

DOMESTIC RESOURCE MOBILISATION AND HEALTH OUTCOMES IN NIGERIA

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Abstract

Domestic Resource Mobilisation (DRM) has remained a key instrument for improving fiscal revenue. It's the long haul way to sustainable development finance. While DRM has been instrumental in driving most economies in achieving their sustainable development goals yet the effect and sectorial results have been different over nations. This study examines the effects of domestic resource mobilisation on health outcomes in Nigeria. The study adopts the unrestricted co-integration rank test and vector error correction model. The variables included in the model are: Tax revenue, Agricultural productivity, Gross Capital Formation, Female Literacy Rate and Carbon dioxide emission as the independent variable and under-five mortality rate as the dependent variable. Using the time series data covering from 1981-2015, the results revealed a positive relationship between tax revenue and under-five mortality, a statistically significant relationship between agricultural productivity and under-five mortality rate, Gross capital formation was statistically significant. Based on the findings, it is imperative that policy direction be made to enhance tax administration and huge investment in value chain agricultural activities as well as enhancing infrastructural capacity to reduce cost of distribution and also waste of agricultural products. lastly These outcomes have in some fronts significant impact for accomplishing the objectives envisioned in the Sustainable Development Goals.

Keywords: *Agricultural Productivity, Human Capital, Tax Revenue, Under-5 Mortality.*

INTRODUCTION

Expenditure on health is a part of human capital investment which is to a great extent responsible for the change and improvement of resource. It is to say that, human capital is an essential key for nation's financial and political change (Efanga & Nwokomah, 2013). However, one of the challenges confronting developing economies like Nigeria regarding human capital development is insufficient investment in health and education. Public spending on social services, for example, education and health services that are basic to human capital improvement is for the most part low in Nigeria (Riman & Akpan, 2012). Literature reveals that most nations developed or developing share same objective for their health systems (Roberts, Hsiao, Berman & Reich, 2004). These objectives include good health for all, financial risk protection for all, and the satisfaction of the general population, while at the same time striving to maintain an affordable health care system. Each of these

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three goals has two basic dimensions: level and distribution. These goals go beyond the typical worries of economic analyses, which tend to concentrate only on effectiveness, however stay quiet on value (Sassi, Le Gran & Archard, 2001).

However, public financing of the health sector in Nigeria was less than 10 percent from 1981 to 2014 which is grossly inadequate (Central Bank of Nigeria, 2014). Due to inadequate health funding, indices such as infant mortality, maternal mortality, number of patients per doctor, are relatively high indicating poor health outcomes. The World Health Organisation (WHO) 2013 report on condition of health financing in the African district stipulate that the vast majority of the nations in the locale flop to achieve the Abuja declaration target (allotting 15% of the government spending plan(budget) to health) without Out-Of-Pocket expenditure use still higher than 40% of total health expenditure

Most developing countries have been dependant on aid to meet up with development financing neglecting the inherent potential needed to be explored by domestically mobilising the needed Resource. Domestic resource mobilisation has traditionally been a significant challenge for the developing countries (DCs) like Nigeria, notwithstanding the impact of the recent financial and economic crisis. As domestic resource mobilisation boils down to the generation of revenue domestically and channelling them to productive investments. Raising more revenue from internal sources helps countries devote needed resources to reduce poverty, bridge infrastructure gaps and provide public services for example, health and education.

Moreover, Estimates have it that 50-80% of resources needed to finance the sustainable development goals will have to be sourced domestically (WHO, 2015). However, the growth rate of domestic resource mobilisation (tax, savings, remittance) has been on a decline due to some challenges like low savings, capital flight, weak administrative systems and organisational capacities etc. This could explain Nigeria's failure to achieve most of the Millennium Development Goals (MDGs).

In the light of the lingering challenges, this study identifies domestic resource mobilisation via investing in Agricultural Value addition as a key component to enhance income generation as well as revenue generation. In this context, the study seeks to know whether domestic resource mobilisation is essential to improve health outcome in Nigeria looking at the short-run and long-run effect. The study will adopt the Co-integration and Vector Error Correction technique to check for long run association and the short run dynamics ascertaining the speed of adjustment when a shock occurs in the system using secondary data from 1981-2015. The study test the following hypothesis; H_0 : There is no long-run relationship between Domestic Resource Mobilisation and Health outcomes in Nigeria, H_1 : There is a long-run relationship between Domestic Resource Mobilisation and health outcome in Nigeria.

This paper is structured as follows; the first sections covers the introduction, the second section reviews literatures while the third section consists of the methodology, interpretation



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and analysis of results and discussions are in section four while conclusion and recommendation are in section five.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

➤ Global Health Spending Gaps

Several studies (Ichoku & Okoli, 2015, Xu and Saksena (2011)) revealed that there is an increasing global health spending gap between developed and developing countries. In many developed countries, there have been dramatic increases in government expenditure on health. The current global expenditure on health is estimated to be about \$4.1 trillion while the OECD countries account for about 80 percent of this amount. The United States spends 14.6% of GDP on health with a per capita health expenditure of US\$ 8,000. Public health expenditure per person in Norway is US\$ 4,508. Germany spends about 10.9 percent of its GDP on health while France spends 9.7 percent of its GDP on health. Canada, Australia and Sweden spend 9.6 percent, 9.5 percent and 9.2 percent, respectively, of their GDP on health (Ichoku & Okoli, 2015). The high proportions of total income of developed countries to health contrast sharply with the situation in LICs particularly in Sub-Saharan Africa (SSA). For example Burundi with US\$0.70 has the lowest public expenditure per capita in the world. The annual total government expenditure on health in Republic of Benin is US\$ 86 million or US\$10.5 per capita (Ichoku & Okoli, 2015). This revealed that many African countries devote infinitesimal percentage of their income to health and these accounts for the dismal health profiles in these countries.

The health sector is generally poorly funded in many low income countries (LIC). Several multilateral and regional organisations often stipulate minimum benchmarks for the funding of the health sector for countries but these are in reality hardly ever met in SSA countries. For example, the Macroeconomic Commission on Health (2001) stipulated that LIC should spend a minimum of 2% of their GDP on funding of their health sector but most LICs hardly ever meet this minimum benchmark. WHO (2006) estimates that the minimum spending per person per year needed to provide basic, life-saving services is between US\$ 35 – US\$ 50. Yet most SSA countries are far from meeting this benchmark of 15%.

Empirical Review

Studies on health care financing and health sector performance measured by health status uncover that expenditure on health care .Cyprus (2015) fundamentally assesses domestic resource mobilisation in Caribbean district. The study employed descriptive analysis and found that tax revenues represent the most significant source of development financing for most developing countries including Caribbean developing countries and by far the largest component of domestic resource mobilisation.

Amusa, Monkam & Viegi (2015) evaluate empirical perspective, focusing on non-resource tax revenues in Nigeria and examines whether foreign aid does enhance domestic resource mobilisation (DRM). The GMM technique was adopted using secondary time series data from 1980-2013. The study found that foreign aid in the form of loans is a more effective tool for enhancing domestic resource mobilisation.

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Wujung, Vukengkeng, Fozoh (2015) in his study on assessing the effect of domestic resource mobilisation on the economic growth of Cameroon. This paper observes that in spite of the endeavours made to upgrade domestic resource mobilisation as a means of boosting economic growth in Cameroon, the economy does not appear to develop at the similar rate. An empirical investigation is done utilising information from the World Bank's development indicators (WDI, 2014) for Cameroon for the period 1980-2013. Descriptive statistics and the Instrumental Variable Generalised Method of Moments (IVGMM) were utilised to break down the data. The outcomes show that there is a positive and significant relationship between the different sources of domestic resources and economic growth in Cameroon.

Matthew, Adegboye and Fagbeminiyi. (2014) then again analysed Public Health Expenditure and Health Outcomes in Nigeria. The review takes a gander at government spending on wellbeing and its impact on wellbeing results in Nigeria. This review made utilisation of the Johansen Co-integration and the Vector Error Correction Model (VECM) econometric system to decide the long-run relationship between public spending on health outcomes. The review discovered that public spending had a negative relationship on health outcomes in Nigeria.

Batya (2012) on the other hand examine the challenges in domestic resource mobilisation in the Less Developed Countries. The study attempted to portray the challenges that Less Developed Countries (LDCs) face when mobilising resources for development domestically, both in terms of private savings and public revenue. The author employed an exploratory review of literature and descriptive analysis. The study concludes that challenges to domestic resource mobilisation in LDC are unquestionably significant. While LDCs financing needs are unlikely to be met in a near future entirely by domestic resources, protracted reliance on external finance poses dangers that take form of unpredictability, economic and political dependence.

Summary and Gap

From the various literatures that have been reviewed under this section, it is discovered that a large body of evidence suggests that domestic resource mobilisation is vital for sustainable development. However, credence is given to various works, quite a number of studies conducted focused there conceptual ideation of domestic resource mobilisation to be restricted only to effective tax administration, in similar vein others tailored towards analysing domestic resource mobilisation and economic growth as well as sustainable development. Furthermore, research works on financing the health sector has basically been viewed from the angle of increasing government expenditure towards the health sector without a consideration of necessary outlet to increase government revenue.

From the aforementioned it becomes imperative that addressing the issues of deficit led budget to a mild fiscal debt is of necessity. Therefore, the idea of inward revenue generating strategy becomes key and a driving force towards achieving developmental plans. This work seeks to conceptualise domestic resource mobilisation from a different point of view. In this context, domestic resource mobilisation is viewed as any economic activity that springs up



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pocket industries in form of subsidiaries in the value chain cycle. As a means of policy direction towards economic diversification to avoid dependency on oil and also increase the revenue base of the economy. The agricultural sector is pivotal to the achievement of the set goals and targets. The spiral effect of value addition in agricultural output generates series of production intermediate processes and in turn industries are established thereby leading to employment opportunities, income generation, and revenue to the government via corporate company tax well as personal income tax and also a good source of medical research. These in turn, increases the revenue base as well as the proportion of funds allocated towards health.

➤ **Stylized Facts**

Table 1: Average Performance of the Variables of Interest

YEARS	SAVINGS (% change)	TAXREV (% change)	REMIT (% change)	LIFE (years)	MAT	DOCPAT
1981-1985	16.85	NA	-13.59	46.2	NA	17
1986-1990	19.35	NA	56.33	46.1	1333.33	17
1991-1995	31.17	375.29	14.63	46.1	1284.00	19
1996-2000	29.24	39.14	18.44	46.4	1216.00	22
2001-2005	29.10	25.17	126.67	47.7	1040.40	30
2006-2010	36.62	26.03	6.36	50.3	870.60	40
2011-2014	23.17	12.52	2.36	52.7	830.92	40

Source: Researcher's Computation from CBN (2015); WDI (2015)

Note: SAVINGS stand for aggregate savings, TAXREV stand for Tax revenue, REMIT stands for Remittances, LIFE stand for life expectancy at birth, and MAT stands for maternal mortality rate, DOCPAT stand for physician density

Table 1 revealed that aggregate savings grew by average of 16.85 percent from 1981 to 1985 rose to average of 19.35 percent from 1986 to 1990 and average of 31.17 percent from 1991 to 1995 but fell to average of 29.24 percent from 1996 to 2000. It fell further to average of 29.10 from 2001 to 2005 and rose to average of 36.62 percent from 2006 to 2010 but decline again to average of 23.17 percent from 2011 to 2014 (see Table 1).

Tax revenue grew most in periods from 1991 to 1995 by average of 375.3 percent; fell to average of 39 and 25 percent from 1996 to 2000, and 2001 to 2005. Average tax revenue was average of 26.03 percent from 2006 to 2010, and 12.52 percent from 2011 to 2014. Revenue from tax was least from 2011 to 2014; the dwindling growth of tax revenue generation in Nigeria makes it difficult to use tax as an instrument of fiscal policy for the achievement of economic development. Another channel for domestic resource mobilisation is remittances, which had the least growth among other channels for resources mobilisation in Nigeria; especially periods from 2006 to 2014 (see Table1 and Figure 1-3). The extent to which remittances contribute to development is not clear. Remittances do constitute a significant source of finance for many emerging economies because of their counter-cyclical nature. They rise during recessions in the recipient economy, unlike capital flows such as foreign direct investment (FDI), and so play an important role in alleviating economic shocks. Yet,

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their current development impact is disputed. Remittances are often spent on meeting the daily needs of families and to a lesser extent on productive investment.

Life expectancy at birth was average of 46.2 years from 1981 to 1985 but fell to average of 46.1 years from 1986 to 1990 and 1991 to 1995. It improves from average 46.1 years, to 46.4 years, 47.7 years, 50.3 years, and 52.7 years from 1996 to 2000, 2001 to 2005, 2006 to 2010 and 2011 to 2014 respectively. Maternal Mortality rate also improves from 1,333 per 100,000 from 1986 to 1990 till average of 830.92 from 2011 to 2014. There were average of 17 doctors per 100,000 people from 1981 to 1990 which rose to 19 and 22 doctors from 1991 to 1995 and 1996 to 2000, respectively. Also, it further increase to average of 30 doctors per 100, 000 people between 2001 to 2005 but stagnate at 40 doctors from 2006 to 2014 (see Table 1; Figure 1-3).

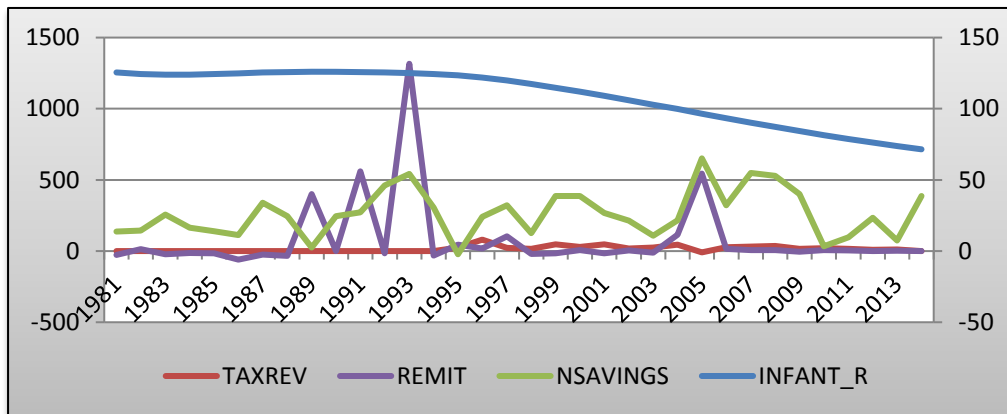
During the 80s, it could be observed that savings was fairly stable ranging from ₦6.5 billion to about ₦23 billion. The immediate change in monetary policy stance from direct to indirect controls led to an improvement in savings and efficiency of resource allocation due to responsiveness of market forces. Nwachukwu (2009) noted that the deregulation of the exchange rate system in August 1987 to a market-based system enabled banks determine their deposit and lending rates in accordance to market conditions through negotiations with customers, though the Minimum Rediscount Rate (MRR) continued to be determined by the Central Bank of Nigeria. By 2000, the figure had climbed to ₦385.1 billion, rising further by 2005 to ₦1.3 trillion. For the year 2006 the figure doubled to ₦2.6 trillion, ₦4.1 trillion in 2008. As at 2009, the figure stood at ₦5.7 trillion. Within the period 1980-1985 it could be seen that life insurance funds were inexistent in the total financial savings, 1991-2005 National provident fund, federal mortgage bank and life insurance funds along with time and savings deposit were of relevance to total financial savings of which time and savings accounted for the majority. In subsequent years' time and savings of Deposit Money Banks (DMBs) became the only recognised portion of total financial savings.

Nnanna (2003) reported the efforts of the monetary authorities in the promotion of savings and investment culture in the Nigerian economy over the years stating that among recent efforts in 2003 including the introduction of savings and investment instruments and schemes; stimulation of financial intermediation and promotion and sustenance of macroeconomic stability. The amount mobilised stood at ₦8.5 billion in 2002 when the federal government scrapped it. In the year 2004 the banking sector consolidation that was initiated by the CBN ensured a sustainable and stable financial system to support the economy's real sector. This consolidation could explain the increase in average saving from 2005 to 2010 while the global financial crisis in 2009 could be responsible for the decline in average savings, tax revenue and remittances from 2011 to 2014.

An evaluation of the trends of the variables of interest, aggregate savings outweighs tax revenue and remittances. Yet, revenue from remittances was more than the revenue from tax due to the structural defects in the country's tax system. Nigerian tax system is concentrated on petroleum and trade taxes while direct and broad-based indirect taxes like the value-added

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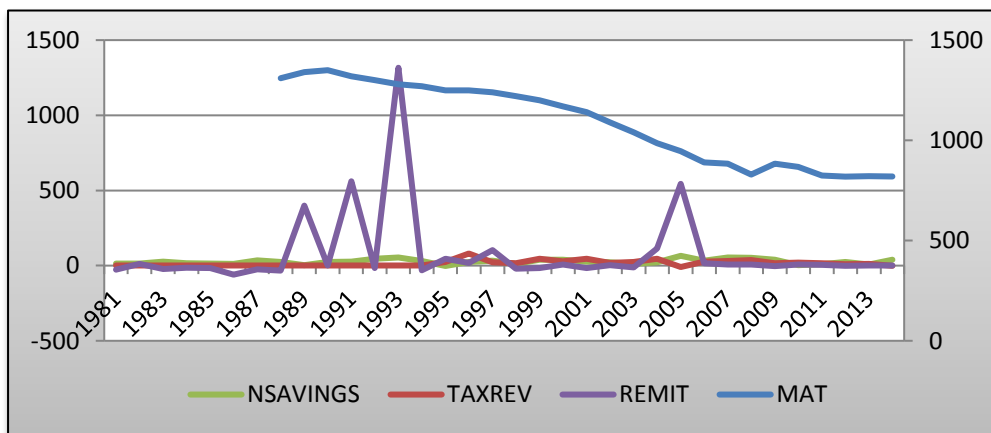
(VAT) are neglected. This is a structural challenge in the country’s tax system. Although direct taxes and VAT have the potential for expansion, their impact is limited because of the dominance of the informal sector in the country. Although, the percentage changes in domestic resource mobilisation oscillated during the period under review, hence the long run association between domestic resource mobilisation channels and the selected health outcome in Nigeria is of essence.



Source:

Author’s Computation from CBN (2015); WDI (2015)

Figure 1: Percentage growth of Tax Revenue, Remittances, National Savings and Infant Mortality



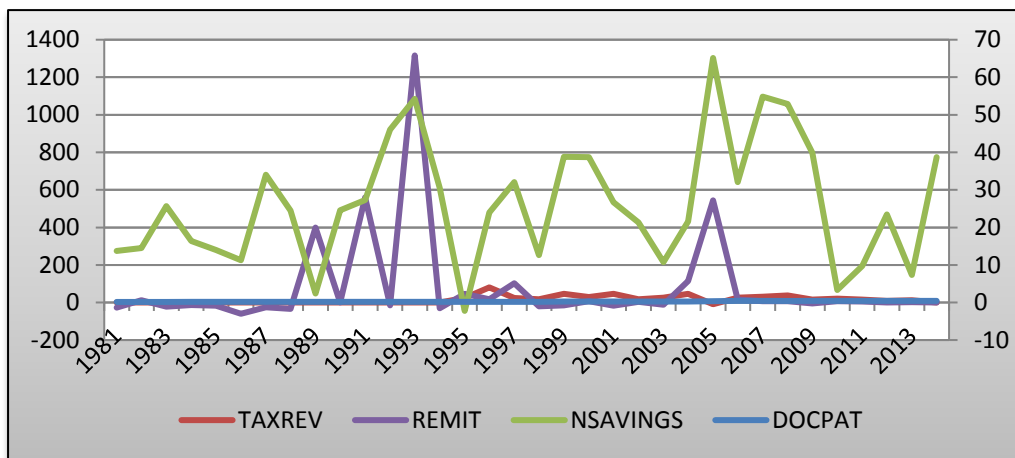
Source: Author’s

Computation from CBN (2015); WDI (2015)

Figure 2: Percentage growth of Tax Revenue, Remittances, National Savings and Maternal Mortality



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Source:

Author's Computation from CBN (2015); WDI (2015)

Figure 3: Percentage growth of Tax Revenue, Remittances, National Savings and Doctor to Patient

➤ **Theoretical Framework**

The mechanism linking domestic resource mobilisation and health outcome is yet an open question in the theoretical literature. The study employs Grossman health production model developed by Michael Grossman in 1972. The model indicates that an individual is both a producer and a consumer of health. Grossman model state that health is treated as a stock which degrades over time in the absence of "investments" in health, so that health is viewed as a sort of capital. The model acknowledges that health is not only a consumption good that yields satisfaction and utility but also an investment good. In attempt to utilise the household model, the health outcome function as specified in equation (1) is as follows;

$$Y = f(H) \tag{1}$$

Where:

Y is the expected health outcome; H is the vector for economic variables

METHODOLOGY

This study will engage a three step procedure in order to determine the relationship between domestic resource mobilisation and health outcomes in Nigeria; these procedures are unit root test, Johansen co-integration technique and Vector error correction model (VECM) using E-views 8.

➤ **Model Specification**

The model of this study is specified as;

$$Y = f(H) \tag{1}$$

Expressing the model in implicit form

$$UMR = f [TR, AP, GCF, FML, CO_2] \tag{2}$$

Thus equation 2 can be re-specified explicitly as follows:

$$UMR = \alpha_0 TAXREV^{\alpha_1} AP^{\alpha_2} GCF^{\alpha_3} FML^{\alpha_4} CO_2^{\alpha_5} \tag{3}$$

Taking the log function linearizes the above function in equation 3.

$$\ln UMR = \alpha_0 + \alpha_1 \ln TAXRV + \alpha_2 \ln AP + \alpha_3 \ln GCF + \alpha_4 \ln FML + \alpha_5 \ln CO_2 + Ut \tag{4}$$

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WHERE; UMR is under five mortality rate; TR is tax revenue; AP is Value of Agricultural Productivity; GCF is Gross capital formation; FML is Female literacy rate; CO2 is Carbon dioxide emission; α : Intercepts are parameter estimates of the explanatory variables: Time element to illustrate the time-series structure of the data; $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5$ are parameters to be estimated.

Apriori Expectation

The variables expected on apriori ground are to be signed as follows;

$$\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5 < 0$$

➤ **Variable Definition and Source**

The variables that were incorporated in the model are defined in table below and the sources were additionally exhibited.

Table 2: Data Description and Sources

Variable	Identifier	Definition	Source
Under- five mortality rate	UMR	Under-five mortality rate is the probability per 1,000 that a new born baby will die before reaching age five.	World Development Indicator(WDI) 2015
Tax Revenue	TAXREV	Tax revenue refers to compulsory transfers to the central government for public purposes.	World Development Indicator(WDI) 2015
VALUE of agricultural productivity	AP	Agricultural productivity is measured as the ratio of agricultural outputs to agricultural inputs. Agriculture value added per worker is a measure of agricultural productivity	World Development indicator(WDI) 2015
Female Literacy rate	FML	Total female enrolment in primary education, regardless of age, expressed as a percentage of the female population of official primary education age	World Development Indicator(WDI) 2015
Gross capital formation	GCF	Formerly gross domestic investment consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories.	World Development Indicator(WDI) 2015
Carbon dioxide emission	CO2	They include carbon dioxide produced during consumption of solid, liquid, and gas fuels and gas flaring.	World Development Indicator(WDI) 2015

Source: Author's Computation from WDI (2015)

ANALYSIS AND DISCUSSION OF RESULTS



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Table 2: Summary of Descriptive Statistics

	UMR	TR	AP	GCF	FML	CO2
Mean	179.4571	64733.92	2112.397	12.58818	85.43854	17.99365
Median	197.0000	29.21390	1366.936	11.74670	83.86050	18.80778
Maximum	212.6000	461224.5	4760.310	34.02084	99.47595	28.84898
Minimum	108.8000	0.038000	685.4052	5.467015	72.43542	5.661769
Std.dev.	36.19679	125787.5	1402.770	6.122224	7.800158	5.821172
Skewness	-0.689853	2.098858	0.692832	1.837585	0.282647	-
Kurtosis	1.938119	6.224250	1.910239	6.809332	1.990531	2.708105
Jarque-Bera	4.420473	40.85755	4.531982	40.85941	1.952103	0.417824
Probability	0.109675	0.000000	0.103727	0.000000	0.376796	0.811467
Sum	6281.000	2265687.	73933.89	440.5864	2990.349	629.7778
Sum sq.Dev.	44547.07	5.380011	66903972	1274.375	2068.644	1152.126
Observations	35	35	35	35	35	35

Source Author computation 2015, using E-views

From the above results this indicates the total summary of descriptive statistics the major idea is to establish the normality test of variables used. That is to check if the distributions of the variables used conform to the assumed normally distributed population or not. From above the yearly sum of observations of the variables are 35. The basic idea is checking the outliers which give signal for residual error especially those with high deviations. The skewness of the variables are all positive except for UMR and co2 which is negatively skilled, implying that the mean of the observation drawn towards the left and for the positive the right. Examining the kurtosis, all have their entire kurtosis coefficient >0 which shows they are leptokurtic. The Jarque-Bera test is used as a test from the probability values the rule is that the p-value should be less than the 0.05% from the results looking at the p-values it would be said that only tax revenue and gross capital formation are normally distributed.

➤ **Unit Root Test**

The initial stage in the johansen procedure is to test whether the time series is stationary in order to guide against spurious results that is why all the variables in this model were subjected to unit root test.

Table 3: Results of the Augmented Dickey Fuller Unit Root Test

Variables	ADF		Critical Value			ID	Remarks
	Level	1 st diff	1%	5%	Pvalue		
InUMR	-	-5.878420	-3.724070	-2.986225	0.0001	1(1)	Stationary
InAP	-	-5.524980	-3.653730	-2.957110	0.0001	1(1)	Stationary
InTR	-	-5.481156	-3.646342	-2.954021	0.0001	1(1)	Stationary



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InGCF	-	-5.741673	-3.653730	-2.957110	0.0000	1(1)	Stationary
InCO2	-	-5.763870	-3.646342	-2.954021	0.0000	1(1)	Stationary
InFML	-	-7.258463	-3.646342	-2.954021	0.0000	1(1)	Stationary

Source Authors Computation 2015, using E-views

As usual, the rule of thumb is that null hypothesis of unit root should be accepted if the augmented dickey fuller (ADF) statistics is less negative than the critical value. The result from the table above indicates that all the variables were stationary at 1st differencing haven check all the necessary criteria using the critical value and the probability values, the hypothesis of non-stationarity were rejected for the entire variable; this means that any shock or disturbance in them will be sustained for a short period. Observably all the p-values are less than 0.05% this is a desirable result there we can go ahead to carry out the co-integration test

➤ **Unrestricted Co-integration Rank Test Result**

The co-integration test were undertaken based on the Johanssen (1988) and the Johasen and Juselius (1990) maximum likelihood framework. The essence was to establish whether long-run relationship exit among the variables of interest. The Johanssen technique was chosen not only because it is vector auto-regression based, but also because it performs better than the single equation and is alternative multivariate methods. This method produces asymptotically optional estimates since it incorporates a parametric correction for serial correlation.

Table 4: Co-integration Rank Test Result

Ho	Ha	Eigen value	λ max test	λ max(0.95)	P-Value	Trace test	p-value	Trace(0.95)
r=0	r = 1	0.949349	86.50122	40.07757	0.0000	224.9153	0.0000	95.75366
r ≤ 1	r = 2	0.823867	50.35904	33.87687	0.0000	138.4141	0.0000	69.81889
r ≤ 2	r = 3	0.699730	34.88910	27.58434	0.0048	88.05506	0.0000	47.85613
r ≤ 3	r = 4	0.464002	24.09327	21.13162	0.0186	53.16595	0.0000	29.79707
r ≤ 4	r = 4	0.315347	18.08623	14.26460	0.0119	29.07268	0.0003	15.49471
r ≤ 5	r = 5	0.378475	10.98645	3.841466	0.0009	10.98645	0.0009	3.841466

Source: author’s computation, 2015 using E-views

Note; from the trace statistics there exist at most six integrating equations significant at 0.05% level of significance. The Max-eigenvalue test indicates six co-integrating equations at the 0.05 level. In conclusion it indicates that there exists a long run association amongst the variable of interest.



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Table 5: Normalized co-integrating result

Co-integrating Equation Log likelihood					
Normalized co-integrating coefficients (standard error in parentheses)					
Under-5 mortality	TR	AP	CO2	FML	GCF
1.000000	-0.023850	0.360133	0.077264	-1.436376	-0.794195
S.E	(0.01534)	(0.12689)	(0.09360)	(0.40918)	(0.07238)
T-Stat	1.554759	2.838151	8.254701	3.510377	10.972575

Source: Author's Computation, 2015

The long-run equation is therefore specified as follows (The sign of the co-efficient in the equation below is a reversal of the table above)

$$u5mort = 0.023850 * IGR - 0.360133 * AP - 0.077264 * CO2 + 1.436376 * FML + 0.794195 * GCF$$

From the above table shows the normalized long run co-integrating result amongst the variables, it follow that from above holding other variable constant the long run impact of a unit change in tax revenue would positively affect under-five mortality by a magnitude of 0.023 which does not follow the apriori expectation, from the t-statistics which is 1.6 implies that it is statistically not-significant. Similarly from the above table the valuation of Agricultural productivity (AP) holding all other variables constant, a unit change in AP would in the long run negatively affect under-five mortality that is to say it would reduce infant mortality by a magnitude of -0.36, and from the t-statistics above, it is significant at 2.84 which is greater than 2. Carbon dioxide emission (Co2) indicates motor vehicles and industrial processes which constitute air pollution that is not good for human beings. Form the above long run equation result it indicate that a reduction in Co2 would impact on infant mortality negatively by a magnitude of -0.077 this also holds true when carbon dioxide emission decrease it will reduce under-five mortality, from the t-statistics which is 8.3 implies that it is statistically significant. Also, female literacy rate will affect under-5 mortality positively with a magnitude of 1.436 which does not fit in with the apriori expectation. However its t-statistics is significant with a value is 3.5 which is greater than the threshold 2. This therefore means that female literacy is statistically significantly on under-5 mortality. This was in consonant with the findings of Zainab Ijaz (2012) by the positive effects of female literacy on under-five mortality rate. One of the arguments for female literacy remaining ineffective tool to reduce under five mortality justified on the grounds, that women especially in the rural area even if educated lack freedom of expression and decision making authority. Lastly gross capital formation from the equation indicates that it positively affect infant mortality rate by 0.794, this is not desirable. However it is statistically significant since its t-statistic value 10.97 which is greater than the threshold 2. From the above model, it depicts that in the long run gross capital formation would increase under-five mortality.

➤ **VECTOR ERROR CORRECTION MODEL (VECM)**

The error correction term depicts the speed of adjustment heralding to equilibrium when the system equation is shocked.



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Table 6: Vector Error Correction Model (VECM)

Error Correction:	D(UMR)	D(TR)	D(AP)	D(FML)	D(GCF)	D(CO2)
CointEq1	-0.006255	1.530268	0.031011	0.066534	0.254905	0.256288
p-value	(0.00064)	(1.15945)	(0.05348)	(0.04114)	(0.13454)	(0.15086)
T-STAT	[-9.77343]	[1.31982]	[0.57982]	[1.61720]	[1.89460]	[1.69887]

Source: Author's Computation, 2015

From the above error correction term for InU5mort is -0.00642 approximately signifying 0.63% speed of adjustment in the system when disequilibrium occurs. The sign of the error correction term is as expected to be negative, this confirms to the a-prior expectation. The magnitude however is very weak by implication the responsiveness of error made in previous year can only be corrected for the following year by 0.63% which is very low for the above model in explaining resource mobilisation and health outcomes. By implication, it indicates with response to the independent variable within the system in influencing a recovery as a result of a shock in the dependent variable (It means that the above independent variables in the short-run are weak to respond to a shock in under-5 mortality rate).

DISCUSSION OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

Based on the results, tax revenue was statistically not significant. In Nigeria, domestic resource mobilisation is challenged by shallow domestic revenue base. The bulk of the country's population is engaged in the informal sector while several others are experiencing different forms of unemployment. In fact, industrial, manufacturing and general corporate activities are very limited with informal sector accounting for around 90 percent of employment and close to half of total economic activities. This suggests that the bulk of activities going on in these very important sectors are untaxed either through direct taxes or VAT. The current wave of Export Processing Zones among Sub-Saharan countries with its accompanied tax exemptions and waivers tend to further reduce the tax base of the economies.

Furthermore, the result also shows a significant relationship between agricultural productivity as a source of domestic resource mobilization on health outcome in Nigeria. This make more meaning in many fronts, agricultural value addition create a wide range of pocket investment in form Agro-industries in the value addition cycle, these process avails opportunity for job creation income generation, more revenue to the government and also form a good source of medical research; implying more mobilization of revenue and increase in general welfare when fully developed.

The result also shows carbon dioxide emission to be statistically significant. From the model, the negative sign implies that in the long-run if adequate measure is made on greenhouse emission its effect on health would go a long way to reduce health related issues on under-five mortality resulting from air pollution.

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However, female literacy rate didn't follow through on the grounds of the apriori expectations. This could be as results of not all women are educated especially in the rural areas on personal hygiene. The current state of the curriculum is lacking knowledge related to health and hygiene. This means that a female who goes to school is simply being taught basic subjects such as English and mathematics, etc., but not imparted with the knowledge of improving her and her children's health.

Lastly, Gross fixed capital formation was largely insignificant. This indicates that the government has paid less attention in investing on physical infrastructure for example, electricity, clean water, good roads, health workers, health facilities (laboratories), this could be as a result of mismanagement or embezzlement of funds, outdated technology

RECOMMENDATION

1. The federal government should strengthen more efforts in generating tax revenue, establishing a strong fiscal responsibility and also a transparent system in the country that would encourage increase in investment especially in infrastructure so as to boost the health system and also the informal sector should be incorporated. Enforceable Tax administration should be in place
2. As for agricultural productivity, increased financing of value addition in agricultural productivity as well as enhancing infrastructural capacity to finance agricultural value chain.
3. Agricultural and health researchers could collaborate to identify research gaps or needs and research agenda, and build up a joint research agenda; to improve on the agricultural sector (adopting genetically modified crops which are resistant to weather shocks and provide an opportunity for Nigeria to address food security) this could be done by setting up forums, educative programmes with joint cooperation and partnership that can thrive across sectors (public and private).

CONCLUSION

This study has provided reliable evidence of the effects of domestic resource mobilisation and health outcome (under-five mortality) in Nigeria from the period of 1981-2015. Based on the findings tax revenue one of the variables for domestic resource Mobilisation has a positive relationship with under-five mortality, it was seen that agricultural productivity had an inverse relationship with under-five mortality which substantiated hypothesis II. Several factors such as gross capital formation, female literacy rate and carbon dioxide emission were identified as a vital determiner for health outcomes in Nigeria, Nevertheless, to achieve high and sustainable health outcomes, suggested policy recommendations was viewed which when properly implemented will surely stimulate an effective domestic resource mobilisation and hence increase health outcomes. Paying attention to health outcomes is not merely of political value, but an interest of national and global economic development. Health status has an impact on national economy, households and individuals. Therefore putting health high on the political agenda and implementing the necessary health policy will



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uplift national productivity because, a healthy population work more with physically and psychologically/mentally balanced.

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