An Empirical Investigation of Oil Rents and Institutions as Determinants of Economic Growth in Nigeria

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Key Facts about the Nigerian Economy

- Nigeria has a population of 200.964million people(IMF,2019)
- Oil was discovered in 1956.
- Oil Rents account for over 80% of the total governmental income
- Nigeria is a member of OPEC and Gas Exporting Forum
- Nigeria produced approximately 2.4milion barrels of crude oil daily
- Nigeria is the 13th largest oil producer in the world
- Nigeria Crude oil reserve is 10th largest in the world and 2nd in Africa
- Nigeria economy is the largest in Africa with a rebased GDP value of $460.5billion(constant 2010 US dollars) in 2017

Trend of Oil Rents and Per Capita GDP Growth of Nigeria

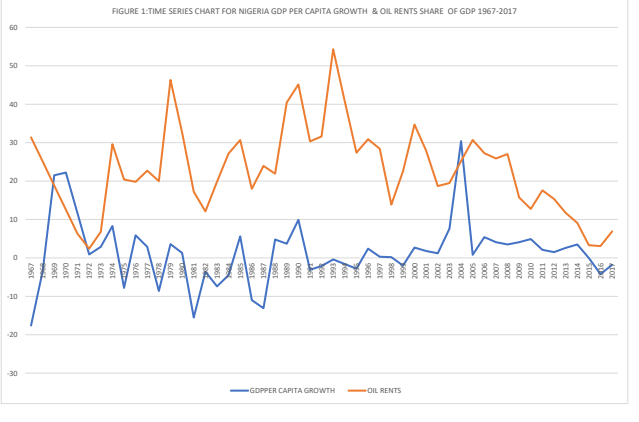
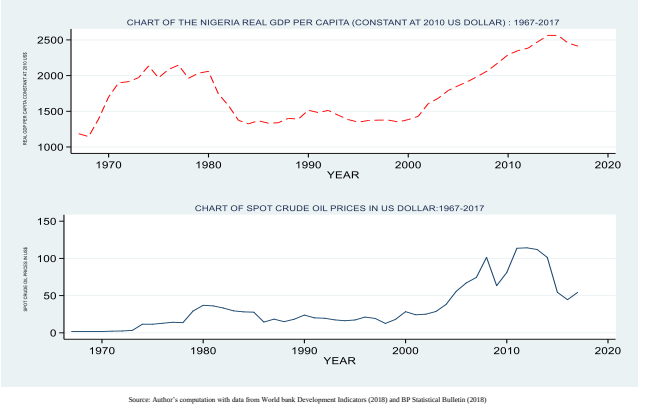


Figure 1: Share of Oil Rents in GDP and Per Capita Real GDP Growth Rate of Nigeria

Source: Author's calculations with data from the World Bank's World Development Indicators(2018)

Crude Oil Prices and Per Capital Real GDP Growth Rate



Source: Author's computation with data from World bank Development Indicators (2018) and BP Statistical Bulletin (2018)

Figure 2: Spot Price of Crude Oil and Nigeria Per Capita Real GDP(Constant 2010 US Dollar)

Source: Author's calculations with data from the World Bank's World Development Indicators(2018)

The key Findings and Contributions to the Literature

- Key Findings:
  1. We identified a positive short run and long run association between oil rents and economic growth in Nigeria.
  2. The political institution in the form of a democratic system of institution has positive effect on the growth rate of the Nigerian economy in the long run.
  3. Human capita development in Nigeria has positive long run association with economic growth.
- Contributions to the literature:
  1. The research work is the first attempt in the concept of Nigeria to focus exclusively on how institutions complement oil rents as determinants of the Nigerian economy
  2. We utilised an updated time series data (1967-2017) to augment the past empirical works on the oil rents and economic growth which utilised panel data
  3. The application of quality of budgetary management in Nigeria as proxy for economic institution is a novel idea in the economic research history of Nigeria

The Research Objectives

- To empirically investigate oil rents and institutions as determinants of economic growth in Nigeria.Specifically:
  1. We seek to examine the effects of oil rents on the Nigerian economy and determine both the pattern and magnitude of such effect if it exists.
  2. To ascertain if good institution matters for economic growth in Nigeria.
  3. For the fluctuations in the flow of oil rents, we seek to examine the diversification options of the Nigerian economy.

Institution and the Nigerian Economy

- Institutions are the rule of the game in a society or more formally , the humanly devised constraints that shape human interactions-North (1990:3)
- Institutions in Nigeria can be grouped into three main spectrum: The Political Institution, The Economic Institution and The Regulatory Institution.
- Political Institution consists of Democratic system of institution and Stable Governance Institution.
- Economic Institution is sub-divided into two segments, the budgetary institution and the tax institution.
- The Regulatory Institution entails anticorruption institution

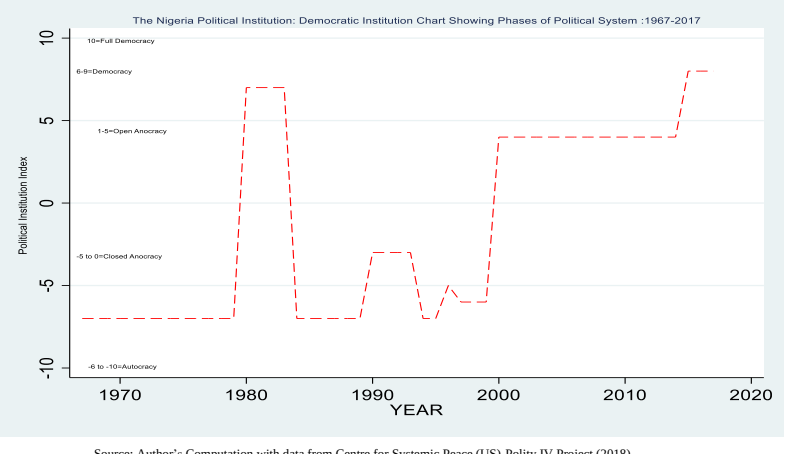
The Nature and Types of Institutions

TABLE A : THE NATURE AND TYPES OF INSTITTUTIONS

Type of Institution	Sub-categories of Institution	Measurement and Derivation	Source
Political Institution	Democratic System of Institution	Polity IV Index of good governance represents measurement of varying types of governance from autocracy to full democratic governance. The polity IV governance score ranges from -10 as the lower bound to +10 as the higher bound. For the political history of Nigeria with military regime and democratic governance, it is probably a better measurement of political institution for its ability to contain the Nigeria political history.	Polity IV Index Project-The Freedom House (US-2018)
	Stable Governance Institution* (Composite Institution Index)	I derived the composite institution from the interaction of one (Political stability and absence of violence) of the Worldwide Governance Indicators which is a special Change Project funded by the World Bank's Knowledge for Change Trust Fund. It represents the stakeholders' opinion in the form of qualitative and quantitative measurement of institution with six distinct dimensions of governance under the title: Voice and Accountability, Political stability, Government effectiveness, Regulatory quality, rule of law and control of corruption; with government integrity index from Economic Freedom index from The Heritage Foundation and Wallstreet Journal (US) I created a composite index of the institution from the combination of political stability with absence of violence and Government integrity to derive "stable Political Institution" for Nigeria as an alternative measure of political institution. The score for political stability ranges from the lower bound of -2.5 which implies "weak" governance performance and +2.5 as the higher bound which denotes "strong governance". For the Government integrity, the lower bound is 0 and the higher bound is 100.	Worldwide Governance indicator-http: www.govindcators.org. Produced by Daniel Kaufmann, Natural resources Governance Institute and Bookings Institution with Aart Kraay, World Bank Development Research Group in 1996. Economic Freedom Index produced by the Heritage Foundation and Wall street Journal (US).
Regulatory Institution	Anticorruption Institution*. (Composite Institution Index)	I created a composite institution variable from the interaction of property rights index for Nigeria with data sourced from the World Bank development indicator (2018) and the corruption perception index for Nigeria sourced from the Transparency International (2018).The property rights index by the World Bank is based primarily on an assessment of how economic activities are carried out with an effective legal framework and strong governance institution from a lower bound of 1 to higher bound of 6. As for the corruption index from the Transparency International, it is based on a scale of 0 to 100, whereby 0 denotes a highly corrupt economy and 100 represents a very clean economy.	The World Bank Development Indicator, (2018) and The Transparency International (2018)
Economic Institution	Budgetary Institution	The budgetary institution is an assessment by the World Bank on the policy priorities of the government, effective management systems and accurate financial/accounting reporting with 1 as lower bound and 6 as the higher bound. I used it to analyse budgetary system of the Nigerian state as measurement of an economic institution in Nigeria.	The World Bank Development Indicator, (2018).
	Tax Institution* (Composite Institution created)	I created a composite variable from two of the Economic Freedom Index by the Heritage Foundation and Wall street Journal (US) which are Business Freedom and Tax Burden in other to determine the extent of openness of the Nigerian economy and the fiscal health institution for sustenance of economic growth. Through the interaction of the two economic indices, I formed a new economic institution index called tax Institution. .	Economic Freedom Index produced by the Heritage Foundation and Wall street Journal (US).

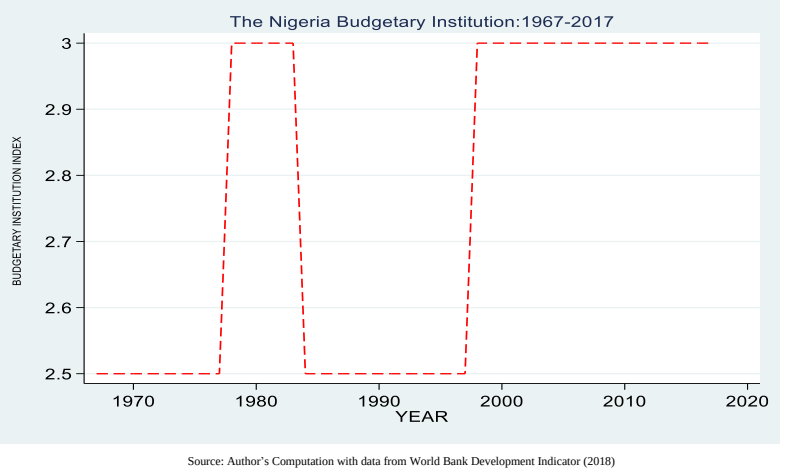
*** Author's contributions to the literature on the conceptual meaning, -measurement and derivation of an institution

The Political Institution: Democratic Institution in Nigeria



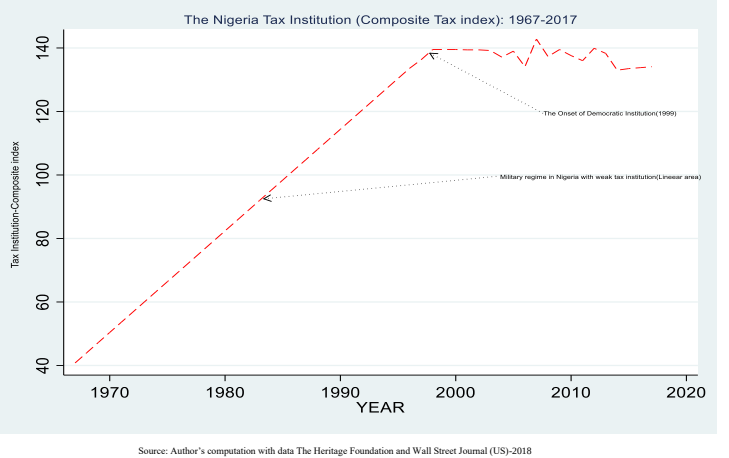
Source: Author's Computation with data from Centre for Systemic Peace (US)-Polity IV Project (2018)

The Economic Institution: Budgetary Institution in Nigeria



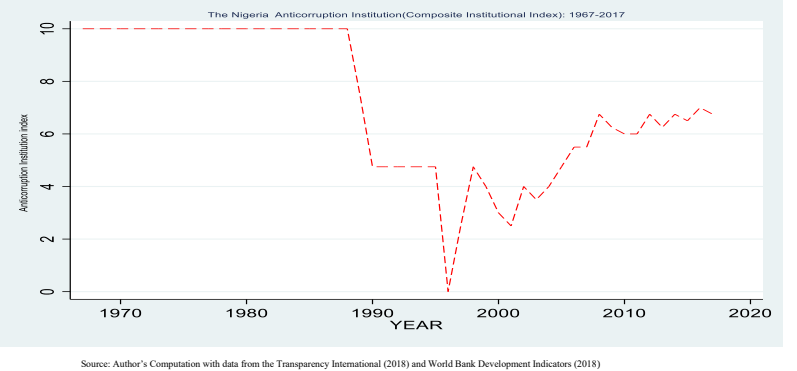
Source: Author's Computation with data from World Bank Development Indicator (2018)

The Economic Institution: Tax Institution in Nigeria



Source: Author's computation with data The Heritage Foundation and Wall Street Journal (US)-2018

Regulatory Institution:Anticorruption Institution in Nigeria



Source: Author's Computation with data from the Transparency International (2018) and World Bank Development Indicators (2018)

Review of Literature

- The theoretical foundation is based on the neoclassical model developed by Swan and Solow(1956) and the Endogenous growth model of P.Romer(1990),Grossman and Helpman(1991a), Agbon and Howitt(1992).
- Benign School of thought of Oil Rents and Economic Growth: Rosser(2006), Akinlo(2012), Sevil(2017),Baker and Fawehinmi(2011),Afolabi(2011).
- Malign School of thought of Oil Rents and Economic Growth: Sachs and Warners(1997),Oladipo and Fabayo(2012),Oyeleke(2011).
- Neutral School of thought of Oil Rents and Economic Growth with Good Institution as the key Growth determinant: Acemoglu et al(2015,2019),Rossi(2001),Ejuvbekpokpo(2012), Plungis(2014),Collier(2009),Afangideh and Obiora(2004), Adeoti et al(2013), Transparency International(2016), Obadan(2004),Isham et al(2003),

The Data

- Data were sourced mainly from the secondary sources
- Time series data from 1967 to 2017 were utilised
- The Dependent variable is per capita real GDP growth rate of Nigeria sourced from the World Bank development Indicators(2018)
- Regressors are : Share of oil rents in GDP sourced from the World Bank development Indicators(2018).
- Regressors-Five proxy variables for institution: democratic institution sourced from Polity IV index,Jagger and Mashal(2018),Stable Governance Institution,a composite institution variable developed from the Worldwide Governance Indicator-Heritage Foundation and Wallstreet Journal, US.The Budgetary Institution sourced from the World Bank development Indicators(2018),Tax Institution which represents a composite institution index sourced from Heritage Foundation and Wallstreet Journal(2018),Anticorruption Institution, a composite institution index from Transparency International (2018) and World Bank development Indicators(2018).

The Data

- Regressors-Diversification Proxies: agriculture food export share of merchandise export sourced from the World Bank development Indicators(2018), Manufacturing sector share of GDP sourced from Central Bank of Nigeria Statistical Bulletin(2018).
- Regressors: Health of the population proxy,share of FDI in GDP,Share of Gross Savings in GDP sourced from World Bank development Indicators(2018)
- Regressor: Human Capita Index sourced from Penn World Table(9.1)-2018

The Descriptive Statistics

VARIABLES[NOTATION]	(1) MEAN	(2) SD	(3) MIN	(4) MAX	(5) N
Per Capita Real GDP Growth Rate[GRO]	1.445	8.410	-17.60	30.40	51
Share of Oil Rents in GDP[REN]	22.82	11.36	2.400	54.33	51
Democratic System of Institution[DEM]	-1.373	5.882	-7	8	51
Stable Governance Institution[STI]	-21.421	12.111	-50	-5	51
Anticorruption Institution[PRA]	7.157	2.795	0	10	51
Budgetary Institution[BGT]	2.755	0.252	2.500	3	51
Tax System Institution[OUO]	107.9	33.010	40.80	142.8	51
Human Capita Index[HCI]	1.395	0.258	1.150	1.900	51
Diversification Proxy by Agriculture Export[JIV]	6.542	12.862	-1.001	63.30	51
Diversification -Manufacturing Sector in GDP[MAN]	0.081	6.021	-0.04	0.9	51
Health of the population[EAP]	46.437	3.460	39.80	54	51
Share of Foreign Direct Investment in GDP[FDI]	2.311	2.296	-2.81	10.83	51
Share of Gross Savings in GDP[VGS]	59.375	33.59329	15.80	123.5	51
Daily Crude Oil Produced in log form[CPL]	7.427	0.503	4.949	7.837	51
Spot crude Oil Price in log form[ICE]	3.459	0.676	2.535	4.738	51

Research Method

- Dynamic IV model utilised with model development assumptions drawn from Hendry and Krolzig(2005) about General-to-Specific(Gets) rule of model selection
- Endogeneity Issues -Oil Rents Estimation and Measurement of Institution
  1. Oil Rents is the difference between the price of crude oil produced in Nigeria at the international market and the cost of producing the crude oil
  2. Actual cost of production of crude oil in Nigeria is esoteric
  3. Rent seeking associated costs of producing oil in Nigeria are assumed be be captured by the stochastic error component
  4. The measurement problem and subjectivity of institution in economics literature
  5. Oil rents estimation problem and measurement challenges of institution increase the likelihood of measurement or misspecification problem within our sample and model

Model Specification

Our econometric model is expressed as:

$$GRO_t = \alpha + \beta_1 REN_t + \beta_2 REN_{t-1} + \beta_3 REN_{t-2} + \beta_4 DEM_t + \beta_5 DEM_{t-1} + \beta_6 DEM_{t-2} + \beta_7 STI_t + \beta_8 PRA_t + \beta_9 BGT_t + \beta_{10} OUO_t + \beta_{11} HCI_t + \beta_{12} JIV_t + \beta_{13} EAP_{t-1} + \beta_{14} MAN_{t-2} + \beta_{15} FDI_t + \beta_{16} VGS_t + \beta_{17} GRO_{t-1} + \mu_t$$

Where REN_t *is the share of oil rents in GDP,* DEM_t *is the democratic institution,* STI_t *is the stable governance institution,* PRA_t *is the anticorruption institution,* BGT_t *implies the budgetary institution,* OUO_t *is the tax institution,* HCI_t *is the human capita index,* JIV_t *represnts the health of the population,* MAN_t *implies the share of manufacturing sector in GDP,* FDI_t *is the FDI share in GDP,* VGS_t *is the share of gross savings in GDP and* GRO_{t-1} *is the lag one of dependent variable , the per capita growth rate of real GDP.*

μ_t *is the stochastic error component.*

Two instruments utilised: the log of spot price of crude oil and the log of daily crude oil produced in millions of barrels

Instrument relevance and exogeneity tests were performed to confirm the validity of the two instruments

The Empirical Result

VARIABLES[NOTATION]	(1) OLS Model 1	(2) OLS Model 2	(3) IV Model 3	(4) IV Model 4
Share of Oil Rents in GDP[REN]	0.286**	0.317**	0.529***	0.517***
	(0.123)	(0.135)	(0.192)	(0.187)
Share of Oil Rents in GDP[REN](-1)	-0.0585	-0.0560	-0.0234	-0.0148
	(0.134)	(0.140)	(0.137)	(0.132)
Share of Oil Rents in GDP[REN](-2)	-0.0371	-0.00474	-0.0486	-0.00485
	(0.115)	(0.128)	(0.116)	(0.118)
Democratic System of Institution[DEM]	0.216	0.247	-0.0548	0.00112
	(0.374)	(0.397)	(0.350)	(0.347)
Democratic System of Institution[DEM] (-1)	-0.479	-0.479	-0.283	-0.309
	(0.379)	(0.394)	(0.339)	(0.328)
Democratic System of Institution[DEM](-2)	0.689**	0.629*	0.639**	0.551**
	(0.309)	(0.334)	(0.274)	(0.277)
Budgetary Institution[BGT]	-4.586	-5.723	-6.348	-6.826
	(6.660)	(8.698)	(6.346)	(7.552)
Tax Institution[OUO]		-0.0907		-0.170
		(0.235)		(0.195)
Anticorruption Institution[PRA]		-0.0787		0.293
		(1.262)		(1.043)
Stable Governance Institution[STI]		0.102		0.0809
		(0.165)		(0.138)
Diversification Via Manufacturing Sector[MAN]	12.86	12.81	5.408	8.410
	(8.571)	(9.696)	(7.901)	(8.074)
Diversification Proxy by Agriculture Export[JIV]	0.374*	0.370	-0.494	-0.742
	(0.193)	(0.237)	(0.635)	(0.632)
Human Capita Index[HCI]	48.47***	50.36**	54.24***	66.01***
	(14.50)	(21.13)	(14.14)	(18.55)
Health of the Population[EAP]	-4.055***	-4.118**	-3.282***	-4.202**
	(1.034)	(1.776)	(1.193)	(1.640)
Share of Foreign Direct Investment in GDP[FDI]	-0.698	-0.658	-1.368**	-1.017
	(0.594)	(0.646)	(0.671)	(0.661)
Share of Gross Savings in GDP[VGS]	-0.0477	-0.106	0.0320	-0.0932
	(0.0891)	(0.176)	(0.0965)	(0.148)
Per Capita Real GDP Growth[GRO](-1)	0.0323	0.00513	-0.0625	-0.0695
	(0.133)	(0.144)	(0.136)	(0.132)
Constant	134.0***	151.8**	88.26	140.5**
	(47.34)	(62.71)	(55.67)	(62.79)
Observations	49	49	42	42
R-squared	0.614	0.622	0.458	0.497
Jarque-Bera Normality Test	11.83	3.95		
Heteroskedasticity Test-Breusch-Pagan	0.3214	0.3267		
Durbin Watson Autocorrelation Test	0.1653	2.245		
Breusch-Godfrey LM Test	0.1003	0.1091		
Ramsey RESET Test	0.1501	0.1747		
Hausmann Test	0.0203	0.0182		
Endogenous Test-Durbin Chi2 Pvalue			0.0006	0.0014
Endogenous Test-Wu-Hausmann Pvalue			0.0040	0.0120
Min. Eigenvalue F Stat			13.877	13.0014
Overidentification Test-Sargan Chi2 Pvalue			0.1269	0.0729
Overidentification Test-Basman Chi2 Pvalue			0.2166	0.1673

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The Results

- Positive statistically significant short run and long run relationship identified between oil rents and economic growth in Nigeria. A unit increase in oil rents increases the Nigerian economic growth by about 0.47 in the long run.
- The political institution in the form of democratic system of institution is identified to have positive effect on the Nigerian economic growth in the long run with about 0.23 as magnitude of effect in the long run.
- Our finding about the impact of institution, especially the political institution re-echoed the assumptions in Acemoglu et al(2019),Mehlum et al(2006),Collier and Hoeffler(2005) with the application of new and updated dataset for the Nigerian economy.
- Our empirical work found a negative relationship between the health of the population and economic growth of Nigeria within the period of study which negates a priori expectation.
- There exists positive relationship between human capita development and economic growth of Nigeria both in the short run and in the long run.

Conclusions

- In the concept of Nigeria,the oil sector or oil rent is rather a blessing if relevant factors are controlled for, especially institutional factors.
- The argument about diversification of the Nigerian economy via the agriculture sector does not offer positive long term effect for the Nigerian economy.
- Empirical evidence showed that slow but sustained growth has been recorded within the Nigerian economy since the return to democratic system of institution. This implies that political institution is likely to be an essential ingredient of economic growth.
- Human capita development as enshrined in the endogenous growth model is vital for the growth of the Nigerian economy.
- The dictum of a resource curse within the Nigerian economy is probably an economic fallacy with the presence of good institutions.