

# Analysis of Fiscal Decentralization and Public Service Delivery in Nigeria

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## Abstract

The study assessed the effects of fiscal decentralization on public service delivery in Nigeria. This was with a view to analyzing the influence of fiscal decentralization on health and educational service delivery in Nigeria between 1999 and 2012. Cross sectional (secondary) sources of data was utilized which covered the period of 1999 to 2012. Data on transfer from federal government (*tr*), internally generated revenue (*igr*), loans and grants (*or*), states' *GDP* (*Y*), human development index (*hdi*), access to health (*hel*), access to education (*edu*), fully vaccinated children (*fv*) and rate of enrolment for primary education (*pne*) were obtained from the annual statistical bulletin published by the Central Bank of Nigeria and Core Welfare Indicators published by the National Bureau of Statistics. Two core components of public services (*Health and Education*) were analyzed, and a total of thirty six states in Nigeria including Federal Capital Territory were used. Stata 10.0 Software were used for the estimation; data were analyzed using descriptive and econometric technique. The results showed that fiscal decentralization had significant positive effects on educational service delivery ( $t=2.3$ ,  $p<0.05$ ); conversely, fiscal decentralization had insignificant and negative effects on health service delivery in Nigeria ( $t=1.18$ ,  $p>0.05$ ). Also, internally generated revenue was statistically equal to zero and contributed negatively to public service delivery in Nigeria ( $t=1.44$ ,  $p>0.05$ ). The study concluded that there is need to increase states government revenue autonomy in order to meet their expenditure responsibility functions of providing qualitative public services.

**Keywords:** Fiscal Decentralization, Public Service Delivery, Health, Education, States Government and Nigeria.

## 1. Introduction

It has long been recognized that governments differ significantly in the delivery of public services (Tanzi and Schuknecht, 1998). Some are extremely wasteful and ineffective in the delivery of these services, whereas others achieve their objectives in a systematic and comprehensive way. The strive to improve the delivery of public services has spawned a vigorous theoretical literature on channels that may affect it, with a quite prominent one being the design of fiscal relation across the levels of government (Antonis, Manthos and Kammas, 2008). During the past two decades, a silent revolution in public sector governance has swept across the globe. This revolution aimed to move decision making for local public services closer to the people (Shah and Thompson, 2004). Thus, decentralization has become a key issue in development policy in the last two decades.

*Decentralization* is a process of transitioning from a governance structure in which power is concentrated at the federal level to one in which authority to make decisions and implement them is shifted to lower level of governments or agencies. It consists of transfer of public functions from higher tiers to sub-national levels of governance. Anyanwu (1999) defined decentralization as the political-administrative arrangement entailing the transfer of the authority to plan, make decisions and manage public functions from the federal government to subordinate organization, agencies or units of government, either geographically or structurally. The concept can be mirrored as stages along a continuum differentiated by the types and degrees of autonomy exercisable by the lower layers of authority within a country. At the lower end, there is more administrative or bureaucratic delegation or devolution of fiscal and service delivery functions by the federal government to states government. At the upper end, there is a situation where the lower tiers of government enjoy clear-cut statutory autonomy of governance within the framework of constitutionally-enshrined or legislated sharing of fiscal power and responsibilities.

Government may have many reasons for decentralizing. The main reason here is to improve the delivery of public services. Conventionally, there are three types of decentralization (IDHR, 2001): "*Deconcentration*" is the weakest form, it means shifting of responsibilities to local administrators who are closely supervised by federal government. "*Delegation*" involves transferring of decision-making and administration to semi-autonomous organizations (e.g. public corporations). "*Devolution*" is the strongest form and entails transferring some authority for decision-making, finance, and management. In this case, states government can elect their own leaders, raise their own revenue and make their own investment decisions.

Thus, decentralization can be *administrative* (transfer of civil servants and public functions to the lower level), *fiscal* (devolution of fiscal resources and revenue generating powers), *political* (devolution of

decision-making powers), Jutting et. al. 2005. In economics, the focus is on fiscal resources, revenue generating powers and expenditure responsibilities at the states government levels in order to finance adequately the delivery of public services. In theory, fiscal decentralization can be a powerful tool for initiating improvements in policies for the citizens. Effective fiscal decentralization results in democratic institutions in which the poor can effectively participate and lobby for their interests. Improved knowledge also leads to better matching of local needs and better policies. All these lead to improve access to public services, better quality and targeting of those services (Jutting et. al. 2005).

It has been demonstrated that there is strong correlation between a country's prosperity and the quality of its public sector; without effective and efficient fiscal decentralization, government will be unable to translate its vision and aspirations into sound policies (Eboh, 2009). A key function of government is to provide essential services. Despite the emerging consensus on Nigeria's need to rely more on the private sector, there is certainly a case for governments at all levels to continue participating in the provision of certain services. The questions of what the government should provide in terms of services will necessarily depend on a country's circumstances and its stages of development. However, the general consensus from the point of view of citizens' rights, is that government ought to be active in such basic services such as health and education. Public services constitute an important foundation for growth and development in any economy.

One of the most important and enduring competitive advantages that a country can have in this era of globalization is an effective, dynamic and responsive public service. "*Public service delivery*" means the provision of affordable, accessible, qualitative and effective basic amenities to the citizens. Kimenyi and Shughart (2006) defined public services as those services such as national defence, that are non-excludable, non-rival and indivisible both in production and consumption. Public services can be divided into two category; social and economic services, social services consists of those services that yield benefits to the recipients, for instance health and education, while economic services are those services that generate returns to the provider; for example; housing, agriculture, transportation and communication network. Government also frequently intervenes in the delivery of improved public services that are only partially rival or partially excludable. Government delivery is justified on the basis of equity and efficient delivery to the end users.

Nigeria is characterized by an inadequate and poor social services, partly accounting for the low life expectancy, high infant mortality rate and high level of illiteracy, which in turn retards growth and development (World Bank, 2005 and Okojie, 2009). In Nigeria, decentralization is entrenched in the constitution. In practice however, the country has not realized its expectations of improved service delivery. Nigeria's experience of decentralization suggests that states government have failed to deliver effective, qualitative and affordable public services to the citizens. In this respect, there was over concentration of political and financial powers as well as human resources at the federal level to the detriment of states government; decentralization has been used by ruling parties at the federal level to renew or consolidate their power and influence at the state level. Due to inadequate finance and insufficient tax power, states government in Nigeria depend heavily on federal government for funds; in a nutshell, the creation of states has not led to effective fiscal decentralization (Okojie, 2009).

In Nigeria, fiscal decentralization is entrenched in the constitution. In practice however, the country has not realized its expectations of improved service delivery. The experience of fiscal decentralization in the country showed that the constituents units of government that make-up the federation have failed to deliver effective, qualitative and affordable public services for their citizens. For instance, there is a consensus that geographical access to health care facilities is generally inadequate. The Structural Adjustment era led to the reduction of public funding for social sector. As a result, Nigerian health care is now largely characterized by underfunding and shortages of drugs, equipment and skilled personnel. The emigration of Nigerian doctors and nurses to other countries, helps explaining the personnel shortages. Furthermore, the health care system shows spatial variation in terms of availability. The citizens have to contend with long distances before they can access health facilities. Consequently, there is persistent high infant mortality rate, as well as diseases in epidemic proportions (Okojie, 2009).

The infant mortality rate was 110 per 1000 live births in 2005, while the under-five mortality rate was 197 per 1000 live births in 2005. Maternal mortality rate remains high at 800 per 100,000 live births (National Planning Commission 2007a). Since 1999, substantial amounts of resources have accrued to the states government and that has presented tremendous opportunities for service delivery. For instance, government revenue as a percentage of GDP rose from 16.3 percent in 1998 to 19.8 percent in 2003 and 20.4 percent in 2005. In practice, however, the country has not realized its expectations of improved health and education service delivery. The primary health care program is the cornerstone of the health policy and is expected to raise life expectancy to 60 years. Nonetheless, these targets have not been met. A nation's health care system is an indicator of its citizens' well-being. Nevertheless, health care services in the country have been poor and are often characterized by inefficiency, low and deteriorating quality and waste. This is in addition to the fact that government spending on health is very low vis-à-vis the recommendation of the World Health

Organization(WHO). Although Nigeria is making reasonable progress in increasing its citizens' access to health care, the social indicators show that the country is still one of the world's poorest when assessed on standard health indicators (The World Bank 1996; Central Bank of Nigeria 1999; Obadan et. al. 2004).

In the same vein, the educational system in Nigeria also experienced a deep crisis for several years and has fallen into a deplorable condition in the last two decades. The adult literacy rate was relatively poor at 57 percent in 1999. A recent Education For All Global Monitoring Report for 2009 noted that Nigeria had the highest number of out-of-school children (over 8 million in 2004-2005, 23 percent of Sub-Saharan Africa's total). There is little progress given the current trends (7.6 million children are still projected to be out-of-school in 2015). Although net enrolment rates have increased, they still below the African regional average. The quality of education has fallen significantly at all levels. This is especially at the tertiary level, which witnessed a phenomenal brain-drain to other parts of the world. The federal government, in order to address the declining rate in the education sector; packaged a set of objectives for the education system, which include the eradication of illiteracy by 2010 and the acquisition of science and technology education and its effective application. The measures employed to achieve the objectives are intended to reposition the education system to adequately play its role as a fundamental instrument for accelerating national development. So far the measures have not revived the education sector due to lack of adequate planning and poor implementation of the National Policy on Education (Adebayo, 2007).

Basic services, such as education and health care facilities are the responsibilities of the government and are systematically failing the people who need them most (i.e. the citizens). Sound education and qualitative health care are all fundamental for human development and well-being. Yet as the National Bureau of Statistics (2010) demonstrated, the provision of these vital services are facing a lot of difficulties. For instance, funding is misappropriated, service providers do not report to work, building for schools and hospital equipment are in need of repair, basic materials for the provision of good health and teaching devices are missing.

To this end, empirical evidence to justify or discredit the pursuit of fiscal decentralization in Nigeria is scant and mixed. None of the claims on either extreme, that fiscal decentralization retards the delivery of public service and has a variety of undesirable macroeconomic effects; or that it improves the delivery of public services and enhances economic growth has not been adequately examined, particularly using cross sectional data across the 36 states of the federation, hence this study.

In order to put the study in the right perspective, the pertinent issue raised for investigation is, does fiscal decentralization improve or retard the productive and allocative efficiency of public service delivery? In this wise, the objective of this study is to assess empirically the influence of fiscal decentralization on public service delivery in Nigeria.

The paper is organized into five section; in section one, we present a brief overview of the theoretical introduction, research problem, scope and plan underlying our study. Section two is devoted to the review of existing literature on the subject matter. Section three presents the theoretical framework and model specification while section four covered the empirical evidence of the nexus between fiscal decentralization and public service delivery on health and education in Nigeria, using Stata 10.0 software. Section five concludes the paper.

## **2. Literature Review**

In the literature, there is lack of consensus on the effects of fiscal decentralization on public service delivery; particularly in Nigeria. A school of thought argued that fiscal decentralization holds great promise in improving the delivery of public services (Alderman, 1998; Bardhan and Mookerjee, 2003; Eskeland and Filmer, 2002; Faguet 2001, Enikolopov and Zhuravskaya, 2003). Some argued contrarily that devolution of revenue generating powers and expenditure responsibilities to states government lead to sub-optimal delivery of public services (Ravallion, 1998; Azfar and Livingston, 2002; and West and Wong, 1995), regrettably, neither side is able to substantiate its arguments convincingly with empirical evidence; others argued that the nexus between fiscal decentralization and public service delivery is ambiguous and inconclusive (Azfar et. al. 2000; Khaleghian, 2003 and Winkler and Rounds, 1996). In this respect, the section is structured into three segments; one segment deals with evidence from developed economies, another segment deals with evidence from developing economies, while the last segment deals with evidence from Nigeria economy.

### **2.1 Evidence from Developed Economies**

Robalino, Picazo and Voetberg (2001) provide one of the few cross-country studies for industrial economies. In their study they regressed infant mortality on the ratio of expenditure managed by local governments relative to that managed by the central government. They also introduce a few control variables, which refer to institutional capacity, such as political, civil rights and corruption. These variables allow the authors to control the quality of political institutions. Without reference to the actual use of inputs, however, one cannot perform a thorough assessment of production efficiency with the partial exemption of GDP. The results showed that outcomes are positively correlated with decentralization. They also showed that the marginal effects of decentralization

diminish as GDP increases. This finding, if validated with other empirical evidence, would be an interesting result. It would mean that when countries grow, their institutional capacity increases and thus the advantages of decentralization are likely to vanish because the presumed differences between central and local government of public affairs disappear.

Dunn and Wetzel (2001) examine the uneven progress on fiscal decentralization and key challenges to effective decentralization in the transition economies in Europe and Central Asia countries. They adopted a traditional approach that focuses on different structural elements that together make up a system of effective fiscal relations. The common measure of fiscal decentralization which is the share of sub-national spending in total government spending, on average about 25 percent among the transition countries, has varied from 15 percent in Albania and Macedonia to over 50 percent in Russia and Kazakhstan. This standard however, fails to take into account the effective decision making authority of sub-national governments. It also does not take into account whether sub-national governments have the financial resources required to meet their assigned role of service delivery.

Akai and Sakata (2004) analyze US state level panel data and found a negative influence of fiscal system on service delivery. The studies of Lessman (2006) and Akai and Sakata (2004) are synonymous but the main difference is that for the study of Lessman (2006) a panel data set of OECD countries was compiled, while Akai and Sakata 2004 used panel data of US states. Their approach has the advantage of analyzing relatively homogenous regions within the US state, perhaps the connection of fiscal decentralization and service delivery is US-country-specific and therefore, these results cannot be generalized for other countries.

## 2.2 Evidence from Developing Economies

Collins and Green (1994) Bardhan and Mookherjee (1998) and (2000) and Prud'homme; (1995), argue that decentralized systems, particularly those without well-functioning democratic systems, could lower local citizen welfare through a higher degree of corruption or leakage of resources than centralized systems. Some have argued that imperfections in local delivery of public service may offset the potential benefits of decentralization. Oates (1999) and Inman and Rubin-feld (1997) carried out a comprehensive review of the advantages and disadvantages of decentralization in the fiscal federalism literature. Fisman and Gatti (2000), using cross national data, found that fiscal decentralization is associated with lower levels of corruption, although no attempt is made to determine if the relationship is causal or simply associative. Other studies have split on the issue of decentralization and corruption. Wade (1997), using data from India, found that centralization was associated with higher levels of corruption in the irrigation sector; Brueckner (1999) found that corruption was more likely in local governments, in this regard, the benefits of decentralized service delivery system to the sub-national government will be completely eroded .

Campbell (2001) highlights the extraordinary scope of authority and resources that have been decentralized throughout the region, and argues that this quiet revolution has generated a new model of governance based on innovative, capable leadership, high popular participation and a new implicit contract governing local taxation. Conversely, it was argued that the political motives of reformers often combine with vertical imbalances to make fiscal decentralization bad in terms of elite capture, regional inequality and macroeconomic stability. Rodriguez-Pose and Gill (2004) elaborated further on the tension between inequality and stability for the case of Brazil, while Eskeland and Filmer (2002) found econometric evidence that fiscal decentralization did lead to improvement in Argentine educational achievement scores.

Casson and Obidzinki (2002) report that fiscal decentralization in Indonesia has spurred depredatory logging by bureaucratic actors with a stake in its proliferation. The cross-country evidence of Martinez-Vazquez and McNab (2003) is similarly unhelpful, showing that we don't know empirically whether fiscal decentralization affects the delivery of public service directly or indirectly and have no clear theoretical grounds for predicting a relationship either way. Worse, De Mello's (2000a) in his study of 30 countries predicted that failures of intergovernmental fiscal coordination will lead to chronic deficits and eventually macroeconomic instability. The studies of Sundar (2001) and Wiggins, Marfo and Anchirinah (2004) offered more cautious nuanced arguments that are on the whole skeptical about the possibility of beneficial change through decentralization.

Shankar and Shah (2003) find a negative correlation between fiscal decentralization and service delivery on the basis of time series data of different developed and developing countries. The major flaws of this study is that for several countries the use of time series are very short and fiscal decentralization is not measured by financial accounts but only by a classification in unitary and federal states. Also, Kanbur and Zhang (2002) show that fiscal decentralization led to higher inequalities in the delivery of public services for Chinese during the period 1952-1999. That more fiscal decentralized countries have higher inequalities is concluded by Kim et. al. (2003), who analyzed Korean time series data.

### 2.3 Evidence from Nigerian Economy

Okafor et. al. (1998) examine the Structural Adjustment Program (SAP) as it affected access to essential social services, using health care in selected states as a case study. One of their major findings was that the rising cost of health care as well as the high cost of living engendered by the SAP adversely and significantly affected health-seeking behavior. They pointed out that in spite of a generally positive disposition to biomedical facilities among Nigerian consumers; the high cost of health care is generally driving many of them to alternative forms of medication, including self-medication. The results obtained by the authors from the focus group discussions in their study indicated that users of health care delivery services consider the cost of accessing them to be high. Specifically, 91 percent of the respondents opined that the cost of health care delivery services was neither moderate nor low. Fifty-two percent of them actually considered it to be high. This inhibited Nigerians' use of hospital services. In fact, 57.8 percent of the respondents admitted a reduction in their use of health care services as a result of increased cost occasioned by the SAP. Responses obtained from the Okafor et. al. surveyed indicated that the cutback in the use of health care services stemmed not from a dislike of biomedical services as 84 percent of respondents expressed preference for it.

In Nigeria, a study of primary health care in the early 1990s revealed a complete lack of real participation in decision-making despite the devolution of responsibility to elected local officials. Local residents saw primary health care as unreliable, ineffective and unresponsive to their needs, while councilors were unclear about the health needs of their constituents and had little knowledge of health plans and activities (Crooks and Sverrisson, 2001). Robinson (2003) concluded that greater emphasis should be given to measuring and monitoring service delivery outcomes under decentralized forms of provision, to ensure that participation produces real gains for the poor in terms of improved access and quality of services.

Gupta, Gauri and Khemani (2003) carry out a study on decentralized delivery of primary health services in Nigeria using Lagos and Kogi away from original budget allocations. They found some evidence that active community participation in health service delivery may make staff more responsive to community health needs and increase the overall productivity of facilities. Communities were particularly active in making use of health services in Kogi State, whose population largely lives in rural areas and depends heavily on public institutions for service delivery. The most striking result is that community participation in Kogi is significantly associated with greater productivity per staff in providing in-patients deliveries, immunizations and out-patient consultation.

The available literature highlighted some points, which must be noted, the first is that, the question of whether or not fiscal decentralization improve or retard the productive and allocative efficiency of public service delivery remains open empirically; therefore, the solution to this question remain an empirical one. In addition, there is no consensus on the significance of the available results. In the same vein, the policy implications of cross-countries regression analysis are somewhat discouraging and cannot be used for the generalization of the country specific-effects of the relationship between fiscal decentralization and public service delivery. This is partly due to methodological flaws and how to deal with problem of endogeneity of some of the explanatory variables; thus, further analyses are still called for. In this regard, the subsequent sections of this study will provide evidence at filling these empirical gaps, which is rare in Nigeria, to the best of our knowledge.

## 3. Theoretical Framework and Model Specification

### 3.1 Theoretical Framework

The study is situated on Keynesian macroeconomic theory developed by Musgrave, R. (1959). Musgrave framework delineated three core government functions which includes stabilization, distribution and allocative function. This study is in line with the allocative function of Public finance of Keynesian Macroeconomic theory developed by Richard Musgrave with the strong perception that federal government are in the best position to undertake stabilization and distributive function while economic theorist argued that states government are in the best position to undertake allocative function because the preferences for particular services differs across states and by locality. <sup>10</sup> Thus, an easy theoretical framework employed by Elhiraika (2007) is employed in this study, the government is assumed to choose levels of education (E), health expenditure (H) and other revenue (O) in order to maximize a social welfare function. The government maximizes a general welfare function of the form;

$$U(E_i, H_i, O_i) \quad (1)$$

Where  $U(E, H, O)$  is the objective function, subject to the budget constraint

$$E_i + H_i + O_i = R_i \quad (2)$$

Where R is states government revenue, which consists of:

$$R_i = IGR_i + TR_i + OR_i \quad (3)$$

Where  $IGR_i$  is internally generated revenue,  $TR_i$  is the transfer from federal government (statutory allocation), and  $OR_i$  is the revenue from other sources including borrowing (domestic and foreign). The marginal utilities of Education ( $U_E$ ), Health ( $U_H$ ) and other services ( $U_O$ ) are assumed to satisfy the first-order conditions: i.e. the partial differentiation of  $U$  with respect to  $E$ ,  $H$  and  $O$  equals zero:

$$U_E = U_H = U_O = 0 \quad (4)$$

It is assumed that states governments utilized the revenue generated internally plus statutory allocation and borrowing from different sources to finance the delivery of public services to their citizens. This can be written as;

$$E_i + H_i + O_i = IGR_i + TR_i + OR_i \quad (5)$$

The social welfare function is assumed to have the usual properties of strict quasi-concavity such that the second-order conditions are:  $U_{EE} < 0$ ,  $U_{HH} < 0$ ,  $U_{OO}$ ,  $U_{EE}U_{OO} > 0$ ,  $U_{HH}U_{OO} > 0$ .  $U_{EE}$ ,  $U_{HH}$ ,  $U_{OO}$  are the second order partial derivatives. Accordingly, we can write the equations as:

$$E = E(RP) \quad (6)$$

$$H = H(RP) \quad (7)$$

Where  $RP$  is the predetermined component of  $R$  (such as transfers). Assuming that  $E$  and  $H$  are normal goods, demand for education and health is expected to vary positively with  $R$ . And to the extent that the state and local governments action can determine revenue levels,  $R$  will be endogenous. This is particularly true for  $IGR$ . However, if states governments' internally generated revenue, particularly the tax base and tax rate, are fixed by the federal government, then  $IGR$  will be exogenous. The degree of endogeneity will depend on the freedom given to states government to determine tax rate and tax base. Normally, states government determine the tax rate and tax base within certain limits.

At this juncture, it is important to develop an empirical model in order to sort out the important factors and behaviors' at play in determining qualitative decentralized service delivery and to aid in interpretation of the empirical results. In particular, we are interested in determining whether fiscal decentralization necessarily implies higher or lower relative levels of public service delivery. The model for testing this unsettled argument will be specified by expressing  $E$  as access to education and primary school net enrolment ratio, while  $H$  is expressed as access to health and fully vaccinated children in state  $i$ ,  $IGR$  is the share of internally generated revenue,  $TR$  is the share of transfer from federal government,  $OR$  is the revenue from other sources including borrowing (domestic and foreign),  $\mu$  is the stochastic disturbance term. The relative performance of these variables would then determine whether or not the unsettled argument in the theoretical modeling would be empirically resolved.

### 3.2 Model Specification

The model was estimated by OLS, using Stata 10.0 software estimator, some relevant variables (federal transfer and internally generated revenue) will be omitted one after the order to ascertain their effects on the regression results. Thus, omitting relevant fiscal decentralization variables could cause a mixed or ambiguous relationship between fiscal decentralization and service delivery. Therefore, to correct for this omitted variables bias in this study, we included relevant fiscal decentralization and service delivery variables. In order to account for the real effects of fiscal decentralized system in our model, we include  $Y$  which is states'  $GDP$  and  $HDI$  which is human development index. As indicated previously, the demand for education and health will depend on income, the level of development, and the factors determining  $R$ ; thus, the education and health equations are;

$$E_i = \alpha_1 + \alpha_2 IGR_i + \alpha_3 TR_i + \alpha_4 OR_i + \alpha_5 Y_i + \alpha_6 HDI_i + \mu_i \quad (6)$$

The specification for health is;

$$H_{it} = \beta_1 + \beta_2 IGR_i + \beta_3 TR_i + \beta_4 OR_i + \beta_5 Y_i + \beta_6 HDI_i + \mu \quad (7)$$

Where  $Y$  is states'  $GDP$ ,  $IGR$  is internally generated revenue;  $TR$  is the transfers from federal government,  $OR$  is other revenue (borrowings and loans) and  $\mu$  is the stochastic disturbance term. The focus of this study is to establish the link between fiscal decentralization and public service delivery in Nigeria.

In this regard, by rearranging equations (6) and (7), differencing with respect to time and taking log in order to have a base line model for our estimate, then equations (6) and (7) becomes:

$$\ln E_i = \alpha_1 + \alpha_2 \ln IGR_i + \alpha_3 \ln TR_i + \alpha_4 \ln OR_i + \alpha_5 \ln Y_i + \alpha_6 \ln HDI_i + \mu_i \quad (8)$$

$$\ln H_i = \beta_1 + \beta_2 \ln IGR_i + \beta_3 \ln TR_i + \beta_4 \ln OR_i + \beta_5 \ln Y_i + \beta_6 \ln HDI_i + \mu_i \quad (9)$$

Where  $i$  denotes cross-sectional dimension of the data used; the existing studies especially on developing countries relied on the standard Barro (1990) and Futagami et. al. (1993) procedure. This method appears to be popular and yield satisfactory results, its unpredictability in the signs of some of the important comparative static derivatives by interpolating the corresponding results might lead to spurious regression. Thus, the model to be adopted is of the form;

$$\ln E_i = \alpha_1 + \alpha_2 \ln IGR_i + \alpha_3 \ln TR_i + \alpha_4 \ln OR_i + \alpha_5 \ln Y_i + \alpha_6 \ln HDI_i + \mu_i \quad (10)$$

The health specification is;

$$\ln H_i = \beta_1 + \beta_2 \ln IGR_i + \beta_3 \ln TR_i + \beta_4 \ln OR_i + \beta_5 \ln Y_i + \beta_6 \ln HDI_i + \mu_i \quad (11)$$

#### 4. Effects of Fiscal Decentralization on Health and Educational Service Delivery

At this juncture, we now turn to an econometric estimation of the relationship between fiscal decentralization and public service delivery. We approached the estimation with a cross sectional set of 36 states across the federation including federal capital territory. Table 1 and Table 2 were estimated with access to education and primary school net enrolment as their dependent variables respectively while Table 3 and Table 4 were estimated with the access to health and fully vaccinated children rate as their dependent variables respectively. The first three column of these tables (Table 1, 2, 3 and 4) were estimated without using states' dummy variable, while the second three column of these table were estimated with the inclusion of dummy variable.

The model were estimated using cross sectional data for the 36 states of the federation including FCT, the use of this type of data is preferable as it can account for differences across states. Estimation is by Stata 10.0 software, the dependent variables are health and education access, primary school enrolment ratio and fully vaccinated children ratio. Standard errors are in square brackets and 't' value are in parenthesis. The explanatory variables are displayed sequentially ranging from (*Ltr*) federal transfers, (*Ligr*) internally generated revenue, (*Lor*) other revenue, (*Ly*) States' GDP, (*Lhdi*) human development index with constant term at the bottom of the table.

The econometric findings on the effects of fiscal decentralization on public service delivery are presented in the tables below; nevertheless, the findings of the estimated models are interpreted with caution because of high degree of correlation between internally generated revenue and federal transfer, the two variables are entered separately. They turned out to have different effects in the educational service delivery as well as in the health service delivery. It is pertinent to state that the results of internally generated revenue (*igr*) and intergovernmental transfers (*tr*), determine the ability of states government to meet their expenditure responsibilities. Tables 1, 2, 3 and 4 were estimated with the omission of federal transfer variables in column 2 and 5, and omission of internally generated revenue in column 3 and 6. Additionally, States dummy variable (*dstate*) were included among the regressors in each estimations to determine whether there is positive link between the fiscal resources devolved to the oil producing states and their level of service delivery.

#### 4.1 Empirical results

Operationally, we used cross sectional data with dependent variables for education service estimations; access to education estimated in Table 1 and primary school net enrolment ratio estimated in Table 2; while dependent variables for health service are access to health and fully vaccinated children ratio estimated in Tables 3 and 4 respectively. The system generates a separate constant coefficient for each regression equation, the estimations were carried out by Stata 10.0 software.

**Table 1. Dependent variable: Access to education (*Ledu*)**

Explanatory variables	Without states' dummies			With states' dummies		
	1	2	3	4	5	6
<i>Ltr</i>	.4396 [.1848] (2.3)*		.4454 [.1879] (2.37)*	.1430 [.2248] (0.64)		.1683 [.2310] (0.73)
<i>Ligr</i>	.1161 [.0806] (1.44)	.1202 [.0864] (1.39)		.1290 [.0766] (1.69)	.1322 [.0756] (1.75)	
<i>Lor</i>	.0461 [.0744] (-0.62)	-.0380 [.0797] (-0.48)	-.0116 [.0717] (-0.16)	-.0700 [.0714] (-0.98)	-.0730 [.0705] (-1.03)	-.0305 [.0695] (-0.44)
<i>Ly</i>	-.1680 [.0855] (-1.96)	-.0465 [.0736] (-0.63)	-.1228 [.0809] (-1.52)	-.1273 [.0833] (-1.53)	-.0957 [.0661] (-1.45)	-.0801 [.0808] (-0.99)
<i>Lhdi</i>	.4383 [.3361] (1.30)	.2767 [.3530] (0.78)	.4030 [.3410] (1.18)	.5666 [.3242] (1.75)	.5590 [.3207] (1.74)	.5193 [.3327] (1.56)
<i>Dstate</i>	-----	-----	-----	.4192 [.1993] (2.10)*	.4987 [.1536] (3.25)*	.3922 [.2046] (1.92)
<i>Constant</i>	1.7738 [1.3906] (1.28)	4.5802 [.7904] (5.80)	1.7736 [1.4145] (1.25)	4.4412 [1.8284] (2.43)	5.5007 [.7470] (7.36)	4.2697 [1.8807] (2.27)
<i>R<sup>2</sup></i>	0.2197	0.0723	0.1656	0.3230	0.3135	0.2567
<i>Adjusted R<sup>2</sup></i>	0.0896	0.0474	0.0580	0.1829	0.1328	0.1328
<i>Prob &gt; F</i>	0.1677	0.6624	0.2155	0.0609	0.0968	0.0968

**Notes: Standard errors are in square brackets and 't' values are in parenthesis. Asterisks indicate significance at 5% level.**

We open the discussion with the results, on Table 1 which displays the results of the regressions of educational service delivery on explanatory variables with and without states' dummy variable. In Column 1, among the sets only federal transfer demonstrates a significant association with service delivery on education based on the regression analysis (without the dummy variable).

In column 1, of Table 1, access to education was regressed on other explanatory variables; in the estimated equations, dummy variable was not included. Evidently in Table 1 column 1, among these set, the coefficient of federal transfer bears a significant association at 5% level of significance, suggesting a strong and positive link between fiscal decentralization and access to educational service delivery. This result is aligned with the propositions of the theoretical debate discussed in the literature. Thus, the interpretation of the slope coefficient (.4396) of federal transfer is that assuming federal transfer increases by a unit, which is billion naira; accessibility to education on the average increases or improves by 44%. Also, in column 1, the co-efficient (.1161) of internally generated revenue, implies that a unit change in internally generated revenue which is in billion, decreased the rate of access to education service by 12%. Thus, increased fiscal resources (statutory allocations) to states government would generate increased access to education service delivery as measured by access to education on the average increases by 44%.

Focusing on the rest of the explanatory variables, we observe that coefficients of other revenue (i.e. grants, loans and borrowings) bears negative sign and is statistically equal to zero, indicating that loans, grants and borrowings exert a negative impact on access to educational service delivery based on the results. In contrast, transfer from the federal government has positive coefficient and is significant by 5% levels of significance. These results may be explained by the beneficial effects of internal and external constraints on the function of governments. Finally, based on the results, federal transfer appeared to be the main determinant of access to educational service delivery.

In column 2, of Table 1, we re-estimated the model using federal transfer as an omitted variable. The dependent variable still remain the same. The slope coefficient (.1202) of internally generated revenue connotes that a unit increase, which is billion naira for the internally generated revenue, decrease on the average the accessibility of citizens to educational service by (12%).

In column 3 of Table 1, we regressed the model by omitting internally generated revenue, the slope coefficient (.4454) of federal transfer, indicates that a unit increase in federal transfer which is billion of naira, changes and improves on the average by (45%) accessible ways to educational facilities. Since federal transfer is the only significant coefficient among the explanatory variables, this show that positive link exists between federal transfer and access to educational services.

In column 4, 5 and 6. we re-estimated the model using access to education as a dependent variable while other explanatory variables are still remain the same. Dummy variable was included in order to examine the difference in the educational service of oil and non-oil producing states. In column 4, the slope coefficient (.4192) is positive and statistically significance, a unit change or increase in the excess share from crude oil to oil



producing states generates additional (42%) citizens accessibility to educational service delivery which is measured by access to education.

Column 5 of Table 1 demonstrated the expected result for the co-efficient of the dummy variable. In column 5, the co-efficient (.4987) is significantly and positively related to education service which is measured by access to education. the interpretation of the slope coefficient is that a unit increase in the share of excess crude oil revenue accruing to oil producing states is positively correlated with their citizens accessibility to education service delivery by (50%).

**Table 2. Dependent variable: Primary school net enrolment (*Lpne*)**

Explanatory variables	Without states' dummies			With states' dummies		
	1	2	3	4	5	6
<i>Ltr</i>	.3737 [.1668] (2.24)*		.3788 [.1696] (2.23)*	.1130 [.2037] (0.55)		.1358 [.2092] (0.65)
<i>Ligr</i>	.1046 [.0727] (1.44)	.1081 [.0773] (1.40)		.1159 [.0694] (1.67)	.1185 [.0684] (1.73)	
<i>Lor</i>	-.0229 [.0672] (-0.34)	-.0161 [.0713] (-0.23)	.0081 [.0647] (0.12)	-.0440 [.0647] (-0.68)	-.0464 [.0638] (-0.73)	-.0085 [.0629] (-0.14)
<i>Ly</i>	-.1495 [.0771] (-1.94)	-.0463 [-0.658] (-0.70)	-.1089 [.0731] (-1.49)	-.1138 [.0755] (-1.51)	-.0888 [.0598] (-1.48)	-.0714 [.0732] (-0.98)
<i>Lhdi</i>	.4260 [.3034] (1.40)	.2886 [.3158] (0.91)	.3941 [.3077] (1.28)	.5386 [.2938] (1.83)	.5327 [.2902] (1.84)	.4962 [.3013] (1.65)
<i>Dstate</i>	-----	-----	-----	.3683 [.1806] (2.04)*	.4312 [.1390] (3.10)*	.3441 [.1853] (1.86)
<i>Constant</i>	2.9158 [1.2552] (2.32)	5.3010 [.7070] (7.50)	2.9157 [1.2767] (2.28)	5.2593 [1.6571] (3.17)	6.0968 [.6759] (9.02)	5.1053 [1.7032] (3.00)
<i>R<sup>2</sup></i>	0.2115	0.0795	0.1571	0.3104	0.3031	0.2440
<i>Adjusted R<sup>2</sup></i>	0.0800	0.0393	0.0483	0.1677	0.1869	0.1180
<i>Prob &gt; F</i>	0.1880	0.6182	0.2430	0.0746	0.0449	0.1176

**Notes: Standard errors are in square brackets and 't' values are in parenthesis. Asterisks indicate significance at 5% level.**

In Table 2, we regressed primary education net enrolment rate on other explanatory variables. In column 1, the coefficient (.3737) of federal transfer is positive and statistically different from zero as compared to the co-efficient (.1046) of internally generated revenue which is positive but statistically insignificant. The slope coefficient (.3737) of federal transfer is assumed that a unit change in federal transfer which is billion naira, there would be a corresponding positive changes by (37%) in the primary school net enrolment rate. More so, the slope co-efficient (.1046) of internally generated revenue indicates that a unit change in the internally generated revenue would cause a decreased by (10%) in the net primary school enrolment rate.

In column 2, we re-estimated the model using federal transfer as an omitted variable while in column 3 we used internally generated revenue as an omitted variable. When these variables were omitted for instance in column 2, the slope co-efficient (.1081) of internally generated revenue is statistically insignificant and negatively correlated with education service delivery measured by primary school net enrolment ratio. This means a unit change in internally generated revenue caused a decrease of (11%) in primary school net enrolment ratio. This is an indication that no state within the federation can survive without collecting federal allocations based on the result. In column 3, a unit change in federal transfer resulted into (38%) increases in the net enrolment for primary education.

The inclusion of dummy variable on column 4 and 5, of Table 2 brought about positive and significant co-efficient. The slope co-efficient (.3683) and (.4312) of dummy co-efficient in column 4 and 5, means that a 1% increases in the share of excess crude oil revenue accruing to oil producing states on the average increase the net enrolment ratio for primary education by (37%) and (43%). This means that oil producing states do more in term of educational service delivery as compared to non-oil producing states.

**Table 3. Dependent variable: Access to health facilities (*Lhel*)**

Explanatory variables	Without states' dummies			With states' dummies		
	1	2	3	4	5	6
<i>Ltr</i>	-0.3314 [.1543] (-2.15)*		-0.3259 [.1585] (-2.06)*	-0.2353 [.1996] (-1.18)		-0.2143 [.2040] (-1.05)
<i>Ligr</i>	.1110 [.0673] (1.65)	.1079 [.0711] (1.52)		.1069 [.0680] (1.57)	.1015 [.0683] (1.49)	
<i>Lor</i>	-0.0166 [.0622] (-0.27)	-0.0227 [.0656] (-0.35)	.0163 [.0605] (0.27)	.0089 [.0634] (-0.14)	-0.0040 [.0637] (-0.06)	.0239 [.0613] (0.39)
<i>Ly</i>	0.637 [.0714] (0.89)	-0.0278 [.0606] (-0.46)	.1069 [.0683] (1.56)	.0506 [.0740] (0.68)	-0.0015 [.0597] (-0.03)	.0897 [.0713] (1.26)
<i>Lhdi</i>	.0821 [.2808] (0.29)	.2040 [.2906] (0.70)	.0483 [.2877] (0.17)	.0406 [.2879] (0.14)	.0531 [.2895] (0.18)	.0015 [.2937] (0.01)
<i>Dstate</i>	-----	-----	-----	-0.1358 [.1770] (-0.77)	-0.2667 [.1387] (-1.92)	-0.1581 [.1806] (-0.87)
<i>Constant</i>	6.9493 [1.1618] (5.98)	4.8340 [.6505] (7.43)	6.9492 [1.1936] (5.82)	6.0854 [1.6236] (3.75)	4.3418 [.6744] (6.44)	5.9434 [1.6604] (3.58)
<i>R<sup>2</sup></i>	0.2034	0.0810	0.1312	0.2193	0.1819	0.1528
<i>Adjusted R<sup>2</sup></i>	0.0707	0.0375	0.0191	0.0578	0.0455	0.0116
<i>Prob &gt; F</i>	0.2096	0.3327	0.3430	0.2646	0.2770	0.3902

Notes: Standard errors are in square brackets and 't' values are in parenthesis. Asterisks indicate significance at 5% level.

In Table 3, access to health facilities was used as a dependent variable with other explanatory variables still remain the same. The estimations were run with and without states dummy variables. In column 1 and 3 the slope coefficient (-0.3314) and (-0.3259) of federal transfer implying that for a 1% increase in the federal transfer from federal government to states government, health service delivery measured by access to health facilities on the average decreased by about (33%) and (33%) in column 1 and 3 respectively.

The co-efficient (.1110) and (.1079) of internally generated revenue in column 1 and 2 respectively, connotes that a unit change in the internally generated revenue, bring about decrease of about (11%) and (11%) in the health service delivery measured by access to health care facilities.

The introduction of dummy variable in column 4, 5 and 6 yielded negative coefficients of (-0.1358), (-0.2667) and (-0.1581). This implies that a 1% increase in the share of excess crude oil to states government generate a decrease of (14%), (27%) and (16%) in the accessibility of qualitative health care delivered to the people.

**Table 4. Dependent variable: fully vaccinated children (*Lfvc*)**

Explanatory variables	Without states' dummies			With states' dummies		
	1	2	3	4	5	6
<i>Ltr</i>	.9058 [.4738] (1.91)		.9415 [.4801] (1.96)	.7303 [.6047] (1.21)		.8003 [.6121] (1.31)
<i>Ligr</i>	.2803 [.2031] (1.38)	.3014 [.2116] (1.42)		.2867 [.2063] (1.39)	.3075 [.2072] (1.48)	
<i>Lor</i>	.1424 [.1923] (0.74)	.1805 [.1995] (0.90)	.2136 [.1880] (1.14)	.1256 [.1981] (0.63)	.1189 [.1995] (0.60)	.2013 [.1935] (1.04)
<i>Ly</i>	-.4943 [.2145] (-2.30)	-.2676 [.1866] (-1.43)	-.3830 [.2018] (-1.90)	-.4685 [.2240] (-2.09)	-.3137 [.1852] (-1.69)	-.3601 [.2134] (-1.69)
<i>Lhdi</i>	1.0663 [.8805] (1.21)	.8705 [.9124] (0.95)	.9286 [.8879] (1.05)	1.1321 [.9030] (1.25)	1.1336 [.9101] (1.25)	.9792 [.9105] (1.08)
<i>Dstate</i>	-----	-----	-----	.2552 [.5341] (0.48)	.6472 [.4275] (1.51)	.2061 [.5415] (0.38)
<i>Constant</i>	-1.3401 [3.5879] (-0.37)	4.5381 [1.9302] (2.35)	-1.5252 [3.6390] (-0.42)	.2416 [4.9181] (0.05)	5.6604 [2.0301] (2.79)	-.2510 [4.9835] (-0.05)
<i>R<sup>2</sup></i>	0.2255	0.1279	0.1747	0.2318	0.1918	0.1788
<i>Adjusted R<sup>2</sup></i>	0.0920	0.0116	0.0646	0.0672	0.0524	0.0372
<i>Prob &gt; F</i>	0.1688	0.3747	0.2033	0.2465	0.2621	0.3065

**Notes: Standard errors are in square brackets and 't' values are in parenthesis.**

In Table 4, fully vaccinated children was used as a measure for health service delivery, other explanatory variables are still remain the same. The co-efficient (.9058) and (.9415) of federal transfer in column 1 and 3 bear insignificant relationship with the rate of fully vaccinated children, likewise the coefficients (.2803) and (.3014) of internally generated revenue are statistically equal to zero. This means that the relationship between federal transfer, internally generated revenue and health service delivery measured by the ratio of fully vaccinated children is negative. Additionally, the inclusion of dummy variables in column 4, 5 and 6 had insignificant co-efficient and they are statistically insignificant. The dummy variable coefficient (.2252), (.6472) and (.2061), connotes that a unit change in the share of excess crude oil revenue to oil producing states generate reduction of about (23%), (65%) and (21%) in the health service delivery measured by fully vaccinated children. In summary, the results displayed that intergovernmental transfers (*TR*), determine the ability of states government to meet their expenditure (health and education) responsibilities. Starting with educational equation, it was observed that the coefficient (.4396) and (.4454) of the federal transfer are statistically significant, likewise the coefficient (.4192) and (.4987) of dummy variables are all positive and statistically different from zero. Contrarily, the coefficient (-.3314) and (-.3259) of federal transfer and that of dummy variable (-.1358) (-.2667) and (-.1581) appeared to be negative for health related indicators. The regression results concluded that there is positive effects of fiscal decentralization on educational service delivery while there is negative relationship between health service delivery and fiscal decentralization in Nigeria.

## 5. Conclusion

Our findings are; that fiscal decentralization has positive link with educational service delivery, while high degree of fiscal decentralization is negatively related to health care delivery. However, our analysis is more satisfactory from an econometric perspective; thus, the results of this work indicate that there is heavy dependence of states government on federal transfer from the federal government in Nigeria, this suggests that the benefits from fiscal decentralization in terms of improved service delivery due to enhanced transparency and accountability to the citizens are likely to be limited. The intergovernmental transfer system makes states government more accountable to federal government and hence the design of federal fiscal policy standards is critical and more important than accountability to the citizens.

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