EFFECT OF HEALTH CARE EXPENDITURE ON THE ECONOMIC GROWTH OF NIGERIA: AN ARDL ANALYSIS

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ABSTRACT

This study focuses on the Health Care Expenditure and Economic growth using, some key indicators as the independent and dependent variables (expenditure on specialist surgical work force, external health expenditure, domestic health expenditure and the gross domestic product growth); in determining the effectiveness of health care expenditure on economic growth in Nigeria. This study gave answers to the research questions and the stated hypothesis. The study scope covered between the years 1990-2023, in order that a proper understanding will be grasped. The study highlighted several theories in the chapter, from which the theory which the work anchored on was selected; which are the Grossman model of health production and the endogenous growth model. The ex-post facto research design was adopted that aided the examination of how pre-existing variables influences the dependent variable, from the sourced data from the world development index 2024. The study adopted the ARDL model for the regression analysis because the variables were stationary at level and 1st difference. The result that was reached shows that there exist relationships between the independent variables and the dependent variable; DHE exhibits a positive and significant influence on GDPG, while SSW, reveals a positive but not significant influence on the GDPG; lastly, EHE shows a positive influence on the growth of the gross domestic product. It is therefore recommended that the Nigerian government should strengthen policies that attracts and retain investments in the health sector.

Keywords: Gross Domestic Product Growth, External Health Expenditure, Specialized Surgical Workforce, Domestic Health Expenditure.

Introduction

Endogenous model of growths highlights the needs of capital investments on human capacity improvement on economic improvements and in a whole development. Health of the economy workforce is a sine qua non for economic drive for economic development; a productive economy is caused majorly by a healthy population/ workforce hence, higher productivity/ output, thereafter, upward income per individual. The needs for human capital improvement to the growth of the economy cannot be over stated/emphasized due to the fact-

that it works as a reagent to economic improvements. Contribution of the level of health expenditure on economic improvement come from/ is revealed from the health-led hypothesis of growth. Health is reasoned as capital; therefore, focus/ investments on labor force health condition can lead to an increased labour level of productivity; hence, increase in the state of income in a country is followed by increase in the performance of the population/ citizens.

Bloom and Canning (2011) reveals that in cases where labour force is in a good state of health, the likelihood to acquire new/ modern skill tends to be higher due to expectation of long-term gains/ benefits. Although, when the labourforce is comprised of workforce in terrible health condition, it is likely that the level of productivity will be low and disappointing; this reveals/ explains the difference/ disparity in growth cum development worldwide. A huge percent of divergence/ different economic improvement is experienced between nations that are improving/ developing and those that are already improved/ developed and this is linked to the level of good health condition of the workforce and well as the advanced level of the health facilities. Level of economic health of most population is determined by change in health technology, although part of these variations is because of advancement in science of medicine. Newhouse (2012) stated in their research that the variations that is witnessed in technology in medicine and health facilities is a major reason that health expenditure increases. The postulations of Newhouse (2012) were backed by evidence in United States by a scholar called Fuchs in 2018, although 85% of scholars from the area of health economics revealed that changes that are technically inclined accounts for the quick improvement in health sector expenditure in different countries.

Public health expenditure is an expense on social-welfare which benefits the lives and health wellbeing of individuals, so is investment in a nation's capital in health-related matters. According to research data of previous works, the macro/ capital rate of return on investment of member nations of the Organizations for Economic Co-operation and Development (OECD) from the year 2005 up until 2020 experienced an unstable downward trend. Articulated enhanced social security systems improve individuals' conditions of health, enhances the market level of participation of labor force that is effective, thus advancing rapid social-economic development. The right public expenditure on health, can help stop hyper-inflation in social consumption will inadvertently enhance economic and stability in social-economic space. OECD nations rests on investment in areas of healthcare plus social-welfare activities to enhance individuals' health conditions and efficiency of work, ensuring the economic input process of labor market activities that is effective, hence promote development in economic activities. The nexus between economic advancement and public-health expenditure in now a necessary/ important research area in fields of public-health as well as in social security. Focusing on increased expenditure in public health all over the world, it becomes necessary to notice and understand the nexus between growth/ development and public expenditure in health, as well as the ways/ trends these relationships are revealed.

The nexus that exists between public health expenses and growth of a nation's economy seems special, complex, dynamic, and somewhat un-noticed. As a component of indicators of human capital development, health of these capital may be considered as the main input that will enhance productivity; when related to other conventional inputs like the physical capital (Weil 2007). Meanwhile, compelling evidence exist which states that health condition of the variable input influences the growth of an economy, although, the magnitude of this influence

is not clear due to multi-dimensional nature of health-outcomes and bi-directional causation that exists between income of individuals and health expenditures. From the historically perspective, health improvements across nations can result from sources like Improved living standard, sanitation and modifications in health patterns, medical support through drugs and medical surgeries.

Some of the indicators that shows the benefits that accrues due investment in the health sector that transpires to growth of the economy includes; productivity increase which reveals that; improved health and nutrition lead to increased output. Secondly the effect that healthy work force can have on the demography, for instance; reduced infant mortality which will increase healthy work force. Thirdly, due to the effect of investment in the human capital/ workforce, better education outcome is guaranteed; healthy children tend to learn better in classes and this will lead to a better equipped work-force. Lastly, the investment in health has a savings effect which is evident in the life expectancy of individual to save more hence take part in effective nation building.

All over the entire world (developed, developing and underdeveloped economies), the health of their population is key towards the growth and advancement of the entire economy; reveling the importance of a healthy population. Series of reforms that has been carried out by economies all over the world include those that are related to the health sector so that the goal of the Millenium Development Goal can be met.

Material and Method

The health care expenditure over the years has not revealed the impact that it shown on the growth of the Nigerian economy. It is important to note that the health care expenditure is not truly visible and felt in Nigeria even though so much has been done it terms of allocation of resources and support to the health sector notably. On this back drop, this study will utilize the independent variables to determine if it has an effect on the growth of the Nigerian economy within the years specified in this study (1990-2023), even if from prior knowledge, Nigeria provides supports for the postulation that existing structure/ concept are inadequate towards the stimulation of social development (Jinadu. G, 2022). This is the reason why the study is quite important to determine if the Nigerian health care expenditure is effective in the growth of the economy of Nigeria.

The main objective of this study is to determine the effectiveness of health care expenditure on economic growth in Nigeria; while the specific objectives of this study are; while the specific objectives considered domestic, external and specialist surgical workforce expenditure on the growth of the Nigerian economy. The hypotheses of this study are all stated in the null form; revealing the initial perception of the study giving the stated objectives above.

The significance of studying health care expenditure and economic growth in Nigeria (1990-2023) is based on gaining a comprehensive understanding of the nexus that exist between health care expenditure and growth of the economy. This research can help in choosing the right policies that will enhance better health care investment for greater economic development, and contribute to global efforts in addressing social protection short-comings. The study also provides essential insights for developing targeted social protection programmes and promoting a balanced approach towards sustainable national and international goals. The study informs scholars, students, policy makers to be to be very

conscious about the issue of social protection and welfare (most especially in the area of health).

The scope of this study encompasses an in-depth examination of the health care expenditure and economic growth in Nigeria using variables (gross domestic product growth, Specialist surgical workforce, External health expenditure, Domestic health expenditure) via the data collected from secondary source gathered spanning from 1990 to 2023.

The literatures that help boost this study; the literatures comprises of the conceptual literature (definitions of key concepts that are used in this study), the theoretical literature (relevant theories that this study draws breath from) and the empirical literatures (previous works of scholars, the method the used for their analysis, the year their studies were carried out, their results and recommendations) and the gap in literature or the addition to knowledge.

Spending on the Health care sector can enhance/ stimulate growth of the economic, according to Mushkin's hypothesis therefore; health of an economy determines the growth of an economic (Mushkin S.J. 2015). In respect to this hypothesis, health is a type of capital which leads to improvement of the economy. Investment in health sector can cause increased output/ income level and increase the gross domestic product. As long as health sector is a core component of human capital venture, the buildup of human capital/ workforce is the main indicator of the endogenous model of growth. To accrue human capital, innovative approaches and policies in health care are specially imperative. It is important to form fitting health care strategies for both justifiable advancement and the general health of the people. Numerous protuberant economists (Kleiman, Newhouse and Pueyo, among others) offered academic and experiential signal that reveals that public health spending encourages the growth of the GDP (Kleiman E. 2020). Wang, Naidu et al., Hatam et al., Aboubacar et al. and Wang et al. spelt out that spending in public health shows a firm role in endorsing GDP growth (Wang K.M. 2011). Atilgan et al. projected that a 1% surge in per-capita health spending leads to a 0.434% surge in per-capita GDP (Aghion P, Howitt P, Murtin F. 2017). Aghion et al. researched that venture in health care have an important and positive influence on GDP growth from and between 1940 to 1980, but they postulated that this affiliation tends to decline after 1960 (Aghion P, Howitt P, Murtin F. 2011).

Gross domestic Product Growth GDPG); is the yearly percentage rate of growth of the GDP at market prices built on constant home currency. Aggregates are built on constant 2015 year prices, stated in U.S. dollar. Gross Domestics Product implies the sum of value added by all occupant/ residents' manufacturers in a nation plus any output taxes, minus any subsidies that is not included in the value of the output. It is premeditated without making reduction for depreciation of assets that are fabricated or for depletion and degradation of resources of the natural kind.

Specialist workforce of the surgical kind (SSW) is the quantity of specialist surgical, anesthetics, obstetric workers working in each nation per 100,000 population. SSW also refers to trained and certified healthcare professionals specializing in various surgical disciplines. These professionals are accountable for execution of surgeries, handling preoperative and postoperative care and ensuring patient protection in operating theaters. The workforce typically includes; Surgeons, Anesthesiologists, Surgical Nurses, Surgical Technologists, Surgical Assistants. These workforce helps improves patient outcomes, intervene timely, collaborate with other colleagues to get the best result; they are also innovative in their operation.

External Health Expenditure; EHE is the portion of current health expenses backed from sources that are external. Sources that are external comprises of direct foreign transfer and external transfer dispersed by government surrounding all financial influxes into the nation's health sector system from outside the country. External sources either stream via the government schemes which are guided via non-governmental settings or other systems. Is the financial support from foreign entities like internal donors, organizations or governments to help fund health- related activities and services in a specific country. These funds are typically directed towards improving healthcare systems, addressing specific health challenges and supporting public health programs especially in less developed countries.

Domestic expenses on health; is the portion of present health expenses backed from domestic public fonts for health purposes. Domestic communal fonts include domestic proceeds as internal transmissions and grants, transfers, subsidies to voluntary health insurance recipients, non-profit establishments-serving-households (NPISH) or enterprise funding schemes, as well as obligatory prepayment and social health insurance donations. Not including external resources spent by government/ managements on health.

The Keynesian economic theory, articulated by the influential British economist John Maynard Keynes in the 1930s, represents a paradigm shift in understanding the dynamics of economic activity and the role of government intervention. Keynes challenged the classical economic doctrine, which held that free markets naturally adjust to achieve full employment through price and wage flexibility. Instead, he argued that economies could experience prolonged periods of disequilibrium, characterized by high level off unemployment and under-utilized resources, due to insufficient aggregate demand. Keynes posited that collective demand, comprising consumption, investment, and government outlay, is the main driver of economic activities/ functions. During economic depressed state and downturns, when private sector demand is weak, Keynes advocated for active government interference through expansionist fiscal policies, such as amplified public outlay on infrastructure ventures and social agendas, as well as tax cuts to boost disposable income and stimulate consumption. By doing so, governments can offset the decline in private sector demand, reduce unemployment, and promote economic recovery. The Keynesian framework has profoundly influenced modern macroeconomic policy, particularly in its emphasis on counter-cyclical fiscal measures to stabilize economic fluctuations and foster sustainable growth.

The model of government behavioral making explains the primary/ main decision-maker for public health expenses, the government most often than not determines people's level of medical safety. Government provision of health expenditure for the public is an area of general communal fiscal expenses. Hence, fiscal expenses can be separated into non-public health expenses and health expenses for the public. Researchers all over the world have steered wholesome research on how the growth of an economy affects expenditure in public health. The public expenses on health of the OECD examined in this work references the expenditure of government for patient that are in the clinics and those outside the medical facilities, therapy care, lasting care, and precautionary healthcare. Public health expenditure in the republic of China is often regarded as healthcare expenses of government in power and is a significant constituent of administration public expenses, and the related research literature in China has predominantly focused on the nexus between healthcare outlay and growth. Preceding research gifts various standpoints on the association between public health spending and GDP,

and no agreement has been grasped. Some researchers have claimed that public health spending has a restrictive effect on GDP growth.

Rosa and Pueyo (2005), considered the connection between economic growth of a nation, public health spending, and life anticipation by building a model of endogenous lifespan, confirming a negative association between economic growth rate and public health spending (Aisa, R & Pueyo, F; 2005). Ghosh and Gregoriou utilized panel data from 15 nations between 1972 and 1999, defining that public health outlay has a meaningfully negative effect on the growth of these economies (Ghosh, S & Gregoriou; 2006). Liu and Zhang inspected data from the republic of China between the years 1981 and 1999, determining that that Chinese administration healthcare expenses have a noteworthy adverse direct influence on economic growth rate (Yongsheng, L & Zhang, K; 2014).

Sun utilized regional panel data from republic of China between the years 1995 and 2012; and hired generalized method of moments estimation technique, reaching a conclusion that healthcare investment expenditure delays economic growth and developments (Sun, Z; 2014). Contrariwise, some academics have claimed that public health spending profits the economy. Helms scrutinized data from the United State of America between the years 1965 to 1979, discovering that public health spending meaningfully arouses GDP growth (Helms, J.I; 2015). Devarajan and Bleaney et al. (2014) realized that public health outlay to have a important positive outcome on GDP growth. Geng et al. (2018) contended that administration healthcare spending has a huge contribution to GDP growth. Beraldo et al. (2009) inspected panel data from some OECD nations between years 1971 till 1998, determining that healthcare outlay has a noteworthy advertising effect on growth of a nation, with an involvement that exceeds that of education spending. Creating a generalized Cobb–Douglas production-function econometrics model that included government's healthcare venture whereas Jiang and Tian (2009) proved that improved government outlay on healthcare somewhat indorses/ promotes growth of the economy.

Luo, Y. (2009) utilized a stochastic dynamic general-equilibrium model in econometrics and health work-force input–output competence as a substitution variable for health of the human capital, finishing that public health spending pointedly promoting growth of an economies' growth. Guo et al. (2011) examined the promotional outcome of government healthcare outlay on growth by means of an endogenous model of growth. Lan (2013) used provincial panel data from republic of China between the years 2001 and 2010 and used spatial-panel econometrics model to examine public health outlay, discovering that enhanced human capital investments promote an economic that can grow. Fan and Chen (2016) researched that the expenditure on government healthcare meaningfully encourages the growth of most economies based on the adopted panel data with the aid of two-stage least squares and general moment method (GMM). Saida and Kais (2019) research revealed that medical investment expenditure for positive effect on growth and development, which shows more importance/ significant as expenditure in the health sector is improved, entailing that the government at the helm of affairs should establish workable policies to enhance expenditure in the health sector to help build a healthy and more productive/ proactive economy and for national development. Wang (2018) utilized a spatial economics model and reached a conclusion that the republic of China government expenditure on healthcare has a positive profile-raising effect on growth of an economy.

This study covers a gap in the literature that is observed; firstly, the gap in the scope of previous works when compared with this study; secondly, the literatures cited on health expenditure and economic growth did not cover the variables that are included in this work and lastly, the method of data analysis that was used in this study is different from those that were used in the cited literatures due to the different variables used.

Results and Discussions

The machinery via which public investment in health impacts on economic growth and advancement is decorated in the endogenous models of growth. Some models intimate the good associated to human capital investment and the effect on economies' growth. Neo-classical growth models clarify economic growth built on savings habit of the population. Esian (2013) emphasized that states with improved savings drive have developed/ improved per capita most other factors remains equal. This emphasized theory highpoints that incompetence in the establishment of health care should be changed not by supply of health-care services but by improved quality such as infrastructure investment, equitable distribution resources in the health sector. Many models were established to integrate the impact of human-capital on economic growths. Romer (2011) and Barro (2013) stated that expenditure on the development of human capital is sin-quo-non towards enhancing the growth of an economy. The theoretical backing of Barro's work is due to the appropriate need in modern human capital in Africa. Augmented model of Solow states the need for human capital investment on the growth of the nation. Endogenous models don't accept human-capital as a constant variable; instead, it is based on the guile of human capital spending that influences the improvement of the economy in a brief period as well as in the long terms. Theoretical model that was developed in this work shows a functional nexus between growth of the nation's economy and the health spending that signifies the component of human-capital and its growth.

The research design employed in this study is the ex-post facto research design. In this research the focus lies in predicting causes based on past actions, without the ability to manipulate or alter those actions, behaviors or participant traits; the study test hypotheses to identify cause-and-effect relationships between the independent and dependent variables.

The variables used in this study are; the gross domestic product growth (GDPG), external health expenditure (EHE), specialist surgical workforce (SSW) and domestic health expenditure (DHE). The GDPG, measures the annual percentage growth rate of GDP, reflecting the average income change in a country. Aggregates are based on constant 2015 prices, expressed in U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.

Having the objective of the study as determining the relationship between health care expenditure and economic growth 1990-2023; the model that is specified is based on the variables used in the study. The variables used in the study are gross domestic product growth (GDPG), external health expenditure (EHE), specialist surgical workforce (SSW) and general government health expenditure (DHE) by implication, there should be a functional link between the dependent variables and the independent variables as expressed in this model below. They can be specified in three forms as seen below:

Functional Specification

GDPG=F (EHE, SSW, DHE)

Statistical Specification

$GDPG= \beta_0+ \beta_1EHE+ \beta_2SSW+ \beta_3DHE$

Econometric Specification

$GDPG= \beta_0+ \beta_1EHE+ \beta_2SSW+ \beta_3DHE+ \varepsilon_t$

Where;

GDPG represents Gross Domestic Product Growth

EHE represents External Health Expenditure

SSW represents Specialist surgical workforce

DHE represents Domestic health expenditure

ε Represents the error term

β0, β1, β2, β3 represents the parameters of the variables.

The method of data analysis for this study is the Autoregressive distributed lag model (ARDL) after the stationarity test has been carried out (because the variables were stationary @ level and 1st difference). The method that was chosen was chosen to help in predicting the relationship between the endogenous/ dependent variable (GDPG) and the exogenous/ independent variables (SSW, DHE and EHE). Base on the apriori expectation, EHE should have a positive relationship with GDPG; the SSW also have a positive relationship with GDPG while a positive DHE should have a positive relationship with GDPG as well and vice versa (all things been equal).

This study used time series data which span between 1990 and 2023 for Nigeria. The data of concern include external health expenditure, surgical work force, domestic health expenditure and GDP growth. These indicators/ variables are all in line to determine the effectiveness and relationship that exists between the dependent and independent variables in Nigeria. The data was sourced from the World Development Index 2024.

In determination of whether the variables in the model are stationary, augmented dickey fuller (ADF) unit root test was conducted.

Table 1: Augmented Dickey Fuller (ADF) Unit Root Test

Variables	ADF statistics	Level CV	ADF Statistics 1st difference	1st difference CV	Order of Integration
SSW			-4.851351	-2.957110	I (1)
EHE			-6.622555	-2.957110	I (1)
GDPG	-3.735593	-2.953021			I (0)
DHE			-8.266643	-2.960411	I (1)

Source: Author's Computation 2025

The unit root or stationarity test results indicate that only GDPG among the variables have computed ADF statistic values higher than the 5% critical values in absolute terms at level, as shown in table 1. This suggests no presence of unit root problem in the GDPG variable used as a dependent variable, which is typical of time series data. Upon taking their first differences, the other variables that are the independent variables become stationary, as their computed ADF statistic values exceed the critical values in absolute terms. Therefore, SSW, DHE, EHE are

stationary at first difference, while GDPG is stationary at level. Consequently, the appropriate analysis method is Auto regressive distributed lag model. However, due to the advantages of the ARDL model regarding sample size, the stationary of the variables at level and 1st difference necessitated the use of this model type; this model was also carried out because it is used to, examine the short-term and long-term effects of the explanatory variables on the dependent variable.

A conclusive test of null hypothesis rejection implies that the estimated model has met the first (necessary) condition of cointegration. In this scenario, the Bound test result shows the compound f-statistics of 4.843416 which is higher/greater than the upper critical Bound (4.35) at 5% level of significance. In other words, the computed f-statistics falls within the rejection region, and as such the test is conclusive on the existence of long run relationship between the variables as established by Pesaran et al (2001). Hence, we therefore reject the null hypothesis, and conclude that health expenditure has a long run relationship with economic growth.

The dynamic short-run ARDL error correction model presented reveals the relationship between GDPG, Specialist surgical workforce expenditure (SSW), External health expenditure (EHE), and Domestic health expenditure (DHE) with respect to short-run adjustments. The results indicate that past values of GDPG have a significant negative impact on the current GDPG levels. Specifically, the coefficient for the lagged GDPG term is highly significant and negative, suggesting that a decrease in the previous period's GDPG is associated with a reduction in current GDPG, which highlights the persistence of negative economic growth over time. SSW, though positive, does not appear to have a strong immediate effect on GDPG, as reflected by its relatively small coefficient. However, its positive sign implies that specialist surgical workforce expenditure has a potential to enhance GDPG in the short run, even though the immediate impact may not be substantial. EHE, on the other hand, also shows a positive influence on GDPG, which indicates that external health expenditure can contribute to short-term economic growth. However, the impact is somewhat moderate, as seen by the coefficient.

Domestic health expenditure (DHE) exhibits a positive and significant influence on GDPG, reflecting the importance of health expenditure domestically which makes for healthy workforce drive though in the short-term, economic performance. This result implies that increases health expenditures are associated with a corresponding rise in GDPG, underscoring the role of healthy population in bolstering economic growth. The trend variable is also positive and significant, indicating that, over time, there is a steady upward trend in GDPG, reflecting overall economic progress, albeit with fluctuations. Additionally, the error correction term (C) is negative, suggesting a tendency for the model to correct disequilibria in the short run. This signifies that whenever there are deviations from the long-run equilibrium, the economy adjusts back towards it.

In conclusion, short-run dynamics of the ARDL model show that domestic health expenditure play crucial roles in influencing GDPG in Nigeria. However, the effects of SSW may take longer to manifest significantly, and past GDPG performances heavily dictate the current output.

The long-run ARDL model depicts the long-term relationship between GDPG, expenditure on surgical workforce (SSW), external health expenditure (EHE), and domestic health expenditure (DHE). The error correction term (COINTEQ) is negative and significant, which reinforces the notion that any disequilibrium from the long-run relationship is corrected

over time, converging back to equilibrium. This implies that in the long run, the economy has a strong tendency to adjust back to its long-term growth trajectory whenever it experiences shocks or deviations. In terms of the individual variables, specialist surgical workforce (SSW) exhibits a positive and significant impact on GDPG. This indicates that in the long run, increases in SSW contribute to economic growth by boosting domestic workforce. This aligns with the idea that health citizens are key for the success of any economy.

Also, external health expenditure (EHE), however, does not show a statistically significant effect on GDPG in the long run. This suggests that EHE contribution to real economic growth might be less pronounced, and may be due to the uncertainty around the SSW, which tends to have a more direct and sustained impact on the productive sectors of the economy. Domestic health expenditure reveals a positive and significant long-run effect on GDPG, underlining the critical role that a healthy work force plays in the economy. The positive relationship suggests that an increase in health expenditure, through both domestic or external, significantly boosts long-term economic growth.

Finally, the constant term is negative and significant, indicating some level of underlying negative influences or structural issues within the economy that could be detracting from growth. These might reflect inefficiencies, policy constraints, or other long-term economic challenges.

The Durbin-Watson statistics of 2.094740 from the ARDL error correction model shows the absence of auto or serial correlation in the model. Furthermore, after conducting autocorrelation test using the Breusch-Godfrey Serial Correlation LM Test, the probability value of the observed R-squared of 0.2002 is above the 5% level which supports the claim of no serial or auto correlation in the overall model.

Conclusion

This research comprehensively shows analysis of the effects of health expenditure on the growth of the economy using the Autoregressive distributed lag (ARDL) from (1980-2023). First, a bound test was conducted, the results of the Bound test indicate a significant long-run relationship between health expenditure and economic growth, as evidenced by a computed F-statistic of 4.843416, which surpasses the upper critical bound of 4.35 at the 5% significance level. This result allows for the rejection of the null hypothesis, confirming the existence of a long-run relationship between the variables under study.

The dynamic short-run ARDL error correction model reveals that past GDPG has a significant negative impact on current GDPG levels, highlighting the persistence of negative economic growth over time. While specialist surgical workforce expenditure (SSW) exhibits a positive relationship with GDPG, its immediate impact is modest, suggesting that the benefits of SSW on economic growth may take time to fully materialize. External health expenditure (EHE) and Domestic health expenditure (DHE) both demonstrate positive and significant impacts on GDPG, underscoring their roles in driving short-term economic performance. The error correction term indicates that the model tends to correct disequilibria in the short run, signifying an adjustment mechanism that steers the economy back toward long-run equilibrium.

In the long run, the ARDL model indicates that SSW positively and significantly impacts GDPG, confirming its role as a catalyst for long-term economic growth through capital

accumulation, technology transfer, and job creation. Conversely, EHE does not show a significant long-term impact, possibly due to its speculative nature, which contrasts with the more sustained effects of SSW. Domestic health expenditure continues to exhibit a positive and significant long-run impact, highlighting its critical role in fostering economic growth through increased investment, improved technology, and enhanced competition. The negative and significant constant term suggests underlying structural issues that may be hindering growth, despite the positive contributions from health investment.

Given the significant positive impact of SSW on long-term economic growth, the Nigerian government should strengthen policies that attract and retain investment in health sector. This could include offering tax incentives, ensuring political stability, improving infrastructure, and creating a more business-friendly regulatory environment. By doing so, Nigeria can enhance the benefits of SSW, such as technology transfer, job training/creation, and increased productivity.

Strengthen the Regulatory Framework for External health expenditure/ investment (EHE): Although EHE has a moderate short-term impact, its long-term effects are less pronounced due to its speculative nature. To maximize the benefits of EHE, the government should implement better regulations that promote investment in the health sector while mitigating the risks associated with ineffective and efficient workforce. This could involve implementing measures to ensure able workforce, improve investment, and protect health experts.

Address Structural Issues in the Economy: The negative and significant constant term in the long-run model indicates underlying structural challenges. To address these issues, the government should prioritize policies that enhance economic diversification, improve governance, and reduce corruption in all sectors. Structural reforms in key sectors such as education, healthcare, and transportation are essential to create an enabling environment for sustainable growth.

Implement Macroeconomic Stability Measures: The persistence of negative GDP growth over time suggests a need for stronger macroeconomic management. The government should focus on policies that improves the quality of workforce, manage the investments in the health sector, and public debt towards achieving overall economic benefit. A stable investment in the health sector will not only foster better workforce but also ensure that the benefits of SSW, EHE, and DHE are fully realized in the long term.

Further studies could focus on examining the impacts of SSW and EHE on the performance of the service sector in the Nigerian economy. This would provide deeper insights into which sectors benefit the most from health sector investments and how policies can be tailored to maximize economic benefits. Future research should explore the long-term effects of specific domestic policies, such as tax reforms, regulatory changes, or trade agreements, on health investments and services. Such studies would help policymakers understand the effectiveness of different policy measures and guide them in making informed decisions to sustain economic growth.

Conclusively, health investment offers significant opportunities for Nigeria to enhance its economic growth, but the extent to which these opportunities are realized depends largely on the country's ability to implement effective policies and reforms. By creating a conducive environment for foreign investments in the health sector, while simultaneously addressing

structural weaknesses, Nigeria can better harness the benefits of health sector to achieve sustainable and inclusive economic growth. This study contributes to the existing literature by providing empirical insights into the specific dynamics of SSW investment, EHE, and DHE in the Nigerian context, offering valuable guidance for policymakers and future researchers as well.

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