



# Unbundling the Impact of Fiscal Policy on Health and Educational Outcomes in Nigeria: A Sectoral Analysis

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## Abstract

This study examined the impact of fiscal policy on health and education outcomes in Nigeria, focusing on key variables such as life expectancy, infant mortality rate, school enrollment, total government expenditure, tax revenue, GDP growth rate, and urbanization. Using the Non-Linear Autoregressive Distributed Lag (NARDL) model to analyze data from 1981 to 2022, the study investigated both short-term and long-term effects of fiscal policy on health and education indicators. The findings revealed that increased government expenditure has a significant positive impact on life expectancy and school enrollment, particularly in the long run. However, short-term effects were more variable, with some inconsistencies observed in the immediate response of health and education outcomes to fiscal policy changes. The study concluded that while fiscal policy is a critical tool for improving health and education outcomes, its effectiveness depends on targeted spending, efficient resource allocation, and continuous monitoring. To enhance the positive impacts of fiscal policy, the study recommended that the government prioritize targeted interventions, especially in healthcare and education, and improve the efficiency and accountability of public spending. Additionally, complementary policies such as budgeting and strengthening industry linkages in education are suggested to support the broader objectives of fiscal policy. The study underscored the importance of aligning fiscal expenditure with long-term development goals to ensure sustainable improvements in health and education sectors in Nigeria.

**Keywords:** *Fiscal Policy, Health Outcomes, Education Outcomes, Government Expenditure, Life Expectancy, School Enrollment Rates*

## Introduction

There is no consensus on the relationship between fiscal policy and health as well as education outcomes. On the one hand, studies suggested that fiscal policy inform of investment in health and education by the government is paramount to human capital, which a nation can use to augment productivity (Becker, 1964; Aminu & Abiodun, 2022). Obadan (2019) also argued that fiscal policy positively impacts on net enrollment of education and Adebayo (2020) corroborated that fiscal policy inform of expenditure improves health outcomes. On the second hand, Ezenwa and Nwosu (2023) revealed that fiscal policy tends to reproduce existing inequalities in education access where taxation is found to be regressive. Also, Onwuama and Chukwuemeka (2018) found limited evidence for the link between fiscal policy and research output.

Fiscal policy in Nigeria includes measures aimed at achieving macroeconomic stability, fostering inclusive growth, and addressing structural imbalances within the economy. Taxation, as a key component, serves as a vital source of government revenue and a means to redistribute wealth and promote social equity (Adeniji & Folorunso, 2020). The government's approach to taxation has evolved to broaden the tax base, enhance compliance, and improve revenue collection efficiency. Government spending also plays a crucial role in driving economic growth and development, prioritizing investments in infrastructure, social services, and human capital formation. Fiscal policy in Nigeria also encompasses borrowing and debt management strategies essential for financing budget deficits, funding capital projects, and managing the country's debt portfolio, especially given its reliance on oil revenues (Elechi et al., 2020). Nigeria's fiscal policy is intricately linked to broader macroeconomic factors such as oil revenue volatility, political stability, institutional capacity, and global economic trends (Periola, 2019). These factors significantly influence government revenues, expenditure priorities, and overall fiscal sustainability (Caselli et al., 2022). Despite progress in areas such as tax administration reforms and infrastructure development, significant policy gaps and implementation challenges persist. The Nigerian government must adopt a comprehensive approach to fiscal policy that prioritizes long-term economic sustainability, social inclusion, and human development (Ayodeji & Adebayo, 2015). Strengthening institutional capacity, improving governance and transparency, and diversifying revenue sources are essential steps towards reducing dependency on oil revenues and unlocking Nigeria's full economic potential (Obute, 2021).

The health sector in Nigeria faces numerous challenges, despite the government's efforts to enhance healthcare provision. These challenges include deficiencies in infrastructure, limited access to essential services, shortages in the healthcare workforce as a result of brain drain and replacement of workforce, and the burden of diseases like malaria, HIV/AIDS, and maternal mortality (Abimbola et al., 2019). Several health policies and initiatives, such as the National Health Policy, the National Health Insurance Scheme (NHIS), and the Primary Healthcare Revitalization Program, have been implemented to address these issues and improve health outcomes (Nigeria Health Watch, 2020). Despite these efforts, significant gaps and disparities remain, highlighting the need for continued investment, innovation, and collaboration to achieve equitable access to quality healthcare for all Nigerians. Similarly, the

education sector in Nigeria faces challenges that impede the accessibility and quality of education. These challenges include insufficient funding, dilapidated infrastructure, deficiencies in teacher quality, high rates of out-of-school children, and regional disparities (Okoli & Igwe, 2019). The Nigerian government has embarked on a series of education reforms, including the Universal Basic Education (UBE) Act, aimed at revitalizing the sector and improving educational outcomes. Efforts to promote vocational and technical education also seek to equip students with practical skills essential for employment and economic empowerment (Federal Ministry of Education Nigeria, 2020). Despite these reforms, significant gaps persist, underscoring the need for sustained investment, innovation, and collaboration to transform the education landscape and ensure every Nigerian child can fulfill their potential.

Throughout Nigeria's history, the government has acknowledged the pivotal role of investing in health and education as essential components of national development. Successive administrations have demonstrated a commitment to enhancing healthcare and education outcomes through various policies and programs (World Bank, 2018). These efforts include augmenting budgetary allocations, expanding specialized institutions, implementing comprehensive training programs for healthcare workers and educators, and forging strategic partnerships with international organizations and donors. By investing in these fundamental pillars of national development, Nigeria aims to lay a solid foundation for socio-economic progress, foster human capital formation, and empower its citizens. However, challenges persist, necessitating continued commitment and innovation to achieve inclusive and sustainable development goals.

At the frontier of knowledge, there is no strong ground to affirm that fiscal policy has positive impact on health and education outcomes. Also, studies have not empirically shown if increase or decrease in expenditure will have similar impact on them or otherwise in the short and/ long run. Based on the above, we examined the nexus between fiscal policy and health outcomes taking into consideration three health outcomes (Life expectancy, neonatal mortality rate and infant mortality rate). We also examined the nexus between fiscal policy and education outcome using secondary school enrolment. The Nonlinear Autoregressive Distributed Lag (NARDL) used for short and long run analysis has not been documented in related literature.

### **Literature Review**

Speaking from the theoretical aspect, human capital theory, postulated by Gary Becker in 1964, posits that individuals make investments in education, training, and healthcare to augment their productivity and earning potential gradually. Becker, a distinguished economist, introduced this theory to elucidate how human capabilities contribute to economic growth and individual prosperity. Human capital, as conceptualized by the theory, represents the stock of knowledge, skills, and expertise possessed by individuals, acquired through investments in education and training. According to human capital theory, individuals allocate resources to education, training, and healthcare with the expectation of yielding returns in the form of higher wages, increased productivity, and enhanced job

opportunities over their lifetime. The theory assumes that individuals are rational decision-makers who carefully evaluate the costs and benefits associated with human capital investments. People make choices based on maximizing their utility, considering factors such as anticipated future earnings, educational expenses, and career advancement prospects.

At the empirical front, fiscal policy has tendency to spur healthcare utilization and reduces infant mortality in states through fiscal decentralization of healthcare service delivery (Aminu & Abiodun, 2022). Also, it was affirmed that fiscal policy using increased health expenditure benefits women's health more than men's, emphasizing the need for gender-sensitive budgeting and targeted health interventions (Onwuka & Uwakwe, 2022). Evident also in the literature is the work of Alao and Adeyemo (2020) who explored the distributional impact of fiscal policy on healthcare access in Nigeria, differentiating between rural and urban areas from 2010-2018. It was submitted that urban populations exhibit higher healthcare utilization with increased expenditure, emphasizing the need for pro-rural health policies. Also, Olanrewaju and Adebayo (2018) investigated the role of fiscal transparency in enhancing the effectiveness of fiscal policy for health and education in Nigeria. Focusing on governance quality from 2012-2019. It was observed that fiscal transparency improves the efficiency and effectiveness of health and education spending, suggesting the need for stronger transparency mechanisms and citizen engagement. Ayodele and Adebayo (2020) examined the impact of fiscal policy on maternal and child health outcomes in Nigeria. Focusing on maternal and child health indicators from 2010-2018, and found that targeted maternal and child health interventions funded by increased fiscal expenditure demonstrably improve outcomes, but sustainability and equity issues require further attention. In another related study, Akpantah and Olayiwola (2018) also explored the impact of fiscal policy on public healthcare outcomes in Nigeria from 1990-2015. The study affirmed that increased health expenditure shows mixed results on life expectancy and infant mortality, suggesting efficiency issues alongside positive trends.

Ezenwa and Nwosu (2023) examined the relationship between fiscal policy and inequality in access to education in Nigeria. It covered socioeconomic groups from 2015-2020. Outcome of the investigation revealed that fiscal policy tends to reproduce existing inequalities in education access, suggesting the need for progressive taxation and targeted scholarships. Fiscal sustainability in Nigeria can be achieved by using Public-Private Partnerships (PPPs) in education. Omotosho and Adebayo (2023) found that PPPs can increase private enrollment and reduce fiscal pressure, although concerns persist about equity and quality in private education. In addition, Ogbona and Onwuka (2022) investigated the impact of fiscal policy on Technical and Vocational Education and Training (TVET) in Nigeria. Focusing on TVET enrollment from 2010-2020. The study demonstrated that increased TVET expenditure leads to higher enrollment and employability among graduates, suggesting it can drive economic diversification. In the same vein, Adeyemi and Ajayi (2023) analyzed the intersection of fiscal policy and the informal sector in education in Nigeria, particularly focusing on formal versus informal schools from 2017-2022. The study highlighted the significant role of informal education and emphasized the need for regulatory approaches and partnerships with informal providers. Obadan (2019) examined the impact of fiscal policy on educational

attainment in Nigeria from 1995-2013. The study found that education expenditure positively impacts net enrollment but shows limited influence on literacy rates, suggesting the need for targeted interventions.

Contrary to the opinion that fiscal policy improves school enrolment, Onwuama and Chukwuemeka (2018) examined the influence of fiscal policy on Research and Development (R&D) in the Nigerian health sector. Limited evidence was found for a direct link between fiscal policy and research output, suggesting the need for complementary policies that foster research capacity and collaboration. Adigun and Adepoju (2020) studied the impact of fiscal policy on the digital divide in education in Nigeria, particularly focusing on urban versus rural areas and access to technology in schools. The study revealed that urban schools benefit more from increased technology spending, highlighting the need for targeted interventions and infrastructure development in rural areas. In most of these studies, trend analyses with short periods were used to affirm the relationship between fiscal policy and health as well as education outcomes. Also, studies have not empirically shown if increase or decrease in expenditure will have similar impact on them or otherwise. Based on the above, we examined the nexus between fiscal policy and health outcomes taking into consideration three health outcomes (Life expectancy, neonatal mortality rate and infant mortality rate).

## Methodology

In this study, we are particularly interested in addressing two issues in unbundling the impact of fiscal policy on health and education outcomes. First is to examine the nexus between fiscal policy and health outcomes taking into consideration three health outcomes (Life expectancy, neonatal mortality rate and infant Mortality rate). We also examined the nexus between fiscal policy and education outcome using secondary school enrolment. The model specification for this study was adapted from the work of Owuru (2021) to outline the relationship between fiscal policies (tax revenue and government expenditure) and their respective outcomes (life expectancy for health outcomes and education expenditure for education outcomes) in Nigeria. To achieve this, we specify the model for each objective for clarity's sake. The model specification for each objective is as follows where health and education outcomes depend on fiscal policy:

$$LE_t = \beta_0 + \beta_1 TR_t + \beta_2 GE_t + \beta_3 GDP_{gt} + \beta_4 URB_t + \epsilon_t \dots \dots \dots (1)$$

$$NMR_t = \beta_0 + \beta_1 TR_t + \beta_2 GE_t + \beta_3 GDP_{gt} + \beta_4 URB_t + \epsilon_t \dots \dots \dots (2)$$

$$IMR_t = \beta_0 + \beta_1 TR_t + \beta_2 GE_t + \beta_3 GDP_{gt} + \beta_4 URB_t + \epsilon_t \dots \dots \dots (3)$$

$$SER_t = \beta_0 + \beta_1 TR_t + \beta_2 GE_t + \beta_3 GDP_{gt} + \beta_4 URB_t + \epsilon_t \dots \dots \dots (4)$$

Where *LE* (Life expectancy) is the dependent variable, representing health outcomes.  $\beta_0$  is the intercept term,  $\beta_1$  and  $\beta_2$  are the coefficients of tax revenue and government expenditure, respectively? *TR* (Tax Revenue) and *GE* (Government Expenditure) are the independent variables, representing fiscal policies. *GDP<sub>g</sub>* is Gross Domestic product growth rate, *URB* is Urbanization and  $\epsilon$  is the error term. *NMR* is the neonatal mortality rate, *IMR* is the infant Mortality rate and *SER* (School enrollment) is the dependent variable, representing education outcomes.

It is expected that an increase in tax revenue ( $TR$ ) and government expenditure ( $GE$ ) will positively influence life expectancy. Higher tax revenue may indicate greater fiscal capacity to invest in healthcare infrastructure, while increased government expenditure on healthcare can lead to improved access to medical services, preventive measures, and overall health outcomes. Therefore, we anticipate a positive relationship between tax revenue, government expenditure, and life expectancy. Similarly, we expect that higher tax revenue ( $TR$ ) and government expenditure on healthcare ( $GEH$ ) will be associated with lower neonatal mortality rate (NMR) and infant mortality rate (IMR). Increased fiscal resources allocated to healthcare are likely to enhance maternal and child health services, reduce barriers to prenatal and postnatal care, and mitigate factors contributing to maternal and infant mortality. Consequently, we predict a negative relationship between tax revenue, government expenditure on healthcare, and MMR/IMR. For education outcomes, it is anticipated that higher tax revenue ( $TR$ ) and government expenditure ( $GE$ ) will positively impact school enrollment rates. Increased fiscal resources allocated to education can support the expansion of educational infrastructure, provision of scholarships, and implementation of educational programs, thereby improving access to schooling. Thus, we expect a positive relationship between tax revenue, government expenditure, and school enrollment rates. Urbanization is expected to be either positive or negative because, it may help to access health facilities and improve school enrolment or it can also increase pollution that may impact negatively on health.

### **Sources of Data**

The study employed time series data from 1981 to 2022 for each of the variable of this study and data were obtained through secondary source from World Development Indicators (WDI) and CBN statistical bulletin. Data retrieved from WDI are life expectancy, Gross Domestic Product (GDP) growth rate, urbanization, neonatal mortality rate, infant mortality rate and school enrollment, while tax revenue and government expenditure. The timeline for this study is 42 years observation. The chosen data scope was informed by data availability and the need to have even start and end dates for all the series.

### **Empirical Analysis**

The descriptive statistics for the logged variables is below (Table 1). The mean of LTGEXP is around 6.39 and LTR is 5.44, implying that considerable amounts of expenditure and revenue are recorded. The maximum and minimum statistics provide the range of values that indicate the degree of variability within each variable. For example, the LTGEXP ranges from 2.26 to 9.99, indicating significant variability in government spending on health and education across different periods. The data spread is further demonstrated by standard deviation values. The LTGEXP standard deviation of 2.41 indicates a broad dispersion around the mean, reflecting periods of both high and low expenditure. In a similar vein, the standard deviation for LTR shows notable variations in total revenue, which reflects shifts in the state of the economy and financial capacity. The data distribution is asymmetric, as indicated by skewness statistics. Most variables show a minor negative skewness, which suggests a tendency towards lower values within their respective distributions. Kurtosis measurements imply that the data is less likely to contain severe outliers since a flatter distribution with lighter tails than a normal

distribution is presented. The results of the Jarque-Bera test imply that the data does not significantly deviate from a normal distribution, with p-values typically showing a failure to reject normality. In terms of the economy, the comparatively high mean, and median values for LTGEXP point to significant investments in health and education, while the high standard deviation suggests that these may vary depending on the state of the economy or changes in policy. The government's capacity to continuously finance health and education programs is impacted by variations in economic performance, which are reflected in the variability of total revenue (LTR). The low variability of life expectancy (LE) indicates a stable life expectancy across the time, whereas the increased fluctuation of newborn mortality rate (LNMR) could be attributed to shifts in the quality and accessibility of healthcare. Similarly, although there are occasional fluctuations, the infant mortality rate (LIMR) exhibits moderate variability, indicating success in lowering newborn mortality. Although there is certainly room for improvement, the secondary school enrollment rate's (LSER) low variability points to continuous growth in student enrollment. Significant economic oscillations are reflected in the high variability of GDP growth (GDPG), which affects the fiscal capacity for investments in health and education. The low variability and continuous increase in urbanization (LURB) point to a progressive shift towards urban regions, which in turn affects the demand for education and health services. In addition to suggesting periods of significant investment and improvement, these descriptive statistics also highlight trends, variability, and areas requiring policy focus. They also highlight ongoing challenges and the need for targeted interventions to sustain progress in health, education, and economic growth.

**Table 1:** Descriptive Statistics

|              | LTGEXP    | LTR       | LLE      | LNMR      | LIMR      | LSER     | GDPG      | LURB      |
|--------------|-----------|-----------|----------|-----------|-----------|----------|-----------|-----------|
| Mean         | 6.386958  | 5.436178  | 3.883760 | 3.771855  | 4.608195  | 4.512090 | 3.046473  | 3.590856  |
| Median       | 6.925693  | 6.216406  | 3.866466 | 3.802118  | 4.655293  | 4.492425 | 3.449434  | 3.585907  |
| Maximum      | 9.993744  | 8.980243  | 4.015301 | 3.958907  | 4.822698  | 4.728677 | 15.32916  | 3.980074  |
| Minimum      | 2.261763  | 1.098612  | 3.817427 | 3.552487  | 4.257030  | 4.336808 | -13.12788 | 3.121087  |
| Std. Dev.    | 2.410591  | 2.572046  | 0.057918 | 0.138518  | 0.203006  | 0.095205 | 5.319457  | 0.249966  |
| Skewness     | -0.371963 | -0.382915 | 0.422747 | -0.182799 | -0.313172 | 0.624937 | -0.831907 | -0.138248 |
| Kurtosis     | 1.876187  | 1.728601  | 1.766160 | 1.338548  | 1.490358  | 2.815814 | 4.736123  | 1.913727  |
| Jarque-Bera  | 3.178664  | 3.855161  | 3.915137 | 5.064647  | 4.674821  | 2.793190 | 10.11920  | 2.198768  |
| Probability  | 0.204062  | 0.145500  | 0.141201 | 0.079474  | 0.096577  | 0.247438 | 0.006348  | 0.333076  |
| Sum          | 268.2522  | 228.3195  | 163.1179 | 158.4179  | 193.5442  | 189.5078 | 127.9519  | 150.8159  |
| Sum Sq. Dev. | 238.2489  | 271.2321  | 0.137536 | 0.786671  | 1.689664  | 0.371621 | 1160.162  | 2.561798  |
| Observations | 42        | 42        | 42       | 42        | 42        | 42       | 42        | 42        |

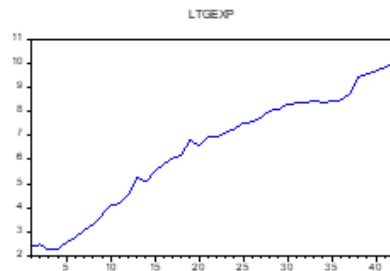
The trend of the LTGEXP as shown in Fig.1 indicates an upward trend over time. Starting from a value of around 2.43 in the early 1980s, it rises steadily, surpassing 8 by the 2020s. This trend suggests that government spending has consistently increased over the years, potentially reflecting rising public sector activity, investments in infrastructure, or responses to economic crises. Notably, the growth is not entirely linear, as there are some fluctuations, especially between 1990 and 2000, but the long-term trajectory remains upward. In fig. 2, LTR

also shows significant growth. Beginning at around 1.55 in 1981, it reaches over 8 by the end of the time series. This growth parallels the rise in government expenditure, indicating that as governments spend more, they also collect more in taxes. However, there is notable volatility in the data during the 1980s and early 1990s, suggesting periods of economic instability or changes in tax policies.

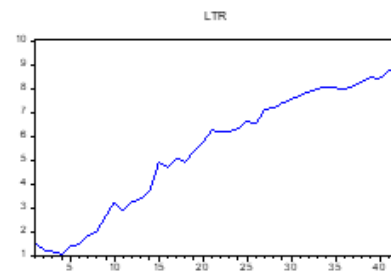
Shown in Fig 3, the LLE has remained stable compared to the other variables. It fluctuates within a small range, indicating gradual improvements in life expectancy over the years. While the increase is subtle, there is a positive trend, implying better health outcomes and healthcare improvements. By the 2020s, life expectancy has improved modestly, suggesting ongoing, albeit slow, advancements in public health. The LNMR shows a general decline, which is a positive indicator of improving health outcomes for newborns. Starting at around 3.96 in 1981, it declines steadily throughout the years, reaching approximately 3.58 by the early 2020s. This trend reflects improvements in maternal and child healthcare, medical advancements, and better access to healthcare services over time.

Similarly, the LIMR also follows a downward trend, reflecting progress in healthcare for infants. The decline is gradual, with some fluctuation in the 1990s, but by 2022, the values have dropped from around 4.82 to 4.30. This trend aligns with global improvements in reducing infant deaths due to better medical care and preventive health services. LSER shows a positive trend. The data indicate a steady increase from the early 1980s to the early 2000s, with some fluctuations around the mid-2000s. By the 2020s, the enrollment rates have slightly leveled off, indicating saturation or challenges in expanding education further. Nonetheless, the overall trend suggests that access to education has improved significantly over time. The GDPg is highly volatile. It starts with a sharp negative growth rate of -13.13% in the early 1980s, indicating a period of economic downturn. Over the following decades, the GDP growth rate fluctuates widely, with periods of both rapid growth and sharp contractions. Notable peaks can be seen in the mid-2000s and around 2021, while the troughs suggest economic crises, linked to global recessions or local economic issues. The overall trend shows no clear long-term growth pattern but rather cyclical fluctuations typical of an emerging or developing economy.

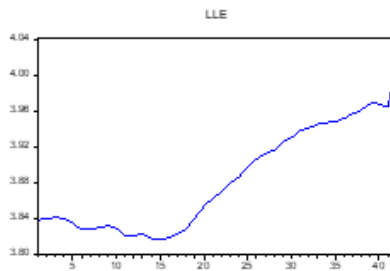
Lastly, LURB shows a steady upward trend, reflecting the increasing urbanization over the past four decades. From a value of around 3.12 in 1981, it climbs steadily to over 3.9 by 2022. This growth aligns with global trends of rural-to-urban migration as people move towards cities for better economic opportunities, industrialization, and improved living standards. Summarily, the trends in the data indicate overall improvements in economic and social indicators such as government expenditure, tax revenue, life expectancy, and urbanization. However, some indicators, like the GDP growth rate, show significant volatility, while others, such as school enrollment and mortality rates, indicate positive long-term changes. The data reflect both progress and the challenges inherent in managing economic and social development over the past four decades.



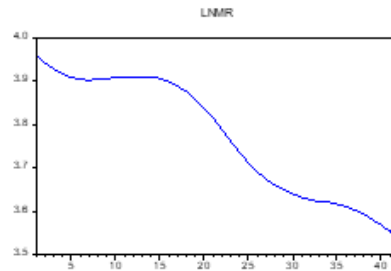
**Fig 1- Trend of LTGEXP**



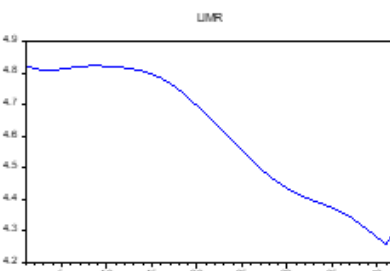
**Fig 2- Trend of LTR**



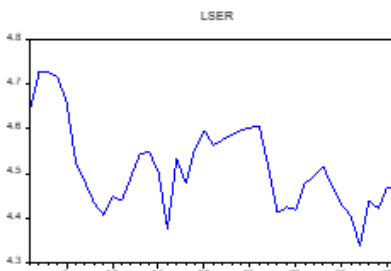
**Fig 3- Trend of LLE**



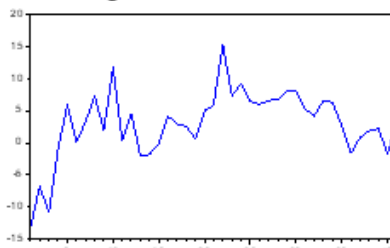
**Fig 4- Trend of LNMR**



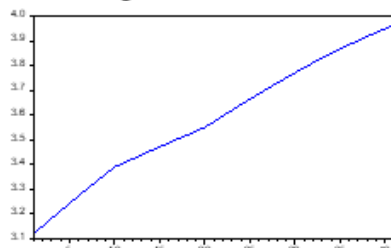
**Fig 5- Trend of LIMR**



**Fig 6- Trend of LSER**



**Fig 7- Trend of GDPg**



**Fig 8- Trend of LURB**

The Augmented Dickey-Fuller (ADF) test results indicate the stationarity of various variables at both their levels and first differences. The critical values at 1%, 5%, and 10% significance levels are provided for comparison. The variables LTGEXP, LTR, LLE, LIMR, LSER, and LURB are non-stationary at their levels, as their t-statistics are greater than the critical values and their probabilities are not significant. However, they become stationary at the first difference, as indicated by significant t-statistics. Conversely, the variables LSER and GDPg show stationarity at the level and become stationary at the first difference. These results suggest that most variables are integrated of order one,  $I(1)$ , meaning they become stationary after differencing once.

**Table 2:** Summary of Unit Root Test Results

|               | ADF                |                                                 |                               |                         |                                                |                                     |
|---------------|--------------------|-------------------------------------------------|-------------------------------|-------------------------|------------------------------------------------|-------------------------------------|
|               | AT LEVEL           |                                                 |                               | AT 1 <sup>ST</sup> DIFF |                                                |                                     |
| Variables     | t-stat/Prob        | Critical values at 1%, 5% and 10%, respectively | Order of integration          | t-stat/Prob             | Critical values at 1%, 5% and 10% respectively | Order of integration                |
| <b>LTGEXP</b> | -0.9199<br>0.7716  | -3.6055<br>-2.9369<br>-2.6068                   | Non-stationary at level       | -7.4635<br>0.0000       | -3.6055<br>-2.9369<br>-2.6068                  | Stationary at 1 <sup>st</sup> diff. |
| <b>LTR</b>    | 0.4643<br>0.8099   | -2.6326<br>-1.9506<br>-1.6110                   | Non-stationary at level       | -3.2911<br>0.0020       | -2.6607<br>-1.9550<br>-1.6090                  | Stationary at 1 <sup>st</sup> diff. |
| <b>LLE</b>    | 0.46994<br>0.9821  | -3.7114<br>-2.9810<br>-2.6299                   | Non-stationary at level       | -4.0771<br>0.0044       | -3.7240<br>-2.9862<br>-2.6326                  | Stationary at first diff.           |
| <b>LNMR</b>   | -0.9312<br>0.3069  | -2.6272<br>-1.9498<br>-1.6114                   | Non-stationary at level at 1% | -1.6339<br>0.0957       | -2.6272<br>-1.9498<br>-1.6114                  | Stationary at 1 <sup>st</sup> diff. |
| <b>LIMR</b>   | -1.6642<br>0.0900  | -2.6569<br>-1.9544<br>-1.6093                   | stationary at level           | -2.2153<br>0.0283       | -2.6569<br>-1.9544<br>-1.6093                  | Stationary at 1 <sup>st</sup> diff. |
| <b>GDPg</b>   | -1.98471<br>0.0463 | -2.6240<br>-1.9493<br>-1.6117                   | Stationary at level           | -4.0525<br>0.0002       | -2.6272<br>-1.9498<br>-1.6114                  | Stationary at 1 <sup>st</sup> diff  |
| <b>LSER</b>   | -0.9112<br>0.3150  | -2.6289<br>-1.9501<br>-1.6113                   | Stationary at level           | -4.5492<br>0.0000       | -2.6289<br>-1.9501<br>-1.6113                  | Stationary at 1 <sup>st</sup> dif.  |
| <b>LURB</b>   | 1.80993<br>1.0000  | -4.2732<br>-3.5577<br>-3.2123                   | Non-stationary at level       | -4.9743<br>0.0019       | -4.2845<br>-3.5628<br>-3.2152                  | Stationary at 1 <sup>st</sup> diff. |

The covariance analysis indicates that there exists a robust positive association between LLE and both LTGEXP and LTR. This suggests that an increase in public spending and revenue collection is linked to longer life expectancies. This emphasizes how crucial fiscal policies are to enhancing the outcomes of public health. As expected, there is a negative association between LLE and both LNMR and LIMR. This indicates that life expectancy is linked to lower death rates. Fascinatingly, the positive but smaller association between GDPg and LLE suggests that although economic expansion improves health outcomes, its influence is less direct than that of fiscal policies.

Strong fiscal policies are essential for enhancing child health, as indicated by the negative connection of LIMR and LNMR with LTGEXP and LTR. This further highlights the role of government spending and revenue in lowering infant and newborn death rates. The

relationship between government spending and revenue production is shown by the substantial positive connection between LTGEXP and LTR. Furthermore, there is a large positive association between urbanization (LURB) and both LTGEXP and LTR, indicating that higher government spending and revenue have a significant positive impact on urban areas and may result in improved infrastructure and services. The poor relationship between GDP growth and urbanization suggests, nevertheless, that without specific fiscal policies, economic expansion could not always result in urban development. Overall, the analysis shows that fiscal policies play a crucial role in improving urbanization and public health, with economic expansion acting as a supportive rather than the primary driver.

**Table 3:** Short run Covariance Analysis

| Covariance  |          |          |           |          |         |         |         |
|-------------|----------|----------|-----------|----------|---------|---------|---------|
|             | LLE      | LIMR     | LNMR      | LSER     | LTGEXP  | LTR     | GDPG    |
| LLE         | 0.0032   |          |           |          |         |         |         |
|             | 1.0000   |          |           |          |         |         |         |
|             | -----    |          |           |          |         |         |         |
|             | -----    |          |           |          |         |         |         |
| LIMR        | -0.0112  | 0.0402   |           |          |         |         |         |
| Correlation | -0.9823  | 1.0000   |           |          |         |         |         |
| t-Statistic | -33.1793 | -----    |           |          |         |         |         |
| Probability | 0.0000   | -----    |           |          |         |         |         |
|             |          |          |           |          |         |         |         |
| LNMR        | -0.0076  | 0.02728  | 0.0187    |          |         |         |         |
| Correlation | -0.97328 | 0.9939   | 1.0000    |          |         |         |         |
| t-Statistic | -26.8077 | 57.3215  | -----     |          |         |         |         |
| Probability | 0.0000   | 0.0000   | -----     |          |         |         |         |
|             |          |          |           |          |         |         |         |
| LSER        | -0.0021  | 0.0084   | 0.0059    | 0.0088   |         |         |         |
| Correlation | -0.3968  | 0.4476   | 0.4647    | 1.0000   |         |         |         |
| t-Statistic | -2.7344  | 3.1664   | 3.3191    | -----    |         |         |         |
| Probability | 0.0093   | 0.0030   | 0.0019    | -----    |         |         |         |
|             |          |          |           |          |         |         |         |
| LTGEXP      | 0.1173   | -0.4388  | -0.3009   | -0.1148  | 5.6725  |         |         |
| Correlation | 0.8607   | -0.9185  | -0.92311  | -0.5124  | 1.0000  |         |         |
| t-Statistic | 10.6950  | -14.6973 | -15.1860  | -3.7745  | -----   |         |         |
| Probability | 0.0000   | 0.0000   | 0.0000    | 0.0005   | -----   |         |         |
|             |          |          |           |          |         |         |         |
| LTR         | 0.1263   | -0.4710  | -0.32362  | -0.12165 | 6.0134  | 6.4579  |         |
| Correlation | 0.8689   | -0.9241  | -0.93051  | -0.50892 | 0.9935  | 1.0000  |         |
| t-Statistic | 11.1066  | -15.2951 | -16.06766 | -3.7391  | 55.4006 | -----   |         |
| Probability | 0.0000   | 0.0000   | 0.0000    | 0.0006   | 0.0000  | -----   |         |
|             |          |          |           |          |         |         |         |
| GDPg_       | 0.05636  | -0.2459  | -0.2230   | -0.1571  | 4.8020  | 5.3563  | 27.6229 |
| Correlation | 0.1874   | -0.2333  | -0.3100   | -0.3179  | 0.3836  | 0.4010  | 1.0000  |
| t-Statistic | 1.2066   | -1.5177  | -2.0624   | -2.1206  | 2.6272  | 2.7688  | -----   |
| Probability | 0.2347   | 0.1370   | 0.0457    | 0.0402   | 0.0121  | 0.0085  | -----   |
|             |          |          |           |          |         |         |         |
| LURB        | 0.01276  | -0.0470  | -0.0323   | -0.0133  | 0.5784  | 0.6154  | 0.4840  |
| Correlation | 0.90298  | -0.9506  | -0.9559   | -0.5756  | 0.9833  | 0.9806  | 0.3729  |
| t-Statistic | 13.2911  | -19.387  | -20.5955  | -4.4529  | 34.1913 | 31.6663 | 2.5420  |
| Probability | 0.0000   | 0.0000   | 0.0000    | 0.0001   | 0.0000  | 0.0000  | 0.0150  |

The recorded variables' long-term associations as shown in table 4, which mirror their underlying economic dynamics are revealed by the long-run covariance analysis. The data indicates a substantial positive covariance between LE and LTGEXP as well as LTR. This suggests a significant positive relationship between long-term increases in government spending and revenue collection and improved life expectancy. This emphasizes how important it is to make consistent financial investments to improve public health over time. On the other hand, there is a significant negative correlation between LLE and both the LNMR and LIMR, indicating that longer life expectancy is associated with lower death rates. The long-term significant interdependency between government spending and revenue production is highlighted by the substantial positive co-variances between LTGEXP and LTR. Significant negative co-variances between these variables and LIMR and LNMR are also observed, highlighting the significance of ongoing financial efforts to lower infant and newborn death rates. The data indicates that there is a positive co-variance between (GDPg and LLE, LTGEXP, and LTR. This suggests that sustained economic growth leads to increased government spending and revenue, which in turn improves life expectancy. But the negative correlation between GDPg and LIMR and LNMR suggests that, in the absence of complementary fiscal reforms, economic development might not be enough to lower mortality rates on its own. Positive co-variances between LURB and LTGEXP and LTR shows that long-term government expenditure and revenue collection benefit urban areas, leading to better services and infrastructure. The comparatively lesser co-variances, however, imply that specific interventions outside of broad fiscal policies may be necessary to address urbanization's direct effects on health outcomes and economic growth. Overall, the analysis highlights how long-term economic growth and fiscal policies can promote urban development and enhance public health.

**Table 4:** Long run Covariance Analysis Result

|               | <b>LLE</b> | <b>LIMR</b> | <b>LNMR</b> | <b>LSER</b> | <b>LTGEXP</b> | <b>LTR</b> | <b>GDPG</b> | <b>LURB</b> |
|---------------|------------|-------------|-------------|-------------|---------------|------------|-------------|-------------|
| <b>LLE</b>    | 0.0119     | -0.0420     | -0.0284     | -0.0078     | 0.4323        | 0.4686     | 0.1853      | 0.0469      |
| <b>LIMR</b>   | -0.0420    | 0.1506      | 0.1020      | 0.0307      | -1.6273       | -1.7578    | -0.8035     | -0.1741     |
| <b>LNMR</b>   | -0.0284    | 0.1020      | 0.0698      | 0.0214      | -1.1125       | -1.2044    | -0.7146     | -0.1189     |
| <b>LSER</b>   | -0.0078    | 0.0307      | 0.02146     | 0.0251      | -0.4045       | -0.4261    | -0.4255     | -0.0467     |
| <b>LTGEXP</b> | 0.4323     | -1.6273     | -1.1125     | -0.4045     | 20.7535       | 22.17214   | 15.8023     | 2.1084      |
| <b>LTR</b>    | 0.4686     | -1.7578     | -1.2044     | -0.4261     | 22.1721       | 23.85126   | 17.40001    | 2.2578      |
| <b>GDPG</b>   | 0.1853     | -0.8035     | -0.7146     | -0.4255     | 15.8023       | 17.4000    | 62.9735     | 1.5027      |
| <b>LURB</b>   | 0.0469     | -0.1741     | -0.1189     | -0.0467     | 2.1084        | 2.2578     | 1.5027      | 0.2208      |

### **Main Results: The effect fiscal measures on health outcomes**

The results of the NARDL (Nonlinear Autoregressive Distributed Lag) model presented in Table 5 provide insight into the impact of fiscal policy on health outcome in the short and long run, focusing on life expectancy (LLE) as the dependent variable. In the short run, tax revenue (LTR) exhibits a negative and immediate significant impact on life expectancy. This suggests that an increase in tax revenue initially reduces life expectancy. However, the lagged effects of LTR show a mix of positive and negative impacts, indicating a complex relationship.

Government expenditure, particularly when positive (LTGEXP\_POS), also shows a significant short-run negative impact at lag three. On the other hand, negative changes in government expenditure (LTGEXP\_NEG) also have a significant negative impact at lag two. GDP growth rate (GDPg) and urbanization (LURB) have mixed short-run effects, with urbanization showing a significant positive impact on life expectancy without lag.

In the long run, tax revenue (LTR) continues to negatively impact life expectancy, indicating that sustained increases in tax revenue could lead to lower life expectancy. Conversely, positive changes in government expenditure (LTGEXP\_POS) and negative changes (LTGEXP\_NEG) both have significant positive effects on life expectancy. This implies that increased government spending, whether initially positive or negative, contributes to higher life expectancy. Urbanization (LURB) also positively influences life expectancy with a significant coefficient of 0.2697, suggesting that urbanization enhances health outcomes. The result highlights the significant roles that tax revenue, government expenditure, GDP growth, and urbanization play in shaping health and education outcomes, particularly life expectancy, in both the short and long term.

**Table 5:** Long run and short run LE

| <b>Dependent Variable: LLE</b> |                    |                   |                    |              |
|--------------------------------|--------------------|-------------------|--------------------|--------------|
| <b>Variable</b>                | <b>Coefficient</b> | <b>Std. Error</b> | <b>t-Statistic</b> | <b>Prob.</b> |
| LTR                            | -0.0370            | 0.0134            | -2.7519            | 0.0175       |
| LTGEXP_POS                     | 0.0554             | 0.0171            | 3.2230             | 0.0073       |
| LTGEXP_NEG                     | 0.1472             | 0.0409            | 3.5952             | 0.0037       |
| GDPG                           | -0.0008            | 0.0003            | -2.2130            | 0.0470       |
| LURB                           | 0.2697             | 0.0421            | 6.3982             | 0.0000       |
| C                              | 1.2341             | 0.0516            | 23.911             | 0.0000       |
| <b>Short- Run Estimates</b>    |                    |                   |                    |              |
| <b>Variable</b>                | <b>Coefficient</b> | <b>Std. Error</b> | <b>t-Statistic</b> | <b>Prob.</b> |
| D(LTR)                         | -0.0231            | 0.0075            | -3.0464            | 0.0102       |
| D(LTR(-1))                     | 0.0117             | 0.0081            | 1.4394             | 0.1756       |
| D(LTR(-2))                     | -0.0115            | 0.0064            | -1.7845            | 0.0996       |
| D(LTR(-3))                     | 0.0086             | 0.0103            | 0.8589             | 0.4072       |
| D(LTGEXP_POS)                  | 0.0139             | 0.0126            | 1.1098             | 0.2888       |
| D(LTGEXP_POS(-1))              | -0.0079            | 0.0160            | -0.4943            | 0.6300       |
| D(LTGEXP_POS(-2))              | 0.0169             | 0.0127            | 1.3346             | 0.2068       |
| D(LTGEXP_POS(-3))              | -0.0636            | 0.0117            | -5.4130            | 0.0002       |
| D(LTGEXP_NEG)                  | 0.0224             | 0.0285            | 0.7857             | 0.4473       |
| D(LTGEXP_NEG(-1))              | -0.0023            | 0.0389            | -0.0596            | 0.9534       |
| D(LTGEXP_NEG(-2))              | -0.1669            | 0.0414            | -4.0252            | 0.0017       |
| D(GDPG)                        | 0.0002             | 0.0003            | 0.0702             | 0.9452       |
| D(GDPG(-1))                    | 0.0056             | 0.0002            | 2.3048             | 0.0398       |
| D(GDPG(-2))                    | 0.0003             | 0.0002            | 1.5138             | 0.1559       |
| D(LURB)                        | 2.4093             | 0.9187            | 2.6225             | 0.0223       |
| D(LURB(-1))                    | -1.2232            | 1.4388            | -0.8501            | 0.4119       |
| D(LURB(-2))                    | 1.4573             | 1.6523            | 0.8820             | 0.3951       |
| D(LURB(-3))                    | 1.4528             | 0.9719            | 1.4947             | 0.1608       |

The NARDL model results in Table 6 offers insight into the short-run and long-run dynamics between fiscal policy variable and neonatal mortality rate (LNMR). The short run model reveals some notable dynamics. The lagged differences of LNMR are significant; with the first lag showing a negative impact on the current neonatal mortality rate, indicating that previous rate in neonatal mortality reduce current levels. However, the second lag shows a significant positive impact, suggesting that previous increases in LNMR lead to further increases in subsequent periods. The GDPG has a mixed result, where the current period and the second lag of GDPG positively affect neonatal mortality, indicating that higher economic growth might be associated with higher neonatal mortality, which may reflect disparities in how growth benefits are distributed. Positive LTGEXP\_POS and negative LTGEXP\_NEG, have varied effects. The third lag of positive expenditure changes significantly reduces, suggesting that increased spending eventually lowers neonatal mortality. Conversely, immediate negative changes in expenditure (LTGEXP\_NEG) significantly increase LNMR, while some lagged effects also show a reduction in LNMR. Urbanization (LURB) shows a positive impact in the current period, though it is not statistically significant.

Overall, the coefficients for GDP growth (GDPG), government expenditure (both positive and negative), tax revenue (LTR), and urbanization (LURB) are not statistically significant. Although government expenditure (LTGEXP\_POS and LTGEXP\_NEG) and urbanization (LURB) have positive coefficients, indicating a potential increase in neonatal mortality associated with these factors, the lack of significance suggests that these relationships may not hold consistently over time. Tax revenue has a negative coefficient, indicating a potential long-term reduction in neonatal mortality with higher tax revenue, but this effect is also not significant.

**Table 6: Long Run and short Run for LNMR**

| Dependent Variable: LNMR |             |            |             |        |
|--------------------------|-------------|------------|-------------|--------|
| Variable                 | Coefficient | Std. Error | t-Statistic | Prob.  |
| GDPG                     | 0.0100      | 0.0070     | 1.4185      | 0.1938 |
| LTGEXP_POS               | 0.3544      | 0.3785     | 0.9362      | 0.3765 |
| LTGEXP_NEG               | 0.3768      | 0.6268     | 0.6012      | 0.5643 |
| LTR                      | -0.5222     | 0.4465     | -1.1695     | 0.2759 |
| LURB                     | 0.9609      | 1.6435     | 0.5847      | 0.5749 |
| C                        | 1.0640      | 1.9549     | 0.5442      | 0.6011 |
| Short – Run Estimates    |             |            |             |        |
| Variable                 | Coefficient | Std. Error | t-Statistic | Prob.  |
| D(LNMR(-1))              | -0.8376     | 0.3651     | -2.2937     | 0.0510 |
| D(LNMR(-2))              | 1.3769      | 0.3681     | 3.7399      | 0.0057 |
| D(LNMR(-3))              | 0.2685      | 0.3945     | 0.6806      | 0.5153 |
| D(GDPG)                  | 0.0005      | 0.0001     | 2.8228      | 0.0224 |
| D(GDPG(-1))              | -0.0006     | 0.0001     | -0.4688     | 0.6517 |
| D(GDPG(-2))              | 0.0002      | 0.0008     | 2.5656      | 0.0334 |
| D(GDPG(-3))              | -0.0001     | 0.0007     | -1.9022     | 0.0936 |
| D(LTGEXP_POS)            | -0.0117     | 0.0080     | -1.4577     | 0.1830 |
| D(LTGEXP_POS(-1))        | -0.0143     | 0.0090     | -1.5976     | 0.1488 |
| D(LTGEXP_POS(-2))        | 0.0067      | 0.0068     | 0.9993      | 0.3469 |
| D(LTGEXP_POS(-3))        | -0.0494     | 0.0093     | -5.2815     | 0.0007 |
| D(LTGEXP_NEG)            | 0.0532      | 0.0161     | 3.2979      | 0.0109 |
| D(LTGEXP_NEG(-1))        | 0.0048      | 0.0264     | 0.1839      | 0.8586 |
| D(LTGEXP_NEG(-2))        | -0.0563     | 0.0255     | -2.2037     | 0.0587 |
| D(LTGEXP_NEG(-3))        | 0.0565      | 0.0169     | 3.3393      | 0.0102 |
| D(LTR)                   | -0.0035     | 0.0058     | -0.6071     | 0.5606 |
| D(LTR(-1))               | 0.0207      | 0.0052     | 3.9248      | 0.0044 |
| D(LTR(-2))               | 0.0046      | 0.0035     | 1.3214      | 0.2229 |
| D(LTR(-3))               | 0.0062      | 0.0051     | 1.1994      | 0.2647 |
| D(LURB)                  | -0.9217     | 0.5286     | -1.7437     | 0.1194 |
| D(LURB(-1))              | 0.9106      | 0.8948     | 1.0176      | 0.3386 |
| D(LURB(-2))              | -1.0351     | 0.7513     | -1.3778     | 0.2056 |

The NARDL model results presented in table 7 for the impact of fiscal policy on the infant mortality rate (LIMR) provide insights into both short-run and long-run dynamics. In the short run, several factors significantly influence the infant mortality rate. The lagged values of LIMR show mixed results. Specifically, the first lag has a negative, but not statistically significant, effect while the third lag has a significant positive effect. This suggests that changes in infant mortality rates have complex dynamics, with past increases potentially leading to further increases in the current period. The GDPG has a significant impact in the short run. The current period GDPG positively affects LIMR, indicating that economic growth is associated with an increase in infant mortality in the immediate term. However, the lags of GDPG show significant negative effects, suggesting that previous periods of economic growth may lead to reductions in infant mortality over time. Government expenditure changes have varied effects. While the positive changes (LTGEXP\_POS) show no significant impact in the short run, the third lag has a significant negative effect, indicating that delayed increases in government spending reduce infant mortality. On the other hand, the negative changes in government expenditure (LTGEXP\_NEG) are not statistically significant in the short run.

LURB significantly decreases infant mortality in the current period, while the third lag shows a significant negative impact as well, suggesting that urbanization has a consistent reducing effect on infant mortality in the short run.

Eventually, the coefficients for GDPG, TR, and URB are statistically significant, indicating their importance in influencing infant mortality over time. The GDPG has a positive coefficient, suggesting that sustained economic growth could lead to higher infant mortality in the long term, due to unequal distribution of growth benefits. Positive government expenditure (LTGEXP\_POS) and negative expenditure (LTGEXP\_NEG) are not significant, indicating that these forms of spending do not have a consistent long-term impact on infant mortality. However, tax revenue (LTR) has a significant negative coefficient, implying that higher tax revenues contribute to lower infant mortality eventually. Urbanization (LURB) has a strong negative long-run effect on infant mortality, highlighting that increased urbanization is associated with lower infant mortality rates over time. While fiscal policy and economic variables show complex and varied short-run impacts on infant mortality, urbanization and tax revenue play significant roles in reducing infant mortality in the long run.

**Table 7: Long Run and short Run for IMR**

| <b>Dependent Variable: LIMR</b> |                    |                   |                    |              |
|---------------------------------|--------------------|-------------------|--------------------|--------------|
| <b>Variable</b>                 | <b>Coefficient</b> | <b>Std. Error</b> | <b>t-Statistic</b> | <b>Prob.</b> |
| GDPG                            | 0.0049             | 0.0006            | 7.4261             | 0.0000       |
| LTGEXP_POS                      | 0.0261             | 0.0315            | 0.8280             | 0.4270       |
| LTGEXP_NEG                      | -0.0397            | 0.0342            | -1.1601            | 0.2729       |
| LTR                             | -0.0589            | 0.0240            | -2.4552            | 0.0340       |
| LURB                            | -0.7512            | 0.2256            | -3.3294            | 0.0076       |
| C                               | 3.3676             | 0.2950            | 11.4137            | 0.0000       |
| <b>Short – Run Estimates</b>    |                    |                   |                    |              |
| <b>Variable</b>                 | <b>Coefficient</b> | <b>Std. Error</b> | <b>t-Statistic</b> | <b>Prob.</b> |
| D(LIMR(-1))                     | -2.0138            | 1.0816            | -1.8617            | 0.0922       |
| D(LIMR(-2))                     | -1.2923            | 1.5210            | -0.8496            | 0.4154       |
| D(LIMR(-3))                     | 5.0717             | 1.7518            | 2.8950             | 0.0160       |
| D(GDPG)                         | 0.0015             | 0.0003            | 3.0879             | 0.0115       |
| D(GDPG(-1))                     | -0.0018            | 0.0004            | -3.8593            | 0.0032       |
| D(GDPG(-2))                     | -0.0006            | 0.0003            | -2.0904            | 0.0631       |
| D(GDPG(-3))                     | -0.0006            | 0.0002            | -2.1726            | 0.0549       |
| D(LTGEXP_POS)                   | 0.0017             | 0.0170            | 0.1013             | 0.9213       |
| D(LTGEXP_POS(-1))               | -0.0015            | 0.0172            | -0.0887            | 0.9310       |
| D(LTGEXP_POS(-2))               | -0.0020            | 0.0119            | -0.1724            | 0.8665       |
| D(LTGEXP_POS(-3))               | -0.0624            | 0.0125            | -4.9707            | 0.0006       |
| D(LTGEXP_NEG)                   | 0.0568             | 0.0360            | 1.5754             | 0.1462       |
| D(LTR)                          | 0.0122             | 0.0092            | 1.3193             | 0.2165       |
| D(LTR(-1))                      | 0.0337             | 0.0088            | 3.7925             | 0.0035       |
| D(LTR(-2))                      | 0.0155             | 0.0075            | 2.0517             | 0.0673       |
| D(LTR(-3))                      | 0.0246             | 0.0112            | 2.1944             | 0.0529       |
| D(LURB)                         | -5.3034            | 1.6104            | -3.2931            | 0.0081       |
| D(LURB(-1))                     | 3.0921             | 1.7685            | 1.7483             | 0.1110       |
| D(LURB(-2))                     | -1.0024            | 1.5479            | -0.6475            | 0.5319       |
| D(LURB(-3))                     | -3.3920            | 1.4000            | -2.4227            | 0.0359       |

The results for the relationship between the selected economic variables and the school enrollment rate (LSER) in Table 8 reveal the dynamics for short-run and long-run dynamics. In the short run, several lag values of LSER are statistically significant, indicating strong autoregressive behavior, LSER (-1), LSER (-2), and LSER (-3) are all positively significant. This suggests that past increases in school enrollment rate are strongly associated with further increases in the current period, indicating persistence or momentum in school enrollment. GDPG has no significant impact in the short run. Positive government expenditure (LTGEXP\_POS) shows no significant short-run effects on LSER, except for the third lag, which has a negative but borderline significant effect, implying that delayed increases in government spending might slightly reduce school enrollment. Negative government expenditure (LTGEXP\_NEG) shows mixed effects but is not significantly impactful in the short run. Tax revenue (LTR) has a significant negative effect, indicating that increases in tax

revenue lead to a decrease in school enrollment in the short run. Urbanization (LURB) shows mixed and insignificant effects in the short run, except for the second lag, which is negatively significant, suggesting that delayed urbanization might decrease school enrollment.

In the long run, positive government expenditure (LTGEXP\_POS) is positively significant in the long run, suggesting that sustained increases in government spending are associated with higher social expenditure. LTGEXP\_NEG has a negative but borderline significant effect, indicating that decreases in government spending can lead to lower social expenditure over time. LTR has a negative long-run effect, suggesting that higher tax revenues are associated with a reduction in social expenditure in the long term. LURB shows a strongly negative and highly significant impact, indicating that greater urbanization is consistently associated with lower social expenditure in the long run. The results indicate that LSER is significantly influenced by its own past values in the short run, showing persistence in expenditure patterns. In the long run, government expenditure and urbanization play crucial roles, with positive government expenditure increasing social expenditure, while urbanization and tax revenue are associated with reductions in social expenditure. The strong significance of the error correction term also suggests that the system quickly corrects any short-run deviations back to the long-run equilibrium.

**Table 8: Long Run and Short Run for SER**

| <b>Dependent Variable: LSER</b> |                    |                   |                    |              |
|---------------------------------|--------------------|-------------------|--------------------|--------------|
| <b>Variable</b>                 | <b>Coefficient</b> | <b>Std. Error</b> | <b>t-Statistic</b> | <b>Prob.</b> |
| GDPG                            | 0.0005             | 0.0008            | 0.6158             | 0.5479       |
| LTGEXP_POS                      | 0.0831             | 0.0413            | 2.0115             | 0.0639       |
| LTGEXP_NEG                      | -0.3103            | 0.1730            | -1.7935            | 0.0945       |
| LTR                             | -0.0596            | 0.0327            | -1.8190            | 0.0903       |
| LURB                            | -0.8207            | 0.1255            | -6.5374            | 0.0000       |
| C                               | 3.1792             | 0.1626            | 19.5467            | 0.0000       |
| <b>Short – Run Estimates</b>    |                    |                   |                    |              |
| <b>Variable</b>                 | <b>Coefficient</b> | <b>Std. Error</b> | <b>t-Statistic</b> | <b>Prob.</b> |
| D(LSER(-1))                     | 0.6893             | 0.1942            | 3.5493             | 0.0032       |
| D(LSER(-2))                     | 0.8775             | 0.1957            | 4.4842             | 0.0005       |
| D(LSER(-3))                     | 0.7375             | 0.1817            | 4.0584             | 0.0012       |
| D(GDPG)                         | 0.0008             | 0.0013            | 0.6372             | 0.5342       |
| D(LTGEXP_POS)                   | 0.0006             | 0.0682            | 0.0102             | 0.9920       |
| D(LTGEXP_POS(-1))               | -0.0263            | 0.0670            | -0.3932            | 0.7001       |
| D(LTGEXP_POS(-2))               | 0.0491             | 0.0679            | 0.7226             | 0.4818       |
| D(LTGEXP_POS(-3))               | -0.1281            | 0.0641            | -1.9981            | 0.0655       |
| D(LTGEXP_NEG)                   | 0.0722             | 0.1610            | 0.4482             | 0.6609       |
| D(LTGEXP_NEG(-1))               | -0.0690            | 0.2272            | -0.3038            | 0.7657       |
| D(LTGEXP_NEG(-2))               | 0.2311             | 0.2448            | 0.9442             | 0.3611       |
| D(LTGEXP_NEG(-3))               | 0.2364             | 0.1249            | 1.8924             | 0.0793       |
| D(LTR)                          | -0.0864            | 0.0376            | -2.2941            | 0.0378       |
| D(LTR(-1))                      | -0.0556            | 0.0434            | -1.2819            | 0.2207       |
| D(LURB)                         | 4.0932             | 4.2425            | 0.9648             | 0.3510       |
| D(LURB(-1))                     | 10.9328            | 6.8174            | 1.6036             | 0.1311       |
| D(LURB(-2))                     | -7.7480            | 4.3142            | -1.7959            | 0.0941       |

### Conclusion and Policy Implication

The discussion of the findings from this study is centered on examining the impact of fiscal policy on health outcomes and education outcomes, reveals significant insights that both align with and diverge from previous research. Regarding the impact of fiscal policy on health outcomes, the study's results indicate that increased government expenditure positively impacts health indicators such as infant mortality and life expectancy. This finding aligns with the work of Aminu and Abiodun (2022), who found that fiscal decentralization, particularly in states with better governance quality, improved healthcare service delivery and reduced infant mortality. Additionally, the findings resonate with Onwuka and Uwakwe (2022), who emphasized the gendered impact of health expenditure, although this study did not specifically differentiate the gender impact. However, the mixed results on life expectancy and infant mortality observed in this study echo the findings of Akpantah and Olayiwola (2018), suggesting that while fiscal expenditure can drive positive health outcomes, efficiency issues may mitigate its full potential.

The findings on the impact of fiscal policy on education outcomes present a complex picture. The results show that while fiscal expenditure positively influences school enrollment, as indicated by the long-run coefficients, the short-run dynamics reveal significant fluctuations, suggesting that the immediate effects of fiscal policy may not always align with long-term educational goals. This is consistent with human capital theory by Becker (1964) that investment in education will boost individual potentials. Furthermore, the results also align with the work of Obadan (2019), who found that while education expenditure boosts enrollment, it has a limited impact on other educational outcomes such as literacy rates, indicating a need for more targeted interventions. Additionally, the findings support the conclusions of Ogbona and Onwuka (2022) and Okoye and Akintunde (2018), who both highlighted the importance of quality and industry linkages in translating increased fiscal expenditure into meaningful educational outcomes, particularly in technical and vocational education. This study confirms the positive role of fiscal policy in enhancing both health and education outcomes in Nigeria, although the effectiveness and efficiency of this impact are subject to several moderating factors, including governance quality, equity considerations, and targeted interventions. The findings suggest that while fiscal expenditure is crucial, complementary policies and practices are essential to maximize its impact.

To strengthen the positive effects of fiscal policy, it is recommended that the government focuses on increased spending, particularly on healthcare and education. Additionally, complementary policies that will minimize fluctuations in budgetary allocations should be adopted to support and enhance the objectives of fiscal policy. Finally, long-term strategic planning should be emphasized, aligning fiscal expenditure with sustainable development goals to ensure lasting benefits in the health and education sectors. These recommendations are intended to optimize the impact of fiscal policy on health and education, thereby contributing to the broader development in Nigeria.

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