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Assessing the Role of Female Health for Sustainable Development in Nigeria: What Can We Learn?

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Abstract

Human capital is key to achieving growth and sustainable development. Therefore, economies that wish to develop invest massively on improving the quality and quantity of its stock of human capital. As aspects of human capital, health alongside education is given priority in the development agenda; this is however not the case in Nigeria. The economy's dismal performances in all indices of development (growth, employment, inequality and poverty levels) may find explanation on poor indices of health as an aspect of human capital – particularly female health. Against this backdrop, this study assesses the role of female health on sustainable development in Nigeria using the Autoregressive Distributed Lag (ARDL) analytical approach. Data on Sustainable Society Index (SSI) was utilized as a measure of sustainable development. Findings provided evidence of importance of female health to sustainable development in Nigeria. Lessons for development policy were also discussed.

Keywords: ***Female Health, Sustainable Society Index, Sustainable Development, Nigeria***

Introduction

Development as a concept is multifaceted and centered on improving the overall wellbeing of the individual. As focal point of development, wellbeing can be achieved through income growth, reduction in poverty, and unemployment, as well as ensuring equitable distribution of income. This makes it imperative that economies that wish to develop must push for improvement on these indices of development. In this adventure, economists have come to the realisation of importance of health in economic performance both at the aggregate and household levels. It is well documented in the literature that health is a commodity that is not sort after for its sake alone, but also as a crucial factor in growth and development process. (see

Grossman 1972). This underscores the importance of health in the development agenda such that economies are required to apportion a significant proportion of annual budget to health. In the current dispensation, health budgetary provisions are viewed as a capital budget rather than consumption budget. As a capital expenditure, it is viewed as investment that has potential to trigger up spontaneous positive changes across sectors therefore should be of importance for policy.

According to Ichoku (2015) and based on scientific evidence, good health accounts for between 30 – 40% of national growth. This may have sparked up investigation on the negative consequences of poor health on national growth and development. Evidence points to unpredictable illnesses which reduce health quality as a major determinant of unhealthy growth and wider spread poverty among less developed countries (LDCs) (Alam & Ke, 2008). In Nigeria, statistical evidence point to the fact that incidence of common causes of ill-health such as outbreak of major influenza, malaria and other communicable diseases is high, and may account for observed poor performances in all indices of health. For instance, child mortality rate for Nigeria is reported to be 100.2 per 1000 live births (World Bank 2017). Maternal mortality rate remain high; 100 per 100 000 live births (WHO, 2014). As a summary measure, life expectancy of an average Nigerian stands at 53.95yrs as against 76.5yrs and 76,22yrs for Morocco and Algeria respectively (World Bank, 2018). Analysis of this across male and female gender shows that life expectancy of an average male child in Nigeria stands at 53.09yrs, while that of female child is 54.84yrs(World Bank, 2018), indicating a slightly more years of life for the female gender than the male. Further statistical evidence points to a state of morbidity crises for the female gender particularly during their reproductive years. According to WHO, (2014) report, only 61% of pregnant Nigerian mothers made at least one contact visit to a skilled health provider during pregnancy period. This no doubt rubs – off on overall contribution of the female gender to total output through reduced productivity. These observed differences underscore the importance of gender specific examination of the effect of ill-health on economic performance. Furthermore, evidence has shown that when the family breadwinner/head suffers health challenge, the family suffers (Krishina 2007). For instance, when a mother suffers health challenge, it affects the whole family in different perspectives; the children also suffer ill-health due to reduced care-giving, they also do not attend school regularly. These have long run negative consequences on growth and other indices of economic performance.

Quite a few numbers of Nigerian specific studies made useful attempt at examining the relationship between health and economic development. However, the focus of each of these studies is quite distinct from the objective of this particular investigation. For instance, a number of these studies examined the relationship among health spending, health status, and economic growth as a component of development (Mathias et al, 2013; Ibikunle, 2019). Some other studies carried out implicit examination of this relation in the context of examining the relationship between health spending and economic growth (Bakare and Sanmi, 2011; Nwanosike et al, 2015; Maduka et al, 2016; Anowor et al 2020). This particular study differ from each of the previous studies by (1) utilizing an index measure of development (Sustainable Society Index); it incorporates all indices of sustainable development, (2) rather than a summary measure of health, it investigates the impact of gender specific aspect of health (female health), (3) it utilized a measure of health that captures morbidity (prevalence of anemia) rather than mortality. Specifically, objective that guided the investigation is to determine the impact of female health on sustainable development in Nigeria.

Empirical Literature

International evidence on the relationship between health and development are mainly studies that examined association between health and economic growth as a component of development. Among these are studies that examined effect of health on labour productivity (Cole & Nenmayer, 2005); Knapp, 2007; Pohl, Neilson and Parro, 2013; Mathias et al, 2013; Trevisan & Zantomoi, 2015; Lixin, Kostas, and Umut, 2008). All found that good health improves productivity. Specifically Lixin et al (2005) found that lower health status result in lower working hours. Some other studies explicitly focused investigation on relationship between health and economic growth (Bloom, Canning, 2001; Bloom Canning and Sevilla, 2001; Swiff, 2011; Odrakiewicz, 2012); all arrived at similar findings which suggest that improved health results to increases in growth as independently measured by either absolute value of GDP, GDP per capita or output growth.

Some other studies undertook an implicit examination of this relation by focusing on the impact of public health expenditure on economic growth (Heshmati, 2001; Mojtahed and Javadipour, 2004; Bakare and Sanmi, 2011; Eggoh, Houeninvo, & Sosson, 2015; Nwanosike et al, 2015; Maduka et al, 2016; Halici-Tuluce et al 2016; Bustamante, and Shimoga, 2017; Ibikunle, 2019;

Tammy & Chris, 2019; Anowor et al 2020). These studies directly or indirectly provided evidence for the relationship between health and economic growth as a component of development. For instance, in the context of a dynamic panel data-set comprising low- and high-income countries Halici-Tuluce et al (2016) examined the relationship between health expenditure and economic growths for the period 1995-2012 and 1997-2009 respectively. In the short run, existing relations between health expenditure and economic growth for low-income countries was discovered to be reciprocal, but one-way causality runs from economic growth to public health expenditure in the long-run. In high income countries, the causality is bidirectional in the short-run for both private and public health expenditures but, causality runs from economic growth to private health expenditure on the long run.

Bustamante, and Shimoga, (2017) compared the income elasticity of health spending in middle- and high-income countries using fixed and random effects, models. The study addressed non-stationary and cointigration properties by implementing the first-difference of the study variables. Findings show that despite rapid growth experiences in sampled middle income countries, their aggregate income elasticity remained below unity and equals aggregate income elasticity of high-income countries. More recently, Anowor et al (2020) undertook a journey to unravel hidden facts in the link between health spending and growth in output per capita in ECOWAS region utilizing data for the period 1985 – 2017. Results of the panel author distributed lag (ARDL) model show that, public and private health spending significantly enhance output per capita. However, none of these findings could offer explanation to what happens to poverty, unemployment and income inequality, hence this particular investigation.

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Methodology

Data

Time series data which span over the period 2006 – 2016 was utilized in the analysis; this was interpolated into quarterly data series using Eview9 econometric software. SUSDEV stands for sustainable development, NOX is non – oil export as a percentage of total export, GfKAP stands for gross fixed capital formation (proxy for physical capital), prevalence of anemia among women of reproductive age was utilized as proxy for female health (FHEALTH), while SSENROL (secondary school enrolment rate) was used as proxy for education as an aspect of human capital. GCEXP is government capital expenditure; NODA denotes net official development aid. Among these, SUSDEV was sourced from the sustainable society index;

GGfKAP, FHEALTH, SSENROL, and NODA are sourced from World Bank (2018) database, while NOX and GCEXP are sourced from Central bank of Nigeria's statistical bulletin (2018).

Theoretical framework and model specification

Analysis in the study is founded on the structural theory of economic development. The argument herein is that development is a function of the extent to which countries are able to diversify away from traditional primary products into manufactured exports and expansion of nontraditional exports (Chineny 1979; Syquin, 1989; Hesse, 2008). Furthermore, the model relates export diversification and growth (as components of development) to the Export-led Growth (ELG) hypothesis. Drawing from this relation, the study disaggregates health and education as component of human capital in the traditional Augmented Cobb-Douglas production function. The specification here fallows that by Obwona (2012) as adopted by Onodugo, Ikpe and Anowor (2013). This is specified as:

$X = A, k^{\alpha}, H^{1-\alpha}$- - - - - - - - -(1)

Where

X = sustainable development (SUSDEV)

K = Physical capital proxied by Gross fixed capital formation (GfKAP)

H = Human capital (Female health (FHEALTH)), education (secondary school enrolment (SSENROL)).

A = Total factor productivity (TFP) of growth in output.

It is of note that "A" is a function of private investment (Pinv.).

Thus $A = h (P_{inv})$ - - - - - - - (2)

By substituting equation (2) into equation (1), and taking note of the fact that X = SUSDEV, K = GfKAP, H = FHEALTH, and SSENROL, we have:

$SUSDEV = f(P_{inv}, GfKAP, FHEALTH, SSENROL)$ - - (3)

Expectation in (3) is that P_{inv} affects development through export trade. This in Nigeria's economic model is categorized into oil (the traditional export commodity) and non – oil export; export diversification for Nigeria is measured by the degree of move away in the direction of non-oil export trade (NOX).

Therefore:

$P_{inv} = g (NOX)$ - - - - - - - (4)

by substituting equation (4) into (3), we have

SUSDEV = f(NOX, GfKAP, FHEALTH, SSENROL) - - (5)

In equation (5), we introduced the role of public sector as well as external development agencies; public sector role is captured by public capital expenditure (GCEXP), while contribution of external development partners is proxied by Net Official Development Agency (NODA). Introducing GCEXP and NODA into the model transforms equation 5 to:

SUSDEV = f(NOX, GfKAP, FHEALTH, SSENROL, GCEXP, NODA) - - (6)

Econometric transformation of equation (5) is as stated below:

$SUSDEV = \beta_o + \beta_1 NOX_t + \beta_2 GfKAP_t + \beta_3 GCEXP_t + \beta_4 FHEALTH_t + \beta_5 SSENRO_t + \beta_6 NODA_t + \mu_t$ - - (6)

Where

SUSDEV = sustainable development

NOX = Non-oil export

GfKAP = Gross fixed capital Formation

GCEXP = Government Capital Expenditure

FHEALTH = Female health

SSENROL = Secondary School Enrolment ratio

NODA = Net Official Development Agency

μ = Error term

t = time subscript

β_1, β_2 - - β_6 are the estimated elasticities; a priori expectation is that all shall be positive.

Estimation Strategy:

Macroeconomics variables by nature tend to exhibit random walks in their behaviour. This makes results estimates from analysis conducted with such non-stationary variables to be unreliable for policy. As a result, time series properties of each of the variables in the model were examined using Zivot and Andrew (1992) unit root test. Zivot and Andrew test statistics was preferred and subsequently chosen given its unique feature of being able to account for unknown single structural break in series. Result of this, is as presented in table 1. Observation therein shows mix order of integration in the macroeconomics data series running between zero and one (I(0) and I(1)). Secondly, structural break was equally observed in each of the data series. This outcome makes Autoregressive Distributed lag (ARDL) model approach to co-integration most appropriate for analysis. Pasaran, Shin and Smith, (2001) ARDL bound testing

approach to cointegration analysis can be applied to series that are integrated of order zero and one.

Table 1: Zivot – Andrews Unit Root Test

Variable	Level form t-statistics	Break date	First difference t-statistics	Break date	Oder of Integration
SUSDEV	-4.751202	2008Q1	-15.01075	2009Q1	I(1)
FHEALTH	-0.605545	2009Q1	-16.83938	2015Q1	I(1)
GCEXP	-4.390105	2010Q1	-7.287525	2010Q1	I(0)
GFKAP	-5.021999	2009Q1	-7.382535	2010Q3	I(0)
SSENROL	-5.968168	2013Q1	-7.800093	2008Q1	I(0)
NODA	-3.006533	2010Q3	-9.81347	2015Q1	I(1)
NOX	-7.217633	2008Q1	-7.336040	2013Q1	I(0)

Equation for the ARDL model is as specified:

$$\Delta SUSDEV_T = \beta_0 + \sum_{i=1}^{p} \beta_I \Delta SUSDEV_{T-i} + \sum_{j=0}^{q} \alpha_j \Delta NOX_{t-j} + \sum_{k=0}^{q} \lambda_k \Delta GfKAP_{t-k} + \sum_{l=0}^{q}$$

$$\varphi_l \Delta GCEXP_{t-l} + \sum_{m=0}^{q} \eta_m \Delta FHEALTH_{t-m} + \sum_{n=0}^{q} \theta_n \Delta SSENROL_{t-n} + \sum_{n=0}^{q} \mu_o \Delta NODA_{t-o} +$$

$$\Delta_0 SUSDEV_{T-1} + \delta_1 NOX_{t-1} + \delta_2 GfKAP_{t-1} + \delta_3 GCEXP_{t-1} + \delta_4 FHEALTH_{t-1} + \delta_5 SSENROL_{t-1} +$$

$$\delta_6 NODA_{t-1} + \epsilon_t \quad (7)$$

The cointegrating equation which is based on an asymptotic non-standard F-test on coefficient of the lag level variables of the unrestricted correction model is specified thus:

$$\Delta SUSDEV_T = \beta_0 + \sum_{i=1}^{p} \beta_I \Delta SUSDEV_{T-i} + \sum_{j=0}^{q} \alpha_j \Delta NOX_{t-j} + \sum_{k=0}^{q} \lambda_k \Delta GfKAP_{t-k} + \sum_{l=0}^{q}$$

$$\varphi_l \Delta GCEXP_{t-l} + \sum_{m=0}^{q} \eta_m \Delta FHEALTH_{t-m} + \sum_{n=0}^{q} \theta_n \Delta SSENROL_{t-n} + \sum_{n=0}^{q} \mu_o \Delta NODA_{t-o} +$$

$$\Omega Ect_{t-1} + \mu_t \quad (8)$$

Ect-1 is the error correction term, ϑ indicates the speed of adjustment to equilibrium should there be occurrence of disequilibrium. Table 2 present the results of this model (results of cointegration).

Results of Estimation

Table2: ARDL Cointigration Result

	Break Date	Selected model	F-statistics
	2009Q1	ARDL(1,0,1,2,1,1,1)	7.272346***
	I(0)	I(1)	
1%	3.6	4.9	
5%	2.87	4	
10%	2.53	3.59	
Note: *** indicates significance at 1% level of significance			

Observation from the result shows that the calculated F statistics is higher than the upper critical value at all levels of significance. This indicates failure to reject the null hypothesis of no long run relationship. This justifies estimation of the model on the bases of ARDL bound test approach to cointegration. Results of the estimation of this specification as presented in tables 3 and 4 formed the bases of findings in this study.

Table 3: Long run estimates

Variable	Coefficient	Std Error	t-statistics	Prob-values
FHEALH	-0.181060	0.042309	-4.279445**	0.0002
GCEXP	0.274606	0.067200	4.086433**	0.0004
GFKAP	0.011766	0.003961	2.070705**	0.0063
NOX	-0.334868	0.073098	-4.581062**	0.0001
SENROL	0.047820	0.012739	3.753840**	0.0009
NODA	-0.049873	0.006510	-7.660594**	0.0000
BRKSUSDEV	0.906976	0.139926	6.481816**	0.0000
C	12.448676	1.856280	6.706248 **	0.0000
@TREND	-0.006002	0.004983	-1.204414	0.2393

Table 4: Short run estimate and diagnostics tests

Variable	Coefficient	Std Error	t-statistics	Prob-values
D(FHEALTH)	-0.110880	0.025158	-4.407330**	0.0002
D(GCEXP)	0.129099	0.040296	3.203746**	0.0036
D(GFKAP)	0.000371	0.003376	0.109776	0.9134
D(NOX)	-0.161510	0.039814	-4.056595**	0.0004
D(SSENROL)	0.24583	0.006085	4.039912**	0.0004
D(NODA)	-0.040268	0.003045	-13.224778**	0.0000
D(BRKSUSDEV)	0.555425	0.076184	7.290626**	0.0000
D(@TREND)	-.0.003675	0.002889	-1.272135	0.2146
COINT Eg(-1)	-.0.612393	0.085469	-7.165115**	0.0000
Diagnostics tests				
Jarque-Bera	1.838255	[0.398867]		
BG Serial Correlation LM	0.716059	[0.4988]		
BPG Hetroscedasticity	2.554095	[0.0174]		
Ramsey RESET	0.785402	[0.3839]		
Note: p – values in []; ** p<0.05				

Figure 1a: Result of CUSUM Test of Stability of Coefficients

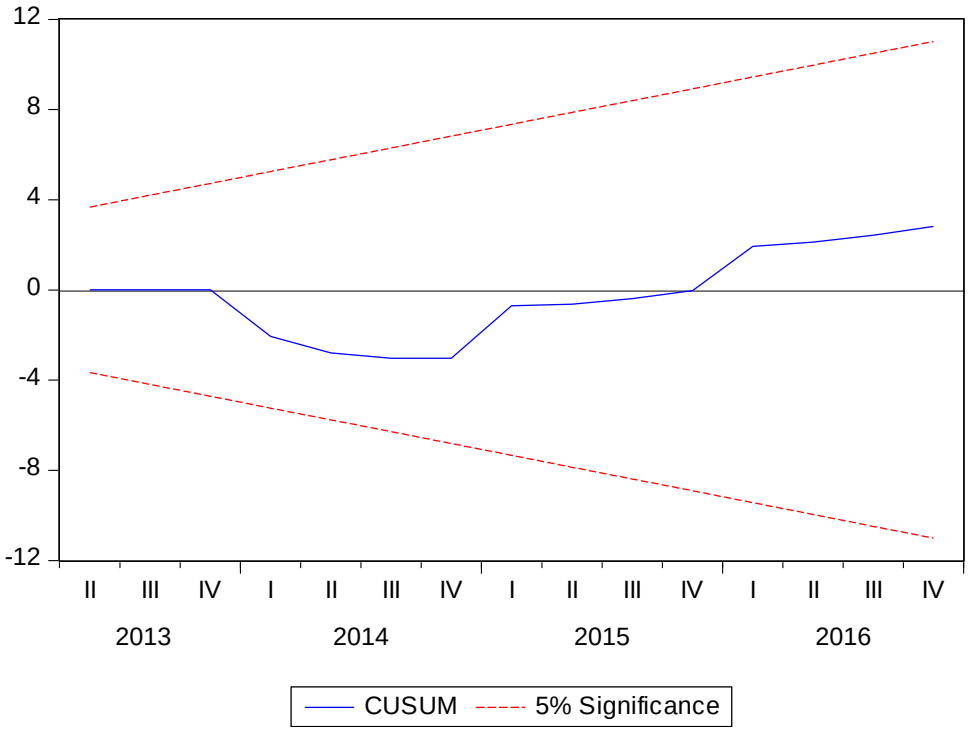
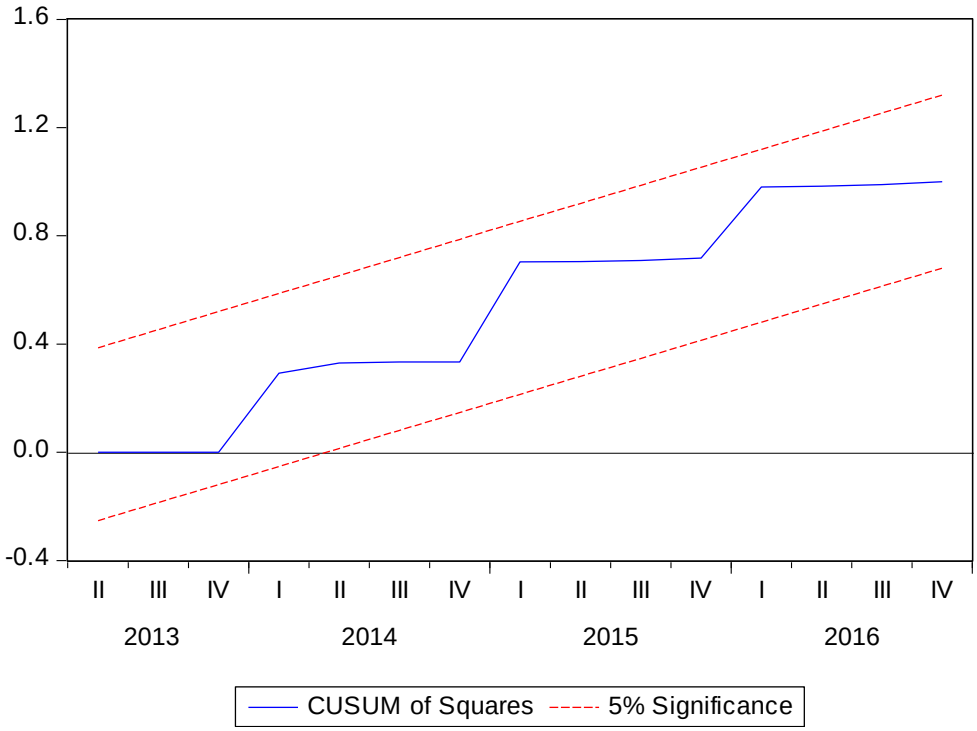


Figure 1b: Result of CUSUM of SQUARES Test of Stability of Coefficients



Empirical Findings and Discussion

Result of the long run regression (table 3) shows that three of the explanatory variables (FHEALTH, NOX, NODA) have negative relationship with sustainable development (SUSDEV). This points to the fact that, increase in level of any of these variables leads to reduction in sustainable development (SUSDEV). The fact that increase in female health leads to reduction in sustainable development means that worsening health burden for the feminine population leads to reduction in level of sustainable development. On the other hand, GCEXP, GfKAP and SSENROL relate positively with SUSDEV; thus indicating that increase in any of these variable scales up level of sustainable development. As a matter of fact, all the explanatory variables statistically exert significant impact on SUSDEV, and also conform to expectations of the theory.

Negative association between NOX and SUSDEV is reminiscence of the dual nature of Nigerian economy, and corresponding trade-off between resource use in oil sector, and its alternative deployment in non-oil sector. In the model, NOX is used to capture the economy's degree of diversification away from its traditional export. This in Nigeria's case is defined by the extent of move away from oil export towards non-oil export. Given the under-developed nature of the non-oil sector relative to the oil sector, the economy has to accept temporary loss of productivity as resources are moved from oil to non-oil sector, hence the negative

relationship. In the case of NODA-SUSDEV relation, sign of this depends on usage of funds; deployment of aid fund into productive investment will lead to positive association between NODA and SUSDEV, and negative if otherwise. Specific empirical interpretation of findings indicates tendency for SUSDEV to reduce by -0.2% should female health worsen by 1% (i.e, should prevalence of anemia among women of reproductive age increase by 1%). Other result shows that 1% increase in NOX and NODA reduces SUSDEV by -0.3% and -0.1% respectively. Furthermore, 1% increase in GCEXP, GfKAP and SSENROL increases SUSDEV by 0.3%, 0.1% and 0.1% respectively.

Dynamics of each of these relations shows that in current period, worsening health condition for the female population (FHEALTH) significantly exhibit tendency to reduce SUSDEV by -0.1% for every 1% increase. NOX and NODA significantly reduce SUSDEV by -0.2%, and -0.04% respectively for every percentage increase in each of the variables. On the other hand, 1% increase in GCEXP, GfKAP and SSENROL significantly increase SUSDEV by 0.1%, 0.0004%, and 0.03% respectively. Significance of BRKSUSDEV indicates that the structural change that affected SUSDEV in Nigeria in the first quarter of 2009 (2009Q1) significantly influenced the impact of each of the explanatory variables on sustainable development in both long run and short run periods. On event of disequilibrium, adjustment to equilibrium significantly takes place at the rate of 61% every period. Furthermore, observations from results of the diagnostics tests shows that the model is robust to Jarque Bera test of normality, B.G test of serial correlation as well as Ramsey RESET test of specification bias - probability values of F-statistics in each case indicate rejection of the individual null hypothesis. Also, coefficients of the variables are stable across periods as adjudged by both the CUSUM, and CUSUM of SQUARES test, (see figure 1). However, observation from result of Breusch-Pegan-Godfrey test of heteroscedasticity indicates rejection of the hypothesis of no heteroscedasticity in the data. This outcome did not come as a surprise, given that the time series variables have mixed order of integration (I(0) and I(I)). Under such situation, it is natural to detect heteroscedasticity (see Mano-Bakalinov, 2016).

Conclusion and Lessons for Development Policy

Primarily, this investigation was embarked on to empirically and specifically determine impact of female health on sustainable development in Nigeria. Results show tendency for sustainable development to reduce as a result of increase in level of female health burden. On the basis of

this, the study concludes that female health burden has a significant reducing effect on sustainable development in Nigeria. As a result, the study identifies key lessons of importance for development policy in Nigeria:

- Female health has both short-run and long-run effect on development. Its short-run effect stems from reduced care-giving to the child, and momentary reduction in feeding habit on account of health challenge on the female household head. The aggregation of these, as well as reduction in school attendance rate suffered by the child on account of a sick mother culminate to long-run income loss on the society.
- Against expectation, non-oil export has negative consequences on growth. This is the case due to the transfer of resources from the oil sector to non-oil sector; reduction in relative contribution of these resources in the non-oil sector viz-a-vis the oil sector where they are migrating from, accounts for the observed reducing effect of non-oil export on sustainable development; this will correct itself as the non-oil sector develops.
- Although development aid has both short and long-run effect on development, it is however not a key factor to be considered in developing Nigerian economy – the country should instead focus on inward looking development policies such that could lead to the development of the non-oil sector.

On the basis of the above, the study recommends improved funding and capacity building in the area of health interventions targeted at the female gender. Improved funding will ensure that health facilities are made available not only for the females, but for the generality of the society. On the other hand, health interventions will serve as a proactive measure to promote good health amongst the female population.

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