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Impact of Macroenomic Variables on Life Expectancy in Nigeria

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Abstract

Life expectancy literally means the expected number of years an average individual live. The global life expectancy has been increasing with the improvement in health science and technology and generally economic progress. Life expectancy is a multidimensional phenomenon influenced by not only health conditions but also a number of socio-economic and environmental factors. Macroeconomic variables such as inflation and unemployment do pose serious economic challenges in terms of access to good medicare thereby increasing mortality rates and lowering the life expectancy of citizens. In Nigeria, life expectancy experienced a mix of trends over the years. Thus the study examined the impact of macroeconomic variables on life expectancy in Nigeria for the period spanning 1991 to 2021. The study collected and used time series data on Life expectancy economic growth proxied by Real Gross Domestic Product (RGDP), Inflation and unemployment rates from World Development Indicators (2021). The data was subjected to stationarity tests using Augmented Dickey Fuller (ADF) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) techniques. Upon the findings, all the variables of study were stationary after first difference, Pesaran and Shin (2001) ARDL bound procedure for Co-integration was employed to investigate the long-run relationship among the variables of study. The ARDL bound test indicated the presence of significant co-integration among the variables of study, therefore short-run ARDL Error Correction Model (ECM) was estimated. The inflation has a negative Impact on life expectancy in Nigeria both in the short-run and the long-run. Economic growth was found to have a positive and significant impact on Nigeria's life expectancy in the long-run. While unemployment has no significant impact on life expectancy both in the short and the long-run. Hence, this study concluded that economic growth and inflation are the major macroeconomic determinants of life expectancy in Nigeria over the period of 1991 to 2021. One of the important recommendations of this study is that macroeconomic policy makers should direct more energy in pursuing more economic growth and reducing inflation for improved life expectancy.

Keywords: Life Expectancy, inflation, unemployment, economic growth
JEL Classification: H51, H75, I15, I10,

Contribution to/Originality Knowledge
The paper contributed to area of health economics by exploring and determining the empirical relationship between key macroeconomic variables namely life expectancy, inflation, unemployment and economic growth in Nigeria.

1.0 Introduction

Life expectancy literally means the expected number of years an average individual live. The global life expectancy has been increasing with the improvement in health sciences and technology and economic progress. Since the agricultural revolution, some 10,000 years ago, average life expectancy had been trapped between twenty 20 and 30 years, until 1800s when

the world experienced significant increase in average life expectancy on average of 43 years (Ord, 2020). Recently, the average global life expectancy at birth has increased from 66.8 years in 2000 to 73.3 years in 2019 with African region having the lowest among all the other region (World Health Organisation, 2020).

Life expectancy is a multidimensional phenomenon influenced by not only health related factors but also socio-economic, environmental and demographic factors. Macroeconomic variables such as economic growth, unemployment and inflation do affect life expectancy in various ways. Therefore, countries with high level of income, low inflation and bearable level of unemployment have the highest life expectancy level. This is evident in World Health Organisation (2020) report in which advanced European countries have the highest average life expectancy at birth of 78.2 in 2019 which is far greater than 64.5 years found in developing economies of African region. This is not random phenomenon because, as economy grows, the level of income grows the standard of living of citizenry increase which in turn improves access to medical care and increases life expectancy. Therefore, there is strong correlation between standard of living and life expectancies. In other words, the higher the standard of living in a country, the higher the life expectancy.

Macroeconomic variables such as inflation and unemployment do pose serious economic challenges in terms of access to good medicare thereby increasing mortality rates and lowering the life expectancy of citizens. Therefore, overcoming high level of inflation on one hand tend to improve the accessibility of health care through reduction in real cost of medical care. Thus, as people have more purchasing power, they tend to consume more health care services which improves their health condition and raises their life expectancy. As pointed out by Tweneboah and Alagidede (2019), inflation is feared by people because of its tendency to disrupt their life and hence poses a negative effect on their life expectancy. On the other hand, unemployed population have little resources to access health care services and hence are prone to preventable health problems that may endanger their life expectancy. Therefore, high level of unemployment will not only affect the consumption of health care but also reduces the production of such health care as the producers are likely to concentrate on consumers with gainful employment and income enough to patronize their services.

In Nigeria, life expectancy experienced a mix of trends over the years. In 1960, the life expectancy in Nigeria was less than 37 years, but managed to up to 45 years in 1980. The indices remained less than 46 years even after a decade from the 1980 and managed to reach 46.3 years in 2000. Nigeria recorded a historical move as it reached 50 years for the first time in 2009 and maintained a steady uptrend to 54 years in 2019 (World Development Indicators, 2021). The country has experienced continuous increase in life expectancy over the years. In 1960, the life expectancy was just less than 37years but improved to 40 years in 1971. Similarly life expectancy grew to 46 years in 1980 but averaged to 45.5 years between the periods of 1981 to 1991 and experienced sluggish growth only to reach 50 years in 2009. Further, between the periods 2009 and 2019, the life expectancy index did not exceed 54years, which was far behind the desired level and health policy targets across the globe.

The average global life expectancy at birth stood at 73.3 years in 2019. However, Nigeria had only 54.7 years which is even below the average life expectancy of 64.5 years of the African region - a quite disturbing problem. In fact, Nigeria has the lowest life expectancy at birth along Central African Republic, Chad, and Lesotho with levels below 54 years in 2021 according to United Nations (2022). Against this backdrop, the study raised some questions: (a) what is the impact of economic growth on the life expectancy in Nigeria? (b) How does unemployment affect economic growth in Nigeria? And (c) Does inflation has any significant effect on life expectancy in Nigeria?

Hence, the paper examined the impact of macroeconomic variables on life expectancy in Nigeria. Specifically, the study measured the impact of economic growth on life expectancy in Nigeria and analysed the impact of unemployment on economic growth as well. Furthermore, it determined the relationship between inflation and life expectancy in Nigeria.

The paper is organized as follows. The next section reviewed the related literature. Section three explain the methodology of the study. Section four presents the empirical results while section five concludes.

2.0 Literature Review

2.1 The Concept of Life Expectancy

Life expectancy is an important index of human beings' health and also a comprehensive indicator for evaluating the level of economic development, education, healthcare systems as well as environmental quality (Chen et al, 2021). Life expectancy is also one of the most important health indicator of mortality and overall health conditions used by health and socio-economic organisations such as world health Organisation (WHO), United Nations (UN), and World Bank in its world development indicators (WDI) indices. Life expectancy is mostly measured at birth - a commonly used summary index that can be used for comparison across countries. Life expectancy is computed using a schedule called life tables which consist of indicators such as the probability of surviving the next year, age of person at a time, number of death between ages, number of person lived after the particular age, and life expectancy at age. It is computed for male and female sexes separately which is then summarised into total life expectancy of a considered population (İlker et al, 2018).

There is less controversy about the meaning of life expectancy. Although the concept has been defined by many organisations and individual researchers but the definitions revolves around the same meaning. United Nations Development Programme (2015) defined Life expectancy is as the number of years a new-born child is anticipated to live if all other known survival variables affecting mortality rates at the time of birth remain unchanged throughout a child's life. Similarly, United Nations (2022) explained life expectancy as an index that measures how many years a new-born baby is supposed to live on average considering current age-specific mortality rates.

Organisation for Economic Co-operation and Development (2005) defined life expectancy as the average number of years that a person is expected to live given that he or she experienced

the age-specific mortality rates prevailing in his/her country in a particular year which does not include the effect of any future changes in age-specific mortality rates. According to Ferda (2010) life expectancy of a country measures its overall health status, and an outcome of many socio-economic and environmental factors. Hence there are number of important policy issues that affect the level of life expectancy such as health issues and also socio-economic factors like economic growth and human capital investment.

Blas et al, (2014) described life expectancy as the "*mean number of years still to be lived by a person at birth*" which is an important indicator for assessing economic growth and social development of a given country or a region. Aigheyisi (2020) defined life expectancy as individual's lifespan or average number of years from birth a person is expected to live. This definition excludes unexpected deaths such as accidental or sudden death, assassination, murder, suicide. In the same direction, Sede and Ohemeng (2015) defined Life expectancy as a measure of the length of life an individual is expected to be live at birth.

2.2 Concept of Economic Growth

Economic growth is one of the most widely explored concepts in economics. For this reason, there are many conceptual clarifications available on economic growth. Cooper, and John (2012) defined economic growth as the increase in the quantity or market value of the final goods and services produced by an economy in a given period of time. Anyanwu and Aikhenan (1995) defined the concept of economic growth as increase in country's capacity to produce the good and services required to improve the standard of living or wellbeing of the citizenry over time. Similarly, Opeyemi (2020) defined economic growth as an increase in the productive capacity of an economy with increased quantities of goods and services. Similarly, Parkin (2012) described economic growth as a sustainable expansion of production possibilities of an economy measured through increase in real Gross Domestic Product (GDP) over a specified period of time.

Economic growth is measured by many similar indicators which include but not limited to Gross Domestic Product, Real Gross Domestic Product, Gross National Product, and Gross National Product percapita. Gross domestic product (GDP) is the sum of value of all final goods and services produced during a particular year or period in a given economy. Real gross domestic product (real GDP) is the value of all final goods and services produced during a particular year or period in a given economy adjusted to eliminate the effects of price changes (Cooper and John, 2012). Sustainable economic growth remains one of the most common macroeconomic objectives in both developed and developing economies. However economic growth is not a mere coincidence but well a product of well-coordinated policies and actions targeting the influential sources. Michael and Lawrence (1991), and Parkin (2012) stressed that an enhanced capital, labor, and technical progress are the major sources of the economic growth of nations. Conventionally, physical growth of capital, human capital growth and technological progress are found to be the major sources of economic growth.

2.3 Concept of Unemployment

International Labor Organization (2018) defined the concept of unemployment as a situation involving the absence of jobs for individuals who are actively searching for work within a period of a month. Organisation for Economic Co-operation and Development (2005) defined unemployment rate as the proportion of people that are out of work among the active population of working age. In addition to the level of the unemployment rate, the duration of unemployment spells the incidence of long-term unemployment on well-being, family life and social conditions. Cooper, and John (2012) defined unemployment as the as the situation in which a portion of labor force is not working but is looking for and available for work.

2.4 The Concept of Inflation

Inflation as one of the major macroeconomic problems has received attention from policy makers and academic scholars over the years. Fahlevi et al, (2020) viewed inflation as the tendency of continuous increase in prices. Hence an increase in one or few goods and services are excluded from being inflation. Therefore, changes in prices of goods and services observed during festivals such as New Year, Eid and Christmas are not considered as inflation. Cooper, and John (2012) on the same meaning described inflation as an increase in the average level of prices measured as the annual rate of increase in the average level of prices.

Theoretical Framework

The Malthusian population theory postulated by Robert Malthus was the earliest theoretical underpinning which established an indirect relationship between life expectancy and macroeconomic variables. The theory predicted that given a linear production function of resources (mainly food supply), sustained increase in population growth will lead to decrease in economic wellbeing because the means of living will be eventually less than enough to sustain the living standard. In support of this, Acemoglu and Johnson (2007) as well as Hansen and Lonstrup (2013) established a more direct linkage between life expectancy and economic growth. In this case, life expectancy was treated as the major cause population growth and given fixed supply of resources, an increase in life expectancy tend to decrease the subsequent growth rate of GDP percaita. However, this conclusion was severely criticized for the assumption of fixed resources which served as the pillar for the inverse relationship between life expectancy and economic wellbeing.

However, Grossman (1972) constructed a more practicable model in which he expressed health as a durable capital stock that can be increased by investment and reduced by age and shadow prices besides the prices for medical care. The model assumes that individual inherits stock which is inversely related to age but increases with an increase in investment. The model also posited that people are the producers of health because of their choices on food and health cares. Further, people are the constrained in health, due to scarcity in financial and natural resources Amjad and Khalil (2014). It can be derived from this theory that, life expectancy as one of the major health outcomes has a larger tendency to be influenced by the investment which is directly proportional to the level of resources and economic growth of a country.

However, unemployment and inflation may negatively affect the level of investment on health care and health services consumption and ultimately reduce life expectancy. As transformed by Oluwatoyin et al. (2015), the Grossman model can be expressed as H = F(Y, S, V). Where H is denotes health output, Y represent the component of macroeconomic variables, S measures the social variables and V represents environmental factors

2.5 Empirical Review

Empirical studies on relationship between economic growth and life expectancy in Nigeria has attracted the attention of several scholars. However, most of them failed to agree on the direction of the relationship with studies such as Owumi and Eboh (2021), Aigheyisi and Oligbi (2019), as well as Ogunjimi and Adebayo (2018) reporting positive relationship between economic growth and it components on one hand and life expectancy on the other. While the empirical findings of Aigheyisi (2020), Ojo et al, (2020), Edeme, et al, (2017) and Sede and Ohemeng (2015) shown that economic growth and it components have a negative relationship with life expectancy in Nigeria. This raises the need for a more recent study with appropriate econometric tools to re investigate the relationship in order to confirm the true relationship between economic growth and life expectancy in Nigeria. However, there are only few studies conducted to examine the impact of inflation and unemployment on life expectancy in Nigeria.

Hendrawaty et al. (2022) analysed the impact of economic growth, financial development, and energy consumption on life expectancy in over thirty (30) Asian countries. Azam et al. (2022) analysed the determinants of life expectancy and environmental degradation in Pakistan. In addition, there are only few studies conducted to examine the impact of inflation and unemployment on life expectancy in Nigeria. As major macroeconomic variables, unemployment and inflation have theoretical justification through their impact on health investment by Grossman (1972) and hence require empirical investigation determine the magnitude of their effect on life expectancy in Nigeria. Most of the previous studies concentrate on the impact of individual macroeconomic variables on life expectancy in Nigeria. This study will provide an all-encompassing analysis on the impact of macroeconomic variables on life expectancy in Nigeria.

As major macroeconomic variables, unemployment and inflation deserve further studies with more suitable tools of analysis to verify how they affect life expectancy in Nigeria. Further, many studies treated only fraction of economic growth such as government expenditure on health sector, and agricultural sector output as conducted in relation to life expectancy conducted by Owumi and Eboh (2021) and Olakunle (2021) respectively. However, none of the studies conducted combined the three major macroeconomic variables (economic growth, unemployment and inflation) in one study to determine their joint impact on life `expectancy in Nigeria.

The literature is rich on the empirical studies on the relationship between economic growth and life expectancy across the globe. In Nigeria as well as the rest of the world, the result of the empirical studies reported mixture of findings indicating contradicting relationship. For instance, Owumi and Eboh (2021), Aigheyisi and Oligbi (2019), as well as Ogunjimi and

Adebayo (2018) indicated positive relationship between economic growth and it components on one hand and life expectancy on the other. In contrast, Aigheyisi (2020), Ojo, et al, (2020), Edeme et al, (2017) and Sede and Ohemeng (2015) reported that economic growth and it components have an inverse relationship with life expectancy in Nigeria. This raises the need for a more recent study with appropriate econometric tools to re investigate the relationship in order to confirm the true relationship between economic growth and life expectancy in Nigeria.

However, there are only few studies conducted to examine the impact of inflation and unemployment on life expectancy in Nigeria. As major macroeconomic variables, unemployment and inflation deserve further studies with more suitable tools of analysis to verify how they affect life expectancy in Nigeria. Further, so many studies treated only fraction of economic growth such as government expenditure on health sector, and agricultural sector output as conducted in relation to life expectancy conducted by Owumi and Eboh (2021) Olakunle (2021) respectively. However, none of the studies conducted combined the three major macroeconomic variables (economic growth, unemployment and inflation) in one study to determine their joint impact on life expectancy in Nigeria.

3.0 Methodology

3.1 Data

The main type of data employed for empirical analysis in this study is secondary time series data on life expectancy, economic growth, unemployment and inflation sourced from World Bank (world development indicators) Central Bank of Nigeria and (Statistical Bulletin) 2021. Life expectancy as the dependent variable in this study was measured by total male-female life expectancy at birth. Economic growth was measured by the real gross domestic product (RGDP) in US dollar terms. Unemployment on the other hand was measured using total unemployment as percentage of total labor force modeled from International Labor Organisation (ILO) estimates. Inflation was measured by annual percentage of consumer prices Inflation.

Table 3.1 **Variables Description and Measurement**

Variables	Measurements	Notations	A-priori expectations
Life Expectancy	Life expectancy at birth, total (years)	LE	Dependent Variable
Economic Growth	GDP (constant 2010 US$)	RGDP	Positive
Unemployment	Total unemployment as percentage of total labor force (modeled ILO estimate)	UNE	Negative
Inflation	Inflation, consumer prices (annual %)	INF	Negative

Autoregressive Distributed Lag (ARDL) Model was employed for the data estimation. Stationarity test using Augmented Dickey Fuller (ADF) developed by Dickey and Fuller (1981)

and Phillips Perron alternative method developed by Phillips and Perron (1986) was also performed.

3.2 Model Specification

The study modelled the variables as follows:

$$\Delta RGDP_t = \alpha + \Sigma^{P}_{i=1}\Delta\beta RGDP_{t-1} + \Sigma^{q}_{i=0}\Delta\delta_1 UNE_{t-1} + \Sigma^{q}_{i=1}\Delta\delta_2 INF_{t-1}\lambda ECT + \varepsilon_t \quad (1)$$

Where: RGDP = Real Gross Domestic Product, UNE = represents unemployment rate and INF = inflation rate.

ARDL model with no Co-integration:

$$\Delta Y_t = \alpha + \Sigma^{P}_{i=1}\Delta\beta Y_{t-1} + \Sigma^{q}_{i=0}\Delta\delta X_{t-1} + \varepsilon_t \quad (2)$$

$$\Delta Y_t = \alpha + \Sigma^{P}_{i=1}\Delta\beta Y_{t-1} + \Sigma^{q}_{i=0}\Delta\delta X_{t-1} + \varepsilon_t \quad (3)$$

ARDL model with Co-integration:

$$\Delta Y_t = \alpha + \Sigma^{P}_{i=1}\Delta\beta Y_{t-1} + \Sigma^{q}_{i=0}\Delta\delta X_{t-1} + \lambda ECT + \varepsilon_t \quad (4)$$

Where:

α = Represents the constant in the model

ΔY = Is the dependent variable

ε_t = Is the stochastic error at a given time period

ECT = Is the error correction term

λ = Is the coefficient

X_{t-1} = Lag or the previous value of explanatory variable

δ = Coefficient of the explanatory variable

Δ = Denotes the variable differenced

Subscripts p and q represent the optimal lag of the dependent independent variables respectively

$\Sigma_{i=1}$ = Represent the number of lagged variables starting from one (1)

$\Sigma_{i=0}$ = Represent the number of lagged variables starting from zero (0) or current value.

4.0 Empirical Findings

4.1 Results of Stationarity Tests

Augmented Dickey Fuller (ADF) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) techniques were employed to determine the stationarity of the variables of the study. Table 4.2 and table 4.3 summarized the results.

Table 4.2: Augmented Dickey Fuller (ADF) Test Result

Variables	T-statistic	Critical value at 5% level	P-value	Order of integration
LE	-4.137399	-3.004861	0.0044	I(1)
RGDP	-2.766452	-3.574244	0.2199	I(1)
UNE	-4.059332	-1.952910	0.0002	-
INF	-4.306275	-2.971853	0.0022	I(1)

From table 4.2, Life expectancy (LE) was found to be stationary at first difference as the augmented test statistic (-4.137399) is greater than it corresponding critical value (-3.004861) at 5% level of significance. Similarly, Unemployment (UNE) was significant at five percent level of significance due to it test statistic (-4.059332) greater than the critical value of (-1.952910. In the same direction, the Probability value of test statistic for inflation rate was less than 0.05 (0.0022) which shows that the variables is stationary after first difference. However, the RGDP was found to be insignificant even after first differencing. This was verified using alternative stationary test in table 4.3. None of the variables was found to be stationary at level.

Table 4.3: Kwiatkowski-Phillips-Schmidt-Shin (KPSS) Test Result

Variables	LM-Statistic	Critical value at 5% level	Order of Integration
LE	0.149664	0.463000	I(1)
RGDP	0.216867	0.463000	I(1)
UNE	0.427289	0.463000	I(1)
INF	0.073238	0.463000	1(1)

From the result in table 4.3, all the variables of study (LE, RGDP, UNE and INF) have their test statistics less than their respective critical values at five percent (5%) level of significance. Therefore, the null hypothesis that they are stationary cannot be rejected. Based on the stationarity tests, it can be concluded that all the variables of study are stationary at first difference, that means they are integrated of order one (1). This confirmed the result obtained using Augment Dickey fuller technique in table 4.2.

4.2 Autoregressive Distributed Lag (ARDL) Model Results

The autoregressive distributed lag (ARDL) bound test was conducted to determine whether there exist long-run relationship between the dependent variables and the explanatory variables. Table 4.4 summarized the result for ARDL bound test.

Table 4.4: ARDL bound Test Result

F-Statistics =	21.48353		
Critical Values	Upper bound I(1)	Lower bound I(0)	Remark
1%	4.66	3.65	Co-integrated
5%	3.67	2.79	Co-integrated
10 %	3.2	2.37	Co-integrated

From table 4.4, the F-value of the ARDL bound test (21.48353) is greater than the upper bound value at 10%, 5% and 1% level of significance (3.2, 3.67, and 4.66 respectively). Therefore, it can be deduced that the variables of study are co-integrated and hence a long-run relationship exist among the variables of study. This enables the reparameterization of the ARDL model into Error Correction Model (ECM) in order to obtain both the short-run dynamics and the long-run relationship of the variables of study in one model.

Table 4.5: ARDL Error Correction Model Result

Short - run Impact			
Variables	**Coefficients**	**Standard Error**	**P-values**
D(LE(-1))	1.158267	0.177522	0.0000
D(RGDP)	-2.70E-12	3.09E-12	0.3916
D(INF)	-0.006068	0.0028807	0.0413
D(UNE)	0.001949	0.044126	0.9652
ECT(-1)	-1.320545	0.292419	0.0002
Adjusted R^2	0.505969	-	
F-statistic	2167.919	-	0.0000
Long-run Impact			
LOGRGDP	1.88E-11	1.05E-12	0.0000
INF	-0.01734	0.006719	0.0159
UNE	-0.06710	0.073623	0.3705
C	43.99870	0.352148	0.0000

Table 4.5 summarized both the short-run and long-run result of the ARDL Error Correction Model (ECM). In the short-run, the coefficient of the first lag value of the life expectancy (D (LE (-1)) was found to be positive and statistically significant even at one percent (1%) level of significance as it probability value (0.000) is less than 0.01. Thus the coefficient of the life expectancy lag (1.158267) indicated than an increase in the previous life expectancy value by one year will increase the current life expectancy by about 1.2 years. the coefficient of inflation (D(INF)) was found to be negative and statistically significant at five percent (5%) level due to it probability value (0.0413) less than 0.05. the coefficient of inflation (-0.006068) shows

that an increase in inflation by one percent (a unit of inflation) will decrease life expectancy by 0.006 years in the short-run. However, the short-run coefficients of economic growth (D(RGDP)) and unemployment rate (D(UNE)) are statistically insignificant as their respective probability values (0.3916 and 0.9652) are greater than 0.05. Therefore, economic growth and unemployment does not have any significant impact on life expectancy in the short-run.

The Error correction term (ECT) measures the speed of adjustment that is, the speed upon which any short-run disequilibrium is corrected in the long-run. A negative Error correction Term (ECT) indicates the convergence of the equilibrium in the long-run which suggests the validity of the long-run coefficients. The long-run result indicated that Economic growth (LOGRGDP) has a positive and statistically significant impact on life expectancy even at one percent (1%) level of significant. This is indicated by the coefficient of LOGRGDP (1.88E-11) and its corresponding probability which is less than 0.01. The coefficient of LOGRGDP shows than one percent (1%) increase in LOGRGDP will increase life expectancy by 1.88 years in the long-run. Similarly, the coefficient of INF (-0.01734) was also statistically significant at five percent (5%) level of significance. It indicates that an increase in INF by one percent (1%) will decrease life expectancy by about 0.02 percent. However, the long-run coefficient of UNE was found to be statistically insignificant which demonstrates the absence of long-run relationship between unemployment and life expectancy in the long-run.

4.3 Diagnostic Tests Results

The aim of post-estimation diagnostic tests is to evaluate the estimated econometric model to ensure its efficiency and reliability for informed hypothesis testing. Table 4.6 summarized the result for Breusch-Godfrey Serial Correlation LM Test, Breusch-Pagan-Godfrey test for heteroskedasticity, Jarque-Bera residual normality test, and overall model specification test using Ramsey Regression Specification Test.

Table 4.6: Post-estimation Diagnostic Tests Results

Diagnostic test	Technique	Null Hypothesis	P-Value at 5% Level of significance
Serial Correlation Test	Breusch-Godfrey Serial Correlation LM Test	No Serial Correlation	0.4107
Heteroskedasticity Test	Breusch-Pagan-Godfrey	Constant Variance	0.5338
Normality Test	Jarque-Bera	Residuals Normally Distributed	0.3717
Specification Test	Ramsey Reset Test	Correctly Specified	0.5099

Table 4.6 summarized the result for post-estimation diagnostic test for the estimated Autoregressive Distributed Lag (ARDL) model. From the result, Breusch-Godfrey LM test shows no serial correlation at five percent (5%) level of significance as the probability of the test statistic (0.4107) is greater than 0.05. Similarly, Breusch-Pagan-Godfrey test for

heteroskedasticity indicated that the model is homoskedastic. This is because the p-value of the test statistic (0.5338) is greater than 0.05. It also indicated that the residuals in the estimated model are normally distributed. This is because the probability value of the Jarque-bera statistic (0.3717) is greater than 0.05. However, the result indicated that the model is correctly specified as the probability value of the Ramsey Reset test statistic (0.5099) is greater than 0.05.

4.4 Findings and Conclusion

The estimated ARDL model indicated a significant and inverse relationship between inflation and life expectancy both in the short and the long-run. Similarly, the result established a positive and significant impact of economic growth on life expectancy in the long-run. However, an inverse relationship was found between unemployment and life expectancy both insignificant both in the short and the long-run. In order verify the reliability and efficiency of the model, various post-estimation diagnostic tests. The result indicated that the residuals (error term) of the estimated ARDL model are free from serial correlation, with constant variance (Homoskedastic) and normally distributed. The model specification test also revealed that the model is does not suffer from specification problem. The Adjusted R^2 and F-statistic indicated that the model has a good fit overall significance respectively. In summary, inflation has negative and significant impact on life expectancy in Nigeria for the period of 1991 to 2021 both in the short and the long-run. In addition, economic growth has a long-run positive and significant impact on life expectancy in Nigeria for the period of 1991 to 2021. More so, Unemployment has an inverse relationship with life expectancy in Nigeria both in the shot and the long-run.

4.0 Recommendations

On the basis of empirical findings above, this study made the following recommendations.

i. Since positive and significant relationship is detected between economic growth and life expectancy in Nigeria, both the public and private sectors of the economy should add more efforts to ensure sustainable economic growth and improved life expectancy.

ii. Since inflation has a negative impact on life expectancy in Nigeria, it is therefore recommended that both monetary and fiscal authorities in Nigeria should device appropriate policies in order to keep inflation to it minimum level so as to increase the life expectancy in Nigeria.

iii. While pursuing stable and sustainable economic growth, macroeconomic policy makers should also avoid jeopardizing the standard of living of citizenry and avoid economic activities that have negative relationship with our life expectancy.

iv. Finally, since unemployment has an inverse relationship with life expectancy in Nigeria both in the shot and the long-run, government and private sector should put in place policies that would reduce unemployment in the country.

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