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# Tax Base Broadening through Improved Business Environment in Nigeria

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## ABSTRACT
This study assessed the response of expenditure on transport, health, education and access to electricity to shocks from external debt and reserves, and the impact of these infrastructures on tax bases like consumption, real GDP per capita, export, and import. Findings revealed that only access to electricity responds positively to shocks from external debt throughout the 10-year forecast period; transport responds positively from period 1 to 3 only; access to electricity, spending on transport and health significantly impacts import positively; spending on education and health alone positively impacts consumption significantly; spending on health alone positively impacts real GDP per capita. Amongst others, the study recommends long-term source of external finance (bonds, debentures or World Bank power project grants) for improving: access to electricity in Nigeria by generating more megawatts, installing more transformers, and supply more prepaid meters and health facilities in the country.

**Keywords:** Base Broadening, Business Environment, External Debt, Reserves, Business Support Infrastructures

**JEL Classification**: H20, H25, M10

## INTRODUCTION

Meeting the need to boost or mobilize additional revenue from tax as an alternative to dwindling oil revenue in Nigeria has been a long-standing issue and always revolves around an implied demand theory of lower tax rate giving rise to the broader tax base. This obviously is borne out of the idea that tax rate reduction will make existing taxpayers indifferent to the tax take possible from removing exemption items and increasing taxable items. The chance of boosting tax revenue via tax rate reduction financed by exemption-removal base broadening could be limited by taxpayers' sensitivity to exemption items to be removed and taxed to offset rate reduction and

further boost tax revenue. If exemption items are a haven for overstating deductibles and reducing non-deductibles, it could induce tax planning efforts in the direction of base relocation and worse is the outbound investment consequence. More so, base broadening through recall of tax-exempt items, tax credit, deferrals and depreciation treatment technique could result in base erosion and profit shifting. As implied in Bull, Dowd, and Moomau (2011), the extent to which tax-incentives-withdrawal base broadening would increase tax revenues depends on the taxpayers' ability to avoid tax consequences.

Enterprise creation and expanding the size of existing business seems to be an area where there is substantial scope for tax base broadening. Enterprise creation largely depends on the ease of doing business in the locations of interest. The ease of doing business depends on a sum total of availability, accessibility to and spending on socio-economic infrastructure (education, health, electricity, transportation, etc.) and macroeconomic predictability (interest rate, inflation, and exchange rate). According to Arnold (2012) tax base broadening includes bringing more of the self-employed into the tax system, subjecting employer-provided fringe benefits and allowances to personal income taxation and reducing the exemptions from value-added taxes. "Bringing more of the self-employed into the tax system", clearly suggests limiting the size of the informal sector. High rate taxes alone do not give rise to informal sector growth as the marginal production cost of the alternative to electricity and accessibility to target markets (transport) to a very significant extent encourages tax evasion and avoidance effort in the informal sector.

Tax base is highly responsive to economic activities, which is dependent on both the creation of new domestic and foreign investment and expansion of existing capital stock (business productive capacity), which depends on the ease in doing business and further on real expenditure on electricity, roads, health and education (Nwadialor, & Ekeze, 2015). The problems of low tax collection, low domestic savings, declining reserves and oil revenue suggest the option of external debt financing. Hence, this paper aims to assess the response of expenditure on transport, health, education and access to electricity to shocks from external debt and reserves as an alternative source of finance, and examine the impact of these infrastructures on tax bases like consumption, real GDP per capita, export, and import. This is premised on the belief that external debt-financed infrastructure could improve business environment needed to increase quantity (firms' creation) and quality (wage increase via promotion from reduced production cost) of labour demand which

will increase quality and quantity of taxpayers, broaden the tax base, and make tax rate stability efficient.

Revenue constraints faced by oil export-dependent countries like Nigeria at the instance of drastic drops in oil price has intensified public interest in alternative revenue mobilization options of which tax plays a very dominant role. Nigeria's fiscal vulnerability to oil revenue is very high. Lowering the tax rate and incentives-removal base broadening cannot compensate for the infrastructural weaknesses and macroeconomic uncertainty that characterizes the business environment in Nigeria. Given the above-stated problems, it is thus expedient to explore the facts behind figures regarding relevant variables in this study.

Background stylized facts are summarized here. From 1981 to 1984, consumption, gross capital formation, real GDP per capita, import (% of GDP), and export (% of GDP) fell by an average of 8.1%, 34.7%, 5.16%, 6.1%, and 4.95%, respectively. This is attributable to the drop in both oil and non-oil revenue by an average of 13.9% and 7.97%, respectively, despite the upward trend in Nigerians' access to electricity (AE). From 1986 to 1987, consumption dropped by an average of 18.4%, in 1989 by 3.15%, by an average of 2.9% from 1993 to 1994, dropped by 3.15% in 1997, 5.5% in 1999, 9.7% in 2006, and 7.4% in 2008. From 2010 to 2012 and 2014 to 2015, it dropped by an average of 1.6% and 0.214% respectively. In the periods 1987-88, 1991-92, 1994-95, 1998-99, 2001, 2004-05, 2008, 2011, and 2015, gross capital formation dropped by 24.9%, 1.5%, 18.5%, 3.9%, 21.9%, 17.2%, 0.72%, 7.9%, and 1.5%, respectively. In the years 1986, 1988, 1990, 1992-94 1996, 1998, 2004, 2001-02, 2007, 2009-10, 2013, and 2015, export as percentage of GDP dropped by 4.1%, 4.1%, 8.6%, 5.8%, 3.5%, 12.1%, 9.6%, 7.9%, 9.4%, 7.31%, 13.4% and 7.78%. In the years 1988, 1994, 1999-00, 2002, 2004, 2008, 2010, 2012 and 2014-15, import as percentage of GDP dropped by 2.2%, 6.2%, 8.4%, 8.9%, 17.1%, 5.6%, 13.6%, 8.5%, and 1.1% (see appendix).

Access to electricity dropped by 10.3% in 2004, by 7.9% in 2010, and by 0.81% in 2012. In 1983, spending on education (SEDU), spending on health (SHTH), and spending on transport (STRANS) dropped by 13.7%. In 1987, SEDU and SHTH dropped by 14.3% and 69.2%, respectively. In 1990, SEDU, SHTH and STRANS dropped by 20.2%, 12.98% and 2.5%, respectively. In 1991, SEDU and STRANS dropped by 47.7% and 17.1%, respectively. In 1994, SEDU, SHTH and STRANS dropped by 16.9%, 45.9% and 78.02%, respectively. In 1998, 2001,

and 2015, SEDU dropped by 8.5%, 31.2% and 5.4%, respectively. In 1992, SEDU and SHTH dropped by 76.8% and 75.7%, respectively. In 1997, 2002, 2005, 2010, 2011, and 2013, STRANS dropped by 23.66%, 0.38%, 52.9%, 69.1%, and 20.2%, respectively. In 2003, SEDU, SHTH and STRANS dropped by 19.5%, 18.1% and 22.8%, respectively. In 2014, SEDU and STRANS dropped by 11.9% and 1.2%, respectively. In 2000, SHTH and STRANS dropped by 8.5% and 72.7%, respectively. In 2016, SHTH and STRANS dropped by 21.5% and 15.01%, respectively (see appendix). These trends as analyzed above show that in 2014-2015, all exhibited negative trends which is attributable to the downward trend in both oil and non-oil revenue in Nigeria. This suggests amongst many others that tax base broadening by repeal of tax incentives cannot cover up for infrastructural weaknesses and also taxpayers (labor and firms) could nurse the mind of uncertainty over tax rate stability because if every opportunity to expand tax base via exemption removal is exhausted, government may be left with no other choice than to increase tax rate.

## LITERATURE REVIEW

### Tax and Business Environment in Nigeria

Taxes are fundamental components of any attempts to build societies and nations at large. Willful default in tax compliance remains a major issue in Nigeria. The self-employed out-number paid workers and they earn as much as four times that of the formal sector employees, therefore, bulk of personal income tax (PIT) accrues from employees whose salaries are deducted at source. The PIT is the oldest tax in Nigeria. The tax system suffers from a lack of a comprehensive legal framework to punish tax evaders. Findings reveal that tax evasion and avoidance by self-employed (informal sector) are as a result of cultural practices, religion, mode of tax administration, and ethical view of the taxpayers. Government's low level of income results in inadequate infrastructural and social developments which derive from high tax rates (Ibadin & Eiya, 2013).

In the 1960s, the main goal of tax policy was revenue generation via increasing existing tax rates. Excise duties were introduced on some goods to broaden the revenue base, not tax base. In the early 1970s, the discovery of oil in commercial quantities made oil tax revenue the dominant source of tax revenue. Non-oil tax revenue dropped as interest in agriculture shifted to oil extraction and export. Oil tax fell in 1985 due to the amendment of the petroleum profit tax law. Criticisms of the Nigerian system have focused on low tax revenue resulting from high tax rates which encourages connivance, evasion and avoidance (Bassey, Edom, & Adanma, 2015).

According to Bismarck (2013), as cited in Mansor and Gurama (2016), Nigerian authority had lost N90 billion, equivalent to $550 million USD, to tax evasion in the automobile industry alone in the year 2013.

As regards value added tax (VAT), which is the tax on spending/consumption levied at every stage of a transaction but eventually borne by the final consumer of such goods and services, in Nigeria, it is a Multi-Stage Tax System levied at 5%. This principally implies VAT is imposed at every stage of the production chain from the manufacturer to the consumer. To mitigate the adverse effect of this Multi-Stage tax system, a credit mechanism system has been installed to allow VAT paid on the input to be deducted from ones paid on output. The VAT system is invoice based and not cash based (see vanguardngr.com, 2018).

The Personal Income Tax Rate in Nigeria currently stands at an average rate of 24 per cent. In Nigeria, the Personal Income Tax Rate is a tax collected from individuals and is imposed on different sources of income like labour, pensions, interest and dividends. The benchmark used is the Top Marginal Tax Rate for individuals. Revenues from the Personal Income Tax Rate are an important source of income for the government of Nigeria. The Corporate Income tax rate is a tax collected from companies. Its amount is based on the net income companies obtain while exercising their business activity, normally during one business year. The operative benchmark is the highest rate for Corporate Income. Revenues from the Corporate Tax Rate are also an important source of income for the government of Nigeria (see tradingeconomics.com).

According to the tax service chairman, Tunde Fowler, the sum recorded by the tax agency in the first quarter (Q1) of 2018 represents a significant leap over the N778.19bn recorded in the Q1 of 2017. This suggests an improvement in the collection performance over the corresponding quarter in 2017. The breakdown of the revenue collection shows that Petroleum Profit Tax (PPT) collection rose by 91 per cent from N338.29 billion in the first quarter of 2017 to N644.76 billion in the first three months of 2018. For Company Income Tax (CIT), it was a commendable leap by 30 per cent from N155.57 billion to N202.16 billion. In the same vein, an aggregate of N269.09 billion was collected as Value Added Tax (VAT) in the Q1 of 2018, compared to N221.38 billion in the Q1 of 2017. This clearly represents a 22 per cent difference. Stamp Duty collection jumped by N1.43 billion from N3.08 billion to N4.45 billion, while Capital Gains Tax (CGT) recorded a

179 per cent rise from N110.94 billion in the Q1 of 2017 to N309.17 billion in the Q1 of 2018 (Bada, 2018).

**The Nigerian Business Environment**

Nigeria, a country located on the western coast of Africa, blessed with human, mineral and natural resources. Despite the above features and potential of great business opportunities, there are challenges constraining her business environment. The Nigerian business environment lacks basic social amenities and infrastructural facilities that aid business development and survival. For example, if an investor intends to start or set up a production firm, he or she will find out that they need to provide their building, water supply, logistics and other amenities needed. So far, the Nigerian government has not been able to find a lasting solution to the situation of poor power supply in the country which affects the big organizations including the multi-purpose and one-man businesses. The presence of this as a major constraint of Nigeria business environment has killed a lot of infant industries in the country.

Nigeria has been for a long time facing poor roads all over the nation. Especially ones linking the rural areas to the urban areas that could aid the welfare of the agricultural sector of the economy as well as the free movement of the people as a whole. Other means of transportation including the railways and waterways also have not been fully established.

Finance and funding is a major aspect of setting-up and running a business. Money is needed to buy materials, supplies, equipment, pay staff and lots more. In the country, funding is also part of the problems especially if an entrepreneur does not have enough money to kick-start the business which occurs mostly in a one-man business. Financial institutions (including banking and non-banking) that could help investors have so much increased their interest percentage on available loans, thereby becoming unaffordable for companies. Government is the backbone of a country's economy. Government policy on business operation in Nigeria leads to delay in the business set-up.

In summary and as discussed above, these challenges are, lack of enabling environment and infrastructure, poor power supply, poor transportation network, poor accessibility of funds, lack of government support, inadequate security of lives and properties, political instability, lack

of adequate technology, lack of good managerial and strategic planning and decisions and, inadequate infant industries protection (Jimoh, 2017).

According to a Strength, Weakness, Opportunities and Threats (SWOT) Analysis of the Nigerian business environment, Nigeria has a high potential for growth and stability. It is a strong environment for the businessmen to flourish their business. The monetary policy of Nigeria is mobilized and in control to manage the supply of money in a way which does not result in excessive appreciation or devaluation of the currency. The rate of her active and mobile population amounts to 40% which implies manpower availability for new and existing businesses in the country. The country can take advantage of going global. It has its strong oil and gas sector which can help her earn a lot of foreign exchange in the field of exports. The petroleum exportation also serves as a source for foreign reserve.

Irrespective of these strengths the country is deficient in her structure and therefore requires foreign assistance and investments to improve and enhance her managerial and capital base. An inadequate internal resource is a big weakness that hampers her productivity and competitiveness on the global platform.

**Base Broadening Strategies in Nigeria**

According to the Sun Editorial (2018), as said by the Minister of Finance, Mrs Kemi Adeosun, taxpayers' base has aggressively grown to 19 million. This is traceable to the revived interest in property tax and the drive for reducing the shadow economy via the voluntary asset/income declaration scheme (VAIDS). However, available statistics show that critical sectors for economic growth such as education, power, health, road and social infrastructure are in serious deficit. Power supply remains a conundrum despite huge investment in the sector. Nigeria still generates less than 4,000mw as against its target of 10,000mw annually. Despite the compelling necessity to pay tax, Nigerians are compliance intolerant as the nation is behind in the provision of social infrastructures such as good roads, efficient health care system, stable electricity supply and others. Recently the International Monetary Fund (IMF) recommended that Nigeria can widen her tax base by removing exemptions, rationalizing tax incentives towards strengthening tax compliance and raising VAT rate (see The Sun, date).

**Empirical framework**

Gangh and Eccleston (2004) studied how benefits from economic globalization constrain the policy capacity of nation-states in the income tax arena. Competitive pressures were found a crucial driving force behind the trend toward lower corporate tax (CT) rates. A combination of competitive pressures on statutory CT rates and the need to maintain revenue yield has forced governments to broaden the CT base. Removing CT concessions in this manner has shifted the corporate tax burden towards new investment by domestic companies. This may result in a long-term reduction in the tax burden on corporations. Competitive pressures on statutory CT rates also tend to 'spill over' into personal income taxation. More specifically, a large tax rate gap between the CT rate and the top rate on personal income makes sustaining high marginal personal income tax rates significantly more expensive – economically, administratively, and politically. In the long run, it creates a bias in favour of 'flattening' personal income taxes. Tax competition in form of lower corporate tax rate contributes indirectly to pressure for tax reform.

Vartia (2008) found that taxes have an adverse effect on industry-level investment. In particular, corporate taxes reduce investment by increasing the user cost of capital. Both personal and corporate income taxes were found to have negative effects on productivity. This study solely focusses on boosting productivity through reducing corporate tax rate as a simulation experiment indicates that the effect of a reduction of the corporate tax rate from 35% to 30% on the yearly Total Factor Productivity (TFP) growth rate (over 10 years) would be 0.08 percentage points higher for industries with the median profitability than for industries with the lowest level of profitability.

Lars and Heckemeyer (2011) discovered that tax rate reduction could be matched with a reduction in public spending. They did not consider the external debt financing of public expenditure which will help maintain welfare. More so tax rate reduction may be ineffective given the fact that investment is location sensitive. The lower tax rate is not a sufficient reason for establishing a business or investing in a country or particular location. The study concluded that further research is needed on tax rate effects of public goods provision and not the external debt-

financed provision of public goods to boost economic activities and consequently widen the tax base.

Oystein (2016) found that tax-induced changes in bilateral foreign direct investments (FDI) positions (stocks) result in a relocation of investments and a redistribution of tax revenue among countries. The calculated effects capture both tax-induced changes in real investments and tax planning, but the analysis cannot distinguish between these two channels. The methodology only captures a part of tax planning activities of multinationals, since many of these activities are not reflected in the size of the FDI positions. Ceteris paribus, lower-tax countries are expected to have larger inflows (and smaller outflows) of capital than higher-tax countries. These expectations could be shattered by inadequate infrastructures.

Babar, Awan, and Nadeem (2017) explored the impact of the corporate tax rate on private investment in Pakistan. The study, using the ARDL technique discovered that the corporate tax rate is negatively impacted private investment in Pakistan, so this is one of the main hurdles for the corporate sector's investment. The study suggests that corporate tax rate should be reduced as it concludes that tax rates are an obstacle for investment in developing countries and that they are giving importance to public sector and do not facilitate the private sector.

Nelson (2017) revealed that high effective rates could put a country in an unfavourable condition in the competition for attracting investments. The reduction of corporate income tax rates seems to be an appropriate measure. Lower rates, accompanied by the suppression of tax benefits, is expected to reduce the opportunities for tax avoidance and can help the country to boost its competitiveness in terms of investment attraction. A second improvement measure for the country could be a revision of the depreciation rules that make them friendlier to investment. Due to technological developments, machinery and equipment tend to depreciate faster and faster.

Djankov, Ganser, McLiesh, Ramalho, and Shleifer (2010) found that effective corporate tax rates have a large and significant adverse effect on corporate investment and entrepreneurship. Higher effective corporate income taxes are associated with lower investment in manufacturing but not in services, a larger unofficial economy, and greater reliance on debt as opposed to equity finance.

Ebifuro, Mienye, and Odubo (2016) analysed the application of geographical information system (GIS) to improve tax collection. The study identified the Global Positioning System (GPS) to be amenable to meeting the challenge faced in bringing the informal sector into the tax net. The study made use of zoning for effective and efficient attribute data collection. GIS infrastructure has been perceived as a viable strategy to enhance government decision in the process of informal sector regularization. Alexander (2016) assessed both the costs and benefits of tax incentives. Tax incentives were identified as rational and of beneficial response to the pressures of tax competition, because they permit, in principle, the combination of a competitive tax system for mobile activities with higher taxes elsewhere. In practice, however, it may be difficult to achieve such an outcome, because of the many disadvantages of existing tax incentives and difficulties in their administration.

## METHODOLOGY

The study, which employed *ex post facto* research design is therefore assisted in filling the gap and also added to the existing knowledge through an in-depth study and analysis of the response of infrastructure quality indicators to external debt and reserves in Nigeria, identify the suitable source of external finance, assess the impact of these infrastructure indicators (spending on transport, education, health and access to electricity) and macroeconomic stability indicators (exchange rate, inflation rate, and lending rate) on tax bases like consumption, real GDP per capita, import, and export. The study is theoretical due to the estimation technique used.

The data for this study were obtained from secondary sources that are the Central Bank of Nigeria's statistical bulletin 2016 and the World Bank 2016). This study is based on annual time-series data from the period 1980 to 2016.

### Estimation Technique (Vector Error Correction Model)

A vector error correction model is a restricted VAR designed for use with non-stationary series that are known to be co-integrated. According to Brooks (2008), the VECM has co-integration built into the specification so that it restricts the long-run behaviour of the endogenous variable to coverage to their co-integrating relationships while allowing for short-run dynamics. The co-integration term is known as the error term correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments. When the variables are co-integrated, the corresponding error correction must be included in the system. By

doing so, one can avoid misspecification of the important constraints. There are several methods of testing for co-integration, but two often stand above the rest namely: The Engel-Granger approach which is residual based and the Johansen and Julius (1990) technique which is based on maximum likelihood estimation on a VAR system.

**Method of Data Analysis**

The impulse response and variance decomposition were used to determine the appropriate source of finance for each infrastructure quality indicator. The variables used are defined below.

CONS = Consumption, RGPC= real GDP per capita, M=import, X=export, SEDU=spending on education, SHTH=spending on health, STRANS=spending on transportation, AE=access to electricity, INF=inflation, OER=official exchange rate, LIR=lending rate

## RESULTS AND DISCUSSION

**Table 1. Unit Roots Tests**

| Variables | Test Statistic | Critical Value at 5% | Prob. Value | Order of Integration |
|---|---|---|---|---|
| AE | -6.321387 | -2.957110 | 0.0000 | I(1) |
| EDU | -7.447433 | -2.951125 | 0.0000 | I(1) |
| HTH | -9.702635 | -2.951125 | 0.0000 | I(1) |
| TRANS | -7.686861 | -2.951125 | 0.0000 | I(1) |
| ED | -4.715422 | -2.951125 | 0.0006 | I(1) |
| RES | -5.313161 | -2.951125 | 0.0001 | I(1) |
| CONS | -6.256302 | -2.954021 | 0.0000 | I(1) |
| M | -7.873695 | -2.954021 | 0.0000 | I(1) |
| RGPC | -4.344214 | -2.951125 | 0.0016 | I(1) |
| REALVA | -3.471364 | -2.951125 | 0.0151 | I(1) |
| INF | -5.416306 | -2.951125 | 0.0001 | I(1) |
| LIR | -5.826746 | -2.951125 | 0.0000 | I(1) |
| OER | -3.644593 | -2.951125 | 0.0099 | I(1) |
| X | -8.526825 | -2.954021 | 0.0000 | I(1) |

***Source: Authors Computation using E-views 7 (2017)***

All variables are integrated of order one that is I(1) which means that they are stationary at first difference.

**Table 2. Impulse Response of Infrastructure Quality Indicators to External Debt and Reserves**

| Response of AE | | Response of EDU | | Response of HTH | | Response of TRANS | |
|---|---|---|---|---|---|---|---|
| ED | RES | ED | RES | ED | RES | ED | RES |
| 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 0.493265 | -0.8567 | -0.24722 | -0.28873 | -0.2234 | -0.19433 | 0.044094 | -0.12503 |
| 0.380149 | 0.019512 | -0.10125 | -0.16193 | -0.10698 | -0.02845 | 0.044041 | 0.064703 |
| 0.299495 | 0.046750 | -0.02097 | -0.07616 | -0.05889 | -0.0559 | -0.09463 | -0.02232 |
| 0.084160 | -0.26628 | 0.011576 | -0.0195 | -0.0402 | 0.016304 | -0.1378 | 0.024239 |
| 0.310403 | -0.47007 | -0.0198 | -0.111 | -0.06667 | -0.0479 | -0.10991 | -0.01393 |
| 0.326898 | -0.06899 | -0.11381 | -0.16718 | -0.13962 | -0.08179 | -0.05718 | 0.012688 |
| 0.268999 | -0.09849 | -0.11998 | -0.13155 | -0.12621 | -0.06751 | -0.01783 | 0.037652 |
| 0.299096 | -0.26972 | -0.0831 | -0.08158 | -0.09973 | -0.0256 | -0.05857 | 0.012726 |
| 0.301007 | -0.26173 | -0.02803 | -0.08974 | -0.06684 | -0.03043 | -0.0871 | -0.01572 |

***Source: Authors Computation using E-views 7 (2017)***

Access to electricity responds positively to shocks from external debt and negatively to shocks from reserves. Education and health respond negatively to shocks from external debt and reserves. Transport responds positively to shocks from the initial period to period 3 and from 4 to 10 it responds negatively to external debt. Transport responds negatively to reserves in periods 1, 2, 4, 6 and 10 while in periods 3, 5, 7, 8, and 9 it responds positively.

**Table 3. Variance Decomposition (D) Analyses**

| Variance D of AE | | Variance D of SEDU | | Variance D of SHTH | | Variance D of STRANS | |
|---|---|---|---|---|---|---|---|
| ED | RES | ED | RES | ED | RES | ED | RES |
| 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 4.748676 | 14.32432 | 9.768839 | 13.32500 | 8.062050 | 6.100044 | 0.155433 | 1.249813 |
| 6.568944 | 12.43794 | 8.979432 | 13.78775 | 8.639107 | 5.431219 | 0.219075 | 1.117979 |
| 5.883699 | 9.074782 | 8.244678 | 13.24805 | 8.422016 | 5.417491 | 0.541729 | 0.857285 |
| 5.283048 | 8.802276 | 7.483172 | 12.04155 | 7.695278 | 4.860406 | 1.129564 | 0.741911 |
| 5.510293 | 9.754109 | 6.739220 | 11.93364 | 7.158344 | 4.469497 | 1.359894 | 0.653465 |
| 5.920956 | 8.893632 | 6.774762 | 12.39497 | 7.964010 | 4.489554 | 1.281909 | 0.577673 |
| 6.011775 | 8.247208 | 7.247759 | 12.60387 | 8.695565 | 4.540235 | 1.163712 | 0.555634 |
| 6.160426 | 8.088784 | 7.220295 | 12.19349 | 9.000099 | 4.347895 | 1.108975 | 0.497358 |
| 6.313838 | 7.951352 | 6.830750 | 11.96356 | 8.795277 | 4.159143 | 1.153095 | 0.454963 |

***Source: Authors Computation using E-views 7 (2017)***

From the variance decomposition analysis table, external debt maintained a steady rising impact on access to electricity unlike education, health, and transport. External debt has the highest impact on access to electricity, education, health, and transportation in period 3, 2, 9 and 6 respectively.

**Table 4. Error Correction Model Results of Selected Tax Bases as Functions of Infrastructure Quality**

| | Export | Import | Real GDP Per Capita | Consumption |
|---|---|---|---|---|
| AE | Positive and not significant | Positive and significant at 5% | Negative and significant at 5% | Negative and not significant |
| EDU | Positive and not significant | Negative and significant at 5% | Negative and significant at 5% | Negative and significant at 5% |
| HTH | Negative and not significant | Positive and significant at 5% | Positive and significant at 5% | Positive and significant at 5% |
| TRANS | Positive and not significant | Positive and significant at 5% | Negative and significant at 5% | Positive and not significant |
| INF | Negative and not significant | Negative and significant at 10% | Negative and not significant | Negative and not significant |
| LIR | Positive and significant at 5% | Positive and not significant | Positive and not significant | Negative and not significant |
| OER | Negative and significant at 10% | Negative and not significant | Positive and not significant | Negative and not significant |
| $R^2$ | 0.508302 | 0.713758 | 0.429893 | 0.449850 |
| F-stats Prob. Value | 0.011582 | 0.0000033 | 0.040027 | 0.034680 |

***Source: Authors Computation using E-views 7 (2017)***

The regression results show that access to electricity, spending on transport, health and education explains 45%, 43%, 71% and 51% variation in consumption (tax base for VAT), real GDP per capita (tax base for personal income tax), import (tax base for tariff) and export (tax base for excises) respectively. Impact assessment shows that access to electricity, spending on health, and transport impact positively on import at a 5% significance level. Spending on education and health impacts positively on consumption significantly. Spending on health impacts positively on real GDP per capita while access to electricity, spending on education, and transport impacts negatively on real GDP per capita. Only lending rate (positive) and official exchange rate (negative) impact significantly on export. This supports the theory behind the foreign trade multiplier that export is dependent on domestic investment which depends largely on the lending rate in the economy and also elasticity approach to the balance of trade which states that exchange rate devaluation can be used to improve export and at this same time discourage dumping via import.

F-statistics show that access to electricity, spending on transport, education, and health, exchange rate, lending rate and inflation rate can jointly explain in a significant way changes in the selected tax bases-consumption, real GDP per capita, import, and export. From the Granger causality test result, bidirectional causality was found between real GDP per capita and

consumption and between lending rate and education. Unidirectional causation was found to flow; from access to electricity to real GDP per capita, spending on health and education, and consumption; from reserves, official exchange rate, spending on health, education, external debt to consumption.

## CONCLUSION AND RECOMMENDATION

### Conclusion

The study gave a vivid exposition to the limits of base broadening via exemption removal. It was observed that trends of the tax bases and infrastructure quality indicators as analyzed above show that in 2014-2015, all exhibited negative trends which is attributable to the downward trend in both oil and non-oil revenue in Nigeria. Tax base broadening extends beyond exemption removal as it very much includes bringing more of self-employed into the tax system, creating more firms and generating more employment opportunities. The study also posits that Nigeria's fiscal vulnerability to oil revenue is very high and lowering the tax rate cum incentives removal base broadening cannot compensate for the infrastructural weaknesses.

Based on the findings from the impulse response, the study concludes that; Transport should be financed with more of reserves. This is due to the fact that the result suggests long-term external debt source may not favour transportation. Education and health should not be financed by external debt. Access to electricity should be primarily financed with a long-term external source of finance given its revenue generating capacity as regards the payment for electricity supply.

This study in summary found that base broadening via improved business environment in terms of foreign borrowing to finance and improve access to electricity which will mitigate production or supply or trading costs, improve economic activities, weaken tax planning effort towards evasion and avoidance, enhance voluntary tax compliance as well as VAIDS, revenue generation (more profit to be taxed), increase taxpayers by encouraging enterprise creation (increase in company income tax (CIT)) and consequently employment generation (increase in personal income tax (PIT)), is possible provided there is legal framework to enforce compulsory use of electronic transfers when carrying out public projects cum programmes like road construction down to the pettiest payments.

### Recommendations

On the basis of the overall analysis, the following policy recommendations are made:

1. Long-term source of external finance (bonds, debentures or World Bank power project grants) for improving (i) access to electricity in Nigeria by generating more megawatts, installing more transformers, and supply more prepaid meters (ii) health facilities, their cost, allocation and technical efficiency.
2. The Nigerian government should call for feasible proposals from experts/specialists on the cost and benefit analysis of providing 24 hours' electricity, time-saving and depreciation reducing road network cum transportation system.
3. The maximum ceiling should be set for lending rate, inflation rate, and exchange rate just as it is with premium motor spirit to reduce macroeconomic uncertainty.
4. The federal government should thoroughly scrutinize the absorptive capacities of promoters of the feasible proposals to avoid diversion of funds and financial misappropriation

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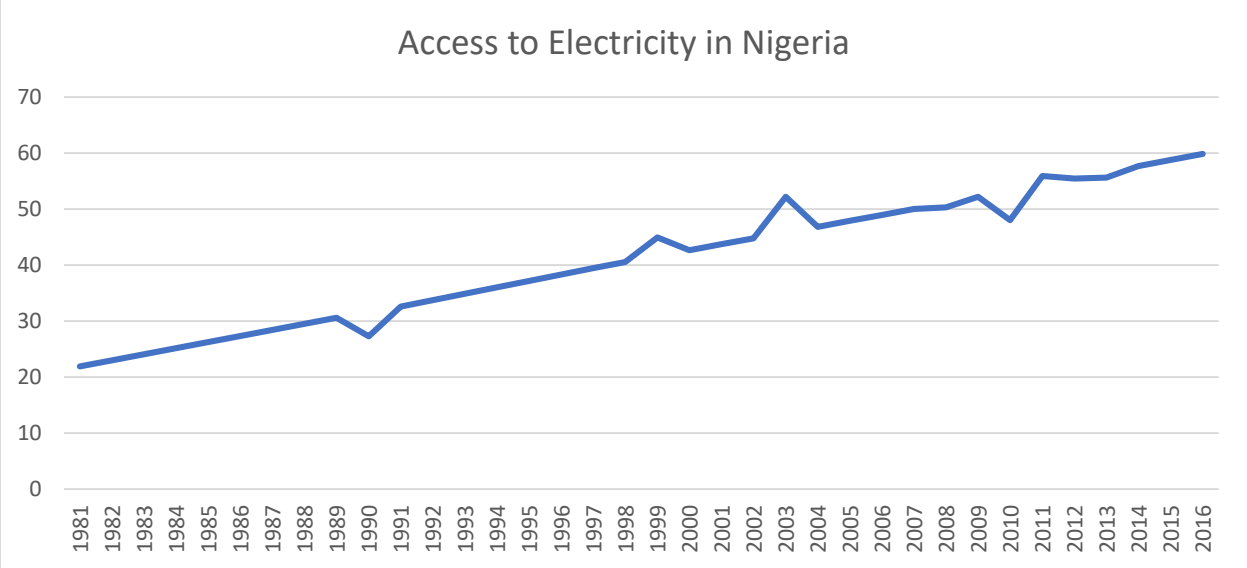
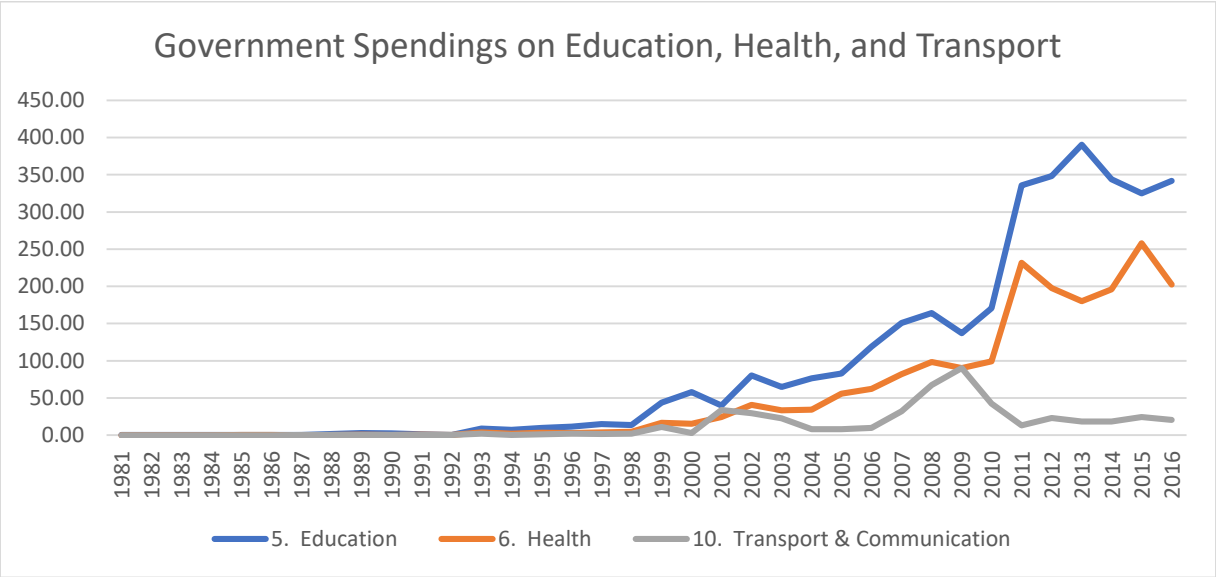
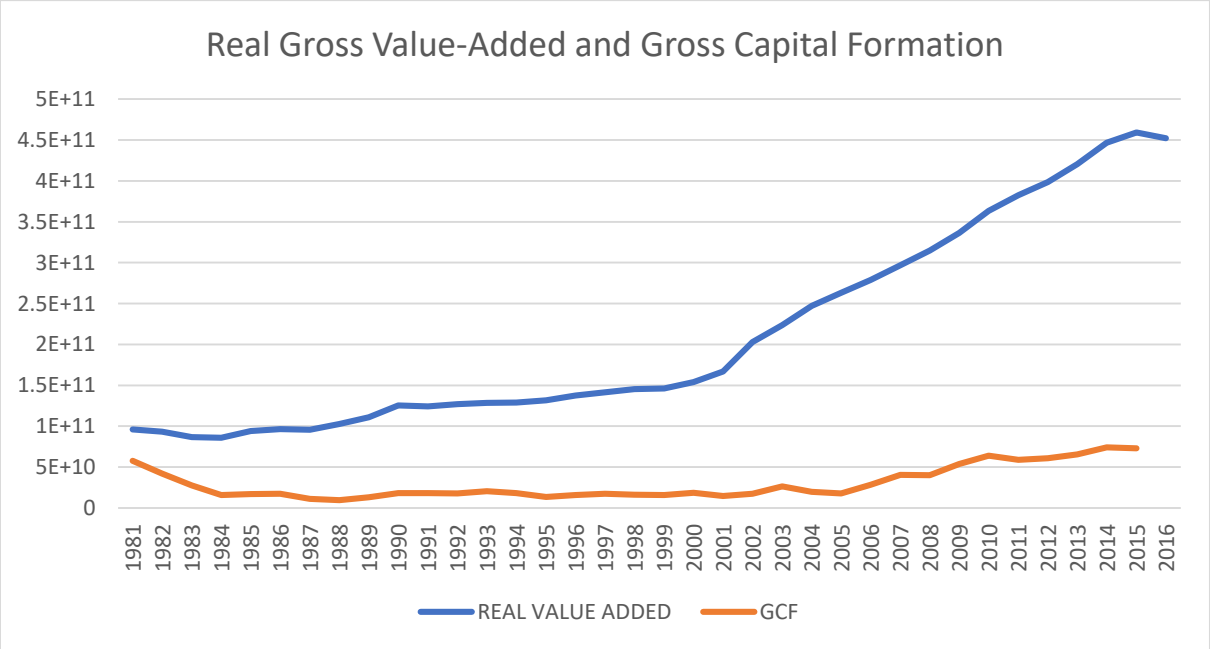
## APPENDIX



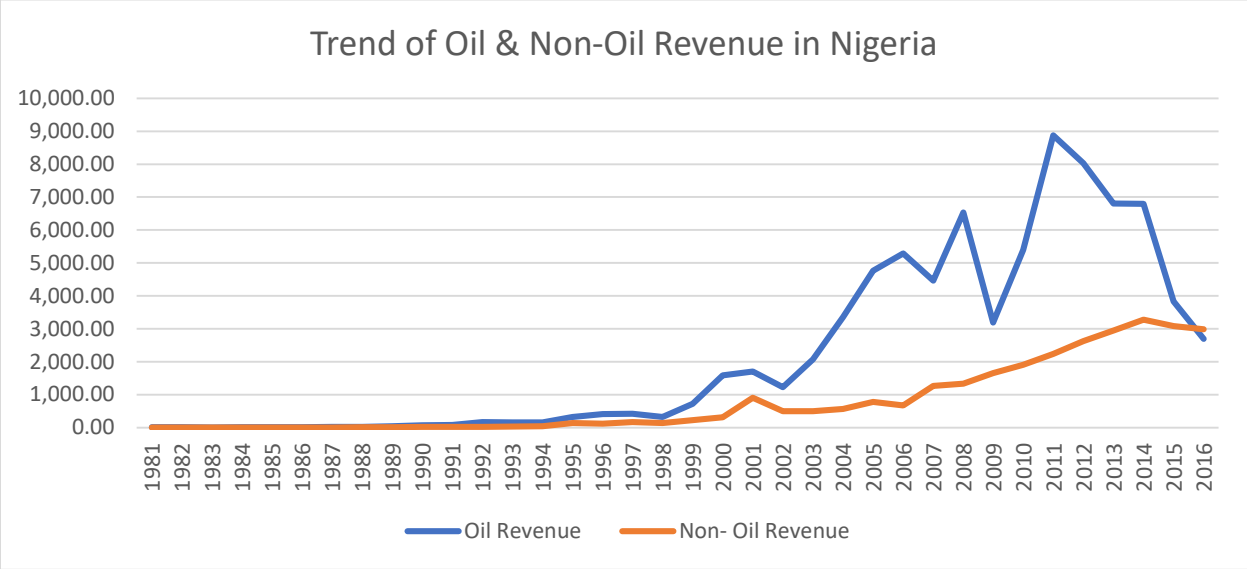

*Source: Authors Initiative using World Bank Data 2017*




*Source: Authors Initiative using World Bank Data 2017*




*Source: Authors Initiative using World Bank Data 2017*




*Source: Authors Initiative using World Bank Data 2017*

Pairwise Granger Causality Tests
Date: 06/08/18 Time: 01:30
Sample: 1981 2016
Lags: 2

| Null Hypothesis: | Obs | F-Statistic | Prob. |
|---|---|---|---|
| CONS does not Granger Cause AE | 33 | 0.64475 | 0.5324 |
| AE does not Granger Cause CONS | | 8.00498 | 0.0018 |
| EDU does not Granger Cause AE | 34 | 0.52868 | 0.5950 |
| AE does not Granger Cause EDU | | 5.02337 | 0.0134 |
| HTH does not Granger Cause AE | 34 | 1.17966 | 0.3217 |
| AE does not Granger Cause HTH | | 4.98243 | 0.0138 |
| REALGDP does not Granger Cause AE | 34 | 1.16472 | 0.3262 |
| AE does not Granger Cause REALGDP | | 7.71227 | 0.0021 |
| RES does not Granger Cause AE | 34 | 1.56463 | 0.2263 |
| AE does not Granger Cause RES | | 5.54095 | 0.0092 |
| RGPC does not Granger Cause AE | 34 | 1.05199 | 0.3622 |
| AE does not Granger Cause RGPC | | 7.62616 | 0.0022 |
| RI does not Granger Cause AE | 33 | 2.06945 | 0.1451 |
| AE does not Granger Cause RI | | 9.15412 | 0.0009 |
| ED does not Granger Cause CONS | 33 | 4.35124 | 0.0226 |
| CONS does not Granger Cause ED | | 1.26107 | 0.2990 |
| EDU does not Granger Cause CONS | 33 | 10.0426 | 0.0005 |
| CONS does not Granger Cause EDU | | 0.01692 | 0.9832 |

| | | | |
|---|---|---|---|
| HTH does not Granger Cause CONS | 33 | 11.2952 | 0.0003 |
| CONS does not Granger Cause HTH | | 0.28920 | 0.7511 |
| OER does not Granger Cause CONS | 33 | 10.9066 | 0.0003 |
| CONS does not Granger Cause OER | | 0.44888 | 0.6429 |
| REALGDP does not Granger Cause CONS | 33 | 4.09625 | 0.0275 |
| CONS does not Granger Cause REALGDP | | 0.05661 | 0.9451 |
| RES does not Granger Cause CONS | 33 | 4.74863 | 0.0168 |
| CONS does not Granger Cause RES | | 1.68626 | 0.2035 |
| RGPC does not Granger Cause CONS | 33 | 4.34340 | 0.0228 |
| CONS does not Granger Cause RGPC | | 4.78910 | 0.0163 |
| TRANS does not Granger Cause CONS | 33 | 6.85166 | 0.0038 |
| CONS does not Granger Cause TRANS | | 0.05497 | 0.9466 |
| RI does not Granger Cause CONS | 33 | 5.60072 | 0.0090 |
| CONS does not Granger Cause RI | | 0.55385 | 0.5809 |
| RIR does not Granger Cause DCP | 34 | 0.45626 | 0.6381 |
| DCP does not Granger Cause RIR | | 6.41060 | 0.0049 |
| INF does not Granger Cause EDU | 34 | 4.57614 | 0.0187 |
| EDU does not Granger Cause INF | | 1.83711 | 0.1773 |
| LIR does not Granger Cause EDU | 34 | 4.14882 | 0.0260 |
| EDU does not Granger Cause LIR | | 3.44717 | 0.0454 |