PUBLIC EXPENDITURE BY STATE GOVERNMENTS AND HUMAN CAPITAL DEVELOPMENT IN NIGERIA

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Abstract

The agitation by state governments in Nigeria for an upward review of revenue allocation to them and the low level of human capital created the need to find out how revenue allocated to states in Nigeria have improved human capital development in the country. Using the panel and partial frontier efficiency(PEF) analyses to examine data sourced from the National Bureau of Statistics and the Federal Ministry of Finance over the period 2011 - 2016, the results indicated that: expenditure of the states from the federation account reduced basic school enrolment and spurred infant mortality level. Expenditure from federation account to states was statistically significant in explaining changes in basic school enrolment and infant mortality rate in Nigeria. Expenditure of states via external debts bears a positive sign with basic school enrolment but has negative relationship with infant mortality rate but was not significant in explaining changes in basic school enrolment and infant mortality rate. Expenditure by states from the Value Added Tax , has positive coefficient with basic school enrolment, but negative relationship with infant mortality rate. VAT was also significant in explaining human capital development in Nigeria. Price level was significant in explaining changes in basic school enrolment but was not significant in explaining changes in infant mortality level. The result further revealed that the impact of government expenditure on human capital development vary significantly amongst states of the federation. This implies that some states performed better than others in utilizing revenue from the federation account in achieving human capital development. Based on these findings, the paper suggests: the practice of fiscal federalism in Nigeria, review of modalities for external borrowing by states government and a stable macroeconomic environment as possible ways of enhancing human capital development in Nigeria.

Keywords: Public expenditure, school enrolment, infant mortality, human capital development, external debt and VAT,

Introduction

Public sector expenditure on socio-economic infrastructure plays a crucial role in stimulating economic growth and development and, therefore improve the quality of life of the people. Studies by many scholars have supported the fact that increases in government expenditure on socio-economic and physical infrastructure encourage human capital development and stimulate economic development.

The endogenous growth theory by Arrow (1962) and Romer (1986) recognized the critical role of knowledge and health in the growth process. Unfortunately, most developing countries like Nigeria lack the requisite funds to improve human capital (education and health) at the household level hence the need for government intervention through the public utility approach (Arrow, 1971). Empirical studies by Abu and Abdullahi, (2010); Al-Yousif, (2000); Abdullah, (2000) and Cooray, (2009) have all supported the importance of public spending in enhancing economic growth and development. These studies simply suggest that government expenditure on health and education raises the productivity of labour and increase the growth of national output. Similarly, expenditure on infrastructure such as roads, communications, power, etc, reduces production costs, increases private sector investment and profitability of firms, thus fostering economic growth (Abu N et al 2010).Other scholars like Foster and Henrekson (2001), Ghura (1995) and Barro (1991) argued that government expenditure is characterized by waste hence constitutes an impediment to rapid and sustainable economic growth and development.

Over the years, Nigerian governments at all levels of governance have routinely rolled out annual budgets, some of which proposed multi-billion naira expenditures to achieve economic development. To be specific, large sums have been allocated for expenditure on social services such as the universal basic education and improvement in health care both at the national and states levels. In recent times, especially within the framework of the Millennium Development Goals (MDGs), government and development agencies are becoming more interested in human capital development and are accordingly channeling spending into these areas which directly have positive reward for low income groups (NISER 2005).

According to the World Bank (2015), education expenditure as a percentage of GNI in Nigeria was 0.85 as of 2015. Its highest value over the past 45 years was 5.11 percent in 1981, while its lowest value was 0.85 percent in 1991. The World Bank also reported that health expenditure by the public sector as a percentage of GNI in Nigeria was 0.92 as of 2014 with its highest value over the past 19 years at 1.47 percent in 2007, while its lowest value was 0.60 percent in 1996. To Kupoluyi, (2012), Nigeria spends less than 9 percent of its annual budget on education compared to other African nations with lower population size like; Botswana with 19.0% on education, Swaziland, 24.6%; Lesotho, 17.0%; South Africa, 25.8%; Cote d'Ivoire, 30.0%; Burkina Faso, 16.8%; Ghana, 31%; Kenya, 23.0%; Uganda, 27.0%; Tunisia, 17.0%; and Morocco, 17.7%. This implies that Nigeria spends less in growing her human capital.

Though statistics on public spending on human capital development at the states levels appears scanty, most of the states of the federation tend to ally with the expenditure pattern of the central government hence the disparity in socioeconomic indicators amongst the 36 states of the Nigeria's federation. It is therefore necessary to investigate how expenditure made by the states of the federation has affected human capital development and to determine if the impact of expenditure of states on human capital development differ across the states or not. We continue our investigation by examining related theoretical and empirical literatures on public expenditure, followed by the methodology employed to achieved the objectives, results and discussion and the concluding remarks and recommendations

Literature Review

Education and health needs of the public fall within the public goods purview in most developing economies. This is because of the critical role they play in the development process and the tendency of excluding greater segment of the society from it consumption if left to be produced and managed by the private sector alone. The public goods approach to public expenditure by Arrow (1971), argued that "when the market cannot manage to establish an optimum situation, society will, at least to some extent, become aware of the shortages, and other social institutions, outside the market, will emerge to try to fix them." In order to correct externalities from market failure, it is necessary to

devise institutional mechanisms and policy instruments that include the implications of an agent's action in the decision process. These may take different forms, such as the establishment of a tax or fee equal to the external cost generated or the introduction of emission certificates with commercial value determined by the market.

Public goods are goods that once produced, can be consumed by an additional consumer at no additional cost. This theory posits that government expenditure is determined by the demand for public goods. According to CBN (2013) the market mechanism is not available for their provision because such expenditure is characterized by one or both of non-rivalry and non-excludability for instance roads and national defense. Rivalry is the ability of multiple consumers to consume the same good, while excludability is the ability of producers to defect and prevent non-compensating consumption of their products. Public goods, therefore, get under-produced because they are not excludable. The pricing mechanism tends to fail in the allocation of such goods because it cannot force consumers to reveal their demand for purely non-excludable goods, neither can it force producers to meet that demand.

Although, absolute non-rivalry and non-excludable does not exist in the real world, but economists think that some goods approximate the concept closely enough for the analysis to be economically useful. Thus, public goods usually relate to all goods and services provided by government and included a wide variety of goods and services.

Until recent times, studies on decentralization of public expenditure and economic development were concentrated in the developed economies of America, Europe and Asia. For instance, Zhang and Zou (1998) in their study on liberalization of public expenditure and economic growth in 28 Chinese provinces over the period 1987 – 1993, find a negative and significant relationship between fiscal decentralization and economic growth in China. In a similar study, Jin et al. (1999) however, report a direct and significant relationship between decentralization of expenditure and economic growth in same sample size in Chinese provinces. The results were the same despite the inclusion of a dummy variable by Jin et al study which was not included by the earlier authors.

In Germany, Berthold et al. (2001) using panel data from 1991 - 1998, investigated the impact of equal fiscal allocations among states and additional federal grants on economic development of the 16 Lander (states). Their findings show that, increase grants amongst states and increase fiscal allocations among the tiers of government have serious negative effect on nominal economic growth per capita of the Lander (states). However, in a similar study, Behnisch et al. (2002) find a positive relationship between increase in federal fiscal activities and economic performance in Germany in a study carried out using time series data from 1950 – 1990

Blankenau et al (2007) studied government spending and economic performance in Brazil and find that public expenditure on education stimulates economic growth while revenue from taxes retard economic growth, resulting in an unpredictable net effect. The authors argue that the complexity of the result may be due to the manner in which government funds educational expenditure – imposing tax on income. An increase in educational taxes may hamper growth by reducing aggregate investment. However, increase in educational funding increases quality of education and improves human capital spending and economic growth.

In a related study, Basu and Bhattarai (2009) discover a relatively weak relationship government spending on education and economic growth implying a non-linear U-shaped nexus between government expenditure and economic growth. Usually public expenditure on education spurs a positive effect on economic growth in more developed economies, whereas in less developed economies, public expenditure on education may retard long-term economic growth and development. This implies that countries which have less investment in education and human capital, will experience a crowding out effect of public expenditure on private sector expenditure in education which may outweigh the joint impact, cumulating into low growth of the economy.

In a study on the relationship between level of decentralization and economic performance in Nigeria, Jimoh (2003) applied the Error Correction Mechanism and Granger causality test. The study revealed that increase in the number of local governments and states and subsequent improvement in revenue allocations to them have significant implications on economic

development in Nigeria. Though the author did not conduct any preliminary test on the data used.

Aigbokhan (1999) examines fiscal liberalization on economic performance in Nigeria using Ordinary Least Squares method. His finding revealed a high concentration proportion of fiscalism in Nigeria. The study also finds proofs of mismatch in fiscal roles with states being worse affected. In a related study by, Jimoh (2003) using OLS, he found that more liberalized governance, especially in terms of increased number of local governments and improvement in revenues allocations to lower tiers of government would increase economic performance.

Akinlo (1999) also studied the fiscal responsiveness of State governments to total revenue flows and base on the type of federal government assistance schemes using the OLS technique. The study revealed that state governments' spending was spurred by federal grants during the period of the study. The study further shows that grants to states have direct impact on the expenditure capacity of the state governments. Finally, the study revealed that statutory grants seem to explain most of the impact of federal government funds on state spending capacities during the period of the study.

Castro-Lead et, al, (1999) investigated the effectiveness of social spending of government on education and health care in several African countries and discovered that the programmes did not favour the poor, but those who are better off. The investigation concluded that this concentration problem cannot be resolved simply by adjusting the subsidy programme. They however, maintained that the problems that prevent the poor from taking advantages of these services must also be addressed, if the public expenditures social services are to be effective.

Dehn, et, al (2003) however, posit that public expenditure may fail to translate into desired and expected services for several factors: (i) possibility that the expenditure may be directed at the wrong goods or the wrong people. But even when governments spend on the right goods or the right people, the money may fail to reach the frontline service provider as evidence from expenditure on primary schools in Uganda in the mid-1990s, and (ii) even when the resources reaches the frontline facility, the incentives to provide the service

may be weak – a trait mostly feature of public services that are concerned with inputs rather than outputs.

Dang (2013) investigated the contributions of federal government revenue allocation to the three tiers of government on Nigeria's economic development. using the error correction mechanism and Granger causality test, he found that revenue allocations to federal government has significant impact on economic development while revenue allocation to states has indirect and serious implication on economic development in Nigeria. The study also shows evidence of unidirectional causation between revenue allocations and economic growth in Nigeria.

Rocha and Gilbert (2007) examined the components of public expenditure in Brazilian that affected economic growth over the period 1986 - 2003. The authors discover a significantly positive nexus between public expenditure on defense, education, transport and communications the growth rate of the Brazilian economy. The authors also find capital expenditures and the rate of growth of the economy to be negative

Divino and Silva Jr (2012) carry out a related investigation to Rocha and Gilbert (2007) study on the Brazilian municipalities. They discover from their results that total public expenditure affected economic growth positively in municipalities in the same manner as the average age of schooling and life expectancy at birth. Their finding also revealed that, economic growth was negatively influence by changes in level of income, income inequality and the number of homicides in Brazil. Furthermore, in absolutely poor municipalities, public expenditure on maintenance was discovered to be more growth friendly than spending on capital projects. The outcome of this finding shows that low income areas are primarily concern about increasing economic growth than other macroeconomic goals.

Using a cross-country data, Blejer and Khan (1984), to study public spending and social outcomes, the authors discovered that public spending, infrastructure, urbanization, demographic structure, income in equality, and per capita income had a significant relationship with enrolment rates, poverty reduction and infant mortality reduction.

Gupta et al (1999) carried out a study on 50 transitional and developing countries, using the Ordinary Least Squares approach, their results indicated that higher public spending on primary and secondary education had a positive implication on educational performance. The result of the study also revealed that per capita income, urbanization, environment, and sanitation also have serious implication on basic school enrolment rates and performance of the education sector.

Ogbu and Gallagher (1991) and Anyanwu and Erhijakpor (2007), conducted a study on public expenditure and education performance in African countries using the panel analysis. The result of their study revealed a positive relationship exists between public spending on education and enrolment rates.

In a study on the impact of tax revenue on economic performance in Nigeria, Bukie and Adejumo (2013) used the OLS and found that economic performance variables like; local investment, labour force, FDI and tax revenue are all positively and significantly related to economic growth in Nigeria. Adereti et al. (2011) in another study expanded the scope of his study by analyzing the relationship between revenue from VAT and the growth of the Nigerian economy over the period 1994 to 2008. Utilizing data on GDP, VAT Revenue, aggregate Tax Revenue and aggregate revenue of the central government. Their findings conformed with that of Owolabi and Okwu (2011) which shows a positive and significant relationship between revenue from VAT and economic growth in Nigeria.

In a separate study, Success et al. (2012) analyze the implication of Petroleum Profit Tax on the development of the Nigerian economy over the period 2000 - 2010.Their findings show that petroleum profit tax positively and significantly impacted on economic growth (GDP) in Nigeria. In spite of this result, the authors complained that the huge revenue from Petroleum Profit Tax has not improve the general wellbeing of the people in Nigeria.

Ofoegbu et al (2016) examined the impact of tax revenues on development of the Nigerian economy using HDI as a proxy for performance. Their finding revealed that tax revenue has a significant positive impact on human development index in Nigeria.

Similarly, Okeke (2014), conducted an investigation on public expenditure on health and education on economic development, in Nigeria over the period 1908 – 2010 by employing the Vector Error Correction Mechanism. The result of the study revealed that government expenditure on health significantly reduced infant mortality rate. However, the result of the study also indicated that public spending had no significant effect on total school enrolment level during the period under investigation.

Filmer and Pritchett (1997) study provided a proof which shows that public spending on health is not the major determinant of infant mortality outcomes. According to the authors, the level of income, inequality level, female education, and the degree of ethnolinguistic fractionalization determines to a greater extent the variation in infant mortality across countries. Given this result, the study suggested policies that encourage economic growth, reduce poverty and income inequality, and increase female education in order to reduce the mortality among children.

In another investigation, Ude and Ekesiobi (2014), used panel analysis to study the impact of state government expenditure on social outcomes with greater emphasis on education in the 36 states across Nigeria. Their findings indicated that state spending on education had a significant impact on basic school enrolment rates, secondary enrolment rates and adult literacy in the states that make up Nigeria.

In a related study but with different methodology, Ernest (2014) investigated how Nigeria's policy on government expenditure affects education and poverty reduction in the country using the integrated sequential dynamic computable general equilibrium (CGE) model. The outcome of the study indicated that it will be extremely difficult for Nigeria to eradicate poverty and achieved 100 percent literacy level by the year 2015. The study concluded that increase in investment in human capital will help the country to meet SDGs targets and reduce poverty level and improve literacy in the further.

The review above indicated that several studies have been done on public expenditure and economic growth and development both outside the shore of Nigeria and within. However, the studies consulted in Nigeria do not examine

how expenditure done by the states has affected human capital development in the states of the federation. This study seeks to bridge this gap in scope and also improve on the methodology applied by using both the panel analysis and partial frontier efficiency ranking in its analysis.

Methodology

The analytical foundation for this study is the Barro (1990) which proposes a simple endogenous growth model with the public sector as a major player. In the Barro model, government expenditure goes for public investment(infrastructures, schools, health, sanitation etc.). Public investments, which are financed through income taxes,complement private investments.Since public investments raise the productivity of private investments,higher taxes can increase government revenue, expenditure and raise human capital development (productivity) while a reduction in taxes could stifle government revenue, expenditure and retard human capital development (productivity) and the overall growth of the economy. Barro (1990) added public spending to the Romer's production model (AK) and expressed thus:

$$Y = BK^{1-\beta}G^{\beta} \qquad 1$$

Where: Y = total output; B = average productivity of capital/learning factor, K = aggregate level of capital and G = public spending. Borrowing from the Barro's model, the study specifies a functional relationship between public expenditure and human capital development thus:

$$Y_{it} = f(\text{FRAS}_{it}, SEDT_{it}, VAT_{it}, INF_{it}) \qquad 2$$

Where: Y_{it}= human capital development proxied by basic school enrolment and infant mortality rate in the 36 states of Nigeria, $FRAS_{it}$= revenue allocated to the states from the federation account, $SEDT_{it}$= external debts incurred by the 36 states in Nigeria, VAT_{it}= value added tax revenue shared to the 36 states in Nigeria and INF_{it}= price level in the states. I = cross section/number of states in Nigeria (36) and t = time period covered by the study (2011 – 2016) for the 36 states = 216

Thus equation 2 could be expressed in a non-linear form thus:

$$SSER_{it} = \alpha(\text{FRAS}_{it})^{\alpha_1}(SEDT_{it})^{\alpha_2}(VAT_{it})^{\alpha_3}(INF_{it})^{\alpha_4}e^{u_{it}} \qquad 3$$

$$IFMR_{it} = \alpha(\text{FRAS}_{it})^{\alpha_1}(SEDT_{it})^{\alpha_2}(VAT_{it})^{\alpha_3}(INF_{it})^{\alpha_4}e^{u_{it}} \qquad 4$$

Where SSER = Basic School Enrolment, IFMR = Infant Mortality Rate

In the estimation process some parameters are introduced and a disturbance term "U" to take care of variables that affect human capital development but not included in the models above. Also to estimate the equations 3 and 4 using economic technique of panel analysis (cross sectional and time series data), the equations are transformed into a log -linear form by taking the natural log of the variables as follows:

$$\ln\text{SSER}_{it} = \alpha_0 + \ln\alpha_1\,\text{FRAS}_{it} + \ln\alpha_2 SEDT_{it} + \ln\alpha_3 VAT_{it} + \ln\alpha_4 INF_{it} + U_{it} \qquad 5$$

$$\ln IFMR_{it} = \beta_0 + \ln\beta_1\,\text{FRAS}_{it} + \ln\beta_2 SEDT_{it} + \ln\beta_3 VAT_{it} + \ln\beta_4 INF_{it} + U_{it} \qquad 6$$

Note: Ln = natural logarithm, α and β are parameters and elasticities of the variables. All the variables in equation 5 except inflation rate are expected to be positively related to basic school enrolment while all the variables in equation 6 except inflation rate are expected to be negatively related to infant mortality rate. Data used for this study were sourced from the National Bureau of Statistics and the Federal Ministry of Finance, Abuja and analyzed using the panel and partial efficiency frontier analyses.

Equations 5 and 6 were estimated by pooling the variables together analysed for Fixed effect (FE) and Random effect (RE) after conducting a correlation test and descriptive statistics of data using graphs and charts. FE implies that there is change in the intercept, further implying that there is a difference amongst the states in term of utilizing revenue/expenditure for development, while RE implies that the intercept is constant and further that there is no difference amongst the states in term of utilizing revenue/expenditure for development. FE regression is one of the approaches used to capture specific effects in a panel data model. Cross-sectional FE are to capture/control for factors that may differ across the cross-sectional unit (States), but are invariant over time or change slowly over time (Islam 1995; Baltagi 2001).

The partial efficiency frontier analysis computes and ranks maximum performance measure for each decision making units (DMU) relative to all other DMUs. This study focuses on the efficiency level of the individual expenditure heads – statutory revenue allocated to states from the federation account, expenditure by states via external borrowing, and VAT revenue shared to the states (DMUs) over the period under investigation. The expenditure heads also served as the inputs while human capital development indicators such as: average basic school enrolment and infant mortality rate are output/outcomes. The panel result shows that impact of expenditure by state governments on human capital development varies across the states. Hence to really capture how each state utilized revenue/expenditure to improve human capital development, the partial efficiency frontier analysis was used to rank the performance of each state. Partial efficiency frontier (PEF) analysis ranks performance from a maximum score of one (1) – zero (0). In this study, efficiency score of 1 represents state(s) with higher capacity for using revenue/spending to achieve improve school enrolment while efficiency of 1 represent state(s) with least utilization of revenue/expenditure for reducing infant mortality and vice versa.

Results

Table 1: Descriptive Statistics

Variable	Observation	Mean	Std. Deviation	Minimum	Maximum
IFMR	216	67.21	29.90	15	163
SSER	216	456737.7	442594.2	18280	2474923
VATS	216	9.18	9.59	2.05	73.56
SEDT	216	0.41	0.61	0.03	6.26
FRAS	216	42.10	35.31	15.76	220.74
INF	216	10.65	2.53	8.06	15.3

Source: Author's Computation

The result in Table 1 indicates that there exists significant variation in all the variables under investigation. The wide range of deviation from the mean in infant mortality, basic school enrolment, federal allocation to states and price level indicate that achieving sustainable revenue generation/expenditure and

human capital development in Nigeria were not very sustainable during the period under study due to wide fluctuation in the variables. The wide disparity between the minimum and maximum values also support the unsustainable nature of the Nigeria's revenue/expenditure and human capital indicators.

Trend Analysis

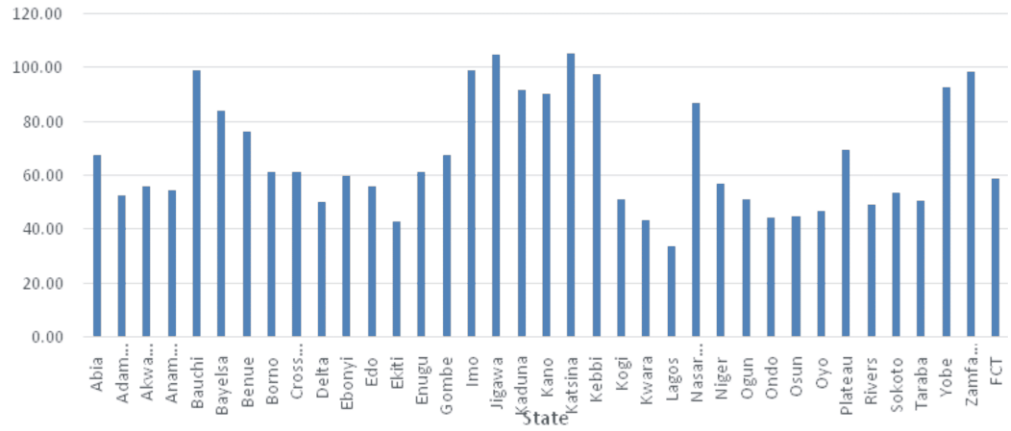


Figure 1: Average Infant Mortality rate in Nigeria by States 2011 - 2016

Information in Figure 2 unveils that infant mortality rate differs amongst the states of the federation. With an average of more than 100 deaths per 1000 births, the Northern states have the highest child mortality. These states are:Katsina and Jigawa, Yobe, Kebbi, Zamfara and Bauchi States. Imo state top the chart in the Southern region, followed by Bayelsa state. The States with the lowest infant mortality rate are Lagos, Ekiti, Ondo and Osun.

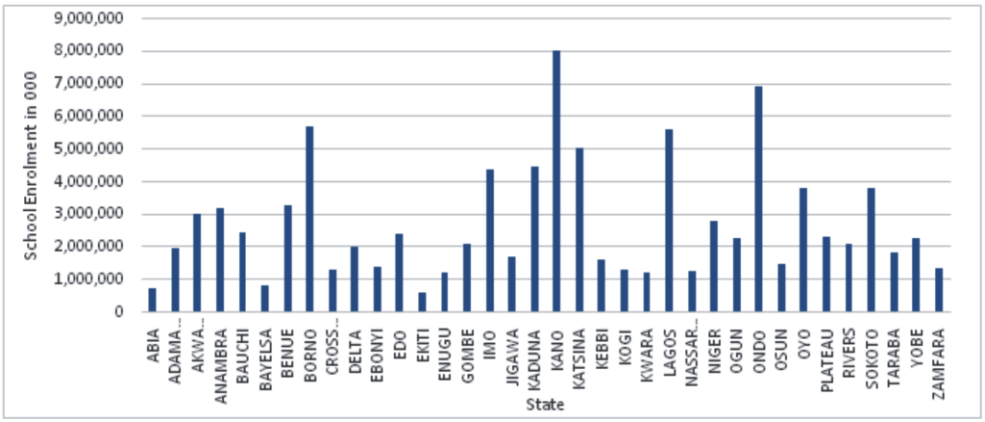


Figure 2: Total Primary School Enrolment in Nigeria by States

The basic school enrolment statistics as reported in Figure 2 discloses that it varies across the states of the federation just like infant mortality rate. With an aggregate basic school enrolment of 8 million, Kano state has the highest basic school enrolment. This is followed by Ondo, Bornu, Lagos and Katsina states. Ekiti state has the least basic school enrolment, accompanied by Abia, Bayelsa, Kwara and Enugu states. The chart further reveals that school enrolment appears high in the northern region. Revenue allocation to states of the federation as shown in Figure 3, suggests that the oil producing states of Akwa-Ibom, Delta, Rivers, Bayelsa have the highest revenue allocation. Ebonyi, Ekiti and Nasarawa states have the least revenue allocation over the period.

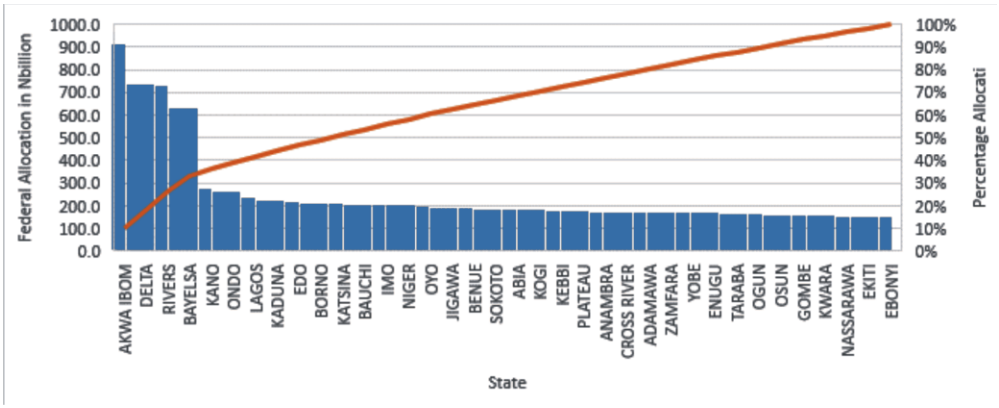


Figure 3: Total Federal Revenue Allocation to States in Nigeria 2011 - 2016

As reported in Figure 4, southern states of Lagos, Cross Rivers and Akwa Ibom states have the highest stock of external debt while northern state of Kaduna also followed states with very high debt profile. The states with very low external debt profile are Taraba, Bornu and Benue States with external debt below N1 billion.

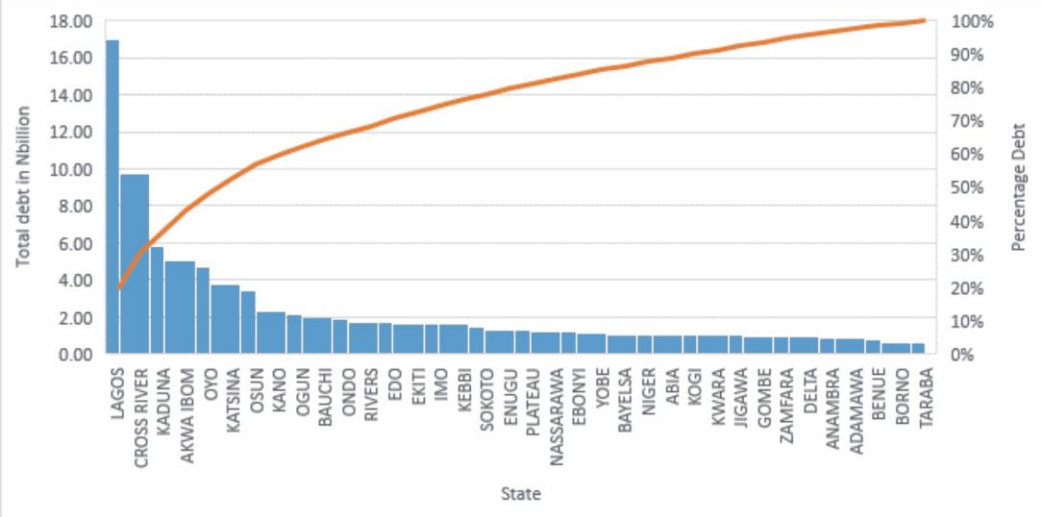


Figure 4: External Debt Incurred by States in Nigeria 2011 - 2016

As shown in Figure 5, the states that got high VATs allocation aside Lagos state are Kano and Rivers. Kwara, Nasarawa and Bayelsa states have the lowest VATs allocation from the federation account allocation.VAT represents the productive and consumption capacities of a state. VAT is collected by the federal government through the Federal Inland Revenue Service (FIRS) and distributed to states of the federation on monthly basis based on amount generated from each state.

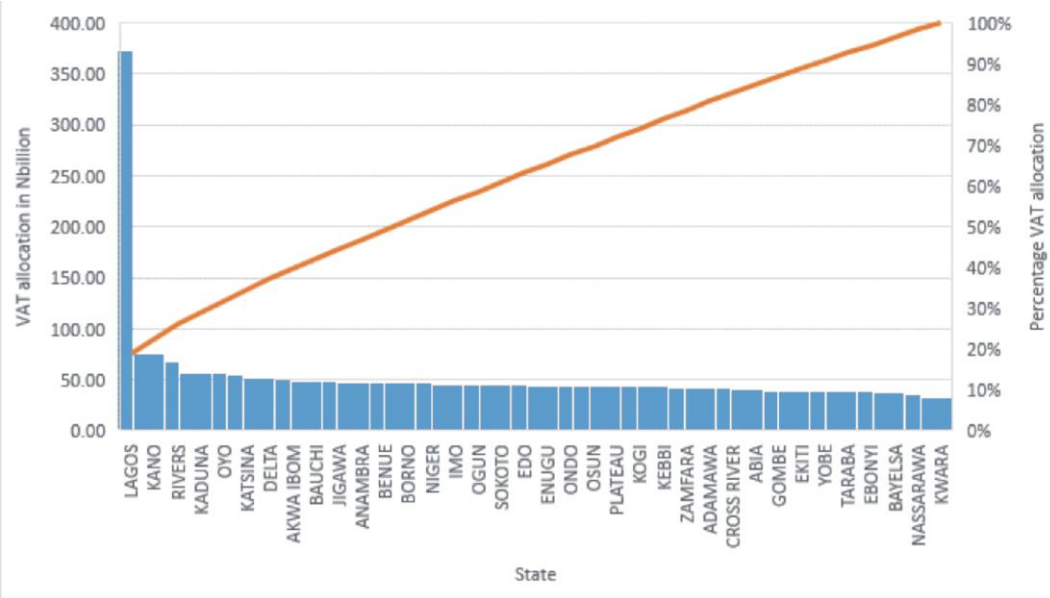


Figure 5: VAT Allocation to States in Nigeria 2011 – 2016

Panel Result

Table 2: Result of Basic School Enrolment Model

Variable	Linear Regression	Random Effect (RE)	Fixed Effect (FE)
Log(FRAS)	-0.29 (0.04)	-0.66 (0.00)	-1.72 (0.00)
Log(SEDT)	0.17 (0.08)	0.30 (0.01)	0.26 (0.14)
Log(VATS)	0.69 (0.00)	0.76 (0.00)	1.41 (0.00)
Log (INF)	-0.16 (0.64)	-0.57 (0.07)	-1.42 (0.00)
Constant	12.75 0.00)	15.06 (0.00)	19.57 (0.00)
R^2	0.15	0.14	0.10
Breusch-	Chi2(1) = 0.03; Prob = 0.86; H_0: Constant variance		

Pagan/Cook-Weisberg test for heteroscedasticity	
Ramsey RESET test	F(3,208) = 5.34; Prob = 0.002; H_0: model has no omitted variable
Hausman Test for Fixed Effect (FE)	Chi2(4) = 25.09; Prob = 0.00; Ho: difference in coefficients not systematic

Source: Author's Computation

The panel result reported in Table 2 revealed that revenue allocation to states bears a negative and has a significant relationship with human capital proxy by basic school enrolment in the linear regression, random and fixed effect models. This implies that revenue allocated to the 36 states of the federation has not improve knowledge/literacy level in Nigeria. This result is not in tandem with economic theory/apriori theoretical expectation. This result conforms with the investigation by Okeke (2014) and Ernest (2014). Their studies all revealed a negative relationship between public expenditure and school enrolment in Nigeria. This result tends to expose the Nigeria's state in term of the achievement of the Sustainable Development Goal (SDG). Nigeria yearly budget to the education sector has consistently fell below the UNDP/UNESCO requirement of earmarking at least 25 percent of total yearly budget to the educational sector.

External debt incurred by the 36 states of the federation is positively related to human capital (basic school enrolment) in the linear regression, random and fixed effects models. This connotes that external debt improves school enrolment and human capital in Nigeria. This result deviated from theoretical economic expectation. The result however shows that only the random effect model was significant at 5 per cent level. This result is in conformity with the study by Okwu et al (2016). They found a positive relationship between public debt and economic development (social outcomes). Ndikumana and Boyce (2004) also found that public debt is like a double-edged sword which can affect development positively or negatively depending on the application of such funds. To the authors, debts channeled towards human capital development and the production of goods for the poor tend to improve

development than those earmarked for the day-to-day running of government businesses.

Value Added Tax (VAT) proceeds to the 36 states of the federation has a positive coefficient with basic school enrolment and was significant at 5 per cent level in the linear regression, random and fixed effects models. This entails that VAT positively and significantly energizes human capital measured by basic school enrolment. This result agrees with the apriori theoretical expectation. This result is also in tandem with earlier studies by Okwu (2011), Success et al (2012) and Ofoegbu et al (2016). These authors in their studies find VAT to be positively related to school enrolment. VAT provides revenue to the three tiers of government, hence such fund if channeled into the educational sector will improve the performance of the sector.

Price level (inflation rate) has a negative coefficient in the linear regression, random and fixed effect models. This connotes that increase in prices level slows down school enrolment. This outcome is in consonance with the theoretical expectation however, only the fixed effect model was significant at 5 per cent level. This result is in consonance with the studies by Krener and Miguel (2007) and Evans, Kremer and Ngatia (2008). An increase in price level raises cost of living especially, food, clothing and books. This may reduce school enrolment and impact the development of a country negatively.

The diagnostic test carried out shows evidence of constant variance as contained in the Breusch-Pagan/Cook-Weisberg test for heteroscedasticity while the Ramsey RESET test shows variable omission. The test for fixed effect conducted using the Hausman procedure indicates that difference in coefficients was systematic. This connotes that the impact of revenue allocation to state, external debt owes by the states, VATs and price level on school enrolment differ amongst the 36 states of the federation.

Table 3. Result of Infant Mortality Rate Model

Variable	Linear Regression	Random Effect (RE)	Fixed Effect (FE)
Log(FRAS)	0.13 (0.03)	0.58 (0.00)	0.98 (0.00)
Log(SEDT)	-0.02 (0.63)	-0.04 (0.38)	0.03 (0.53)
Log(VATS)	-0.30 (0.00)	-0.61 (0.00)	-0.93 (0.00)
Log (INF)	0.64 (0.00)	1.01 (0.00)	1.28 (0.00)
Constant	2.73 (0.00)	0.90 (0.04)	7.40 (0.00)
R^2	0.18	0.13	0.10
Breusch-Pagan/Cook-Weisberg test for heteroscedasticity	Chi2(1) = 0.42; Prob = 0.52; H_0: Constant variance		
Ramsey RESET test	F(3,208) = 2.24; Prob = 0.09; H_0: model has no omitted variable		
Hausman Test for Fixed Effect (FE)	Chi2(4) = 83.30; Prob = 0.00; Ho: difference in coefficients not systematic		

Source: Author's Computation

The result of public spending and human capital development (proxy by infant mortality rate) in Table 3 shows that revenue allocated to states of the federation (expenditure) has significant positive implication on infant mortality rate in the linear regression, random and fixed effects model. This result deviated from the apriori theoretical expectation and entails that increase in revenue allocation (expenditure) to states in Nigeria seriously reduced infant mortality level in Nigeria. This result is in agreement with studies by Or, (2000a,b); Baldacci et al., (2002); Berger and Messer, (2002) who also found a positive relationship between spending on health and health outcomes (infant and maternal mortality rates). Most states of the federation still have very poor health indices like infant and maternal mortality in spite of

huge revenue from the federation account. Statistics from the NBS (2016) indicates that Katsina, Jigawa states have the worst health indicator (infant mortality rate) with 100 deaths per 1000 births while Lagos, Ekiti, Ondo and Osun states have the best health indicator (infant mortality level) in Nigeria over the period 2011 – 2016.

External debt stock of states government in Nigeria bears negative sign in the linear regression and random effect model. This deviated to the apriori theoretical expectation and connotes that increase in foreign debt reduced infant mortality hence promoted human capital development in Nigeria. However, the positive sign of the coefficient of debt in the fixed effect model shows that rising debt increase infant mortality level and retarded human capital development in Nigeria. The negative coefficient of external debt agrees with our apriori theoretical expectation and aligned with the findings of Gupta, Verhoeven and Tiongson (1999) who found that health expenditure reduces childhood mortality rates. However, investigation by Musgrove (1996) traced infant mortality to the level of education by mothers, cultural factors among others.

Value Added Tax (VAT) relationship with infant mortality rate is negative and substantial in explaining changes in infant mortality level in the linear regression, random and fixed effects models. This result is in tandem with the apriori theoretical expectation and entails that increase in VAT allocation to the 36 states of the federation reduced infant mortality rate significantly. This result is in tandem with the findings of Bhejer and Khan (1984) and Okeke (2014). They found a negative relationship between government spending and infant mortality rate. Also Robalino et al (2002) found that higher fiscal decentralization led to improved health outcomes (lower mortality rates), particularly in environments with strong political rights and high levels of ethno-linguistic fractionalization. An increase in revenue allocation to the various tiers of government and their expenditure could improve medical care through the training of more medical personnel, construction of more bed space and procurement of additional medical facilities and drugs for both the pregnant mothers, the infants and the general public.

Inflation rate also conforms to the apriori theoretical expectation by bearing a positive coefficient in the linear regression, random and fixed effect models.

This connotes that increase in price level substantially worsen infant mortality hence reduce economic prosperity in 36 states in Nigeria.

The diagnostic test conducted using the Ramsey RESET test display evidence of no variable omission in the infant mortality model. TheHausman test for fixed effect indicates that difference in coefficients was substantial. This entails that the consequence of revenue allocation to state, external debt owes by the states, VATs and price level on economic prosperity (infant mortality rate) differ amongst the 36 states of the federation.

Table 4.6: Partial Efficiency Frontier (PEF) Analysis Result

S/N	State	Average Efficiency Score for SSER	Average Efficiency Score for IFMR
1	Abia	0.95	0.95
2	Adamawa	0.98	0.96
3	AkwaIbom	0.89	0.88
4	Anambra	0.98	0.96
5	Bauchi	0.96	0.93
6	Bayelsa	0.92	0.93
7	Benue	0.97	0.94
8	Bornu	1.00	0.93
9	Cross River	0.95	0.95
10	Delta	0.89	0.88
11	Ebonyi	0.98	0.97
12	Edo	0.96	0.93
13	Ekiti	0.98	0.97
14	Enugu	0.96	0.95
15	Gombe	0.98	0.96
16	Imo	0.96	0.94
17	Jigawa	0.95	0.96
18	Kaduna	0.95	0.92
19	Kano	0.93	0.90
20	Katsina	0.95	0.93
21	Kebbi	0.96	0.96

22	Kogi	0.97	0.94
23	Kwara	0.98	0.97
24	Lagos	0.93	0.86
25	Nassarawa	0.98	0.98
26	Niger	0.98	0.94
27	Ogun	0.96	0.96
28	Ondo	0.96	0.91
29	Osun	0.96	0.96
30	Oyo	0.95	0.91
31	Plateau	0.98	0.94
32	Rivers	0.85	0.85
33	Sokoto	0.97	0.94
34	Taraba	0.98	0.96
35	Yobe	0.97	0.96
36	Zamfara	0.97	0.97

Source: Researcher's Computation (Stata 13)

The PEF results indicate that Borno state has the highest efficiency score of 1.0 in primary school enrolment over the period under investigation. This was followed by Anambra, Ekiti, Gombe, Kwara, Nassarawa, Niger, Plateau and Taraba states with efficiency score of 0.98. This implies that Bornu state and the later states have utilized revenues from the federation account to achieved very high primary school enrolment compared to other states of the federation. Rivers state has the lowest efficiency score in primary school enrolment with a score of 0.85. This implies that Rivers did not use her revenue from the federation account to achieved less school enrolment.

The efficiency score for infant mortality rate indicates that Nasarawa has the worst utilization of revenue to reduce infant mortality rate with and efficiency score of 0.98. This is followed by Ebonyi, Ekiti, Kwara and Zamfara States with efficiency score of 0.97. Rivers, Lagos and Delta states were more efficient in the use of revenue to reduce the incidence of infant mortality in their state with efficiency scores of 0.85, 0.86 and 0.88 respectively.

Findings

The results indicated that statutory revenue allocated to the states does not conformed with theoretical expectation with negative relationship with school enrolment and positive nexus with infant mortality rate. However, it was significant in explaining changes in human capital development in Nigeria. VAT was significant in explaining changes in human capital development and also conformed with aprioriexpectation with positive relationship with school enrolment and negative nexus with infant mortality. External debt expenditure was not significant in explaining changes in human capital development but complied with aprioriexpectation with positive nexus with school enrolment and negative relationship with infant mortality. Price level was significant in explaining changes in infant mortality rate and also conformed with apriori expectation by bearing positive sign with infant mortality and negative sign with school enrolment. It was however significant in the FE model for school enrolment.

The significance of the fixed effect test in both infant mortality and school enrolment models indicate that the impact of revenue/expenditure on human capital development differ substantially across the 36 states of the federation. This implies that some states were more efficient in the utilization of funds allocated to them to improve human capital (increase school enrolment and reduce child mortality) than others. Specifically, Bornu, Anambra, Ekiti and Gombe were more efficient in utilizing revenue allocation for primary school enrolment. Bornu and Gombe states were among the highest beneficiaries of the 'Amagiri' school programme executed by the former President Goodluck Jonathan's administration during the period under study. This programme increased the number of schools in the northern state and also provided food for school children which help to improve and sustain primary school enrolment and reduce out of school children. Anambra state witnessed very rapid socio-economic transformation during the administration of Peter Obi. His policy on education and agriculture helped to improved school enrolment and reduced poverty in the state. The case of Ekiti is similar to Anambra state. Rivers state has a neglected basic primary school education with dearth of basic infrastructure and low teachers-pupil ratio until 2014 when the administration of Chibuike Amaechi employed 13,000 teachers in the state.

The long years of neglect may have explained the poor performance of Rivers state.

Rivers, Lagos and Delta states were most efficient in reducing infant mortality rate with funds from the federation account. These states have very high revenue allocation from the federation account and also have very high internal revenue generation capacity. The three states have very good primary health care structure and facilities that helped promote efficient health care delivery and reduced mortality rate amongst children and their mothers over the period. The over 500 primary health care facilities built by the Rivers state government during the administration of Chibuike Amaechi helped pregnant mothers to access medical care. Also the continuous immunization of children below the age of 5 had also assisted. Lagos state has more improve medical care due to its almost 100 percent urban nature and the consistent policy administration in the state from the administration of Bola Tinubu to that of Ambode. The presence of medical doctors as Governors in Delta state over the past 11 years have help to improve medical care in Delta state as most of their policies tend to follow improvement in the health sector.

Nasarawa, Ebonyi, Ekiti, Kwara and Zamfara were not efficient in using federal allocation to improve medical care. These state received very low from the federation account. They also have very low revenue generation capacities due to their rural nature (see figures 4 & 6). Apart from Kwara state with seemingly consistent policy administration (Saraki and Ahmed), Nasarawa, Ebonyi and Ekiti have witnessed very discontinuous policy administration in governance.

Concluding Remarks and Recommendations

The results of our study demonstrate that revenue allocation and VAT revenue disbursed to states of the federation were significant in explaining changes in school enrolment and infant mortality level while external debt was insignificant in explaining changes in school enrolment and infant mortality (human capital development) in Nigeria. Based on these results, the study concludes that; revenue capacity of the state is a serious factor in explaining the human capital development status of the states of the federation. This is because states with higher revenue allocation from the federation account and

higher VAT generation capacity achieved higher human capital development than those with low revenue allocation and tax revenue generation capacity. Also states with low revenue but with consistent policy framework and administration achieved higher human capital development (Anambra, Ondo and Osun) than those with unstable policy framework and administrative capacity like Sokoto and Zamfara. The study thereby recommends: the practice of true fiscal federalism, fiscal discipline of public office holders and a stable macroeconomic environment as possible ways of enhancing human capital development in Nigeria.

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