation (2023).

The result of Figure 2 shows normality of our data series given ($\alpha = 0.24; p > 0.05$), we do not reject the null hypothesis of normal distribution.

5. Conclusion and Policy Recommendations

The study is unique in its kind, as it discussed empirically the role fiscal policy tool as well as the institutional quality function to curtail free - riding in our society. To the best of our knowledge, we adopted the first approach that shows transparency in display of revenue and expenditure in reducing free riders by mapping the nexus between institutional quality and free - riding in empirical studies. And, our result showed an adverse impact of tax evasion, or to an extent free- riding on budgeted tax revenue. Growth of tax evaders or free riders significantly dampened the tax expectations of government in the future time period. Implying a constant negative variance for the expected annual income. Our findings also showed that increased government expenditure on defense significantly reduces free - riding momentarily. As consumers has the tendency to free ride in the longer period of time. This is akin to the study (Zycher,2022) who affirmed that democratic government has little incentive to provide national security since majority decision are focused more on basic necessity; limiting the public choice of national defense and security. Our analysis also demonstrated that government expenditure on health favours free riders. Implying that, the more social insurance cost is reduced, free medical services are increased at little or no cost, the more it increases the opportunity cost of government expenditure. This argument is corroborated by Greenspan and Vogel (1980) who discovered that tax subsidies on the price of health care in United States, increases the Medicare and Medicaid programs' access to beneficiaries. Furthermore, government expenditure on road & construction discourages free-riding via tax evasion. Public spending on road and construction provides source of revenue generation through road taxes, toll gates, Motor Park tolls, vehicle registration and vehicle licenses etc.

Besides, government expenditure on education decreases free - riding when beneficiaries are

subjected to educational taxes and fees but may result in growth of free - riders in the long period. Consequently, consumers are not willing to consume above certain amount of education which their income can carry, and any provision by government above consumers' income level creates incentives to free - riding. This conclusion share link with the finding (Ali Uyar et al; 2022) who concluded that quality education provided with increasing tax received expenditure reduces tax evasion.

This study also examine the role of institutional quality expressed in the form control of corruption (CC).The results first showed a reduction in free riding with strong control measures on corrupt practices , later demonstrated that danger of free- riding may grow unabated with slacks in fight against corruption and economic crimes. Regulatory quality is another crucial issue, from our findings, improvement in regulatory quality in terms private sector soft policies other than increasing growth, creates incentive for private sector to evade tax and indulge in free- riding. But, with stringent adjustment in policy thrust, tax evasion will dampened.

The government effectiveness with respect to independence of public institutions to make and enforce tax compliance, reduces free riding; and while, the use of fiscal policy option show a total decreasing impact on free - riding. On the interaction effect, the synergistic impact of government expenditure and institutional quality elicits significant response on free riding.

Based on the findings, the following recommendations are made on best strategies on how to utilized fiscal policy option to curb population of free riders especially in Nigeria: (1). Greater proportion of government annual proposed budget should be premised on estimated tax revenue than leveraging on borrowing. Implying that, more attention must be given to revenue generation through taxation and other statutory medium rather than public debt tool (2). Government should exploit alternative non – tax mechanism, such as, national – quarterly donation, appeal funds and contributions to the military in order to curb free riding on national defense. (3). Government should pursue revenue potential polices such as, Compulsory Citizenship Health Contributory Plan to give easy access to beneficiaries, and stall proliferation of free riding. (4). A QR code digitalized payment mechanism (in-build data recording technology to eliminate cash-electronic sales suppression) should be deployed by revenue generation agency of government to curtail leakages arising from transport, union and road workers. (5). A special purpose vehicle from Federal Inland Revenue Service should be created as a 'fiscal control unit', to monitor electronic cash registers connected to hospitals, public schools and social services related departments in order to curb tax leakages due to free riders. (6). Government should strengthen the campaign in favour of control of corruption as well as building strong institutions; rather than building strong private individuals who posed as sacred cow in punishment for tax evasion. (7). Government can give award and recognition to the opportunity based entrepreneurs. (8) Investment in Special Purpose Vehicle should be based on transparency rule; transparency in the revenue collection and expenditure. (9) Award should be given to big tax payers. (10) Tax rebate should be allowed to entrepreneurs to subsidize cost.

References

Adeleye, B.N., Ogede, J.S., Rabbani, M.R., Adam, L.S., & Mazhar, M. (2022) Moderation analysis of exchange rate, tourism and economic growth in Asia. PLoS ONE 17(12): https://doi.org/ 10.1371/journal.pone.0279937

Ali Uyar, R. B., Khalil, N. & Friedrich , S. (2022). Education, Digitalization and Tax Evasion: International Evidence, *International Journal of Public Administration*, n(n) DOI: 10.1080/01900692.2022.2082471

Ahmed Bani-Mustafa, Khalil Nimer, Ali Uyar & Friedrich Schneider (2022) Effect of Government Efficiency on Tax Evasion: The Mediating Role of Ethics and Control of Corruption, International Journal of Public Administration, DOI: 10.1080/01900692.2022.2086262

Anderson, W., Wallace, M. S., & Warner, J. T. (1986). Government Spending and Taxation: What Causes What? Southern Economic Journal, 52(3), 630. doi:10.2307/1059262

Angela, K. (2021). Public Goods as Obligatory Bridges between the Public and the Private, Philosophical Papers, 50:3, 387-405, DOI: 10.1080/05568641.2022.2046494

Ashraf, M. (2004). A critical look at the use of group projects as a pedagogical tool. *Journal of Education for Business, 7*(9), 213-216.

Aumeerun, B., Jugurnath, B., & Soondrum, H. (2016). Tax evasion: Empirical evidence from sub-Saharan Africa. Journal of Accounting and Taxation, 8(7), 70-80.

Barro, R.J. (1974). Are Government Bonds Net Wealth? *Journal of Political Economy*, n(n), 1095-1118.

Cordelia, O., and Opeyemi, A. (2022) . Direct Taxes and Agricultural Finance. *Folia Oeconomica Stetinensia* 22(2), pages 180-192.Crossref

Doan, H. (2019). Trade, Institutional Quality and Income: Empirical Evidence for Sub-Saharan Africa, *Economies* 7(2) 48(1). https://doi.org/10.3390/economies7020048

Dougherty, K.L. (2003). Madison's theory of public goods. In S. Kernell (Ed.), *James Madison: the theory and practice of government.* Stanford: Stanford University Press.

Feinstein, J. S. (1991). *An Econometric Analysis of Income Tax Evasion and Its Detection. The RAND Journal of Economics, 22(1), 14.* doi:10.2307/2601005

Foley, D. (1970). Lindahl's solution and the core of an economy with public goods. *Econometrica* 38(1), 66–72.

Frey, B. S., & Torgler, B. (2007). Tax Morale and Conditional Cooperation. Journal of Comparative Economics, 35(1), 136–159.

Friedman, M.(1972). *An Economist's Protest.* New Jersey: Thomas Horton and Company

Gërxhani, k. and Wintrobe, (2021).Understanding Tax Evasion: Combining the Public Choice and New Institutionalist Perspectives. Havry and lyshyn (eds.), *The Palgrave Handbook of Comparative Economics.* https://doi.org/10.1007/978-3-030-50888-3_30

Greenspan, NT., and Vogel, RJ. (1980). Taxation and its effect upon public and private health insurance and medical demand. Health Care Finance Rev. *Springer;* 1(4):39-45. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4191128/

Hardin, G. (1968). The tragedy of the commons, *Science* 16(2), 1243-1248

Henderson, J.M. and Quandt, R. E (1958). Microeconomic Theory: A Mathematical Approach. NY: McGraw-Hill Book Company, Inc.

Jeremiah, K. (2021). How government denies self of N5.26tr tax revenue. Abuja, Nigeria: The Guardian publication. Available at: https://guardian.ng/news/how-government-denies-self-of-n5-26tr-tax-revenue/

JSanz-Sanz, J. F (2022). A full-fledged analytical model for the Laffer curve in personal income taxation, Economic Analysis and Policy, 73 (1), 795-811. https://doi.org/10.1016/j.eap.2022.01.008

Kalu, E. I (2022). Elusive Growth and Development in Nigeria: What did we do wrong? An Inaugural lecture: University of Port Harcourt. Choba: University of Port Harcourt printing pr4ss limited. ISSN: 1119-9849.Availbel at: https://www.uniport.edu.ng/publications/pub1/inaugural.html

Kaplow, L. The (2008).Theory of Taxation and Public Economics. Princeton, New Jersey:

Kerr, N. L., & Bruun, S. E. (1983). Dispensability of member effort and group motivation losses: Free rider effects. *Journal of Personality and Social Psychology, 4(4),* 78-94

Koenker, R., and Kevin, F. H. (2001). Quantile Regression. *Journal of Economic Perspectives*, 15 (4): 143-156.DOI: 10.1257/jep.15.4.143

Lemieux, P. (2015). The Economics of Tax Dodging. Econlib Publication. Available at: https://www.econlib.org/library/Columns/y2015/Lemieuxtaxdodging.html

Lindahl, E. (1919). *Die Gerechtigkeit der Besteuering*. Lund: Gleerup. Part I, ch. 4, 'Positive Lösung', trans. E. Henderson and reprinted as 'Just taxation – A positive solution'. In *Classics in the Theory of Public Finance*, ed. R.A. Musgrave and A.T. Peacock: Macmillan, 1958.

Marwell, G., & Ames, R. E. (1981). *Economists free ride, does anyone else? Journal of Public Economics, 15(3), 295–310.* doi:10.1016/0047-2727(81)90013-x

Montenegro, T.M. (2021) Tax Evasion, Corporate Social Responsibility and National Governance: A Country-Level Study. *Sustainability*; 13(20), 11-16. https://doi.org/10.3390/su132011166

Muench, T. (1972). The core and the Lindahl equilibrium of an economy with a public good: An example. *Journal of Economic Theory* 4(1), 241–255.

Muhrtala, O. T., & Ogundeji, M. (2013). Professionals' Perspective of Tax Evasion: Some Evidence from Nigeria. *Universal Journal of Accounting and Finance 1*(2), 35–41. https://doi.org/10.13189/ujaf.2013.010201

Musa, K.; Sohag, K.; Said, J.; Ghapar, F.; and Ali, N.(2023). Public Debt, Governance, and Growth in Developing Countries: An Application of Quantile via Moments. *Mathematics,11* (3), 650. https://doi.org/10.3390/math11030650

Musgrave, R.A. (1959). The Theory of Public Finance: A Study in Public Economy. McGraw-Hill. [Google Scholar]

Němec, Daniel, Eva Kotlánová, Igor Kotlán, and Zuzana Machová. (2021). Corruption, Taxation and the Impact on the Shadow Economy, Economies 9(1), 18. https://doi.org/10.3390/economies9010018

OECD (2022). Fighting tax evasion. Organization for Economic Cooperation and Developments. Centre for Tax Policy and Administration. https://www.oecd.org/ctp/fightingtaxevasion.htm

OECDs (2023). Tax Revenue Statistics- Organization for economic cooperation and development. Available at : Data extracted on 08 Feb 2023 15:28 UTC (GMT) from OECD.Stat

Okowa, W.J. (1996). How the Tropics Underdeveloped the Negroes: A questioning Theory of Development. Port Harcourt: Paragrahics publications limited. ISBN: 978-2954-00-4

Olivier Blanchard, Roberto Perotti, An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output, *The Quarterly Journal of Economics*, Volume 117, Issue 4, November 2002, Pages 1329–1368, https://doi.org/10.1162/003355302320935043

Olson, M. Jr. (1968).*The logic of collective action: Public goods and the theory of groups*. NY: Schocken Books Publication

Owusu, G. M. Y., Bekoe, R. A., Anokye, F. K., & Anyetei, L. (2019). What Factors Influence the Intentions of Individuals to Engage in Tax Evasion? Evidence from Ghana. *International Journal of Public Administration, 43*(13), 1143–1155. https://doi.org/10.1080/01900692.2019.1665686

Pigou AC (1932). The Economics of Welfare, (4th ed.). London, UK: Macmillan Press. Princeton University Press

Rawls, J. (1971). A Theory of Justice. Cambridge, Mass: Belknap Press.

Roberts, J. (2018). Lindahl Equilibrium. In: The New Palgrave Dictionary of Economics. Palgrave Macmillan, London. https://doi.org/10.1057/978-1-349-95189-5_789

Rodriguez, P., Uhlenbruck, K., & Eden, L. (2005). Government corruption and the entry strategies of multinationals. *Academy of Management Review*, 30(2), 383–396. doi:10.5465/amr.2005.16387894

Sachs, J. (2005). The End of Poverty: Economic Possibilities for our Time. Penguin Press. [Google Scholar]

Salawu, R.O. (2005). *Essential of Public Finance*. Ile-Ife: Obafemi Awolowo University Press Limited. ISBN 978-136-145-X.

Samuelson, P. A. (1955). Diagrammatic Exposition of a Theory of Public Expenditure. *The Review of Economics and Statistics*, 37(4), 350–356. https://doi.org/10.2307/1925849

Samuelson, P.A. (1954). The Pure Theory of Public Expenditure. The Review of Economics and Statistics, 36(4), 387. [Crossref], [Web of Science ®], [Google Scholar]

Sen, A. (1979). Utilitarianism and Welfarism. *Journal of Philosophy* 7(6), 463–489

Sen, A. (1976). Poverty: An Ordinal Approach to Measurement. *Econometrica* 44, 219–231.

Stern, N. H. (1976). On the Specification of Models of Optimum Income Taxation. *Journal of Public Economics 6*, 23–162

Temsumrit, N.(2022). Democracy, institutional quality and fiscal policy cycle: Evidence from developing countries. *Applied Economics, Taylor & Francis Journals* 54(1), 75–98. [Google Scholar] [CrossRef]

Whalen, J. (2020). Tax cheats deprive governments worldwide of $427 billion a year, crippling pandemic response. Washington: Washington Post.Availableat:https://www.washingtonpost.com/us-policy/2020/11/19/global-tax-evasion-data/

Zycher, B. (2022).Government Policy, the Economics of Special Markets. Available at: https://www.econlib.org/library/Enc/Defense.html