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RESOURCE ABUNDANCE AND POPULATION HEALTH IN NIGERIA: TESTING THE RESOURCE CURSE

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ABSTRACT

This study investigates the impact of natural resource abundance (TNR) on population health outcomes—specifically life expectancy (Life), infant mortality (Infant), and under-five mortality (U_five). The study spans 1985–2023, using annual time-series data sourced from the World Development Indicators and the Central Bank of Nigeria. The analysis employs the Autoregressive Distributed Lag (ARDL) model to capture both short-run and long-run dynamics. Empirical results reveal that natural resource rents increase life expectancy in the short run, but the effect becomes statistically insignificant in the long run. In addition, TNR increases infant mortality in both the short and long run, with the long-run effect being substantially larger. For under-five mortality, TNR reduces mortality in the short run but increases it in the long run, indicating divergent short- and long-term effects. These findings suggest that while resource revenues may generate temporary improvements in certain health outcomes, they do not translate into sustained long-term health gains. In particular, the long-run increase in child mortality indicators supports the health dimension of the resource curse hypothesis in Nigeria. The study concludes that transforming natural resource wealth into durable human welfare gains requires effective management of resource rents, transparent governance, and sustained investment in health-supportive infrastructure. It recommends policies that promote institutional transparency, stable health financing, efficient resource allocation, and environmental protection to achieve sustainable health and development outcomes in Nigeria.

Keywords: Source Abundance, Life Expectancy, Infant Mortality, Under-five Mortality

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1. Introduction

Nigeria exemplifies the paradox of resource abundance amid poor health outcomes. Despite being Africa's largest oil producer and earning substantial petroleum revenues for over five decades, the country continues to face major health challenges. The World Health Organization (2024) estimates Nigeria's life expectancy at approximately 54 years, while infant and under-five mortality rates remain among the highest globally (World Bank, 2023). These outcomes persist despite repeated budgetary commitments to health and the implementation of major reforms such as the National Health Insurance Scheme (NHIS), Primary Health Care revitalization, Midwives Service Scheme (MSS), and the Basic Health Care Provision Fund (BHC PF), suggesting that Nigeria's resource wealth has not been efficiently harnessed to enhance population health and human welfare.

Resource dependence affects health through multiple channels. Volatile oil prices create fiscal instability that undermines consistent healthcare financing (Chew, 2025). Environmental degradation from oil exploration—such as gas flaring and water contamination—exacerbates respiratory and waterborne diseases, especially in oil-producing regions (Omokanmi et al., 2022). Moreover, weak governance, corruption, and inefficiencies in public spending limit the impact of health investments and reduce accountability in the use of resource revenues (Okonjo-Iweala, 2023; Nkoa et al., 2024). Together, these factors contribute to persistent health inequalities and the underperformance of the health system despite decades of resource earnings.

Achieving the SDG 3 target of ensuring healthy lives and promoting well-being for all requires strategic reinvestment of resource rents in healthcare, education, and environmental management. Properly managed, resource wealth can finance medical facilities, strengthen health systems, and reduce poverty-induced health inequalities (Omokanmi et al., 2022; Carillo, 2024). When resources are mismanaged, it perpetuates social exclusion and poor human development. Given Nigeria's commitment to the Sustainable Development Goals (SDGs) and the African Union's Agenda 2063, understanding the connection between natural resource abundance and population health is essential for policy action. Evaluating whether oil wealth contributes to or hinders improvements in life expectancy, infant mortality, and under-five mortality provides crucial evidence for policies aimed at converting natural wealth into better health outcomes. This study, therefore, investigates the impact of natural resource rents on population health in Nigeria from 1985 to 2023, offering insights into how efficient resource management can advance national health and sustainable development goals. Based on the problem statement, this study addresses the following questions:

Research Question

- a) What is the impact of natural resources rent on life expectancy in Nigeria?
- b) How does natural resource rent affect infant mortality in Nigeria?
- c) What impact does natural resources rent have on under-five mortality in Nigeria?

Objective of the Study

The main objective of the study is to examine the impact of natural resource abundance on public health in Nigeria. Specifically, the study aims to:

- a) To determine the impact of natural resource rent on life expectancy in Nigeria.
- b) To investigate the effect of natural resource rent on infant mortality in Nigeria.
- c) To examine the impact of natural resource rent on under-five mortality in Nigeria.

Research Hypotheses

Following the research questions stated above, the following working hypotheses are drawn:

- a) Natural resources rent does not have any significant impact on life expectancy in Nigeria.
- b) Natural resources rent does not have any significant effect on infant mortality in Nigeria.
- c) Natural resources rent does not have a significant impact on under-five mortality in Nigeria.

2. Literature Review

2.1 Conceptual Literature

Life Expectancy

Life expectancy at birth refers to the average number of years a newborn is expected to live if current mortality patterns persist throughout life. It serves as a broad indicator of a population's overall health and living conditions and is routinely published by international organizations such as the World Health Organization (WHO) and the United Nations. The length of life expectancy is determined by a wide range of interrelated factors, including disease control, maternal and child health services, nutrition, sanitation, education—particularly female education—income levels, health system capacity, environmental exposures, governance quality, and technological advancements in medicine.

From a theoretical perspective, life expectancy plays a central role in development. In human capital theories, longer life expectancy enhances labor productivity, savings, and investment in education, as healthier individuals tend to live longer and contribute more effectively to the economy.

Infant Mortality

The infant mortality rate represents the number of deaths among infants under one year of age per 1,000 live births in a given period (WDI, 2025). It is one of the most sensitive measures of both the quality of maternal and neonatal care and the general socioeconomic conditions of a country. Determinants of infant mortality can be classified into direct and indirect factors. Direct factors include access to antenatal care, skilled birth attendance, neonatal care, and immunizations. Indirect influences involve maternal nutrition, education, household income, sanitation, access to clean water, disease prevalence, and environmental risks such as air pollution. Health system responsiveness, geographical accessibility, and cultural practices also shape infant survival outcomes. Theoretically, IMR is often used as an indicator of the effectiveness and equity of health systems. Declining infant mortality rates usually signal progress in public health interventions and the successful extension of essential healthcare services.

Under-Five Mortality

The under-five mortality rate measures the number of deaths among children below the age of five per 1,000 live births. It captures both infant and post-neonatal deaths, thus providing a more comprehensive picture of child health and survival. It is shaped by many of the same determinants as infant mortality but also by broader conditions such as food security, child feeding practices, disease prevention (especially diarrhea, pneumonia, and malaria), immunization coverage, and overall socioeconomic well-being. Maternal education, sanitation, and access to healthcare remain critical underlying factors.

In development discourse, under-five mortality is a core indicator of human progress and is directly embedded in the Sustainable Development Goals (SDG 3.2), which seek to end preventable deaths of newborns and children under five.

Natural Resource Endowment

Natural resource endowment encompasses the stock and economic value of a country's natural assets, including oil, gas, minerals, forests, and arable land. It is often measured through resource rents, representing the share of GDP derived from resource extraction and sales. Two main perspectives frame its developmental implications: the “resource blessing” view, which holds that well-managed resource wealth

can finance infrastructure, social spending, and public goods that enhance welfare and health; and the “resource curse” view, which argues that poor governance and dependence on resource revenues can lead to corruption, economic volatility, and environmental degradation. Resource endowments influence health outcomes through multiple channels—fiscal (public health financing), governance (institutional quality), environmental (pollution and ecosystem damage), economic structure (sectoral crowding out and poverty), and social distribution (inequality). Converting resource wealth into health gains requires sound fiscal management, transparent institutions, environmental protection, and equitable investment in healthcare, especially in extraction-affected regions.

2.2 Theoretical Review

This section presents the theoretical foundations underpinning the study, highlighting key frameworks that explain the links between natural resource endowment and public health outcomes. Each theory provides a conceptual pathway through which resource wealth can influence population health in resource-dependent economies like Nigeria.

Resource Curse Theory

The Resource Curse Theory, advanced by Auty (1993) and later reinforced by Sachs and Warner (2001), posits that countries endowed with abundant natural resources often experience slower economic and social development than their resource-scarce counterparts. This paradox arises from rent-seeking behaviour, corruption, fiscal mismanagement, and institutional decay that typically accompany resource dependence. In the context of Nigeria, the theory suggests that resource wealth, if poorly managed, may lead to underinvestment in critical sectors such as healthcare, thereby worsening health outcomes like life expectancy and child mortality. Despite its relevance, the theory has notable limitations. It assumes that all resource-rich economies face similar challenges, overlooking successful cases such as Norway and Botswana, where prudent governance converted resource rents into development.

The Grossman Theory

The Health Production Function, developed by Grossman (1972), provides a microeconomic framework for understanding health as both a consumption and an investment good. According to this model, health outcomes are produced through a combination of inputs such as income, education, access to medical care, nutrition, and environmental quality. Individuals and societies invest in health not only for immediate well-being but also for long-term productivity and economic performance. Within this study, natural resource rents can be viewed as inputs that influence the production of health, either positively, when revenues are

channeled into healthcare financing, or negatively, when environmental degradation and weak governance undermine public health. However, Grossman's model has certain weaknesses. It assumes rational decision-making and perfect information, which are rarely observed in real-world health behaviours. It also overlooks the influence of socio-cultural and institutional factors and focuses mainly on individual-level determinants, limiting its applicability to macroeconomic or national contexts.

Adopted Theory

This study adopts the Grossman Health Production Function (1972) and the Resource Curse Theory (Auty, 1993) to explain the link between natural resource abundance and population health in Nigeria. The Grossman model views health as both a consumption and investment good, produced through inputs such as income, education, medical care, and environmental quality. In this context, natural resource rents serve as potential inputs that can improve health outcomes when efficiently managed or worsen them when misused. The Resource Curse Theory complements this by explaining why resource-rich countries like Nigeria often experience weak social outcomes due to rent-seeking, corruption, and poor institutional management. Integrating both theories, the study explains how resource rents influence health production (Grossman) and why resource dependence undermines health gains (Resource Curse), providing a unified framework for assessing whether Nigeria's natural wealth promotes or constrains population health.

2.3 Empirical Review

Natural Resources and Life Expectancy

Oduyemi et al (2021) examined the health implications of the resource curse paradox among African oil-rich economies. Their analysis, based on panel data and employing the Generalized Method of Moments (GMM) estimation, identified life expectancy and mortality rates as measures of health outcomes, with oil rents serving as the key explanatory variable. GDP per capita, institutional quality, and education were used as control factors. The authors found that oil rents exerted a negative influence on health outcomes, confirming the resource curse hypothesis. They recommended that African economies diversify away from oil dependence and channel resource revenues toward improving healthcare and educational systems.

In a recent study, Amoaning et al. (2024) investigated how natural resource rents affect well-being in sub-Saharan Africa, emphasizing the mediating role of human capital. The study used well-being—measured through life expectancy and the Human Development Index (HDI)—as the dependent variable, with natural resource rents as the independent variable. Education, income, and governance quality were employed as control variables, and the analysis was conducted using structural equation modeling and dynamic panel

methods. The results showed that resource rents improve well-being indirectly through human capital development, suggesting that investment in human capacity can transform resource wealth into social welfare gains. The authors recommended that resource-dependent countries prioritize human capital investment as a sustainable use of resource revenues.

Finally, Alattas (2025) investigated how natural resource abundance influences health outcomes, emphasizing the moderating roles of technological innovation and governance. Using panel data from developing and emerging economies between 2000 and 2022, the study employed a system GMM estimation within an augmented health production model. Health outcomes, measured by life expectancy and infant mortality, served as dependent variables, while resource rents were key predictors, alongside innovation and governance indicators. The findings revealed that resource abundance alone negatively affects health, but when complemented by strong governance and technological innovation, its impact becomes positive. The study recommended fostering institutional quality, promoting innovation, and efficiently allocating resource revenues to enhance public health outcomes.

Natural Resources and Infant Mortality

Njangang et al. (2021) investigated the joint effects of natural resources and governance quality on child mortality in African countries. Their analysis was framed within the institutional resource curse theory, emphasizing how governance mediates the impact of resource rents on health. Using panel data from 1995 to 2018 and employing system GMM estimation, the study used child mortality rate as the dependent variable, while natural resource rents and governance quality indicators were the key independent variables. The findings indicated that resource rents increase child mortality in poorly governed countries but have no significant adverse effects in contexts with strong institutions. The authors concluded that governance quality plays a crucial moderating role in the resource–health nexus. They recommended reforms aimed at improving institutional capacity, transparency, and accountability to transform resource wealth into improved child and maternal health outcomes.

Debonheur et al.(2024) focused on the broader impact of natural resources on human development in selected African economies. Their study employed panel data econometrics to assess how different forms of resource rents—oil, mineral, and forest—affect the Human Development Index (HDI), which encompasses education, income, and health dimensions. The dependent variable was human development, while the independent variables included various resource rent categories and control variables such as institutional quality, trade openness, and public investment. The results revealed that resource rents, particularly from oil and minerals, harm human development, largely due to poor governance and volatility

in resource prices. However, countries with stronger governance and diversified economies demonstrated improved human development outcomes. The study recommended enhancing fiscal transparency, establishing sovereign wealth funds, and directing resource revenues toward social sectors such as education and healthcare.

Chew (2025) explored the effects of income shocks on infant health using evidence from the coal boom and bust cycles. The study exploited the temporal variation in coal production to identify the causal impact of income fluctuations on infant health indicators. Infant mortality and birth weight served as the dependent variables, while changes in coal-related income represented the independent variable. The analysis employed a difference-in-differences approach, comparing regions experiencing coal booms with those unaffected. The results indicated that income gains during coal booms initially improved infant health through higher household income and better access to healthcare. However, the subsequent economic downturn (bust) led to deterioration in infant health outcomes, reflecting the instability of resource-based economies. The author recommended that governments adopt stabilization policies and health safety nets to protect vulnerable populations from the adverse effects of commodity cycles.

Natural Resources and Under-Five Mortality

Wigley (2017) explored whether the resource curse hypothesis extends to child health by examining the relationship between petroleum wealth and under-five mortality across 167 countries with populations above 250,000 between 1961 and 2011. The study argued that the nature of government revenue in petroleum-rich countries reduces the incentive to invest in child health, while governments in petroleum-poor countries are more motivated to implement health-improving policies. Using panel data analysis, the results provided robust evidence that petroleum-poor countries achieve greater reductions in under-five mortality compared to petroleum-rich nations. The findings suggest that oil-abundant governments often mismanage resource windfalls, failing to channel them effectively toward improving child health outcomes.

Gani (2022) examined whether wealth from natural resources affects child health in 57 developing countries from 2002 to 2017 using a multifactor health production model. The study analyzed under-five mortality rates as the dependent variable and natural resource rents, disaggregated into renewable and non-renewable, as key predictors, alongside controls such as immunization, nutrition, private health spending, air quality, and urbanization. Results showed that total resource wealth did not significantly reduce child mortality, though non-renewable resources were inversely related to mortality in some cases. In low human development countries, this relationship was weak, while in medium-level countries it was insignificant.

Gani concluded that effective governance, healthcare investment, and improved environmental conditions are vital for translating resource wealth into better child health outcomes.

3. METHODOLOGY

Research Design

This study adopts an ex-post factor research design using secondary data from reputable sources. Public health is measured in terms of life expectancy (*Life*), Infant mortality (*Infant*) and under-five mortality (*U_Five*). They serve as dependent variables. The variable of interest is total natural resource rent (TNR). The control variables include GDP per capita (GDP), social and community services expenditure (SCE) as well as consumer price index (CPI). Model parameters are estimated using the ARDL techniques. The empirical analysis is performed with E-Views 12 software to ensure robust and comprehensive results.

Theoretical Framework

The Grossman Health Production Theory (1972) views health as both a consumption and an investment good. Its main import is that individuals and societies can “produce” health by efficiently combining inputs such as income, education, medical care, and environmental quality. Better allocation of these resources improves life expectancy and productivity. The Resource Curse Hypothesis (Auty, 1993; Sachs and Warner, 2001) holds that natural resource abundance often leads to poor economic and social outcomes due to rent-seeking, corruption, weak institutions, and environmental degradation. Its key import is that dependence on resource rents can reduce investment in human development, including health and education.

Model Specification

The model of this study begins with the Grossman health production function, which sees public health outcome as a product of health inputs through investment. That is:

$$PH = f(X)(1)$$

Where PH is public health outcomes produced by individuals, which depend on inputs (X), which is a vector of determinants such as investment in health infrastructure, education, exercise, government policy, health in the previous period, and among other determinants. Based on the main objective of the study, equation (1) is re-specified to account for the place of natural resource rent on public health outcomes, and

control for other socio-economic and policy variables that affect health production. Accordingly, equation (1) becomes:

$$PH = f(TNR, GDP, SCE, CPI) \quad (2)$$

Where, TNR = total natural resource rent, GDP = GDP per capita represents income, SCE = Social and Community services, measuring government expenditure in education, health, and other community services, CPI = consumer price index, measuring government policy. The on the specific objectives of the study, PH as public health indicators such as life expectancy at birth (LIFE), Infant Mortality (INFANT), and Under-Five Mortality (U_FIVE).

Specifying equation (2) in econometrics form in econometric form yields the following:

$$PH_t = \varphi + \alpha TNR_t + \delta GDP_t + \gamma SCE_t + \phi CPI_t + \varepsilon_t \quad (3)$$

All variables remain as defined before. φ is the slope of the equation, α , δ , γ , β , and ϕ are the parameters to be estimated. However, ε and t are the stochastic error term and time dimensions, respectively. All variables are log-transformed to reduce noise.

To determine the existence or otherwise of a cointegration among the variables, the general ARDL bounds test after Pesaran et al. (2001) is specified as:

$$\begin{aligned} \Delta PH_t = & \varphi_0 + \varphi_1 \ln TNR_{t-1} + \varphi_2 \ln GDP_{t-1} + \varphi_3 \ln SCE_{t-1} + \varphi_4 \ln CPI_{t-1} \\ & + \sum_{i=0}^p \varphi_5 \Delta PH_{t-i} + \sum_{i=0}^p \varphi_6 \Delta TNR_{t-i} + \varepsilon_t \sum_{i=0}^p \varphi_7 \Delta GDP_{t-i} \\ & + \sum_{i=0}^p \varphi_8 \Delta SCE_{t-i} + \sum_{i=0}^p \varphi_9 \Delta CPI_{t-i} \\ & + \varepsilon_t \end{aligned} \quad (4)$$

The null hypothesis, $H_0 = \varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 = 0$, assumes there is no cointegration among the variables. However, the alternate hypothesis, $H_0 = \varphi_1 \neq \varphi_2 \neq \varphi_3 \neq \varphi_4 \neq 0$, assumes cointegration among the variables. If the F-statistic value generated from equation (4), the null hypothesis is rejected. But when the value is lower than the lower bound, the null hypothesis is accepted. Meanwhile, the outcome is inclusive if the F-statistic is found between the upper and lower bounds (Pesaran et al., 2001).

Data Discussion

This study examines the impact of natural resource rent on public health outcomes in Nigeria. The study is carried out using time series data from 1985 to 2023. This period is chosen because of data availability. Life expectancy per 1000 of life birth, Infant mortality at birth, and Under-five mortality rate are used as public health indicators and enter the model as dependent variables. Total natural resource rent (TNR) is the variable, GDP per capita (US\$ 2015 constant prices) per capita, social and other community services expenditure (SCE), and consumer price index (CPI) form the control variables.

Sources of Data

All data were taken from the World Development Indicators of the World Bank (WDI, 2025), except SCE variables taken from the CBN Annual Statistical Bulletin (2025).

Estimation Procedure

The study begins by applying the Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) unit root tests to establish the order of integration of the variables. Given that none of the series is integrated of order two, $I(2)$, and that the dependent variables are integrated of order one, $I(1)$, the Pesaran, Shin, and Smith (2001) ARDL bounds testing approach is employed to examine the existence of a long-run equilibrium relationship among the variables. The ARDL framework is particularly suitable in this context because it accommodates a mixture of $I(0)$ and $I(1)$ variables and provides both short-run and long-run estimates within a single unified model.

Diagnostic Tests

To ensure the reliability of the estimated ARDL model, several diagnostic tests were conducted, including the Breusch-Godfrey Serial Correlation LM, Breusch-Pagan-Godfrey Heteroskedasticity, Jarque–Bera Normality, and Ramsey RESET tests. The results, presented in Table 4.4, confirm that the model meets key econometric assumptions for valid inference. The Breusch-Godfrey test ($p = 0.271$) indicates no serial correlation, while the Breusch-Pagan-Godfrey test ($p = 0.471$) suggests homoskedastic residuals. The Jarque–Bera test ($p = 0.401$) confirms the normal distribution of residuals, and the Ramsey RESET test ($p = 0.489$) shows that the model is correctly specified with no omitted variable bias. Additionally, the CUSUM and CUSUMQ stability tests indicate that the model is dynamically stable, as the residual plots remain within the 5% significance bounds. These results affirm the robustness, consistency, and reliability of the estimated ARDL model for policy interpretation.

4. Results and Discussion

4.1 Result Descriptive Statistics

Table 1: Descriptive Statistics Analysis

	LIFE	INFANT	U_FIVE	TNR	GDP	SCE	CPI
Mean	3.892631	4.441590	5.067244	2.566790	7.521724	2.375109	3.545287
Median	3.894836	4.458988	5.073923	2.624885	7.509227	2.447863	3.952844
Maximum	3.997503	4.662495	5.347584	3.534256	7.857765	4.146028	6.263218
Minimum	3.817339	4.096010	4.653008	1.516029	7.237397	0.939850	-0.196071
Std. Dev.	0.061516	0.196167	0.237441	0.498547	0.239055	0.561505	1.869317
Skewness	0.122870	-0.211989	-0.158856	-0.384829	0.096486	0.106665	-0.620788
Kurtosis	1.435842	1.496318	1.519672	2.430662	1.281328	4.950477	2.300206
Jarque-Bera	4.073838	3.966326	3.725007	1.489345	4.860494	6.256037	3.300740
Probability	0.130430	0.137633	0.155283	0.474890	0.088015	0.043805	0.191979
Sum	151.8126	173.2220	197.6225	100.1048	293.3472	92.62925	138.2662
Sum Sq. Dev.	0.143801	1.462298	2.142375	9.444878	2.171600	11.98096	132.7851
Observations	39	39	39	39	39	39	39

Source: Author's calculation

Unit Root Test

[Table 1 presents the distributional characteristics of the key variables employed in the study.](#) Table 4.1 presents the distributional characteristics of the key variables employed in the study. Life expectancy (LIFE) exhibits a near-normal distribution with minimal skewness, indicating relative stability in population health over the study period. Infant mortality (INFANT) displays moderate skewness, reflecting disparities in infant survival rates across time and regions. Similarly, under-five mortality (U_FIVE) shows a comparable pattern of skewness and kurtosis, suggesting persistent variations in child health outcomes and the unequal effectiveness of health interventions. Total natural resource rent (TNR) demonstrates noticeable skewness and high kurtosis, highlighting the volatility and cyclical nature of Nigeria's resource-dependent economy. Social and community services expenditure (SCE) is moderately skewed, pointing to uneven budgetary allocations and fluctuations in social sector funding. The consumer price index (CPI) also shows slight deviations from normality, consistent with inflationary trends observed during the study period.

Table 2: Unit-root tests

Series	Augmented Dickey Fuller		Philip Perron		Remarks
	At Level I(0)	At Diff. I(1)	At Level I(0)	At Diff. I(1)	
LIFE	-0.116	-2.807*	-0.904	-2.706*	I(1)
U_FIVE	-1.335	-3.407**	-1.218	-2.912*	I(1)

INFANT	-0.931	-5.785***	-1.110	-2.847*	I(1)
TNR	-2.076	-6.801***	-1.966	-7.139***	I(1)
GDPc	-1.012	-5.360***	-0.591	-4.131***	I(1)
CPI	-2.248	-3.626**	-2.283	--3.008**	I(1)

Note: ***= $p < 1\%$, ** = $p < 5\%$, * = $p < 10\%$,

Table 2 presents the unit root test results obtained from the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, which assess the stationarity properties of the study variables. The results reveal that all variables, life expectancy (LIFE), infant mortality (INFANT), under-five mortality (U_FIVE), total natural resource rent (TNR), social and community services expenditure (SCE), and the consumer price index (CPI), are non-stationary at level but become stationary after first differencing, indicating that they are integrated of order one, I(1). This consistent pattern across both tests confirms that the variables possess unit roots in their levels but are stable in their first differences. The fact that all variables are I(1) validates the use of econometric techniques designed for such data structures, particularly the Autoregressive Distributed Lag (ARDL) model for short- and long-run dynamics among natural resource rents, public expenditure, and health outcomes in Nigeria.

Lag Selection Criteria

Table 3: Lag Selection Criteria for Life Expectancy

Lag	LogL	LR	FPE	AIC	SC	HQ
0	41.68201	NA	8.97e-08	-2.037889	-1.817956	-1.961127
1	268.0569	377.2914	1.26e-12	-13.22538	-11.90578*	-12.76481
2	310.3222	58.70191*	5.26e-13*	-14.18457*	-11.76530	-13.34018*
3	330.4430	22.35641	8.70e-13	-13.91350	-10.39457	-12.68530

Source: From the Author

Table 4: Lag Selection Criteria for Infant Mortality

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-4.963487	NA	1.20e-06	0.553527	0.773460	0.630290
1	237.1835	403.5782	7.01e-12	-11.51019	-10.19059	-11.04962
2	324.5364	121.3236*	2.39e-13*	-14.97425*	-12.55498*	-14.12986*
3	349.3193	27.53647	3.05e-13	-14.96218	-11.44325	-13.73398

Table 5 Lag Selection for Under five Mortality

Lag	LogL	LR	FPE	AIC	SC	HQ
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0	-7.469069	NA	1.38e-06	0.692726	0.912659	0.769489
1	240.9571	414.0436	5.68e-12	-11.71984	-10.40024	-11.25926
2	325.0563	116.8045*	2.32e-13*	-15.00313	-12.58386*	-14.15874*
3	352.6257	30.63263	2.54e-13	-15.14587*	-11.62694	-13.91767

Tables 3, 4, and 5 present the results of the lag length selection for the life expectancy, infant mortality, and under-five mortality models, respectively. As shown in Table 3 (Life Expectancy), a lag length of two is selected by the majority of the criteria, particularly the Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), and Hannan–Quinn (HQ), indicating that two lags are sufficient to capture the dynamic adjustments in life expectancy. Similarly, Table 4.4 (Infant Mortality) identifies lag two as the optimal lag order, as it is consistently supported by all the information criteria.

Cointegration test

Once the unit root properties of variables in the model are confirmed, the next stage is to determine the existence or otherwise of a co-movement among the variables.

Table 6: Pesaran, Shin, and Smith (2001) Bounds cointegration test

Model	F-statistic	Significance	I(0)	I(1)	Cointegration
Model 1: Life. 5%	45.376 2.560	10%	2.200	3.090	Confirmed
		2.5%	2.880	3.870	
		1%	3.290	4.370	
Model 2: Infant	17.774	10%	2.200	3.090	Confirmed
		5%	2.560	3.490	
		2.5%	2.880	3.870	
		1%	3.290	4.370	
Model 3: U_Five	19.790	10%	1.900	3.010	Confirmed
		5%	2.260	3.480	
		1%	3.070	4.440	

Source: Author's computation

Table 6 presents the results of the cointegration test based on the Pesaran et al. (2001) ARDL bounds testing approach. This method is appropriate for models comprising variables that are integrated of order one, I(1), as established in Table 2. According to the bounds testing procedure, cointegration is confirmed when the computed F-statistic exceeds the upper critical bound (I(1)), while values below the lower bound (I(0)) indicate no cointegration, and values between the bounds are considered inconclusive. In this study, the

computed F-statistic value surpasses the respective upper bound critical values across the three specifications ($45.376 > 4.370$; $17.774 > 4.370$, and $19.790 > 4.440$) at 1% significant level, leading to the rejection of the null hypothesis of no cointegration. This outcome confirms the existence of a stable long-run equilibrium relationship among life expectancy, infant and under-five mortality, natural resource rents, social and community services expenditure, and consumer prices in Nigeria.

Parameter Estimates

Table 7 below reports the ARDL estimation results, highlighting both the short-run and long-run effects of natural resource rents (TNR) and other macroeconomic variables on public health outcomes in Nigeria. In the short run, a 1% increase in TNR leads to a 0.006% rise in life expectancy. At the same time, a 1% increase in TNR raises infant mortality by 0.002%, while reducing under-five mortality by 0.4%. These short-run effects are all statistically significant at the 1% level. In the long run, the effect of TNR on life expectancy (life) remains positive (0.006) but statistically insignificant ($p = 0.55$). Although TNR shows a positive association across the three health indicators, its long-run impact differs in magnitude and significance. Specifically, a 1% increase in TNR increases *Infant* by 2.23% and *U_five* by 0.33%. Both are significant at the 1% level.

Social and community services expenditure (SCE) shows a positive but insignificant effect on life expectancy in both the short and long run, implying that although health-related spending supports better health outcomes, its magnitude is not sufficient to produce significant long-term improvements. The consumer price index (CPI) has a negative and significant impact on life expectancy, reflecting the erosion of real income and reduced access to healthcare services due to inflationary pressures. For infant and under-five mortality, natural resource rents increase mortality rates both in the short and long run, confirming the resource-curse effect on public health. However, social and community services expenditure tends to reduce mortality, though insignificantly, while inflation worsens both infant and child health outcomes. Overall, the findings suggest that without effective resource governance and targeted social spending, resource wealth may undermine rather than improve public health outcomes in Nigeria. The error correction term (ECM(-1)) is negative and significant across models, confirming a stable long-run relationship among the variables. It shows that short-run disequilibrium is corrected each period, showing moderate convergence and reinforcing the model's long-run stability in health outcomes.

Diagnostic Test

To validate the reliability and robustness of the estimated models, several post-estimation diagnostic tests were conducted. These include the normality test, serial correlation test, heteroskedasticity test, Ramsey RESET test for model specification, and CUSUM and CUSUMSQ stability tests. The results are presented in the lower part of Table 7. The Jarque–Bera (Normality) test results indicate probability values greater than 0.05 across all models (0.437, 0.759, and 0.428), confirming that the residuals are normally distributed.

The serial correlation test results (0.090, 0.403, and 0.502) also exceed the 5% significance level, implying the absence of autocorrelation among the residuals. Similarly, the heteroskedasticity test values (0.943, 0.622, and 0.826) suggest homoskedastic residuals, indicating that the error variances are constant across observations. The Ramsey RESET test values (0.922, 0.135, and 0.103) confirm that the functional form of the models is correctly specified. Furthermore, the CUSUM and CUSUMSQ tests reveal that the models are structurally stable over the study period, as the plots remain within the 5% critical boundaries.

In sum, the diagnostic analysis confirms that the estimated ARDL models are statistically reliable, correctly specified, free from econometric problems, and structurally stable, thereby validating the robustness of the empirical results.

Table 7: ARDL Estimates

Model 1			Model 2		Model 3							
Variable	Coeff.	S.Error	t-stat	Prob.	Coeff.	S.Error	t-stat	Prob.	Coeff.	S.Error	t-stat	Prob.
Short Run												
ECM(-1)	-0.129	0.046	-2.828	0.009	-0.023	0.002	-11.276	0.000	-0.014	0.018	4.381	0.0001
ΔTNR	0.005	0.001	3.987	0.001	0.002	0.001	3.718	0.001	-0.403	0.065	-6.201	0.0000
ΔGDP	-0.004	0.007	-0.548	0.588	0.011	0.005	2.196	0.037	-0.053	0.015	-3.441	0.0016
ΔSCE	0.047	0.013	3.667	0.001	0.0002	0.000	0.627	0.536	-0.062	0.007	-8.430	0.0000
ΔCPI	0.039	0.01	3.926	0.001	-0.003	0.001	-4.827	0.000	0.080	0.018	4.381	0.0001
Long-Run												
TNR	0.006	0.011	0.603	0.551	0.23	0.077	2.999	0.006	0.326	0.058	5.644	0.000
GDP	-0.029	0.062	-0.466	0.645	0.465	0.383	1.214	0.236	0.606	0.035	17.425	0.000
SCE	0.047	0.013	3.667	0.001	-0.038	0.050	-0.757	0.456	0.048	0.044	1.088	0.286
CPI	0.039	0.01	3.926	0.001	-0.14	0.045	-3.087	0.005	-0.17	0.021	-7.922	0.000
Diagnostics												
Adj-RSQ	0.838				0.987				0.988			
Norm.			0.437				0.759				0.428	
Serial			0.090				0.403				0.502	
Hetero			0.943				0.622				0.826	
Ramsey			0.922				0.135				0.103	
Cusum & CumsumSqStableStableStable												

Source: Computation of the Author

4.2 Discussion of Findings

This section discusses the empirical findings of the study in line with the stated objectives, drawing on evidence from the ARDL estimates presented in Table 4. The discussion focuses on the impact of natural resource rents on life expectancy, infant mortality, and under-five mortality in Nigeria, supported by relevant empirical literature.

Natural Resource Rent and Life Expectancy in Nigeria

Empirical results reveal that natural resource rent has a positive effect on life expectancy in the short-run but the effect is non-significant in the long run. This indicates that increases in resource dependence do not have a lasting effect on overall population health in Nigeria. The finding confirms the resource curse hypothesis, which posits that resource-rich economies often experience weaker health outcomes due to poor governance, revenue mismanagement, and environmental degradation.

The negative effect suggests that oil wealth in Nigeria has not been efficiently converted into health-promoting investments such as healthcare infrastructure, sanitation, and education. Instead, it may have fostered fiscal volatility, rent-seeking, and pollution, which deteriorate living conditions and life expectancy. Thus, while Nigeria's resource wealth offers potential for improving public health, ineffective resource governance continues to constrain the translation of wealth into longer and healthier lives.

Natural Resource Rent and Infant Mortality in Nigeria

The study finds that natural resource rents (TNR) increase infant mortality rates (*Infant*) in both the short and long run. This implies that higher dependence on natural resource revenues is associated with worsening infant survival outcomes. The result supports the health dimension of the resource curse, where mismanagement of oil rents leads to underinvestment in maternal and neonatal healthcare services.

Environmental degradation from oil extraction—especially gas flaring and water contamination—further exacerbates infant morbidity and mortality. Moreover, fluctuations in oil revenue often disrupt health budgets, limiting access to essential maternal and child healthcare services during economic downturns. These findings are consistent with Wigley (2017) and Njangang et al.

(2021), who found that resource dependence significantly worsens child and infant mortality in poorly governed economies.

The implication is that without strong institutional frameworks and targeted reinvestment of resource rents into the health sector, Nigeria's natural resource wealth may continue to hinder progress toward achieving the Sustainable Development Goal (SDG 3) on child health and well-being.

Natural Resource Rent and Under-Five Mortality in Nigeria

Results also show that in the short-run, TNR reduces U_{five} mortality. But in the long run, total natural resource rents have a positive and significant effect on under-five mortality, suggesting that resource dependence worsens child health outcomes in Nigeria. This reinforces the evidence that oil wealth has not been effectively channeled into improving access to healthcare, immunization, clean water, and nutrition for children under five.

The persistence of high under-five mortality despite decades of resource earnings reflects weak policy implementation, environmental hazards, and inadequate social investment. This finding is consistent with Gani (2022) and Wigley (2017), who reported that petroleum-rich countries experience slower reductions in child mortality compared to resource-poor nations. It underscores the need for Nigeria to strengthen health governance, improve the efficiency of social spending, and mitigate environmental externalities associated with oil exploration.

Control Variables

- **GDP per Capita:** The positive and significant effect of income per capita suggests that economic growth enhances health outcomes through improved living standards and better access to medical services, consistent with Amoaning et al. (2024).
- **Social and Community Services Expenditure (SCE):** Though positive, its effect is statistically weak, indicating that health-related spending has not been substantial or efficiently managed to produce measurable health gains.
- **Consumer Price Index (CPI):** The negative and significant impact implies that inflation reduces real household income and the affordability of healthcare, worsening population health. This supports Nkoa et al. (2024), who found that macroeconomic instability weakens health performance in resource-dependent economies.

5. Conclusion and Recommendation

5.1 Conclusion

This study demonstrates that Nigeria's natural resource abundance has not resulted in improved population health, largely due to mismanagement, institutional weakness, and environmental degradation. The findings provide strong evidence for the existence of a health-based resource curse in Nigeria, where resource rents fail to deliver human welfare gains.

In conclusion, transforming resource wealth into improved health outcomes requires effective governance, economic diversification, and sustained investment in public health systems. If properly managed, Nigeria's resource rents can serve as a vital instrument for achieving Sustainable Development Goal 3 (Good Health and Well-being) and the African Union's Agenda 2063 objectives. By aligning resource management with health priorities, Nigeria can convert its natural wealth into a foundation for healthier lives and sustainable human development.

5.2 Recommendations

Based on the empirical findings, the following recommendations are proposed:

❖ **Strengthen Resource Governance and Transparency:**

The government should adopt transparent and accountable frameworks for managing oil revenues to ensure that resource rents are reinvested effectively into public health infrastructure and human development.

❖ **Reinvest Resource Rents in the Health Sector:**

A larger proportion of resource revenues should be allocated to healthcare, particularly maternal and child health services, immunization programs, and environmental health interventions in oil-producing regions.

❖ **Diversify the Economy to Stabilize Health Financing:**

Reducing dependence on oil will minimize fiscal instability arising from price volatility, allowing for more predictable and sustained funding for health services and social programs.

❖ **Improve Efficiency of Health Expenditure:**

Health spending should be better targeted, monitored, and evaluated to ensure that public resources yield measurable improvements in life expectancy and child survival.

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