

GOVERNMENT HEALTH EXPENDITURE, HUMAN CAPITAL DEVELOPMENT, AND
ECONOMIC GROWTH IN NIGERIA

BY

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DEPARTMENT OF ECONOMICS

FACULTY OF SOCIAL SCIENCES

UNIVERSITY OF BENIN

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BEING A THESIS SUBMITTED TO THE DEPARTMENT OF ECONOMICS, FACULTY OF
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CERTIFICATION

We, the undersigned, certify that this research work is adequate in scope and content for the partial fulfillment of the requirement for the award of a Master of Science (M.Sc.) degree in Economics, in the Department of Economics, Faculty of Social Sciences, University of Benin, Benin City.

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DEDICATION

This research work is dedicated to God Almighty for His goodness, mercy and protection upon my life, may His name be forever glorified.

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My gratitude goes to God Almighty, for his grace, mercy and compassion, and for making this

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ABSTRACT

The relationship between government health expenditure, human capital development and economic growth in Nigeria was explored in this study and the period of study was from 1981 to 2023. To find out the impact of government health spending on economic growth, to know its impact on human capital development and to analyse the role of human capital development in economic growth. The data are of annual time-series data that were sourced from Central Bank of Nigeria Statistical Bulletin, the National Bureau of Statistics and also from World Development Indicators. Economic growth was proxied by real per capita GDP, while government spending on health and education was proxying government health expenditure and human capital development, respectively. The study was conducted using descriptive statistics, Augmented Dickey-Fuller (ADF) unit root test, Johansen cointegration test and Vector Error Correction Model (VECM). The dynamic relationships among the variables were also examined through the forecast error variance decomposition and impulse-response analysis. The first difference of the variables was found to be stationary by the unit-root test and the cointegration result verified the existence of long-run relationship between the variables. Estimated results showed that government health spending negatively and significantly affected economic growth. It also had a major adverse influence on human capital development. The ability of human capital development, however, had a positive and significant impact on economic growth. The error-correction coefficient found that about 6 per cent of the deviation from the long-run equilibrium was corrected every year. The results indicate that – if there is a poor allocation of public funds, poor monitoring and poor efficiency in the use of the funds – the result of an increased health expenditure may not be the desired economic and human-capital outcomes. The study, therefore, found that the provision of support to improve funding needs to be coupled with an improvement in health and education service provision and delivery. It suggested ramp up and continued investment in health and education, tighter budgetary control, better primary healthcare facilities, better accountability in public spending and greater access to good quality social services.

CHAPTER ONE

INTRODUCTION

1.1 Preamble

Health is nowadays regarded as one of the most significant bases of human welfare and national development. Health is not just about the quality of life for individuals, but also has a significant impact on a country's working population and the performance of the economic activity. As for economic analysis, health is considered as an integral part of human capital along with other factors such as education, skills and experience. A healthy population has more energy, is mentally alert, and able to participate in productive activities for extended periods of time (Grossman, 1972).

Consequently, investment in health, especially government health expenditure, is now considered a key policy instrument to foster human capital development and ensure economic growth (WHO, 2001).

Human capital is recognized as an important factor in the growth process, both theoretically and empirically, in the literature of economics. Early classical and neoclassical growth models concentrated mainly on the accumulated amount of physical capital and labour as determinants of growth. But these models could not fully account for the differences in income and its growth rates over time among countries. This restriction led to human capital theory and endogenous growth models in which investments in human capital—education and health—play a crucial role in economic growth (Lucas, 1988; Romer, 1990). In this context, health is not only a social product, but also a productive asset, which increases labour efficiency and the economy's functioning.

The theoretical connection between health and productivity is well described by a health capital model developed by Grossman (1972) that views health as a capital asset that individuals build up and sustain over time. This model assumes that healthier people have more productive working hours, fewer days absent due to illness, and are more actively involved in the labor market and other non-market activities. At the macroeconomic level, better health outcomes lead to increased labor productivity, labor force participation and the return on investment in physical capital or education (Weil, 2014). These results are all contributing to economic growth and development.

Government spending on health is especially important in Nigeria, particularly with its large population, the continuing health problems and the desire for long-term economic development. Even though Nigeria is one of the largest economies in Africa, the health indicators in the country remain low, with high infant and maternal mortality rates and short life expectancy. These health problems are important to the human capital development and economic productivity. However,

recent evaluations suggest that Nigeria's health spending has grown in nominal terms over time, but has not grown to the extent of what is required by the population or by international standards (World Bank, 2020).

Health investment has more indirect effects on human capital development and economic growth, besides effecting productivity. Children who are healthy are better able to attend school regularly, to focus their attention in the classroom and to perform better in learning. This improves the quality of teaching and learning and increase the pool of future human capital. In the same way, better health outcomes lead to demographic shifts – reduced mortality and fertility rates – that can produce a favourable age structure with a possible demographic dividend. With proper economic and labour market policies, this demographic shift can have a significant impact on economic growth (Bloom, Canning, & Fink, 2011).

Although there is robust theoretical and empirical evidence supporting health investment in developing countries, they still under invest in the health sector. The volume and effectiveness of public health spending is often constrained by the limited capacity of public institutions, governance issues, competing priorities of spending, and fiscal constraints. The impacts of inadequate health investment are clearly seen in suboptimal health outcomes, reduced labour productivity, continued poverty and sluggish economic growth. The World Health Organization (2010) stresses that the government's investment in health is not only a social duty, it is a strategic investment that is needed for inclusive and sustainable development.

Nigeria is a significant context for the discussion of the link between government health spending, human investment and economic development. Nigeria is Africa's most populous nation and is among the largest economies in the continent, amassing huge human and natural resources. The country, however, is still faced with a number of health issues which continue to affect human

capital formation and performance. There are still low performances in key health indicators like life expectancy, infant mortality and maternal mortality rates when compared to the world and region averages (United Nations Development Programme [UNDP], 2022). Communicable diseases are also widespread, and the burden of non-communicable diseases is increasing, placing additional stresses on the health-care system and on the productivity of the working population.

The government's health spending has been insufficient, in terms of population size and international standards, in Nigeria in general. Over the years, public expenditure on health has been low compared to the amount of public expenditure or gross domestic product (GDP) and is often below international commitments like the Abuja Declaration (15 percent public expenditure to health). This chronic inadequate funding has led to poor infrastructure, insufficient medical equipment, shortage of skilled health workers and poor access to quality healthcare services especially in rural and underserved areas (Adewole & Osungbade, 2016).

Furthermore, macroeconomic conditions and fiscal pressures affect the sustainability of government health expenditure and its potential effect on growth. Nigeria's reliance on commodity price fluctuations, limited revenue options, inflation, and debt-service requirements creates health and economic risks that can impact budgetary space and the regularity of financing for health care (International Monetary Fund [IMF] 2023). The regional and global assessments of development are also clear that increased investment in social sectors, particularly health, can help drive inclusive growth if coupled with good public financial management and efficient delivery of services (African Development Bank, 2023).

Nigeria's health outcomes have direct impacts on labour productivity and economic performance. Ill health lowers the availability of labor through absenteeism, affecting its physical and mental capabilities, and by reducing its working life expectancy. They are more felt in the labor-intensive

sectors like agriculture, manufacturing, and informal services where a significant percentage of the Nigerian workforce are employed. This, in turn, leads to lower productivity growth and inadequate capacity to undertake structural transformation (Bloom, Canning & Sevilla, 2004).

Nigeria's economic growth has been marked by periodic shocks, mainly due to the volatility of oil prices, macroeconomic instability and structural weaknesses. There have been bouts of economic expansion but these have not been paralleled by gains in human development indicators, especially health. This disconnection has created some important questions around how and why government spending works to generate inclusive growth. It also underscores the need to consider if the level and use of government expenditure on health has been adequate and appropriate to foster human capital development and sustainable growth.

Policy-wise, the linkage between government's health spending, human capital formation and economic growth is important. With intensified fiscal pressures, growing debts and competing development demands in Nigeria, policy-makers need to arrive at informed decisions on resource allocation. Assessing the impact of PH spending on human capital and economic performance can provide useful information to guide financing of the health sector, improve the efficiency of its spending, and develop complementary policies which maximize the growth-enhancing impact of health investment.

In view of the foregoing, this research work investigates the relationship between Government expenditure on health, Human capital formation and Economic growth in Nigeria. The study's focus on Nigeria will help to yield evidence-based insights into the effects of public health spending on human capital outcomes and total economic performance in this setting. This information can be vital to informing policy changes to enhance the health system, bolster human capital development, and foster sustainable and inclusive economic development in Nigeria.

1.2 Statement of the Research Problem

Health has been identified as one of the most important factors in human capital, and a key determinant of economic growth, yet Nigeria still has poor health outcomes, and moderately weak and unstable economic performance. Despite the continuous growth of the population and increasing health needs, government health spending in Nigeria has remained relatively low over the years, ranging between 0.45 %–1.2 % of GDP and standing at 0.62 % of GDP in 2022, which places Nigeria below the international levels of 4–5 % of GDP for universal health coverage. This sustained underinvestment has led to low health infrastructure, insufficient health cadre and limited access to quality health services, and high use of out-of-pocket health expenditures by households. The problems are a serious concern to the capacity of the health sector to effectively contribute to human capital development and sustainable economic growth in Nigeria.

Despite several health related policies and reform introduced by successive governments in Nigeria, the country's health indicators have been marginally improved, including life expectancy, maternal mortality rate, and infant mortality rate. Although Nigeria's policies have been active for many years, average life expectancy is still approximately 55.7 years, which is rather low globally (WHO/AFRO). The maternal mortality rate has remained as high as 993 maternal deaths per 100,000 live births in 2023, a slight decrease from levels of 1,000+ deaths in previous years, and one of the highest in the world. Progress has been slow and limited in reducing child deaths, with 52.6 infant deaths per 1,000 live births in 2025, and under-five mortality about 110 per 1,000 live births. Meanwhile, the nation has been facing a challenge in converting economic upswings and turns into tangible gains in human development. This difference implies that public expenditure on health is likely to be under-proportional, underutilized, and/or misallocated and thus has restricted capacity to affect human capital accumulation and economic growth.

The empirical literature exploring the links between human capital accumulation and economic growth, or government health expenditure and economic growth, has yielded mixed findings, especially for developing countries. Although some studies (e.g., Yang et al. (2020), Dritsaki et al. (2025)) have documented positive correlations between health spending and economic performance, others (e.g., Abere & Elamah (2025)) have reported weak or insignificant correlation, which have been explained as a result of institutional weaknesses, governance challenges and inefficiencies in the management of public expenditure. In the Nigerian situation, there is no agreement on how far the government health expenditure has been able to push human capital development and economic growth.

The major research problem, thus, is the lack of empirical knowledge that exists on the effects of government health expenditure on human capital development and economic growth in Nigeria. In particular, the relationship between higher public health funding and better human capital outcomes and economic performance remains unclear, as well as the potential role of structural and institutional obstacles in limiting the impact of public funding on health outcomes. This is very important to inform the policy decision for evidence, to improve financing of the health sector and to ensure that the health expenditure is invested in human capital development and sustainable economic growth in Nigeria.

1.3 Research Questions

The research aims to answer certain relevant questions such as:

What does the government spending on health care mean to the economy in Nigeria?

2. What are the implications of government expenditure on health on the development of human capital in Nigeria?

3. How does human capital development affect Nigeria's economic growth?

1.4 Objectives of the Study

The general aim of the research is to examine the linkage between government health spending, human capital formation and economic growth of Nigeria. The specific objectives are that they will:

Analyze the effect of government spending on health on economic growth in Nigeria.

2. Study the effect of government spending on health on human capital development in Nigeria.

Evaluate the role of Nigeria's human capital development on economic growth.

1.5 Research Hypothesis

Government health expenditure has no significant effect on the economic growth of Nigeria.

2. Government spending on health does not make a significant difference in human capital development in Nigeria.

3. Human capital development does not have significant impact on economic growth in Nigeria.

The purpose of this study is to explore the significance of the study.

It is important that the findings of this study give empirical evidence to establish whether the government health expenditure has been meaningfully contributing to human capital development in Nigeria. The economic rationale for public spending on health is that it maximises productivity and growth outcomes whereas the welfare rationale is more commonly argued. This study may

help to explain if investments in health have led to improved human capital outcomes, including population health and labour productivity, or if structural and institutional barriers have hampered their impact. The knowledge gained from such insight can have useful implications for the allocation of future public funds, particularly with a high fiscal space constraint and growing budgetary pressures.

The study is also important in the context of strategy of economic growth policy in Nigeria. Growth remains one of the main goals of policy, but growth performance has been erratic and sometimes unrelated to the improvements in human development and living standards. The study explores the linkages between the level of government health spending, human capital formation and economic growth, thus identifying health investment as a potential factor for inclusive and sustainable growth. This relationship needs to be understood to reverse the policy paradigm from short-term growth to long-term investments in people, to ensure economic development in a sustainable way.

Furthermore, the study is significant as it provides some insights into the indirect effect of human capital development in the health-growth relationship. Health expenditure has indirect productivity effects, but it also has indirect effects on economic growth in the medium run because of the impact on the quality of human capital. This linkage is highlighted in this study, which helps to explain the full range of ways in which public health expenditure impacts economic performance. This is especially true for Nigeria, where weak health status persists and hinders educational attainment, labor market participation and the efficiency of the workforce.

A further importance of this study is that it may contribute to the better efficiency and accountability of the public sector. The public health expenditure is a significant portion of government investments and measuring the effect it has on human capital and economic development gives public health a foundation for determining whether these funds are being well

spent. The study will also help to identify health sector inefficiencies, misallocations or governance problems if it concludes that health expenditure has only a small effect on development outcomes. These can be used to inform calls for reform for more effective use of expenditure, institution building and service delivery.

The study is also important in tackling the issue of inequality and poverty in Nigeria, which is a perennial problem. Low-income families suffer from bad health, which affects their productive capacity and income earning potential, and limits their capacity to invest in education. The study emphasizes the need for the government to intervene in protecting vulnerable groups and ensuring equitable access to healthcare services, through the lens of examining the role of government health expenditure. Better health outcomes can ease the economic burden of disease on households, increase labor productivity and help to reduce poverty. Overall, the study highlights the social and economic impacts of investing in health.

The study is a significant addition in the literature related to the linkage between health spending, human capital formation and economic growth especially in developing countries. There are many studies that have investigated this relationship in general but no consistent empirical evidence was found, and little evidence was found for Nigeria specifically. The study is centered on Nigeria, a country that is uniquely institutional, demographically and economically different from the rest of Sub Saharan Africa, thereby contributing to the knowledge on the health–growth nexus in the region and offering an analysis of the study in the context of Nigeria's unique conditions. This contribution will be helpful to researchers interested in the impact of health investment on development outcomes in LICs.

1.7 Scope of the study

The research investigates the interlinkages between government health expenditure, human capital development and economic growth in Nigeria within the time span of 1981 to 2023, which is forty-one years.

The study will basically involve secondary data obtained from various data sources including but not limited to the Central Bank of Nigeria Statistical Bulletin, National Bureau of Statistics and World Development Indicators.

The variables that will be considered key will be government health expenditure, human capital development and economic growth in Nigeria.

1.8 Organisation of the Study

This study has five chapters. The first chapter is the introductory chapter while Chapter two is literature review; both theoretical and empirical literature relevant to the topic is covered. In chapter three, we present the theoretical framework, methodology and model specification. The results of the empirical analysis were illustrated in Chapter four which explains the relationship between the variables; findings from the study were presented in Chapter five; and the conclusion and policy recommendations were presented in Chapter five.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter has a literature review. It comprises the conceptual literature review. The Theoretical literature review, the Empirical literature review and finally the Gaps of the literature reviewed.

2.1 Conceptual Literature Review

2.1.1 Health

Health is an integral aspect of human development and influences the performance of people and countries in their work and in their productive lives. The World Health Organization(2022) defines Health as the state of physical, mental and social wellbeing and the absence of disease or infirmity. Here, health is defined as having a sound body, mind and social life, not just as absence of disease and disability. This is a very general definition that considers health to be more than a lack of disease, a state of mental health, emotional stability and social function.

Misselbrook (2014) defines Health as the subjective perception of well-being, meaning and flourishing within one's life context. According to him, the concept of health can only be evaluated in the first-person perspective, in line with phenomenological and existential philosophy.

Shilton et al. (2011) stated that health is the ability to achieve aspirations, meet needs and change or cope with the environment; health is a means of living, not the end of living.

The Lancet Commission on Global Health (Frenk et al., 2010) defined health as "an intrinsic human capability and a key determinant of human development, freedom from illness and the ability to realise one's potential. This definition links health to bigger concepts of human development by incorporating biomedical concepts in relation to the concepts of improving people's lives.

For Nordenfelt (2007) health is an "ability to achieve the essential objectives under normal or acceptable conditions. This action-theoretic definition emphasizes the relationship between health and individual's capacity to achieve personal goals in their context.

Health can be described as having three aspects: Physical health. Mental Health and Social Health. The World Health Organization (WHO, 2022) defines Physical health as being free from disease or infirmity and functioning as a healthy body. It is the capability of the human body to work efficiently and adapt to physical stress (Breslow, 2021).

Mental health is being able to manage the demands of daily living; to think, feel, and act in ways that help you function in your life and work; to learn, grow, and develop; and to contribute to your community and society (WHO, 2022). Mental health is a state of internal equilibrium that allows a person to make the best of his or her abilities in accordance with the universal values of society. This encompasses such cognitive and social competencies as being able to recognize and regulate emotions and to adapt to negative life circumstances (Galderisi et al., 2015).

Social health is a state of complete social well-being, and not merely the absence of social isolation or infirmity (WHO, 2022). It is the capacity and autonomy to perform one's roles in society (e.g. student, worker, parent, and citizen) and feel a part of and supported by a social network (Larso, 2010).

2.1.2 Government Health Expenditure

Government health expenditure is the money used by government to provide health services. It includes costs relating to operation, management and improvement of the care provided, with the objective to promote the health of the population. It covers spending on providing health services, prevention programs, facilities and equipment, staff, regulatory systems, and routine administration. These public sector decisions contribute to the availability, accessibility and quality of health services, particularly in developing settings where for-profit health systems are driven by profit and may not provide equitable services to all.

Public health expenditure includes the proportion of revenues from domestic general government sources that are spent on health, which reflects the domestic government funding of current health expenditure. Domestic general government sources include government internal transfers and grants, government transfers and subsidies to voluntary schemes, as well as social health insurance contributions (WHO, 2023).

Tandon and Cashin (2010) define government health expenditure as "the financial resources collected and directed by the public sector to ensure the provision of preventive, curative, rehabilitative, and palliative care, as well as health system strengthening activities.

According to Xu et al. (2010), government health expenditure refers to "the expenditure of governments at all levels on health goods and services, capital formation in health facilities and transfers to other entities for health purpose. It highlights the capital and running costs of health expenditure and resource transfers between government departments.

Government Health Expenditure is the portion of Government (central and local) recurrent and capital spending, external borrowings and grants (including donations from international agencies, and nongovernmental organisations) and social (or compulsory) health insurance funds as a proportion of total health expenditure or GDP (World Bank, 2018).

Government health expenditure comprises Recurrent and Capital health expenditure. Recurrent health expenditure describes the routine, day-to-day expenditure of a health system within a fiscal year, including staff salaries, medicine, maintenance and other recurrent costs. These are non-investment costs that are necessary to maintain the services that are needed every day, such as preventive, vaccination and curative services (World Bank, 2018). While Capital health expenditure covers a broad range of investments from construction projects (that is, hospitals and healthcare facilities), equipment (e.g. medical and ICT equipment) to intellectual property (OECD, 2018).

2.1.3 Human Capital Development

The concept of human capital refers to the abilities and skills of human resources of a country, while human capital development refers to the process of acquiring and increasing the number of persons who have the skills, education and experience that are critical for economic growth and development of a country's economy (Okojie, 2005).

Hanushek and Woessmann (2015) define human capital development as "the development of the quality and quantity of the labor force via education, training, health services, and social programs to improve cognitive and physical capacities.

According to Acemoglu and Autor (2011), human capital development is "the investment in education and health systems and attributes that increases the productivity of the labor force and social mobility of individuals. This definition separates out various kinds of skills and their role in the labor market from one another.

Human capital development is a continuous process of acquiring and maintaining knowledge, skills, competencies and health throughout life for people to engage fully in society and adapt to the labour market in a successful way (European Skills Agenda 2022). Human capital development can be measured by Human Capital Index and Human Development Index.

The Human Capital Index (HCI) is an annual measurement prepared by the World Bank. It assesses how well countries are doing at harnessing their citizens' economic and professional potential, or human capital. Human Development Index (HDI) is a statistical composite index of life expectancy, education (mean years of schooling completed and expected years of schooling upon entering the education system), and per capita income indicators that is used to classify countries into four human development tiers. A country with a higher HDI has a higher life expectancy, a higher education level and a higher GNI (PPP) per capita (Wikipedia, 2026).

2.1.4 Economic Growth

Economic growth is the continued rise in an economy's output of goods and services over time. It is usually measured by increases in real GDP or real GNI, which adjust for inflation. It is a key goal of macroeconomic policy and development planning because it is closely linked to higher living standards, more jobs, higher incomes, and greater national wealth. Economic growth can

raise a country's ability to fund infrastructure, deliver public services, lower poverty, and improve overall living standards (Todaro & Smith, 2015).

Economic growth is the sustained increase in real GDP per capita resulting from improvements in human capital, physical capital, and technology, with human capital now being the single biggest driver in the 21st century (World Bank, 2018).

According to Stephanie Kelton (2022), Economic growth is the sustained increase in real output made possible by utilizing a country's full productive capacity, including idle labor and resources, without necessarily causing inflation.

Wikipedia defines economic growth as an increase in the quantity and quality of the economic goods and services that a society produces. It can be measured as the increase in the inflation-adjusted output of an economy in a given year or over a period of time.

The most common measure of economic growth is real GDP. This is the total value of all goods and services produced in an economy, with that value adjusted to remove the effects of inflation. There are three different methods for looking at real GDP (Investopedia, 2026).

2.2 Theoretical Review

2.2.2 Grossman's Model of Demand for Health

One of the most influential theories on the demand for health is the Grossman model of demand for health, developed by economist Michael Grossman in 1972. It offers a model to comprehend the decision making process of individuals and the fact that health is seen as a consumption good as well as an investment good. Grossman's theory provides the economic backdrop for understanding the behavior of the individual and society with respect to health investment, health

service use, and health outcomes; hence, it is of special interest to studies of government health expenditure, human capital formation and economic growth.

Health is a consumption good since it is a means of achieving utility for the person consuming it. Healthier days lead to better well-being and comfort, and a greater ability to participate in and enjoy life. Health is an important asset to people not only for its role in enabling them to engage in their work and to earn a living, but also for its role in making them more satisfied with life overall. Health is also valuable as an investment as it increases an individual's working capacity. The healthier an individual is, the less likely they are to take time off, be more energetic while at work, and remain employed longer. In this context, health spending is looked upon as an investment in the same way as other investments such as education or assets (Cai, 2016).

Individuals need to decide how much of their time and resources to devote to health and how much to use for other products and services. The time a person can spend on health is a determinant of health outcomes, as is the access they have to health goods and services, like health care, education, income and daily life choices. A higher level of education may be correlated with people's ability to manage their health more efficiently, as they are able to access health information more readily and select health choices that would benefit their health (Grossman, 1972). This reinforces the argument for Government spending on health and education, as investment in health usually contributes to investment in education, and vice versa; both are factors in the development of human capital.

While the Grossman model was developed to account for the decision by individuals to allocate their health resources, it can be used more generally in macroeconomics and public policy. The national government, being a decision-making body, contributes to health in a number of ways: providing public health facilities; investing in infrastructure; investing in health-related policies.

The theory is that this type of investment is not social in nature, it can also be a catalyst for economic development because as people get healthier they are more productive in the long term (Weil, 2007).

Grossman's model is well suited and is a useful tool in Nigeria for interpreting the problems under consideration. Despite the critical situation in Nigeria, there was a high burden of disease, regular outbreaks of infectious diseases and maternal and child deaths, but weak health services delivery (World Bank, 2020). Access to good medical care is denied to many households because of the high cost of medicine, or because local health care providers and facilities are lacking. This has therefore created a health burden for millions of Nigerians that can be averted or optimised, limiting productivity and life expectancy. The government expenditures on health can be viewed as a public investment to increase the health capital of the population.

If public health policy in Nigeria is analysed through Grossman's theory, then it can be deduced that the more Nigeria invests in health then the more it will build up human capital. The lower disease burden is hypothesized to have a positive association with improved labor market outcomes and increased earning potential. At the macro-level, improving overall health of the population can increase economic production, reduce poverty and contribute to economic growth in the long-term (Bloom et al., 2004).

If investments in health are as intended and distributed fairly, then the outcomes that are predicted by the Grossman model will occur. Public health spending in Nigeria is not very effective in reaching a large proportion of the population, is not well monitored and accounted for, and is not well managed (Chukwu et al, 2018). It assumes a rational human response to actions and efficient use of resources, but in a real world with weak institutions, returns to such actions may be constrained. For example, inequities in access to health services and the quality of health services

between urban and rural areas lead to unequal health outcomes affecting the productivity of the nations (Uzochukwu et al, 2015).

In the Grossman model, opportunity cost is an important consideration when choosing to invest in health. When services are preventive or treatment, these are often foregone in low income and resource limited settings such as Nigeria, either due to inability to afford absences from work or transport to health facilities. The government should reduce these opportunity costs by increasing geographic accessibility of health services, particularly in less-served areas, by improving primary health care, and through subsidies.

Grossman's health demand model relates health, schooling, and earnings, and considers them as related components of human capital. Research in Nigeria and elsewhere in the developing world indicates that healthier households have better attendance rates and improved learning outcomes for children, and that healthy adults are more likely to be and remain employed and productive. (Glewwe & Miguel, 2008) This puts health expenditure within the government in a multi-generational perspective: money invested in health now will benefit the population through social and economic returns in the future, in part through the benefits of improved educational outcomes and future labour market outcomes.

Using the Grossman model to study the value of health spending, even with the restrictions of assuming people make only fully rational choices with respect to their own health investments, and pay primary attention to individual choices, is still a useful exercise. It is an explanation of how health spending can be seen as an investment, rather than a cost, for the government and how it can be beneficial to national productivity and long-term development.

Overall, Grossman's Model of Demand for Health provides a good economic theory of why people invest in health. This theory is relevant in Nigeria, where low productivity and economic growth are caused by illness, highlighting the need for increased and consistent government investments in health. Such investments, if well directed, have a direct impact on human capital development and the establishment of long-term economic growth and reduced poverty.

2.2.2 Health-Led Growth Hypothesis

The Health-Led Growth Hypothesis (HLGH) is a theory about health and economic growth, positing that there is a causal relationship between the two. Here, increased health is translated into economic development, and at times, economic development is translated into enhanced health. The hypothesis is that the benefits of better health are not only a result of better economic development but could also accelerate that process by increasing workforce productivity, reducing absenteeism, extending working lives, and improving cognitive functioning throughout the life cycle (Bloom & Canning, 2000). The HLGH does not view health outcomes as a consequence of development, but rather health as a starting asset in the production process, which influences economic performance.

The health-led growth hypothesis states that the health of population is a component of human capital and that it also plays a role in the efficiency of an economy to produce goods and services. As in education, public health is a key component in ensuring that there is a productive workforce. Remember that when people are healthy, they're more energetic, pay better attention and are more likely to come to work. Those factors contribute to greater productivity per worker and to sustained economic expansion. Research in both rich and poor nations has shown that, improved health includes increased life expectancy, increased child survival rates, better control of disease and other factors, and so do economic growth rates (Barro, 1996; Bhargava et al, 2001).

The case of Nigeria, a developing country where most citizens live with poor health outcomes, provides a theoretical rationale for the need to mobilize public investment in the health sector based on the HLGH framework. Malaria remains a huge problem in Nigeria, maternal mortality remains high and access to safe water and sanitation is limited, and a health care system that is not always able to provide basic services. These health burdens decrease the labour force available for most sectors and decrease total factor productivity. But even a modest improvement in the average health of a nation can, over time, translate into significant gains in national income, says Weil (2007).

The Government's health spending ought to be rethought as an investment in improving health, boosting productivity and contributing to long-term economic growth, rather than simply a social cost. Government investments in nutrition, disease prevention, infrastructure and health care can lead to better nutrition, improved health and increased capacity to work. Improved population health leads to more skilled and dependable labor force, which can increase overall production, make the country more attractive to foreign direct investment, and help diversify the economy into more diverse industries and activities. Better population health can result in better educational outcomes, particularly for children, which can contribute to economic growth and improve skill formation and employability (Bleakley, 2010).

The HLGH has important implications for the design of policies in low-income countries. The theory states that parallel investment (in particular human development, notably in health) is essential for long-term growth, despite GDP being a national priority. The health should be part of the economic agenda and not separate because better health means more productivity and can contribute to long-term growth. This is especially true in Nigeria, where the bulk of the population

are engaged in agriculture and informal activities, which are mostly labor-intensive and a drop in the health of any worker means a corresponding drop in productivity and income.

The success of the Health-Led Growth Hypothesis in practice will depend on the management of health expenditure, its equitable distribution and the provision of good quality services. Poor allocation or management of public health resources can lead to a failure to realize the anticipated economic benefits. The question isn't about the amount of health care expenditures, it's about the direction of those expenditures—whether they go to diseases with high economic costs, diseases where people are most vulnerable, or towards preventive health care services, which delay ill health in the first place.

Overall, the Health-Led Growth Hypothesis states that health should be seen as an integral component of economic growth policy, not an add-on social objective. This would benefit the population health in Nigeria, which is beset by economic volatility, and also increase the use of the productive capacity of the country, as a single intervention could yield two gains. Embedding health objectives in the national development agenda is aligned with national development goals for sustainable, inclusive growth and helps to make health spending a social welfare and economic development priority.

The Keynesian theory of public expenditure is discussed in 2.2.3.2.2.3 Keynesian Theory of Public Expenditure is discussed.

One of the most influential macroeconomic theories that focus on the role of the government in the economy is the Keynesian theory of public expenditure, which was developed in the 1930s during the Great Depression by the British economist John Maynard Keynes. It places special emphasis on the importance of the active use of public sector spending as a tool to boost aggregate

demand, to correct market failures, and to help ensure economic stability and growth. Keynes' theory is that inadequate demand causes unemployment and sluggish growth, and only the government can remedy this by engaging in specific spending to re-establish full employment and economic expansion (Keynes, 1936).

The Keynesian economists believe that government spending, particularly on healthcare, education and infrastructure, can help manage economy in the short run. Such public expenditures can maintain basic services, and in low-income economies or during recessions, they can lead to a multiplier effect: an increase in government spending can lead to higher income, higher consumption, and higher output and employment. This implies that public health budgeting in developing countries like Nigeria in which the health system and the labour market are structurally weak (Musgrave & Musgrave, 1989) should be regarded as a central component of the country's overall economic policy.

In health policy, Keynesian theory lends support to the notion that public spending can stimulate an economy, because the public funding of health services can stimulate overall demand and serve as a method of maintaining jobs and income during a slowdown. Investment in health services, facilities and workers generates employment in the health industry. It boosts household income in the form of wages and can stimulate demand for other goods and services in the economy. The government can enhance public health by investing in healthcare programs and provide support for the long-run productivity of workers in order to increase national output and GDP growth (Hemming, Kell, & Mahfouz, 2002).

A Keynesian perspective would argue for more spending on health care in Nigeria where many are unable to obtain decent health services, and public funding, if it was not already plentiful, would need to be enhanced in order to build up human capital and to foster general economic

development. Increased investment in primary healthcare, maternal services, immunization and health infrastructure can enhance the quality of health services and increase economic productivity through maintaining the health of the people and their ability to work. These changes can lower the economic burden associated with disease burden (DALY), disability, and premature mortality.

The Keynesian theory suggests that governments should reduce taxes and increase spending when the economy slows down and both cut taxes and spending when the economy is booming. Reducing public funding for health in a recession or in times of financial constraint can exacerbate the recession. Stable, or increased, health budgets will benefit overall economy spending, health access when needed most and reduce job losses in the health sector and related industries. In this respect, spending on health can prove to be a stabilizer, maintaining demand and minimizing the likelihood of a sharper and more extended downturn. This was evident in the current COVID-19 pandemic which has led to a worldwide health emergency, even in high-income countries, with the urgent need to expand health spending to manage the public health crisis, but to maintain the stability of the economy. This is particularly evident in the current COVID-19 pandemic, where even high-income countries were forced to raise health spending to contain the public health emergency, while simultaneously aiming to stabilize their economies. Nigeria's response demonstrated that its health sector is not adequately funded and highlights the long-term economic costs of not investing in the health sector.

In the Keynesian framework one of the important points is that an initial increase in spending can cause a bigger increase in total spending and income. The public's expenditure on a sector like health has immediate impacts on health services, and can also have indirect impacts on the economy of other sectors. Indeed, the growth of the health care system leads to higher demand for skilled labor in the construction industry, higher demand for medical equipment, and even indirect

jobs in logistics and supply chains (Elmendorf & Sheiner, 2017). Workers in healthcare industries then spend a portion of their earnings for goods and services, this could increase the demand of households.

Successful Keynesian policies (such as increased spending on public health) are based to a large extent on the efficiency of the government, its transparency in decision making and spending, and its ability to maintain public finances properly. Where money is invested, where it doesn't go, corruption can occur, and/or institutional capacity to implement the policy may be limited, which can result in less or poorer benefits than the theory anticipates. As described by Chukwu et al.(2018), inadequate budget implementation, delays in project delivery, and low coverage of expenditure on health works in Nigeria to deliver benefits of public health spending as anticipated. These conditions call for reforms that will improve funding and ensure that these funds are allocated to enhance outcomes.

The Keynesian theory of public expenditure provides a simple framework for understanding how public spending, particularly on health, can help to drive economic growth. It implies that increased government outlays on health are more than a welfare program. It can serve as a macroeconomic instrument that increases the demand in the economy, promotes employment growth and creates conditions that can contribute to increase productivity over time. In an emerging economy like Nigeria, increased public investment in health is consistent with Keynesian theories, and can be used to drive economic growth as well as to enhance health and education outcomes that affect the production of human capital.

2.2.4 Public Goods Theory

Public Goods Theory gives a basic economic explanation for the government's role in supplying some goods and services (specifically those that are non-excludable and non-rival in consumption). A public good has two characteristics, non-excludable and non-rivalrous, which mean that no one can be excluded from using it and that its use by one person does not prevent another from using it. Among the classic examples are clean air, street lighting, and national defense. Key services in the health sector, like public sanitation, disease surveillance, epidemic control, and vaccination campaigns, are public goods and thus are appropriate for public funding and coordination (Samuelson, 1954; Musgrave & Musgrave, 1989).

Prevention health services and health education can have positive externalities because the benefits of the service are not limited to the person receiving the service; they can also benefit the community as a whole. For instance, vaccination helps immunize the individual and reduce the risk of spreading the disease to others. Similarly, prevention of communicable diseases reduces the burden of disease generally on a country's health system and contributes to increased productivity of the workforce. These spillover effects suggest that the private sector is likely to produce less of these services than optimal, as individuals may make health decisions considering only their personal costs and benefits and neglecting the broader benefits to society. In the context of this, Public Goods Theory can be used as arguments for government spending for providing good health services to handle the shortcomings in the market and to provide adequate health services. In this regard, Public Goods Theory can be used as arguments to support government spending to provide health services to overcome the shortcomings of the market and health services that are essential to achieve good health.

Many individuals in developing countries, like Nigeria, are unable to access private providers for basic health services and in some regions these services do not exist or are too hard to access. The

high care costs, long travel time to health centres and extremely low insurance coverage are significant challenges to access to health care. If health services were not regarded as public goods, many consumers – particularly the poor in rural areas – would not receive sufficient care. This access disparity can impact the country's development trajectory and economic productivity (Uzochukwu et al, 2015).

One way to grasp the Public Goods Theory is to understand that hospitals, rural clinics, safe water and sanitation, and emergency response units are all public goods that ought to be funded by the state. It also advocates for public financing of health promotion programs and health education for preventing diseases and encouraging healthier lifestyles. Private providers may not profit greatly from these efforts, but they are good for the community. It would be expected that gaps in health would continue to grow, infectious diseases would not be as well controlled and losses in productivity to the economy would increase without such levels of public expenditure. (Arthur, 2017)

Public Goods Theory resonates with concepts of equity and social justice, that is, essential health services should not be dependent on an individual's income or social status. This perspective can be used to view health care as a merit good—that is, something that society should be able to provide to those who need it, regardless of their financial resources. Investment and oversight of health systems should be directed and protected by governments to ensure the public good, particularly for those who are most vulnerable (Headey, 2008).

Non-governance of certain basic health services in Nigeria has contributed to the occurrence of successive health crises such as cholera outbreaks, high mortality rates among mothers and children and poor surveillance of diseases. But the health system is not well equipped to handle the sudden health crisis and has been underfunded to prevent avoidable illness, due to chronic

underfunding of primary care and public health services. Public Goods Theory asserts that spending on health should no longer be seen merely as an expenditure but as an investment towards a healthier population and greater economic productivity for the Nigerian Government. Ensuring access to basic health services is a socially important goal, and is also economically justifiable in the context of the theory.

Overall, Public Goods Theory is a helpful approach to consider how government spending on health can contribute to equitable provision of basic and essential health services. The theory states that market forces alone are not sufficient to generate public and merit goods like health care, particularly in resource constrained countries. Public policy should be aligned with this theory to have a positive impact on the health sector in Nigeria to enhance inclusive growth, development of human capital and long-term wellbeing and economic outcomes.

2.2.5 Welfare Economic Theory

Welfare Economics Theory gives the basis for the evaluation of Government policies like health expenditure on the basis of their effect on the social welfare. It is concerned with the allocation of resources in such a way that it maximizes the well-being of society as a whole. The theory was developed and refined by early 20th century economist Arthur Pigou and is based on the premise that where market actions result in inefficiencies or inequalities of outcome that harm the collective welfare of the people, government intervention is justified (Pigou, 1920).

The theory has two fundamental concepts, efficiency (Pareto optimality) and equity (fair distribution). Economics says that efficiency is when no one can be made better off without any one else being made worse off, and equity is whether that is fair or not. These two principles can conflict in the health care sector; an efficient allocation of care to the market's insurers may be an

inefficient distribution of care to the market's needy users (Musgrave & Musgrave, 1989). It is necessary to have publicly financed health care to correct these market imperfections and ensure that basic services are provided to all, regardless of income or social status.

One of the main concepts in the field of welfare economics is the concept of externalities. A service has a positive externality if it has benefits to others in society as well as to the person who uses the service. The provision of health care services, particularly in public health (e.g., public health interventions like immunisation, sanitation and disease control can generate such benefits for other people besides those who receive primary care services directly) can generate these kinds of benefits for other people besides those who receive primary care services directly. Getting vaccinated not only helps the person who is vaccinated become less likely to get sick, but can also help to lower the risk of the infection spreading to others. Had each consumer had to pay the market price for these services, many of them would have used less of the services than is socially desirable and society would, as a whole, have suffered. One way that these external effects can be tackled is by the use of government health expenditure, which involves both cost and benefits in decision making and leads to the improvement of welfare (Cullis & West, 2000).

Many in Nigeria are unable to access basic health care services, and payments of healthcare services is largely made directly by the individual. This implies a policy to boost public expenditure on health from a welfare economics perspective. The theory holds that by providing universal health coverage, everyone has the opportunity to be healthy, and as a result, engage in more work and more economic activity. It also points out that people who are sick can pass costs to others via reduced productivity and increased public and private support requirements. Therefore, the government has a social and economic responsibility to subsidize or even offer health care services, particularly for the poor and the vulnerable (Headey, 2008).

The theory of Welfare economics connects to the concept of equity in public finance through vertical equity (i.e., those who have greater ability to pay greater, and those who have less ability pay less) and horizontal equity (i.e., similar people treated similarly). Vertical equity is the idea that those who have more means to pay more should pay more for the provision of public goods, such as a progressive tax system. Equity in horizontal equity would require that the same rule be followed by those who are in the same economic position with regard to taxes and expenditures. In health financing, this involves a transfer from higher income citizens to lower income citizens in order to finance services that are enjoyed by the latter, and can lead to a decrease in inequity and an increase in overall welfare at the national level (Arrow, 1963).

The policy implications of the theory are that, in making public decisions, societies should allocate scarce resources to programs that yield the greatest net benefit to society, and that a cost-benefit analysis should be used. One example of this is expenditures on primary health care, disease prevention, maternal-child services, and vaccinations. They provide direct health benefits as well as general social and economic benefits which are not fully captured by private markets (Drummond et al., 2015).

Welfare Economics Theory can be used to study Nigeria's public health expenditure since the national development has been impaired by the lack of long-term investment in public health, poor social protection, and disparities in access to health services across the diverse regions. The health sector is spending more than is necessary to sustain the cornerstone objective of the theory: to enhance social well-being and to reduce inequalities which constrain inclusive economic growth. With adequate financing, individuals are more likely to be healthy and able to work regularly, thereby helping to alleviate poverty and contribute to both immediate and future economic objectives.

Welfare economics advocates an active role for government in promoting health care delivery, designed to enhance efficiency and equity. This view suggests that the justification for public health expenditure is that it is a cost of addressing market failure, expanding access to care and redistributing resources to low-income groups, and therefore has to be seen less as an expenditure and more as a practical way of enhancing the national welfare. In Nigeria it is postulated that public expenditure on health issues has consequences for human capital development and for inclusive and sustainable growth.

2.2.6 Human Capital Theory

Human Capital Theory is an essential concept in development and labor economics that relates expenditure on education and health care with greater productivity of the workers, higher wages, and faster economic growth of the country. The theory was introduced by Theodore Schultz and expanded on during the 1960s by Gary Becker. It challenges the notion of labor being a one-dimensional factor of production. It holds that labour is heterogeneous in terms of skills, knowledge, abilities and health, and that these differences lead to the labourer being more economically valuable and to a differential contribution to the total economy (Becker, 1964; Schultz, 1961).

According to Human Capital Theory, health is a major component of human capital which affects the ability to learn, work and create new ideas. Workers under poor health will work less, be absent from work more frequently, and retire from work prematurely due to sickness or early death. Investing in health (including access to clinical services, prevention, and improved nutrition) is associated with increased life expectancy and function in the workforce which can result in enhanced worker productivity and economic outcomes (Strauss & Thomas, 1998). There the role

of public expenditure in health care must be seen not only as a cost of welfare but also as a cost of investment contributing to productivity improvement.

The Human Capital Theory can also be used to explain intergenerational benefits. Investing in health today can have an impact on outcomes far into the future, particularly within the context of maternal and child health. These early investments have been associated with later educational achievement and cognitive functioning and labor market outcomes. Children who are undernourished or chronically ill in early childhood, for instance, tend to have more difficulties in school and may not be as productive in adulthood (Glewwe & Miguel, 2008). This corroborates a theme that was consistently highlighted: there is a need to concentrate on the importance of investing in human capital from an early age and allocate public funds for investments in healthcare and education.

In countries like Nigeria, where many health policies are yet to be strengthened and access to a good care is still limited then, Human Capital Theory can be used to inform practical health policies. According to the World Bank (2020), the HCI is one of the lowest in the world; a child born in Nigeria today is projected to reach around 36% of their potential productivity by the age of 18. Recurrent outbreaks of disease, low immunization rates and poor maternal health services are all contributing to low labour productivity and weak economic performance, due to high infant mortality rates. The conditions highlight the compelling need for greater, more targeted and efficient public spending on health to ensure a healthier and more productive workforce.

The theory provides a good framework for understanding how development differential in Nigeria can be explained in terms of the regions. States and local government can spend more on health and education and residents are likely to be healthier and better educated, making the area more desirable to invest in and more likely to have stable economic activity. Conversely, areas without

investments in human capital may experience greater unemployment and poverty rates, as well as increased reliance on support, which can further contribute to inequality and social instability (Anyanwu, 2013).

Human Capital Theory is compatible with contemporary economic growth theories such as the Endogenous Growth Theory, which holds that the accumulation of human capital is an important source of long-run economic growth (Romer, 1990 and Lucas, 1988). The older models are based on the idea that physical capital and technology are exogenous to the problem of growth, whereas the newer models are based on the idea that human capital, particularly health and education, are endogenously determined in the economy and are used purposefully to aid long-run economic growth. In this perspective, theory calls for greater public expenditure on those activities that stimulate health and education—where long term social and economic benefits are likely to be high.

Human Capital Theory explains why a person's spending on health and education can increase his or her skills and productivity, but critics say that it does not account for the institutional and structural impediments that can restrict the impact of those investments. Poor governance, corruption, and poor health infrastructure in Nigeria can limit the impact of health spending. The theory suggests that investing in people is important, but it is most effective when combined with robust institutions and accountability to get the desired outcomes (Todaro & Smith, 2015).

In general, Human Capital Theory can be used to demonstrate the ways in which government health expenditure can improve human capital and, consequently, economic growth. It provides a solid theoretical rationale for making the case that investments in health can fuel productivity and downstream economic transformation. In Nigeria, implementing policies based on this theory will

enable it to address the persisting Nigeria development challenges by acquiring skills and opportunities for citizens to participate and contribute in the development of the nation.

2.2.7 Health Belief Model

Developed in the 1950s by social psychologists Hochbaum, Rosenstock, and Kegels in the U., the Health Belief Model (HBM) is a theory of behavior.W Public Health Service. It sought to provide an explanation and prediction of people's health behaviours through their health attitudes and beliefs (Rosenstock, 1974). The model can be used to understand decisions in prevention, engagement in treatment, and utilization of services, and how these decisions impact intervention effectiveness and costs.

According to the Health Belief Model, people make decisions about engaging in a health action based on: 1) susceptibility to a health problem, 2) severity of the problem, 3) benefits of taking the action, 4) barriers to taking the action, 5) cues to action, and 6) self-efficacy. These factors combine to determine if individuals engage in preventive behaviors such as getting vaccinated, having regular checkups, or following treatment instructions (Becker, 1974). Individuals who are most likely to use a clinic or sleep under a mosquito net are those who feel vulnerable to malaria, perceive it as threatening, think mosquito nets are effective and do not have significant obstacles, including cost, or to use them.

In public health policy, the HBM encourages the provision of governmental funds for education, campaigns and preventative services. It recognizes that access to health services is not sufficient; that people will not use them without understanding and trust in them. Effective government health spending needs to invest in behavior change strategies that promote healthful options for

individuals and communities in addition to building facilities and providing supplies (Glanz, Doorenbos, & Ewing 2008).

The HBM can be applied to answering questions about why some people may not seek or take care in Nigeria: There are many areas where factors such as the lack of access to care or misinformation or mistrust about interventions like vaccines or reproductive health programs mean that the HBM can be used to help explain the situation. Incorporation of a behavior change approach in public health programs with the goal of enhancing health and productivity. The HBM can target beliefs and barriers to guide campaigns to reduce maternal deaths or to increase TB treatment adherence more effectively.

When cues to action align with norms in the community, the model can provide support for various community interventions, such as educating rural people on the importance of health insurance and antenatal care. Improvements in health contribute to human capital and economic growth through increases in productivity.

The Health Belief Model is about the influence of psychosocial factors on health behaviour. It helps to justify public funds for health promotion and prevents and enhances the uptake by the targeted population. The HBM can be accompanied by investments in health system structures to amplify the effects of public health investment and contribute to broader development objectives.

2.2.8 Endogenous Growth Model

In the 1980s, a model—endogenous growth model (also known as new growth theory) emerged to overcome the constraints of neoclassical growth theory. Specifically, it answered the Solow-Swan model where technological change was assumed to be exogenous to the model (Solow, 1956). The endogenous growth theory suggests that the drivers of sustained economic growth are primarily

endogenous to the economy (innovation, skill acquisition, etc.). In this model, the accumulation of human capital, of innovation, of learning and of knowledge is regarded as important factors in the process of long-run economic growth (Romer, 1990; Lucas, 1988).

According to the old growth models, the decline of the returns to capital means that in the absence of technological change, productivity per worker reaches a maximum level and the economy moves towards a steady state with zero growth. Another perspective, embodied in endogenous growth models, is that some factors can produce constant or even rising returns per capita, enabling continuous per capita growth without exogenous technological advances. This implies that an economy may grow in the long term without relying on external factors, provided that it invests sufficiently in knowledge and in human capital. For that reason, policies promoting public spending on health and education are considered as important instruments for influencing long-term economic growth.

Since improved health can increase worker productivity and help drive long-run growth via human capital, government health expenditure is consistent with the key tenets of the Endogenous Growth Model. The short-term cost of health expenditure is only part of the picture, and can influence the growth trajectory of the economy in the long run, in this perspective. Sick people can be less productive, take more time off for sickness and illness, and even leave the workforce, all of which can help reduce overall productivity. Attainments of education and cognitive performance are related to good health, and this may increase the returns to formal investment in education (Barro, 1996). For this perspective, public expenditure on health is not just a social good, it's also an economic input which can yield long-term benefits and quantifiable returns in the future.

Life expectancy in Nigeria is low, as are the maternal & child mortality rates, and there is still a large burden of disease. This suggests, from the endogenous growth model, that there is a strong

need to invest in human capital, in order to improve health, as healthier people are able to learn more, work more, and contribute to sustainable economic development. Here, the theory suggests that a lack of adequate health spending can slow down economic growth as there are fewer able to work and fewer able to learn the skills and knowledge needed for innovation and growth in the long-term (World Bank, 2020). A rational way to align health spending with a growth strategy is justified based on economic evidence.

According to the endogenous growth approach, the disparities in national and regional growth rates may be a result of the investment disparities in human capital development. Such disparities in access to health and education services between regions in Nigeria will cause differential development and continued social inequalities, especially. The study urges increases and increased investments in targeted public health interventions to mitigate these gaps and contribute to more equitable and inclusive development in the future (Anyanwu, 2013).

One of the key features of the endogenous growth model is that knowledge spillovers are important. For firms or researchers that put money into learning or research in one area, some of the learning that occurs in that area permeates to other areas. This can increase productivity and growth beyond the initial project that generated the new ideas.g.For instance, childhood nutrition interventions can have impacts beyond the targeted result they are intended to achieve. Governments can realize improved school performance, reduced long-term support needs and reduced health care costs in the future with public health investments. Such spillover benefits would make government intervention and public expenditure in health more palatable, particularly in less developed and developing countries where markets alone might not generate sufficient investment in health.

While the model can underpin proactive government policy, it is dependent on good institutions, transparency, efficient government spending, and programs reaching the right target groups. Some of the problems in Nigeria, such as corruption, inadequate health facilities, and poor implementation of policy, limit the impact of public health spending on service and outcomes. Increasing expenditures needs to be accompanied by structural reforms and accountability systems (Todaro & Smith, 2015) if the benefits of the endogenous growth model are to be achieved.

Overall, the Endogenous Growth Model offers a sound foundation to make the case for public investment in health and its role in promoting economic growth in the long run. The evidence points to the potential for long term economic growth to be advanced by steady public investment in health, which, if properly managed, can help to enhance human capital and productivity. In Nigeria, this model suggests that enhancing health outcomes is not just a moral and social imperative, but also a fundamental economic strategy that contributes to inclusive and sustainable development.

2.2.9 Sustainable Development Theory

Sustainable Development Theory is an explanation of how growth, inclusion and environment are interrelated over time. Sustainable development is defined in the Brundtland Commission Report of 1987 as development that ‘satisfies the needs of the present without compromising the ability of the future generations to satisfy their own needs’ (World Commission on Environment and Development, 1987). In time the theory expanded to include objectives such as poverty reduction, decent living standards, environmental protection, and access to basic services (education and health care).

We need to recognize that government expenditures on health are investments in human capital that bring better long term development outcomes, as Sustainable Development Theory does. Health is at the heart of sustainable development, influencing and being reflected in education, productivity, gender equality and economic growth. WHO (2020) states that improved health is essential to sustainable development by prolonging the lifespan, minimising disease and enabling the marginalised population to participate in the economy.

The theory has an impact on the design of policy by linking health expenditure to broader development strategies. The UN SDGs particularly Goal 3 on health and well-being, call for health expenditure to mitigate inequalities and prevent intergenerational transmission of poverty and stop it from getting worse. Healthcare is a social right and public good, needing state action for fair, lasting access (Sachs, 2015).

Sustainable Development Theory backs targeted and sustained public health investment in countries such as Nigeria where quality health care delivery is uneven, as a result of cost and inadequate infrastructure. If growth excludes people or ignores public health, it will not endure because disease can disrupt growth, increase mortality, and impact the productivity of workers (Akpan & Moffat, 2013). Economic change is essential for sustainable development, and it must come hand-in-hand with greater human capital, and health at its heart.

The principle of intergenerational equity is emphasized, which means that development today should not adversely affect future generations. Public health spending has the potential to produce significant savings in maternal and child health, reproductive services, and preventive care. Empirical studies show that investments in maternal and child health have positive welfare effects today and have positive effects on schooling and labor outcomes later in life (Bleakley, 2010).

Economics, Sustainable Development Theory: not just GDP but the sense of development is polyvalent and health is part of the process and a product of development. It condemns growth models that cause environmental harm, inequality and poor health as the price of economic growth. According to the theory, robust health systems are key to sustaining and building resilient economies in developing countries (United Nations, 2021).

Nigeria experiences faster population growth than health system capacity, and this is compromising human development. Sustainable Development Theory requires planning over a long period of time, responsible public expenditure and health interventions that take equity as the goal. Treatment, health promotion and rehabilitation, and prevention should all be included in the budget for public health, with special attention paid to underserved communities and disadvantaged groups. This requires a redesign of health budgets based on sustainability objectives, focusing on multi-sectoral results, and not on short-term political gains.

The theory emphasizes collaboration and cooperation between partners and countries, and Nigeria is encouraged to rely on partnerships with development agencies, private sector and civil society groups to finance and build a health system that meets the needs of the public. The critical element to sustainable development is governance that ensures health spending is transparent, focused on need, and has a positive impact today and into the future.

The Sustainable Development Theory offers a strong foundation for analysis of the contribution government health expenditure makes towards human capital development and inclusive economic development. It claims that public health is the key to national sustainability and should be a fundamental component of larger national development plans for fairness and resiliency. Incorporating health spending into the framework of sustainable development can enhance welfare and economic performance in Nigeria to achieve its growth targets.

2.3 Empirical Literature Review

Empirical research on the relationship between government health expenditure, human capital and economic growth in recent times has emphasised that public investment in health is a determinant of productivity, worker efficiency and long-term economic growth, particularly in developing countries such as Nigeria. Empirical work is broadly consistent that health expenditure in its own right can have a positive direct and indirect impact on economic growth as enhanced health also leads to better human capital. Results are dependent on methods of analysis, the extent of data available, and the effectiveness of public expenditure.

The initial study by Adenikinju and Adereti (2012) investigated the link between investment in human capital and economic growth in Nigeria for annual time-series data from 1980 to 2010. Johansen cointegration analysis was conducted to determine if the variables were moving together in the long-run and Granger causality tests were conducted to determine the direction of causality over time. Government spending on health and education was used to measure human capital for this study, while real GDP was used to measure economic growth. The results imply an enduring long run relationship between health spending and economic growth and both tests point to causality going in both directions. The findings indicate that government expenditures on health and healthcare services have a positive impact on the economic growth and with the growth of the economy, public spending on health would be expanded, which is a reinforcing effect.

Olorunfemi and Adebayo (2013) examined the relationship between government health expenditure and human capital development in Nigeria with the aid of ordinary least squares regression method. This study was based on the data over a 10-year period (1990-2010). Life expectancy at birth and the infant mortality rate were used as indicators of human capital development. The findings indicate positive associations between government health spending and

life expectancy and government health spending and reduced infant mortality; and that the relationships are not likely to be random. According to the authors, an increase in government expenditure on public health leads to better health. A healthy workplace can, in turn, allow the workers to work more and work longer, contributing to the long-term economic growth.

This study by Ismaila and Oladipo (2014) employs error correction model (ECM) methodology to investigate the relationship between government spending on health and economic growth in Nigeria. The study took time-series data spanning 1981-2011, tested stationarity using the Augmented Dickey-Fuller test and estimated long-term and short-term relationships. The empirical results indicate that the long-term effect of increasing government expenditure on health on economic growth was positive and statistically significant, with no significant association between the short-term impact of increasing health expenditure on economic growth and statistical significance. The study attributed this effect to sub-optimal expenditure on health care, and to the time-lag between the health investment and the subsequent improvement in productivity.

Onakoya, Akinbobola and Saibu (2014) investigated the relationship between government health expenditure and human capital formation and economic growth in some selected African countries, such as Nigeria using panel data techniques. The study estimated the models with the fixed-effects and random-effects approaches, and tested the results with Hausman specification tests. Human capital was measured with the help of the indicators, life expectancy and labour productivity level. The findings indicate that increased public health expenditure correlates with improved human capital performance and enhanced economic growth, particularly in countries that continued to invest in public health over time. The results were similar to the results in other African countries but the impact was less than elsewhere, perhaps because weaker institutions inhibited the change.

Oyinlola (2015) carried out the study on the relationship between human capital development and economic growth in Nigeria, employing time series data from 1980-2013. The autoregressive distributed lag (ARDL) bounds testing approach was applied in this study to examine the long run and short run relationship between the variables. Health spending and education spending were used as proxies for human capital development in this study. The findings indicate that, in the long-term, expenditure on human capital development is associated with increased economic growth and a positive and statistically significant long-term relationship exists. Health expenditure, in contrast to education expenditure, has a smaller contribution which could indicate inefficiencies concerning the allocation of health funds and provision of health services in Nigeria.

Ogunniyi, Adepoju and Omonona (2016) examined the long-term relationship between government spending on health and education on Nigeria's human capital development using a vector error correction model (VECM). Data for the period 1995–2014 was analyzed and unit root tests and cointegration tests were applied to verify the stability of the results. The results indicate that the variables run together in time, and thus support a long run equilibrium relationship. The results suggest that, in the long run, governments that spend more have higher human capital indexes, but the short-run reaction is small, and takes time to occur. The results of the impulse response analysis indicated that a health expenditure had a persistent impact on labour productivity and GDP.

Babatunde and Adefabi (2017) studied how human capital development relates to economic growth in Nigeria, using a Cobb–Douglas production function model. Time-series data were used in the study from 1980 to 2014. Once they were sure that the variables are stationary, it estimated the model using ordinary least squares (OLS). In this study, human capital was divided into health and education. For this study, government spending on health and education was considered as

human capital. These findings reveal that higher health expenditure is correlated with higher economic growth, and the estimated effect is statistically significant. This confirms the notion that improved health leads to increased worker productivity, increasing output with time.

Oladunni and Akande (2017) investigated the relationship between public health expenditure and economic growth in Nigeria between 1985 and 2015, and found that public health expenditure is negatively related to economic growth. Using annual data for the period of 1985 to 2015 and ARDL bounds testing method, Oladunni and Akande (2017) investigated the relationship between public health expenditure and economic growth in Nigeria and found that public health expenditure is negatively related to economic growth. We conducted diagnostic tests to ensure stability and reliability of the model. The findings suggest that there is a positive relationship in the long run between government health expenditure and economic growth. The authors suggested that the short run coefficients were not statistically different from zero, which means that weak governance, inefficient use of funds, and low health infrastructure have an immediate effect that is not conducive to growth.

In their study, Ude and Nwite (2018) investigated the impact of government expenditure on health on human capital development in Nigeria, adopted ARDL model and Granger causality test to determine causality. The data were annual data of 1981–2016, and the indicator of human capital development was life expectancy and the labor force participation rate. These findings indicate that, at a long-term level, government spending on health Granger-caused increases in human capital development, whereas there was less evidence of the converse. The study recommended long-term health spending to make real gains in human capital.

Ogundipe (2019) investigated the relationship between various components of health expenditure and economic growth in Nigeria with time-series econometric approach. The data for this study

was analyzed using cointegration analysis and error correction model spanning the time period 1980-2017. We analysed government health expenditure and government out-of-pocket health spending by itself. The results indicate that an increase in government spending on health is associated with increased economic growth. However, very high private health spending seems to dampen growth as it may lead to less savings by households and a higher financial risk for households.

Eke, Okafor and Eze (2020) looked at the relationship between human capital development and sector-based Nigeria's economic growth with particular emphasis on manufacturing sector. The study applied fixed-effects panel regression method on the data for 1990-2018. Human capital indicators were related to health outcomes such as life expectancy and incidence of diseases. The findings indicate that higher health-related human capital was associated with higher labor productivity, fewer days missed from work, and higher manufacturing output.

This study, which used a trivariate vector autoregression (VAR) model applied to data for the time period 1980 to 2019, examined the temporal dynamics of the relationship between government spending on health, human capital development, and economic growth in Nigeria. The study employed a trivariate vector autoregression (VAR) model to analyze the temporal relations between government spending on health, human capital development and economic growth in Nigeria, for the period 1980-2019. I performed the impulse response function and variance decomposition analyses. The results indicate that public health spending had a positive impact on human capital indicators, and that this led to higher economic growth after 2-5 years. The study concluded that the effect of health spending on economic growth is primarily through the influence of human capital development.

In this study, Salami and Okoro (2022) analyzed the relationship between human capital and economic growth in West Africa countries using the common correlated effects mean group estimator. This study used data from 1995 to 2020. The findings indicated that increasing the allocation of public resources to health care was related to an increase in human capital and long-term economic stability, particularly in public investment in the prevention and basic primary care services.

Nwosu and Chukwu (2023) examined the efficiency of health expenditure in Nigeria to get results and the implications for human capital development and economic development using data envelopment analysis (DEA) and time-series regression analysis. The study demonstrates that increasing government expenditures on health is associated with improved health outcomes, but also that waste and mis-targeting of these expenditures detracts from their impact on human capital and economic growth. They explained that improving spending efficiency is important because it contributes to improving health spending's contribution to economic growth.

O'Gara and Nanjao (2024) analyzed the dynamics of human capital development and economic growth in Nigeria, covering both the short- and long-term dimensions and various frequencies over time, in terms of government health expenditure. Ibrahim and Adesina (2024) investigated the relationship between government health spending and human capital development and economic growth in Nigeria using the ARDL bounds-testing and wavelet coherence analysis techniques, capturing both the long-term and short-term dimensions as well as different frequencies of the relationship over time. The results indicate that over the long run, health expenditure and human capital development are correlated, while both are related to increased economic growth using annual data from 1981 to 2022. The study calls for reforms to the institutions and health financing structure as a means to support the relationship between population health and economic growth.

Udeorah et al. (2018) studied effect of Healthcare expenditure on economic growth in Nigeria using descriptive statistics and generalized method of moments (GMM) technique. As per the study, the healthcare expenditure does not have a significant impact on Economic growth. However, government education expenditure has a significant positive Impact on economic growth.

To investigate government human capital investment and its impact on the economic growth of three Sub-Saharan African countries (SSA) namely Nigeria, South Africa and Ghana during the period 1980-2013, Obialor (2017) studied the effect of government investments in human capital (GHC) on the economic growth of the three countries. The aim was to examine the growth impact of three indicators of government investment in human capital (health, education and literacy) on the economies of the countries. Secondary data were obtained from World Development Indicators (WDI), online Database and analysed using Co-integration techniques and Vector Error Correction mechanism (ECM) at 1% and 5% significance levels. The findings showed that in Nigeria, two of the three human capital proxy variables, namely Health (GIH) and Education GIE) had a significant positive impact on growth. Meanwhile, all countries had insignificant positive literacy ratio (LR). Results from the VECM test in this study revealed that the above result did not deter the potential of economic growth in the long run for the economies of the SSA countries. The study therefore recommended the increased focus on skill development in Sub Saharan Africa, increment of budget allocation to skill development and policies for improving enrolment in secondary education in the sub region.

Samuel and Ngozi (2019) examined the effect of spending on education and health on human capital accumulation in the West African Countries (WAC) for the period 1985 - 2016. The results obtained after using ARDL technique of analysis show that increased government education and

health expenditures has a positive and significant impact on Human Capital Development in the selected 13 countries. This study gave an idea on how Public Expenditure affects Human Capital Development of West African countries just 13 of them. The outcome may have varied if other countries had been included in the selected countries and a country-by-country analysis had been performed to get a better indication of the effect being measured.

2.4 Gap in Literature Reviewed

There is still a lack of empirical evidence and many studies in Nigeria have been associated with public health spending, human capital, and economic growth (Edeme, Richard K. et al, 2018). There is mixed evidence and conflicting studies that government health spending boosts economic growth. Research is divided on whether spending on health has a positive relationship to economic performance – some research shows a positive relationship and some research does not. The results of the studies may be different due to the variations in the study periods, econometric methods, the variables used in the study, and the sample size, thereby restricting the conclusions and policy implications from the studies. According to Ogungbenle, Sunkanmi & Adeleye, Bosede Ngozi (2023), Nigeria has a population of 340,100,000 and 56% of them live below the poverty line.

Many studies lump all government health spending into one category, instead of distinguishing between recurrent and capital spending. This misses the point that various categories of health expenditure may have varying economic impacts. Long-term cost factors such as capital expenditure on hospitals and medical infrastructure can stimulate growth, while recurring costs such as wages and supplies will only stimulate activity for a short period. There are not enough studies to compare the differences in impact of these components, making it difficult for policy makers to prioritize their first spending.

Some of the authors like (Muhammad Tariq Majeed & Amna Malik) mention governance and institutional effectiveness, but not many studies include governance indicator in their models. Corruption, financial management, policy capacity, and institutions are crucial to the effectiveness of public health expenditures. Empirical results may be ambiguous when institutions are ignored when it comes to public expenditures and human capital and growth.

There are few studies in the literature that have examined government spending on health, human capital development, and economic growth simultaneously in the same econometric model. Only a handful of studies examine just one or two of these links. This makes it difficult to see the impact of health expenditure on macro outcomes through its human capitalisation effects. This hides the contribution of health expenditure to macro outcomes through human capitalisation effects.

Many empirical studies are based on old data, typically up to 2016-2018. There is limited recent research on health financing, particularly on changes before, during and after COVID-19, when priorities for health spending shifted and weaknesses in health financing systems were exposed. However, a recent empirical analysis is required to capture the current state of health in Nigeria which may have evolved since the health crisis and economic shocks.

There is not enough emphasis on behavioural and cultural dimensions that can influence the effectiveness of health investments. Cultural beliefs, health-seeking behaviours and awareness influence whether or not people utilize public health services and their outcomes, even if public health services are present. While macroeconomic models are less likely to capture these factors, behavioral health theories such as the Health Belief Model emphasize these factors, and how public spending influences personal health.

The gaps highlight the need for a more effective way of measuring the impact of government spending on health on human capital and economic growth in Nigeria. Addressing these gaps will contribute to the body of knowledge, and give greater credibility to influence health and budget policy in Nigeria.

CHAPTER 3

RESEARCH METHODOLOGY

3.0 Introduction

The research methodology is presented in this chapter. It includes the theoretical framework, model specification (the model to be used), how to analyse the data (the regression techniques to be used), and what types and extent of data to use.

3.1 Theoretical Framework

The Keynesian Theory of Public Expenditure focuses on the role of government spending in promoting aggregate demand and reducing market failures. It is convinced that public spending (including health spending) creates jobs, earns income and has multiplier effects which stimulate economic activity, especially in times of economic recession (Keynes, 1936).

Keynes was a demand driven economist – output (Y) is influenced by aggregate demand (AD). The components of aggregate demand are consumption (C), investment (I) and government spending (G). For simplicity, the net exports are ignored in the simplest Keynesian model, so:

$$AD = C + I + G \quad (3.1)$$

In the short run output is determined by aggregate demand, whereas in the long run, output is determined by aggregate supply. Government purchases (G) directly boost AD, thus stimulating production and employment. For example, a government increase in the quantity of social programs or infrastructure results in an increase in demand that stimulates firms to supply more.

A crucial element of Keynes' theory is the consumption function which represents the relationship between consumption and income. The consumption function often can be described as:

$$C = a + c \cdot YC \quad . \quad (3.2)$$

Where:

a is autonomous consumption (consumption independent of income),

c is the marginal propensity to consume (MPC), which is the ratio of the increase in consumption to increase in income ($0 < c < 1$),

Y is income and/or output.

An increase in government spending (G) leads to an increase in spending in the economy, which increases income. This initial rise in income results in an increase in consumption which in turn results in yet another increase in income in later rounds. The multiplier effect is what this is. The multiplier (k) is determined as follows:

$$K = 1/(1-c) \quad (3.3)$$

The increase in the equilibrium level of income (ΔY) due to a change in government spending (ΔG) is equal to:

$$\Delta Y = k \cdot \Delta G \quad (3.4)$$

Combining the components, the equilibrium level of income (Y) in a closed economy with no taxes or imports is found where aggregate demand equals output:

$$Y = C + I + G \quad (3.5)$$

If the consumption function is $C = a + c \cdot Y$ and investment (I) is autonomous (fixed in the short run), the equation is:

$$Y = a + c \cdot Y + I + G \quad (3.6)$$

Switching to a new equation to solve for Y:

$$Y - c \cdot Y = a + I + G$$

$$Y (1-c) = a + I + G$$

$$Y = 1/(1-c) (a + I + G)$$

Here, $1/(1-c)$ is the multiplier (k), so:

$$Y = k (a + I + G) \quad (3.7)$$

The equation illustrates the effect of an increase in G on the level of equilibrium income: When the level of the government's spending increases by a certain amount, the equilibrium level of income increases by the same amount multiplied. This equation demonstrates the force of government spending in increasing output: If the amount of government spending increases by a certain amount, the equilibrium level of income increases by the same amount multiplied.

If the country enters international trade it would be the following national income identity:

$$Y = C + I + G + (X-M) \quad (3.8)$$

Where:

Y = National income (GDP)

C = Consumption Expenditure

I = Investment

G = Government Expenditure

X = Exports

M = Imports

It is given that the government's total expenditure (G) is the sum of the government's health expenditure (G_h) and non-health expenditure (G_o), that is:

$$G = G_h + G_o \quad (3.9)$$

G_h = Government health expenditure

G_o = Other government expenditures

Also, human capital development can be made part of the Keynes National Income Formula by investment in Health and education.

$$I = I_p + I_g \quad (3.10)$$

I_p = Private Investment

I_g = Government Investment

$$I_g = I_e + I_h + I_o$$

(3.11)

I_e = Investment in Education (proxy for human capital development)

I_h = Investment on Health

Let's input equation 9 and 10 into the national income identity, such that it becomes:

$$Y = C + (I_e + I_h + I_o) + (G_h + G_o) + (X - M)$$

(3.12)

3.2 Model Specification

This study's model is rooted in the Keynesian paradigm of macroeconomic theory which states that a rise in government spending will positively and significantly affect economic growth, and thus human capital development. The interrelationship between government health spending, human capital formation and economic growth in Nigeria is specified as a VAR and VECM model.

$$V_t = \alpha_{it} + \sum_{(i=1)}^k A_{ij} V_{t-1} + U_{it} \quad (3.13)$$

$$V_t = \int [(RGDPPC, GHE, GEDEXP)]$$

Where:

The ratio of RGDPPC is a measure of Gross Domestic Product per capita.

GHE = Government health expenditure

Educational expenditures by the government. Government education expenditure (GEDEXP).

Stated in the VECM form as:

$$V_t = \alpha_{it} + \sum_{(i=1)}^k A_{ij} V_{t-1} + \Phi_{it} ECM_{t-j} + \sum_{it} \quad (3.14)$$

The over-parametrized system VECM can be explicitly specified as:

$$\begin{aligned} \Delta GHE_{t-1} = & \alpha_{1t} + \sum_{(i=1)}^k B_{11i} \Delta GHE_{t-1} + \sum_{(i=1)}^k P_{12i} \Delta GEDEXP_{t-1} + \\ & \sum_{(i=1)}^k \pi_{13i} \Delta GDP_{pct-1} + \Phi_{it} ECM_{t-j} + \sum_{it} \end{aligned} \quad (3.15)$$

$$\begin{aligned} \Delta GEDEXP_{t-1} = & \alpha_{2t} + \sum_{(i=1)}^k B_{21i} \Delta GHE_{t-1} + \sum_{(i=1)}^k P_{22i} \Delta GEDEXP_{t-1} + \\ & \sum_{(i=1)}^k \pi_{23i} \Delta GDP_{pct-1} + \Phi_{it} ECM_{t-j} + \sum_{it} \end{aligned} \quad (3.16)$$

$$\begin{aligned} \Delta GDP_{pct-1} = & \alpha_{3t} + \sum_{(i=1)}^k B_{31i} \Delta GHE_{t-1} + \sum_{(i=1)}^k P_{32i} \Delta GEDEXP_{t-1} + \\ & \sum_{(i=1)}^k \pi_{33i} \Delta GDP_{pct-1} + \Phi_{it} ECM_{t-j} + \sum_{it} \end{aligned} \quad (3.17)$$

The model is estimated to explore the dynamic relationship and the rate of adjustment between Government health expenditure, Human capital development and economic growth in Nigeria.

The definition of variables, apriori expectations, and sources of data.

3.3.1 Definition of Variables

Gross Domestic Product Per Capita (GDPpc): Gross Domestic Product (GDP) is the total monetary value of all the final goods and services produced within the boundary of a country in a given period of time (usually quarterly or annually). (IMF, 2023). So GDP per capita is the GNP of a country divided by the total population of the country.

Government Health Expenditure (GHE): This encompasses recurrent and capital spending in the government's (central & local) budget, external borrowing and grants (including donations from international agencies & NGOs), and social funds (or compulsory health insurance). (World Bank, 2022)

Government education expenditure (GEDEXP): Expenditure by local/municipal, regional and national governments (excluding household contributions) on educational institutions (public and private), administration of education and subsidies to private entities (students/households and other private entities). (Infoscipedia, 2018)

3.3.2 Apriori Expectations

Gross domestic product per capita is positively related with Government health expenditure and Government education expenditure.

3.3.3 Sources of Data

The variables used in the model were extracted from Central Bank Statistical Bulletin, International Monetary Fund (IMF), World Development Indicators and other sources on the Internet.

3.4 Methods of Data Analysis.

This study uses time series data, obtained from the following variables: government health expenditure, gross domestic product per capita, government education expenditure, and life expectancy. The tools that are applied are descriptive statistics, Augmented Dicky-Fuller test (ADF), Johansen cointegration test, Vector Error Correction Model (VECM), Forecast Error Variance Decomposition (FEVD), Impulse Response Function and stability test. Analysis of the behavior of these variables, tests of stationarity, determination of long-run relationship, short-run adjustment and analysis of dynamic interactions among the variables were examined.

CHAPTER 4

PRESENTATION AND DISCUSSION OF RESULTS

4.0 Introduction

This chapter reports the findings of the vector error correction mechanism model of the previous chapter. Graphs of the variables were plotted to observe their performances over time, descriptive statistics were analysed, the Augmented Dickey-Fuller test and the cointegration test using Johansen cointegration test was performed. Estimation of the VECM and results of the forecast error variance decompositions and Impulse response function for all the variables were carried out. Finally, as a check if the entire model was stable and appropriate for policy recommendations, an inverse root of the AR polynomial was fitted.

This is a key stage in the analysis process. This is an important part of the analysis process.

4.1.1 Plots of the Series

When carrying out a regression, it is usually important to check for stationarity of the variables (i.e. whether or not the variables used in the model were stable over the time period under analysis).

The figures below shows a graphical representation of the behavior of the residuals of each variable used in the model:

Figure 4.1: Plot of the Series

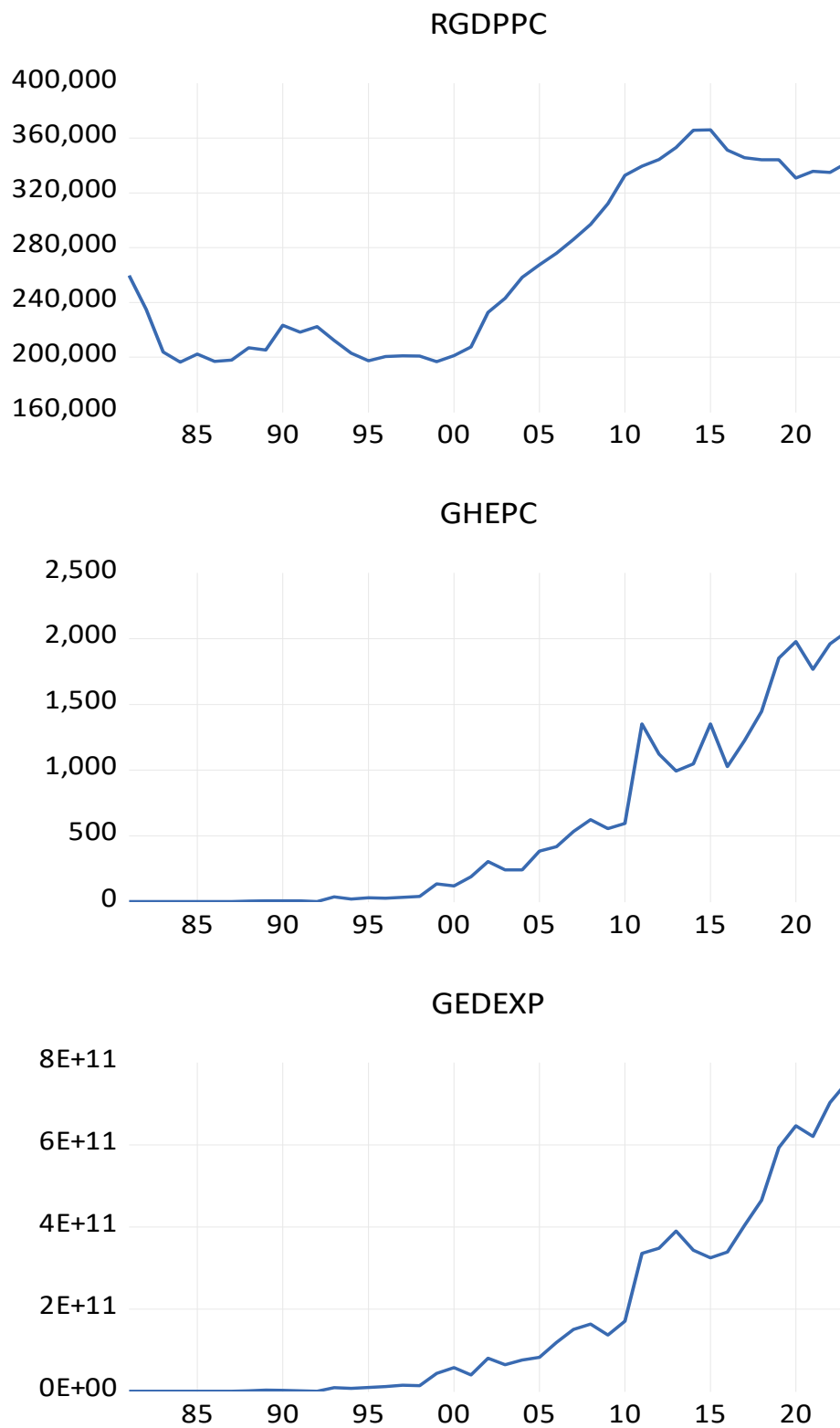


Figure 4.1: Plot of the Series

The series of all the variables in the VEC model are plotted in figure 4.1. The shape of the economic growth series (proxy by real gross domestic product per capita (RGDPPC)) shows a downward trend in the first half of the period under analysis, with a sharp increase at the beginning of the second half and then it takes a downward trend again, with little increases and decreases in each period. The patterns are however irregular.

The plot of GEDEXP exhibits near regular and increasing trend at decreasing rate, however, the plot slightly decreases from 2016, and again increases after 2016 at increasing rate.

The graph representing Government health expenditure (GHE) shows a regular increasing trend of the various plots of the graph.

The results, however, only indicate the behavior of the variables, and do not provide information about their stationarity; a more suitable test should be used to check stationarity. Hence Augmented Dickey Fuller (ADF) unit root tests is an appropriate test for this, which was conducted following the presentation of descriptive statistics.

4.1.2 Descriptive Statistics

	GDPPC	GHEPC	GEDEXP
Mean	264895.1	552.2379	1.75E+11
Median	243046.5	242.4444	64800000000
Maximum	365972.6	2056.489	7.53E+11
Minimum	196439.9	0.461142	162000000
Std. Dev.	63125.72	673.109	2.26E+11
Skewness	0.320636	0.988547	1.197681

Kurtosis	1.412439	2.588696	3.18374
Jarque-Bera	5.252412	7.306546	10.34064
Probability	0.072352	0.025906	0.005683
Sum	11390488	23746.23	7.53E+12
Sum Sq. Dev.	1.67E+11	19029183	2.15E+24
Observations	43	43	43

Source: Author's computations from E-views 12

The summary of statistics of all variables in this study are shown in Table 4.1.2. The average value of GDPPC is 264895.1 with a standard deviation of 63125.72, GHEPC is 552.2379 with a standard deviation of 673.109, and GEDEXP is 1.75E + 11 with a standard deviation of 2.26E + 11.

The maximum value of GEDXP is the highest (7.53E+11) and the maximum value of GHEPC is the lowest (2056.489). GEDEXP has the maximum value of its minimum element (162000000) and GHEPC has the minimum value of its minimum element (0.461142).

A series distribution's skewness is the measure of the series' asymmetric distribution around the mean. In addition, a normal distribution is a distribution with a mode of the same value as the median. Positive skewness indicates that the distribution is skewed to the right with a long tail on the right and negative skewness indicates the distribution is skewed to the left with a long tail on the left. As per the above table, positive skewness is observed in the data of RGDPPC, GHEPC, GEDEXP etc.

Likewise, Kurtosis is a statistical term that represents the "tailedness" of the distribution of the variable: how often extreme values are found in comparison with a normal distribution. From Table 4.1.2, it can be seen that the skewness coefficient, RGDPPC is less than 3, and the kurtosis

coefficient, GHEPC is less than 3, indicating that both are flat or platykurtic, but GEDEXP is greater than 3, indicating it is leptokurtic.

Jarque-Bera (JB) test is a test used to check skewness and kurtosis of sample data against a normal distribution. The results show that the null hypothesis of normal distribution is not rejected at 5% significance level for GDP per capita, suggesting that it is approximately normally distributed. On the other hand, both of GHEPC (JB = 7.31, $p = 0.026$) and GEDEXP (JB = 10.34, $p = 0.006$) fail to accept the null hypothesis, indicating that government health expenditure per capita and government education expenditure are not normally distributed. The non-normality found in GHEPC and GEDEXP are consistent with their high values of skewness and kurtosis, which suggest that the data for the variables are not symmetrically distributed and have leptokurtic properties.

4.1.3 Unit root tests

Unit root tests are used to test for stationarity in a time series. If a time series has a unit root, it means that it is non-stationary. Non-stationarity in time series data can lead to spurious results and the invalidation of the hypothesis. Thus, this test is highly relevant to this study.

The unit root test used in this analysis was the Augmented Dickey Fuller test, and the results are presented below:

Table 4.1.3: Results of Unit Root Tests

Table 4.1.3(a): Augmented Dickey Fuller Test at (ADF) Levels

Variables	ADF Test Statistics	Critical value at 5%	Order of Integration	Remarks
RGDPPC	-1.085634	-2.936942	I(0)	Non-Stationary
GHEPC	-1.963468	-2.941145	I(0)	Non-Stationary
GEDEXP	-2.545946	-2.941145	I(0)	Non-Stationary

The ADF test results show that all three variables RGDPPC, GHEPC and GEDEXP are non-stationary at levels as their ADF test statistics (-1.085634, -1.963468, and -2.545946 respectively) are less than the 5% critical values in absolute terms. Therefore, the null hypothesis of a unit root cannot be rejected for any of the variables, indicating that level forms of the variables are stochastic trends. This requires additional testing for first difference stationarity first before moving on to estimation.

The diagnostic tests for numeric and fixed data are identical. The diagnostic tests for numeric data and fixed data are the same for the first difference (ADF).

Table 4.1.3(b): Augmented Dickey Fuller Test (ADF) at first difference

Variables	ADF Test Statistics	Critical value at 5%	Order of Integration	Remarks
GDPPC	-4.182133	-2.935001	I(1)	Stationary
GHE	-10.61739	-2.935001	I(1)	Stationary

GEDEXP	-8.177347	-2.935001	I(1)	Stationary
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Source: Author's computation using E-views 12

**** Indicates significance at 5% critical level, i.e. $p\text{-value} < 0.05$**

The ADF test results at first difference further validate the achievement of stationarity for all three variables GDPPC, GHE and GEDEXP as each variable's ADF test statistic (-4.182133, -10.61739, and -8.177347) is greater than the critical level of -2.935001 at the 5% significance level. The null hypothesis of a unit root is thus rejected for all variables, and all are found to be of order one, I (1). The uniform order of integration of all variables is important because it satisfies the requirement for cointegration analysis, thus allowing the use of either the Johansen cointegration test to examine the existence of a long-run equilibrium relationship between these variables.

4.1.4 Johansen Co-integration Test

Having carried out the Augmented Dickey Fuller tests and established the stationarity of the variables at the first difference, we proceed to test for the long-run relationship among the variables using the Johansen co-integration test.

Table 4.1.4a: Unrestricted Co-integration Rank Test (Trace Value)

Hypothesized No of CE(s)	Eigen Value	Trace Statistics	0.05 Critical Value	Probability
None *	0.708718	56.06932	29.79707	0.0000
At most 1	0.120938	5.497320	15.49471	0.7539
At most 2	0.005167	0.212407	3.841465	0.6449

Source: Author's computation using E-views 12

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 4.1.4b: Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized No of CE(s)	Eigen Value	Trace Statistics	0.05 Critical Value	Probability
None *	0.708718	50.57200	21.13162	0.0000
At most 1	0.120938	5.284913	14.26460	0.7055
At most 2	0.005167	0.212407	3.841465	0.6449

Source: Author's computation using E-views 12

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 4.1.4c: Normalized co-integrating coefficients (standard error in parentheses)

VARIABLE	LGDP	LGHE	LGDEXP
COEFFICIENT	1.0000	-633.4617	0.00000159
STD.ERROR		52.6388	0.00000016
T-STATISTIC		-12.03412122	9.9375

Source: Author's computation using E-views 12

Co-integration deals with the methodology of modelling non-stationary time series variables (Iyoha and Ekanem, 2002). Table 4.2.4a and 4.2.4b depicts the estimated results of the long-run relationship between the variables, which include LGDPPC, LGHE, and LGEDEXP using the Johansen co-integration test. It was observed that the trace statistics and the maximum eigenvalue indicated one co-integrating equation at the 5% level of significance. Table 4.2.5c shows the normalized co-integration coefficients. It indicates that, in the long run, only LNGEDEXP has a significant positive impact on LNGDPPC, whereas LNGHEPC have negative and insignificant impacts on LNGDPPC. These results suggest that there is co-integration or a long-run relationship among the variables employed in the study.

4.1.5 Estimation of the Vector Error Correction Model

From the result of the co-integration test carried out on the variables, it is evident that there is a long-run relationship among the variables. In view of this, the VEC model was estimated using the Vector Error Correction Model method.

The results of the estimation are shown in Table 4.1.5a:

Table 4.1.5a: VECM Results

Explanatory Variables	D(LGDPPC)	D(LGHE)	D(LGEDEXP)
Constant	0.004472	0.138194	0.179616
	[0.57709]	[1.66830]*	[2.34969]**
D(LRGDPPC(-1))	0.551736	1.475549	0.179130
	[2.95326]***	[0.73880]	[0.09719]

D(LGHEPC(-1))	-0.143061	-0.965911	-1.314109
	[-1.93167]**	[-1.21997]	[-1.79856]**
D(LGEDEXP(-1))	0.108906	0.671789	0.871818
	[1.76317]**	[1.01737]	[1.43072]*
D(LGDPPC(-2))	0.104483	0.451024	0.435522
	[0.54334]	[0.21939]	[0.22957]
D(LGHEPC(-2))	-0.063910	-0.725108	-0.689361
	[-1.58021]*	[-1.67708]*	[-1.72774]**
D(LGEDEXP(-2))	0.070424	0.147998	0.244662
	[2.25048]**	[0.44240]	[0.79251]
ECT	-0.066928	-0.170238	-0.844304
	[-1.38210]*	[-0.32884]	[-1.76731]**
Summary Statistics			
	D(LRGDPPC)	D(LGHEPC)	D(LGEDEXP)
R-squared	0.657276	0.463021	0.258971
Adj. R-squared	0.472733	0.173878	-0.140044
Sum sq. resids	0.005707	0.652188	0.555408
S.E. equation	0.020952	0.223983	0.206697
F-statistic	3.561635	1.601359	0.649026
Log likelihood	56.41416	6.657718	8.344330
Akaike AIC	-4.610873	0.127836	-0.032793
Schwarz SC	-4.212959	0.525750	0.365120

Mean dependent	0.018328	0.090981	0.106447
S.D. dependent	0.028854	0.246429	0.193586

Source: Author's computation using E-views 12

Note: t-values are bracket [] */**/** - significant at the 0.10/0.05/0.01 level of significance with critical values of 1.325/1.725/2.528, respectively.

Table 4.1.5a shows both the long-run and short-run components of the vector error correction model. The long-run estimate indicates long-run causality among all variables: LNGDPPC, LNGEDEXP, and LNGHE. The coefficient of ECT with respect to LNGDPPC is negative and statistically significant at 1.38, indicating convergence/correction from short-run changes or disturbances toward the long-run equilibrium, with a speed of adjustment of 6%. The vector error correction long-run estimate, table 4.1.5b, shows a system of equation which clearly depicts how all variables interact with each other. These equations can also be seen as the short-run coefficients of the model, that is, C(2), C(4), and C(6). RGDPPC is the key variable in this analysis. The results from Table 4.1.5b are interpreted as follows: a percentage change in LNGHEPC is associated, on average, ceteris paribus, with a 14.3% decrease in LRGDPPC, respectively, in the short run. While a percentage change in LNGEDEXP is associated with 10.9% increase in LNRGDPPC on average, ceteris paribus, in the short run. The t-test for the variables LNGHEPC and LNGEDEXP are -1.93 and 1.76, respectively. By implication, the t-test indicates that LNGEDEXP has a positive and significant relationship with LNRGDPPC, while LNGHEPC has a negative and significant effect on LNGDPPC at the 5% level of significance.

Similarly, the coefficient of determination (R^2) is 0.66, which shows that about 66% variations in economic growth is explained by the independent variables. Also, its adjusted counterpart is a 0.47

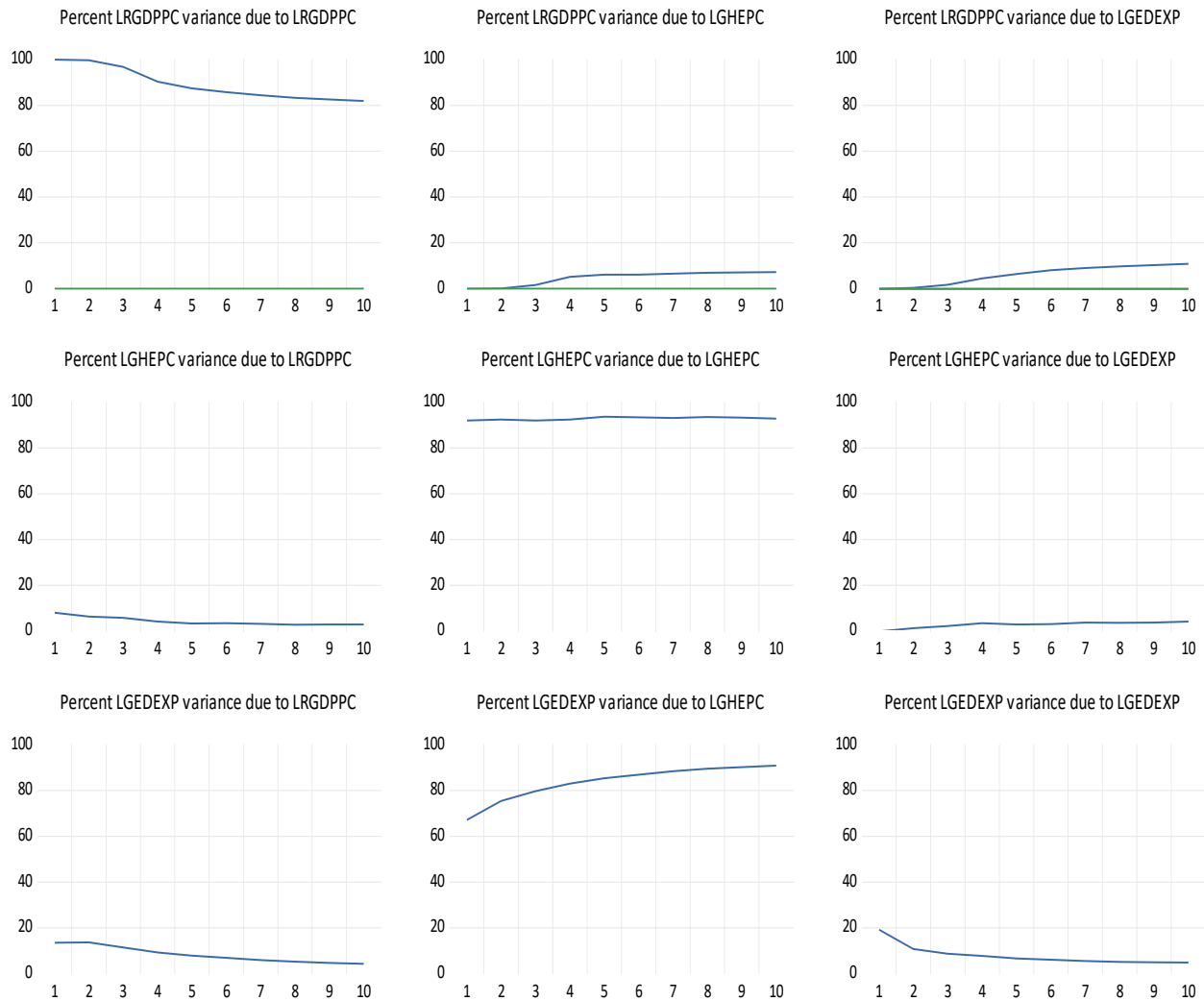
increase in economic growth that can be attributed to the independent variables. The F-statistic is 3.56, indicating the overall model's significance. Thus, this indicates that the explanatory variables are jointly significant in forecasting economic growth in Nigeria. Also, the Durbin-Watson statistic of 2.62 indicates no serial autocorrelation in the model.

4.1.6 Forecast Error Variance Decomposition (FEVDS)

The forecast error variance decomposition indicates the amount of information each variable contributes to the other variables in the model. It determines how much of the forecast error variance of each variable can be explained by the exogenous shocks to the variables (Wikipedia, 2017).

In this study, the variance of each of the variance decompositions was generated over ten periods forecasting horizons as shown in Graph 4.2.:

Figure 4.2



As illustrated in the above graph, shocks to RGDPPC accounted for approximately 100% of the variation in the first horizon, reducing to 81.3% in the 10th horizon, which shows that the share of the shocks in RGDPPC decreased from the first horizon to the 10th horizon. In response to the variations of RGDPPC, the responses of the GHEPCs were consistently higher from period 1 (0%) to period 10 (7.3%). GEDEXP reported an increase of 0.00% in the first period and 10.9 % in the tenth period.

Analyzing the next set of forecast horizons, the variation in GHE could be accounted for by shocks to GDPPC to 8.05% in horizon 1 and only 3.0% in horizon 10. However, the shocks of GHEPC accounted for a portion of the difference in horizon 1 ranging from 91.9% to 92.8% of the difference in horizon 10, with both increases and decreases occurring over the simulation period. The shocks in GEDEXP accounted for between 0% in horizon 1 and 4.2% in horizon 10, growing over the forecast horizon.

In the next forecast horizon, shocks to RGDPPC explained about 13.6% in the first period to 4.29% in the 10th period of variations of GEDEXP, decreasing throughout the forecast period. The proportion of the variation accounted for by shocks in GHEPC accounted for 67.1% of the variation in the first period and rose to 90.8% of the variation in GEDEXP. In horizon 1 to 4.93%, shocks to GEDEXP were responsible for 19.3% of the forecast change, which reduced over the forecast period.

In order to conclude on which explanatory variables explained by the best variations in the independent variables, we succinctly review the results of the FEVD.

Variations of GDPPC explained about 81% to 100% of itself when subjected to shocks, variations of GHE explained about 0% to 7.3% of RGDPPC when subjected to shocks, variations of GEDEXP explained about 0% to 10.9% of RGDPPC when subjected to shocks. Thus, it can be concluded that apart from RGDPPC (which is both an explanatory and dependent variable), GEDEXP has a more significant explanation of the variations in RGDPPC.

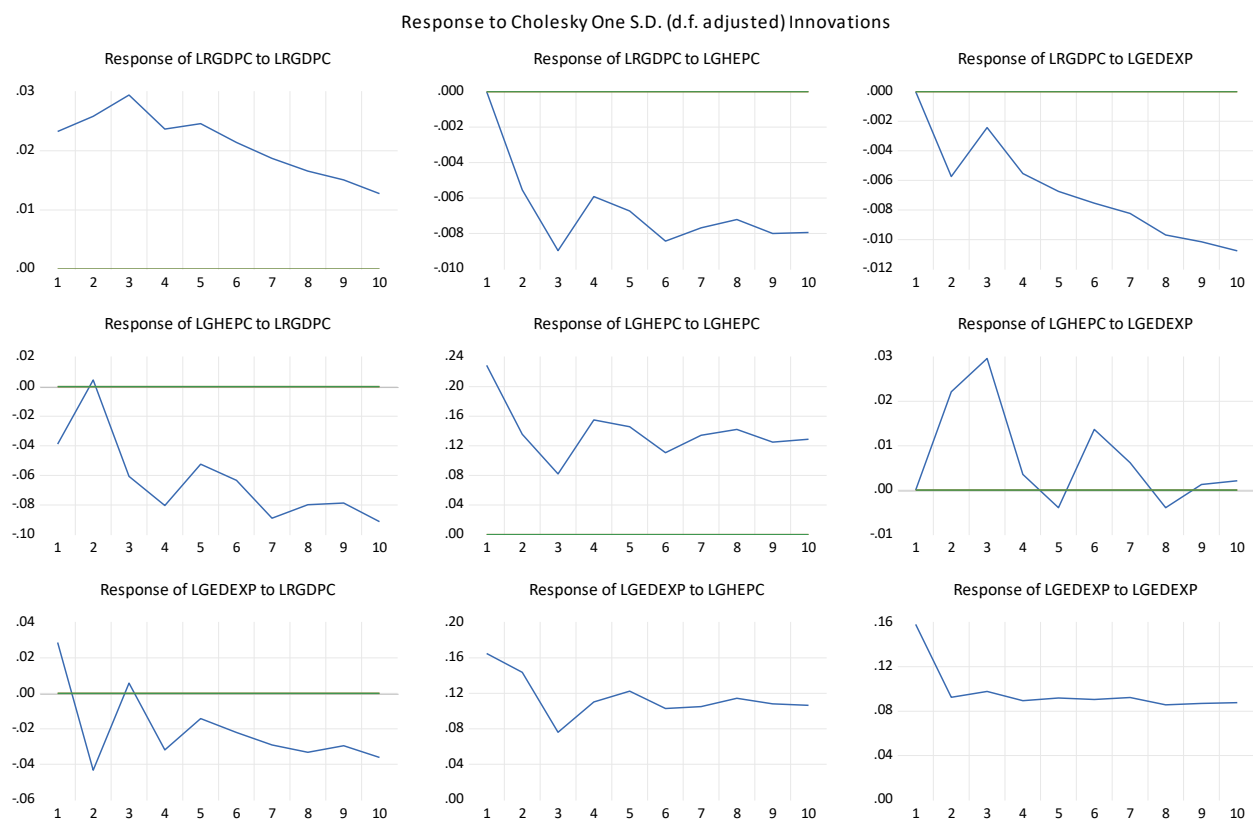
The share of RGDPPC in explaining variations in GHEPC ranged from 3% to 8.05%, that of GHEPC in explaining variations in itself ranged from 91.9% to 92.8% while that of GEDEXP in

explaining variations in GHEPC ranged from 0% to 4.21%. Thus, RGDPPC seems to largely explain the differences in GHE.

The percentage of variations in GEDEXP explained by shocks to RGDPPC ranged between 4.29% and 13.6%, while the percentage of variations in GEDEXP explained by shocks to GHEPC ranged between 67.1% and 90.7%. Shocks to GEDEXP explained about 4.93% to 19.3% of variations in GEDEXP. Therefore, we may conclude that the contribution of GHEPC was significantly large to variations in GEDEXP.

4.1.7 Impulse Response Function

Figure 4.3



In the above figure (fig. 4.3), the impulse response function of various variables towards each other have been shown. The results are explained as follows:

LRGDPC responds to shocks by:

LRGDPC: Responds positively to its own shock, beginning at a relatively high level and steadily decreasing over the 10-period horizon, then levelling off. This implies that the GDP per capita is also persistent with respect to innovations it generates, meaning that the effect of innovation in GDP fades gradually over time, and there is a certain level of economic output inertia.

The LRGDPC has a negative response to a change in government health expenditure per capita that rapidly falls in the early periods and then levels off at a negative value around periods 4-10. This implies that health spending in the short run does not directly lead to GDP growth, perhaps due to the timelag required to realize the productivity benefits of health investments.

LRGDPC reacts positively to a shock in government education expenditure, which increases in the early periods, then decreases and levels off at a negative value around period 3. This means that although expenditure on education can have positive short-run effects on economic output, in the long run the effects are likely to be negative or insignificant, which could be due to inefficiencies in spending on education, or to structural constraints in using human capital investments to improve productivity.

Response of LGHEPC to Shocks:

LRGDPC and LRHEPC are positively related: When a shock is hit by LRGDPC, the reaction of LRHEPC is sharp and climbs quickly until period 2, when it peaks and slowly descends towards zero by period 10. This indicates that within the short-term, an increase in the GDP per capita leads to an increase in the government's health expenditure, which is in line with the idea that wealthier economies invest more funds into health care.

In response to its own shock, LGHEPC shows a positive and persistent reaction over the full 10-period horizon and the reaction stays positive all the way through. This means that the health expenditure shocks are very persistent, implying a path dependency or deep-root commitment to health spending.

The response of LGHEPC to a shock from LGEDEXP is relatively volatile, starts positive and then drops sharply around period 3, oscillates and then approaches zero. The mixed results indicate that there is a complex relationship between the short-run education and health expenditure variables, which may be due to competing fiscal demands or substitution effects in government spending.

3. Response of LGEDEXP to Shocks:

LRGDPC is not strong enough to elicit a strong response from LGEDEXP; it takes a "moderate hit" from LRGDPC in the early periods and then weakens and oscillates around zero for the rest of the horizon. This implies that GDP growth had a short and small effect on education expenditure, suggesting that education expenditure could be relatively unresponsive to short-run economic output.

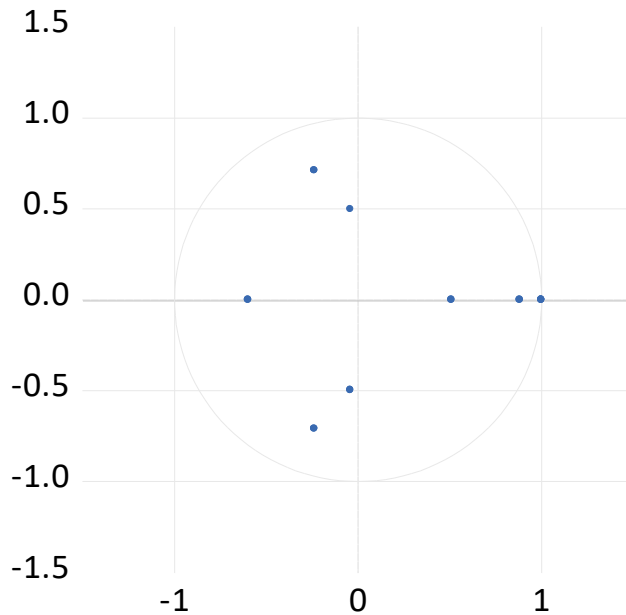
LGHEPC does a good job of providing a shock response to LGHEXP, with the shock response increasing and then leveling off at a positive value over the 10 period horizons. This implies a complementary relationship between the levels of health and education expenditure in the long run with a view to seeing an investment in health and education moving around as part of a broader human capital development policy.

The response to LGEDEXP's shock is strong and positive, and the response level starts high, but is decreasing over time, but remains positive for the entire horizon. This is indicative of the self-

reinforcing and persistent nature of education expenditure shocks and a high degree of budgetary momentum in government expenditure on education.

4.1.8 Stability Test

Figure 4.4 Inverse Roots of AR Characteristic Polynomial



The figure above shows the inverse roots of the AR polynomial's characteristic roots. It is done to check the state of impulse responses in the estimated model. The above shows the estimated VEC is dynamically stable, since all inverted roots fall within the circle.

4.2 Policy Implications

1. The results indicate that Nigeria's economic growth is negatively influenced by Government health spending and the effect is significant. The discovery suggests that government spending in Nigeria on healthcare could be ineffective or mismanaged, thus lessening its impact on economic growth and development. Thus, policy should be geared towards making health spending more

efficient, accountable and effective in allocation, instead of just an increase or reduction in health spending.

2. According to the findings, the GHE has negative relationship with the development of human capital in Nigeria and this is significant. The negative association indicates inefficiency in health spending, or that the money is being spent inefficiently; greater efficiency, accountability and targeting would help to further improve population health, human capital productivity and long-term economic potential.

3. The results show that human capital development is positively and significantly associated with the economic growth in Nigeria. The discovery suggests that policies that enable human capital development such as an increase in investment in education, health, skills acquisition, and training of the workforce can be effective in stimulating the economy of Nigeria. Thus, the Government should focus on quality and availability of education and health services, for better productivity, innovation and long-term economic development.

4. The speed of adjustment of GEDEXP is quite impressive; however, the other variables had a very slow and unimpressive speed of adjustment. The Nigerian economy is not well placed to accommodate fluctuations in Government spending on health and Human capital development.

The FEVD reveals that Government education expenditure (GEDEXP) explainable variations of Economic growth (RGDPPC) significantly and also RGDPPC explainable variations of Government health expenditure per capita (GHEPC) significantly; also GHEPC explained variations of GEDEXP predominantly.

CHAPTER FIVE

SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.0 Introduction

This chapter gives a summary of empirical findings, recommendations of possible solutions to the subject matter and concludes

5.1 Summary of Findings

The study adopted the Vector Error Correction technique in analyzing the inter-relationships between government health expenditures, human capital development and economic growth in Nigeria. In this study, three variables were considered: Government Health expenditure (GHEPC), Human Capital Development, proxied by government education expenditure (GEDEXP) and Economic growth, proxied by Real Gross Domestic Product per capita (GDPPC). For each of the variables, 43 annual time series data were extracted for a period of 1981-2023. The stationarity of all the variables was tested using the Augmented Dickey-Fuller (ADF) test and it was found that all the variables were stationary at the first difference. Following the unit root test, Johansen co-integration test was done, which indicated the presence of a stable long-run relationship between the variables.

The dependency of the vector error correction method was found to be moderately stable and reliable, hence it is reliable for policy making and analysis. According to the results of this study, the following results are obtained:

In Nigeria, 1. Government Health expenditure can be said to exert significant negative effect on the economic growth of the nation.

The government's health spending negatively and significantly affects human capital development in Nigeria.

3. Human capital development (proxy by GEDEXP) positively and significantly affects economic growth in Nigeria.

5.2 Policy Recommendations

Following the above study results, the following recommendations were preferred:

The Federal government of Nigeria should increase its expenditure on health care. Government health spending is important to economic growth because a healthy population translates directly into higher productivity. Nigeria is failing to keep to the 15% health budget target set by the Abuja Declaration, which leads to out-of-pocket health spending that increases poverty and reduces productivity. This would need to be addressed, through an increase in funding by both federal and state governments, and through better pay for healthcare workers to prevent brain drain, to improve Primary Healthcare Centers across the country. In the end, such expenditure lowers the incidence of disease, maintains the population's employment and generates long-term economic development.

Healthcare sensitization campaigns need to be undertaken by the government. A healthcare infrastructure must be built, which is something that needs to be done through public health education. While hospitals can be effective if people are using them, and practicing prevention – which is much cheaper than cure. In Nigeria, cultural differences and misinformation often prevent citizens from seeking modern medical care. Also, national campaigns at grassroots level using local languages and leaders, should be introduced to educate the people on important

health measures such as immunisation and disease prevention. This will significantly lower the long-term cost of healthcare, workforce health and lost labour.

4. The public funding of education should be raised. While education is an important pillar of human development and economic growth, Nigeria's educational system faces a problem of underinvestment, which affects its quality, access and retention of many children out-of-school. Government should increase the education budget to be about 15-20% of government spending, which is the UNESCO recommended percentage. A focus on STEM and vocational education will ensure that a trained workforce is available, that investment is encouraged and that there is continued economic development.

4. Spending of the government should be made more efficient. The efficient use of expenditure is essential; it is not sufficient to simply allocate more money to health and education if they are misused. At present, the public funds are not used effectively and are frequently misappropriated due to mismanagement and corruption. To counter this, the government should be more rigorous in monitoring all human capital projects, and use digital systems in procurement and capital tracking. This will make sure that money is allocated appropriately, waste is minimised and citizens are assured of getting the benefits they are promised from investments.

5. Nigeria's economy needs to be diversified. A diverse economy is essential to a strong human capital base. The Nigerian's dependence on crude oil makes the downturn in oil prices very devastating as it affects critical sectors such as health and education. The country can establish robust connections between education and the new industries by actively investing in non-oil industries like agribusiness, manufacturing, and the digital economy. This diversification creates

a sturdy economy, less susceptible to oil price fluctuations, and a steady stream of income to finance human capital development on an ongoing basis.

6. The government should generate employment opportunities for its citizens. Enabling human capital development should go hand in hand with provision of employment opportunities. A healthy, educated youth population without jobs results in lost potential, social unrest and brain drain. The government should improve the business climate by offering tax incentives, quality electricity and a secure environment to promote private sector growth and employment to alleviate high youth unemployment. Encouraging PPs and provision of low-interest credit facilities for youth entrepreneurship are also critical measures; thereby involving employed citizens to the national development.

5.3 Conclusion

This study examined the link between government health expenditure, human capital development and economic growth of Nigeria. The data used covered a time frame from 1981 to 2023 on an annual basis. The different statistical and Econometric indicators presented were well detailed and the empirical result showed a positive relationship between Health expenditure by Government, Human capital development and economic growth in Nigeria. The government should therefore spend more on health and education, sensitise its citizens to health care, and provide jobs for its citizens to boost the economic performance of the country, based on the above findings.

5.4 Contributions to Knowledge

The aim of this study was to explore the correlation between government health expenditure, human capital development and economic growth in one unified empirical context of Nigeria.

The results show that government health spending has a strong negative impact on economic growth and on human capital development, which means that an increase in health spending could have the opposite effect if the spending is not allocated efficiently or managed well.

3. The findings support the previous findings that Human Capital Development (HCD) contributes significantly to economic growth, thus sustaining investment on health and education for Nigeria's long term economic performance.

A list of suggestions for further studies.

1. In future research, it could be possible to split up government health expenditure into recurrent expenditure and capital expenditure and find out which expenditure has the greater impact on human capital development and economic growth.

2. Other indicators of human capital development could be used in further research: life expectancy, school enrolment, literacy rate, the Human Development Index or the Human Capital Index.

3. State or regional scale-up studies can be conducted to compare the spending, human capital development and economic performance of various states or regions in Nigeria.

Further research could look at the impact of corruption, institution quality, budget implementation and accountability processes on the impact of health spending by the government.

4. Other econometric techniques and the incorporation of other variables like education spending, employment rate, poverty rate, inflation or access to healthcare could be used in further studies to gain a broader insight into the relationship.

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APPENDIX

UNIT ROOT TEST

Null Hypothesis: LRGDPPC has a unit root

Exogenous: Constant

Lag Length: 2 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.085634	0.7122
Test critical values:		
1% level	-3.605593	
5% level	-2.936942	
10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LRGDPPC)

Method: Least Squares

Date: 04/15/26 Time: 10:49

Sample (adjusted): 1984 2023

Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRGDPPC(-1)	-0.025013	0.023040	-1.085634	0.2849
D(LRGDPPC(-1))	0.206322	0.140768	1.465690	0.1514
D(LRGDPPC(-2))	0.232734	0.134115	1.735325	0.0912
C	0.321142	0.286761	1.119892	0.2702

R-squared	0.214035	Mean dependent var	0.012940
Adjusted R-squared	0.148537	S.D. dependent var	0.035885
S.E. of regression	0.033113	Akaike info criterion	-3.883143
Sum squared resid	0.039473	Schwarz criterion	-3.714255
Log likelihood	81.66286	Hannan-Quinn criter.	-3.822079
F-statistic	3.267846	Durbin-Watson stat	1.966964
Prob(F-statistic)	0.032262		

Null Hypothesis: LGHEPC has a unit root

Exogenous: Constant

Lag Length: 4 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.963468	0.3010
Test critical values:		
1% level	-3.615588	
5% level	-2.941145	
10% level	-2.609066	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LGHEPC)

Method: Least Squares

Date: 04/15/26 Time: 10:56

Sample (adjusted): 1986 2023

Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGHEPC(-1)	-0.082037	0.041782	-1.963468	0.0583
D(LGHEPC(-1))	-0.724248	0.160729	-4.506015	0.0001
D(LGHEPC(-2))	-0.517260	0.190850	-2.710302	0.0107
D(LGHEPC(-3))	-0.445654	0.190727	-2.336610	0.0259
D(LGHEPC(-4))	-0.311400	0.161317	-1.930363	0.0625
C	0.974783	0.257300	3.788504	0.0006

R-squared	0.439266	Mean dependent var	0.189137
Adjusted R-squared	0.351652	S.D. dependent var	0.771454
S.E. of regression	0.621175	Akaike info criterion	2.029532
Sum squared resid	12.34748	Schwarz criterion	2.288099
Log likelihood	-32.56112	Hannan-Quinn criter.	2.121528
F-statistic	5.013620	Durbin-Watson stat	1.952327
Prob(F-statistic)	0.001673		

Null Hypothesis: LGEDEXP has a unit root

Exogenous: Constant

Lag Length: 4 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.545946	0.1131
Test critical values:		
1% level	-3.615588	
5% level	-2.941145	
10% level	-2.609066	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LGEDEXP)

Method: Least Squares

Date: 04/15/26 Time: 10:59

Sample (adjusted): 1986 2023

Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGEDEXP(-1)	-0.104731	0.041136	-2.545946	0.0159
D(LGEDEXP(-1))	-0.520154	0.155505	-3.344923	0.0021
D(LGEDEXP(-2))	-0.495983	0.161973	-3.062127	0.0044
D(LGEDEXP(-3))	-0.478890	0.161954	-2.956952	0.0058
D(LGEDEXP(-4))	-0.339945	0.156845	-2.167392	0.0378
C	3.156658	1.027886	3.071021	0.0043
R-squared	0.393778	Mean dependent var		0.209908
Adjusted R-squared	0.299056	S.D. dependent var		0.733926
S.E. of regression	0.614461	Akaike info criterion		2.007795
Sum squared resid	12.08198	Schwarz criterion		2.266362
Log likelihood	-32.14811	Hannan-Quinn criter.		2.099791
F-statistic	4.157194	Durbin-Watson stat		2.126181
Prob(F-statistic)	0.005057			

AT FIRST DIFFERENCE

Null Hypothesis: D(LRGDPPC) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.182133	0.0021
Test critical values:		
1% level	-3.600987	
5% level	-2.935001	
10% level	-2.605836	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LRGDPPC,2)

Method: Least Squares

Date: 04/15/26 Time: 11:02

Sample (adjusted): 1983 2023

Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LRGDPPC(-1))	-0.541893	0.129573	-4.182133	0.0002
C	0.006323	0.005956	1.061581	0.2950
R-squared	0.309615	Mean dependent var		0.002954
Adjusted R-squared	0.291913	S.D. dependent var		0.044904
S.E. of regression	0.037785	Akaike info criterion		-3.666239
Sum squared resid	0.055682	Schwarz criterion		-3.582650
Log likelihood	77.15790	Hannan-Quinn criter.		-3.635800
F-statistic	17.49024	Durbin-Watson stat		2.324333
Prob(F-statistic)	0.000158			

Null Hypothesis: D(LGHEPC) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.61739	0.0000
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LGHEPC,2)

Method: Least Squares

Date: 04/15/26 Time: 11:04

Sample (adjusted): 1983 2023

Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGHEPC(-1))	-1.486171	0.139975	-10.61739	0.0000
C	0.269789	0.105981	2.545638	0.0150
R-squared	0.742963	Mean dependent var		-0.001217
Adjusted R-squared	0.736372	S.D. dependent var		1.282766
S.E. of regression	0.658632	Akaike info criterion		2.050248
Sum squared resid	16.91807	Schwarz criterion		2.133837
Log likelihood	-40.03009	Hannan-Quinn criter.		2.080687
F-statistic	112.7289	Durbin-Watson stat		2.217260
Prob(F-statistic)	0.000000			

Null Hypothesis: D(LGEDEXP) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-8.177347	0.0000
Test critical values: 1% level	-3.600987	
5% level	-2.935001	
10% level	-2.605836	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LGEDEXP,2)

Method: Least Squares

Date: 04/15/26 Time: 11:06

Sample (adjusted): 1983 2023

Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGEDEXP(-1))	-1.263548	0.154518	-8.177347	0.0000
C	0.256038	0.112538	2.275121	0.0285
R-squared	0.631620	Mean dependent var		-0.001435
Adjusted R-squared	0.622175	S.D. dependent var		1.125501
S.E. of regression	0.691817	Akaike info criterion		2.148561
Sum squared resid	18.66583	Schwarz criterion		2.232149
Log likelihood	-42.04549	Hannan-Quinn criter.		2.178999
F-statistic	66.86900	Durbin-Watson stat		2.121327
Prob(F-statistic)	0.000000			

COINTEGRATION TEST

Date: 04/15/26 Time: 16:16

Sample (adjusted): 1983 2023

Included observations: 41 after adjustments

Trend assumption: Linear deterministic trend

Series: RGDPPC GHEPC GEDEXP

Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.708718	56.06932	29.79707	0.0000
At most 1	0.120938	5.497320	15.49471	0.7539
At most 2	0.005167	0.212407	3.841465	0.6449

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.708718	50.57200	21.13162	0.0000
At most 1	0.120938	5.284913	14.26460	0.7055
At most 2	0.005167	0.212407	3.841465	0.6449

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b*S11*b=I):

RGDPPC	GHEPC	GEDEXP
2.88E-05	-0.018214	4.59E-11
-2.56E-05	0.002270	-4.07E-12
-2.04E-05	-0.002855	1.77E-11

Unrestricted Adjustment Coefficients (alpha):

D(RGDPPC)	-1237.157	1236.075	556.7347
D(GHEPC)	71.96101	-42.74550	3.740567
D(GEDEXP)	-5.68E+09	-1.24E+10	7.45E+08

1 Cointegrating Equation(s): Log likelihood -1711.399

Normalized cointegrating coefficients (standard error in parentheses)

RGDPPC	GHEPC	GEDEXP
1.000000	-633.4617	1.59E-06
	(52.6388)	(1.6E-07)

Adjustment coefficients (standard error in parentheses)

D(RGDPPC)	-0.035573
	(0.04101)
D(GHEPC)	0.002069
	(0.00068)
D(GEDEXP)	-163431.2
	(178604.)

2 Cointegrating Equation(s): Log likelihood -1708.756

Normalized cointegrating coefficients (standard error in parentheses)

RGDPPC	GHEPC	GEDEXP
1.000000	0.000000	-7.47E-08
		(1.2E-07)
0.000000	1.000000	-2.64E-09
		(1.9E-10)

Adjustment coefficients (standard error in parentheses)

D(RGDPPC)	-0.067269	25.34045
	(0.05438)	(25.9075)
D(GHEPC)	0.003165	-1.407773
	(0.00086)	(0.41177)
D(GEDEXP)	154158.9	75406535
	(225709.)	(1.1E+08)

VECM

Vector Error Correction Estimates

Date: 04/16/26 Time: 07:29

Sample (adjusted): 2003 2023

Included observations: 21 after adjustments

Standard errors in () & t-statistics in []

Cointegrating Eq:	CointEq1		
LRGDPPC(-1)	1.000000		
LGHEPC(-1)	-2.343967 (0.49106) [-4.77328]		
LGEDEXP(-1)	1.979078 (0.43915) [4.50660]		
C	-48.81443		
Error Correction:	D(LRGDPPC)	D(LGHEPC)	D(LGEDEXP)
CointEq1	-0.066928 (0.04842) [-1.38210]	-0.170238 (0.51769) [-0.32884]	-0.844304 (0.47773) [-1.76731]
D(LRGDPPC(-1))	0.551736 (0.18682) [2.95326]	1.475549 (1.99722) [0.73880]	0.179130 (1.84309) [0.09719]
D(LRGDPPC(-2))	0.104483 (0.19230) [0.54334]	0.451024 (2.05576) [0.21939]	0.435522 (1.89711) [0.22957]
D(LGHEPC(-1))	-0.143061 (0.07406) [-1.93167]	-0.965911 (0.79175) [-1.21997]	-1.314109 (0.73065) [-1.79856]
D(LGHEPC(-2))	-0.063910 (0.04044) [-1.58021]	-0.725108 (0.43236) [-1.67708]	-0.689361 (0.39900) [-1.72774]
D(LGEDEXP(-1))	0.108906 (0.06177) [1.76317]	0.671789 (0.66032) [1.01737]	0.871818 (0.60936) [1.43072]

D(LGEDEXP(-2))	0.070424 (0.03129) [2.25048]	0.147998 (0.33454) [0.44240]	0.244662 (0.30872) [0.79251]
C	0.004472 (0.00775) [0.57709]	0.138194 (0.08284) [1.66830]	0.179616 (0.07644) [2.34969]
R-squared	0.657276	0.463021	0.258971
Adj. R-squared	0.472733	0.173878	-0.140044
Sum sq. resids	0.005707	0.652188	0.555408
S.E. equation	0.020952	0.223983	0.206697
F-statistic	3.561635	1.601359	0.649026
Log likelihood	56.41416	6.657718	8.344330
Akaike AIC	-4.610873	0.127836	-0.032793
Schwarz SC	-4.212959	0.525750	0.365120
Mean dependent	0.018328	0.090981	0.106447
S.D. dependent	0.028854	0.246429	0.193586
Determinant resid covariance (dof adj.)		1.67E-07	
Determinant resid covariance		3.96E-08	
Log likelihood		89.58592	
Akaike information criterion		-5.960564	
Schwarz criterion		-4.617606	
Number of coefficients		27	

FORECAST VARIANCE DECOMPOSITION TEST

Variance Decomposition of LRGDPPC:				
Period	S.E.	LRGDPPC	LGHEPC	LGEDEXP
1	0.020952	100.0000	0.000000	0.000000
2	0.038345	99.61861	0.070807	0.310582
3	0.054426	96.71199	1.630037	1.657978
4	0.071659	90.35725	5.228540	4.414214
5	0.089506	87.44324	6.158478	6.398283
6	0.107317	85.81173	6.162683	8.025588
7	0.124394	84.32480	6.595282	9.079916
8	0.140639	83.32070	6.943007	9.736292
9	0.156251	82.58745	7.086947	10.32560
10	0.171275	81.83572	7.300146	10.86413

Variance Decomposition of LGHEPC:				
Period	S.E.	LRGDPPC	LGHEPC	LGEDEXP
1	0.223983	8.052808	91.94719	0.000000
2	0.272344	6.339146	92.41596	1.244897
3	0.287381	5.811737	91.90261	2.285655
4	0.340253	4.175129	92.34899	3.475884
5	0.378347	3.408232	93.64690	2.944869
6	0.396747	3.554457	93.36881	3.076735
7	0.429454	3.180113	93.09673	3.723159
8	0.464604	2.841013	93.47673	3.682261
9	0.487055	2.976182	93.21589	3.807927
10	0.512233	3.008017	92.77978	4.212198

Variance Decomposition of LGEDEXP:				
Period	S.E.	LRGDPPC	LGHEPC	LGEDEXP
1	0.206697	13.62087	67.10666	19.27246
2	0.281845	13.76545	75.45090	10.78365
3	0.329832	11.46904	79.73776	8.793197
4	0.375721	9.229072	82.98466	7.786270
5	0.406901	7.934011	85.32020	6.745789
6	0.434652	6.986630	86.88967	6.123699

7	0.470671	6.033504	88.37425	5.592241
8	0.503876	5.287539	89.51755	5.194916
9	0.531038	4.760481	90.20645	5.033073
10	0.559327	4.291117	90.77723	4.931658

Cholesky Ordering: LRGDPPC LGHEPC LGEDEXP

IMPULSE RESPONSE FUNCTION

Response of LRGDPC:				
Period	LRGDPC	LGHEPC	LGEDEXP	
1	0.023234	0.000000	0.000000	
2	0.025792	-0.005546	-0.005747	
3	0.029418	-0.008953	-0.002430	
4	0.023655	-0.005920	-0.005547	
5	0.024578	-0.006734	-0.006752	
6	0.021385	-0.008419	-0.007539	
7	0.018685	-0.007683	-0.008245	
8	0.016543	-0.007205	-0.009691	
9	0.015060	-0.007998	-0.010154	
10	0.012766	-0.007940	-0.010769	

Response of LGHEPC:				
Period	LRGDPC	LGHEPC	LGEDEXP	
1	-0.038949	0.228711	0.000000	
2	0.004423	0.135277	0.022134	
3	-0.060772	0.081841	0.029668	
4	-0.080336	0.154828	0.003544	
5	-0.052528	0.145579	-0.003962	
6	-0.063414	0.110703	0.013668	
7	-0.089018	0.134199	0.006147	
8	-0.079980	0.141872	-0.003958	
9	-0.078780	0.124813	0.001264	
10	-0.091379	0.128703	0.002111	

Response of LGEDEXP:				
Period	LRGDPC	LGHEPC	LGEDEXP	
1	0.028658	0.164816	0.158211	
2	-0.043312	0.143729	0.092461	
3	0.005812	0.076203	0.097742	
4	-0.031872	0.110329	0.089351	
5	-0.014180	0.122518	0.091712	

6	-0.022087	0.102998	0.090544
7	-0.029070	0.105097	0.092335
8	-0.033180	0.114528	0.085625
9	-0.029424	0.108162	0.086853
10	-0.036093	0.106356	0.087503

Cholesky Ordering: LRGDPC LGHEPC LGEDEXP
