

## EMPIRICAL ANALYSIS OF INFLATION AND PEOPLE'S WELLBEING IN NIGERIA

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### ABSTRACT

*The living standard of citizens of any country to a great extent indicates her relative global performance. Nigeria is shown to have suffered severely from low standard of living as millions of her people live in abject poverty. High Inflation is recognised as a major macroeconomic challenge that has been confronting the health and wellbeing of the people of the nation. Autoregressive Distributed lag (ARDL) technique was explored in this study to examine the relationship between inflation and people's wellbeing in Nigeria. The study used annual time series data on life expectancy (proxy of wellbeing), inflation, unemployment, GDP per capita, and openness on Nigeria covering the period of 1981 to 2019. The result indicates evidence of short run and long run relationship between people's wellbeing and inflation in Nigeria during the period of the study. It shows that a percentage increase in inflation rate hampers wellbeing status of Nigerian by 0.24%. The study recommends that government should pursue an inward looking non-inflationary growth policies that will enhance the wellbeing status of the people of Nigeria. This could be achieved mainly by promoting productivity in the real sector and enhancing exportation in the country.*

**Keywords:** *Empirical, analysis, inflation, wellbeing, Nigeria.*

### INTRODUCTION

The status of living standard of her citizens is very germane to every economy as it is a broad reflection of her relative performance on a global scale (Ogbebor *et al*, 2020). A highly improved level of health of the population has been empirically established to go hand in hand with high levels of national income (Bloom and Canning, 2008). Higher income also gives access to better health which could be achieved through improved nutrition, safe water and sanitation, and increased ability of the populace to have quality health care.

Nigeria is shown to have suffered severely from low standard of living as over 91 million of its people live in abject poverty. Reports on some major health indicators reveal the health status of the nation to be in shamble. The most commonly used indicator of health conditions is a country's life expectancy. According to World Development Indicator data, Nigerian's life expectancy has fluctuated between 45.8 years in 1999 and 47 years in 2011. Some improvements were however achieved later when the value increased at the rate of 0.58% from 2019 to 54.81 in 2020. The current life expectancy for Nigeria in 2021 is 55.12 years, having increased at 0.57% from 2020. This is one of the lowest in the world; it is lower than the other West African countries counterpart, (Young, 2001). The under – five mortality rate was shown to have fluctuated from 147 per 1,000 in 1990 to 176 per 1,000 in 1995, after which some improvement was witnessed. The value having reduced to 90.16 in 2020. As regards infant mortality rate, it was shown by statistics to have astronomically increased to 195 per 1,000 live births in 1994 from 85 per 1,000 live births in 1990. Thereafter, it dropped steadily until it was 75.1 per 1,000 by 2002. There are however some variations between the rural and the urban areas due to unequal access to health facilities since urban residents are expected to have better access than rural residents (Mathew *et.al*, 2015).

According to Jimmy, (2017), the economic condition in Nigeria has affected the health care delivery service in so many ways. There has been high cost of drug which has given rise to people buying substandard drugs or subscribing to self-medication with traditional or local herbs. Health sector is being poorly financed, and this has affected the provision of medical infrastructure, purchase of drugs, payment of workers, and so on. There is exposure of people to health problems as a result of poor diet and nutrition, environmental factors, low health care seeking, emergence of counterfeit (fake) drugs etc. All these have directly and indirectly contributed to high morbidity and mortality in the country.

Inflation is undeniably one of the major macroeconomic challenges that have been militating against the health and wellbeing of the people of Nigeria generally with the poor and the less privileged ones being the most vulnerable groups. A time of inflation is marked by a persistent and appreciable rise in the general level of prices in the nation (Jhingan, 2002). It is characterized by a fall in the value of the country's currency in term of other country's currency and a rise in her exchange rate with other nation's currencies. An increase in general price level leads to a fall in the standard of living particularly when the real wage income is constant. The increase in general price level implies more money chasing the same bundle of goods and services that were previously obtained or less bundle of goods and services for a previously spent amount of money. This simply implies adjustment in consumption patterns that would reduce the consumption capacity and consequently lower the standard of living of the people.

The pattern and trend of inflation in Nigeria has been from creeping to moderate one, and from high to galloping one (Olubusoye & Oyaromade, 2008). Commenting on the trend of inflation in Nigeria, Gary (1995) stated how the rate of inflation has steadily and markedly increased after independence, and superseding that of the nation's trade partners. The rate of the inflation, which averaged 10% annually between 1965-1975 increased to about 18% in the following decade from 1975-1985, while that of the trading partners reduced significantly to 8% during the period. The trend according to him continued until it was 24% in the decade following this (i.e. 1985-1990), while that of its trading partners reduced to 13%. Following the statistical fact of World bank database, Nigeria inflation rate which was 15.68% in 2016 was 6.67% higher than that of 2015, while the rate in 2017 also witnessed some upward trend to 16.52% at the rate of increase of 0.85%, but was recorded as 12.09% for 2018 with a decline at the rate of 4.43% (data.worldbank.org).

The problem of inflation has been apparent in Nigeria from independence when the "cheap money policy" was adopted by the government to stimulate development in the country after independence (Fatukasi, 2005). The aggravating factors of the incidence of inflation in Nigeria could be identified as including the oil boom of the late 1970s which was characterized by a sharp increase in government revenue from oil exports' foreign exchange, and also the massive gigantic capital expenditure of the government after the world war. Coupled with this is the climax in inflationary trend which was reached when the Udoji Committee on salary review doubled the basic minimum wage in the public sector in 1975 (Suleiman 1998). All these increased the currency in circulation bringing the attendant effects of increased aggregate demand which was not matched by an increased productivity. The problem of macroeconomic stability was further compounded by the hosting of FESTAC in 1977, at the time when the then head of State in Nigeria confessed that money was not Nigeria's problem but the problem was how to spend it.

Fabiosa & Jensen, (2002), and Akekere & Yousuo, (2012) opined that macroeconomic volatility as measured by inflation has the capability of affecting the level of welfare through lowering private consumption expenditure particularly if the income of low income families responds slowly to increases in the price level. Another major effect of price increase on consumption is to reduce the access to public health which consequently may reduce the nutritional intake of babies and have permanent effects on their future learning and income earning abilities. It could also cause malnourished mothers to give birth to low-birth-weight children, and also limit the long-term productivity ability of the poor (Ferreira et al., 1999).

The current worrisome rate of increase of inflation and a realization of how devastating high inflation rate could be on the wellbeing of the people of any country has necessitated this study.

Following this section which introduces the study, section 2 presents review of related literature, section 3 contains the methodology explored in the study, section 4 is on presentation and analysis of result, while section 5 concludes and recommends.

## LITERATURE REVIEW

Different viewpoints are held by economic theories on the relationship between inflation, and economic growth and development. According to Montgomery, (1968), a presumption of inflation as rising prices rather than mere high prices lead to the conclusion that inflation implies persisting shortages. The explanation for the persistent shortage is seen as an apparent lag in the rate of growth of productive capacity behind that of aggregate demand resulting into the production of "dynamic excess demand".

According to a World Health Organization report, a number one threat to public health that has killed more people than HIV/AIDS, malaria and tuberculosis put together in most countries is lack of households' access to food which has led to hunger and undernutrition (WHO, 2008) Suejin et. al., (2013) opined that high food prices can imply chains of discomfort in the economy. These chains of discomfort according to them include an immediate threat to household food security, undermining of population health, retarding of human development, and lowering of labour productivity in the long term. They employed a panel dataset of 63 developing countries from 2001 to 2010 to relate food price inflation to population health which was alternately measured by infant mortality rate, child mortality rate, and the prevalence of undernourishment. They showed that rising food prices have a significant adverse effect on the three health indicators in the countries with severer impact in the least developing countries.

Brinkman et. al., (2010) assessed the effect of high food prices on food consumption in Haiti, Nepal, and Niger by examining the potential effects of the global financial crisis on food consumption, nutrition, and health through various transmission channels. The study showed that a measure of diet frequency and diversity was negatively correlated with food prices; and argue that a large number of vulnerable households in developing countries reduced the quality and quantity of their food consumption, and faced the risk of malnutrition as a result of the global financial crisis (Suejin et. al., 2013).

Christian, (2010) stated that increase in food prices may affect infant and child mortality rate through increases in childhood wasting and stunting, intrauterine growth restriction, and micronutrient deficiencies such as that of vitamin A, iron, and zinc (Suejin et. al., 2013). In the same way, Darnton-Hill & Cogill, (2010) emphasized that food price shocks mainly impact on nutrition, affecting primarily maternal and child nutrition through a reduction in dietary quality and an increase in micronutrient deficiencies, leading to increases in infectious disease morbidity and mortality (Suejin et. al., 2013).

Obayelu, (2010) made use of information gathered from 396 households in North Central Nigeria and also secondary data from different sources in a bid to examine how the severity of food price increases impacted on the nutritional status of Nigerians during the study period. He noted that majority of people were forced to adopt some sub-standard ways of living such as reduction of their nutritional intake, consumption of more carbohydrate food at the neglect of protein, school children are made to work, and in most cases key productive assets were sold in order to cope.

Ogbebor *et al*, 2020 examined the effect of inflation on standard of living in Nigeria between 1998 and 2017. The technique of Auto Regressive Distributed Lag (ARDL) was adopted for the analysis, and the conclusion arrived at was that there exists a long-run relationship between inflation and standard of living in Nigeria. The result showed that a unit increase in inflation rate brought about 0.034 unit decrease in Nigerian's standard of living during the study period. As the study included only the lag of standard of living and inflation variables as the regressors, the authors suggested inclusion of some other relevant variables that determine standard of living for further study.

Fischer, (1993) also support the view that high growth is associated with low inflation. In Fischer's view, a high inflation is an indication that a government has lost control over the economy and that there is no good argument that could be made for a very high inflation rate. Contrarily, Aminu & Anono, (2012); Osuala & Onyeike (2013); Oluh & Idih, (2015) suggested a positive impact of inflation on economic growth.

Doguwa, (2012) on his part examined the issue from the angle of consideration of level of inflation threshold that is inimical to growth in Nigeria. He then estimated the threshold level above which inflation is considered inimical to growth to be between 10.5 to 12 per cent for Nigeria while Sarel, (1996); Khan & Senhadji, (2001); and Drukker et al, (2005) respectively estimated 9.9 per cent, 10.5 per cent, and 11.2 and 12.0 per cent as the appropriate inflation threshold points.

The present study is motivated by the persistent high level of inflation in the country with the observed chronic deteriorating wellbeing in Nigeria. Empirical exploration of the relationship has been rare in literature.

## METHODOLOGY

Time series data on Nigeria were explored in the study, and these were sourced from World Development Indicator data base. The data covered the period of thirty-nine years, spanning the period of 1981 to 2019. Data

on Life expectancy was used to capture the wellbeing of the populace. Life expectancy at birth indicates the number of years a new born infant would live if prevailing patterns of mortality at the time of his birth were to stay the same throughout his life. It is considered a more intuitive and meaningful measure of population health than mortality and morbidity rates (Salomon *et. al.*, 2012).

Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.

Other variables which were found relevant in the course of the study were Unemployment rate, GDP per capita (this is gross domestic product divided by midyear population). GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the product, and Openness, (measured as the ratio of addition of export and import to GDP) which indicates the extent of trade of the economy with the outside world.

The technique of Autoregressive Distributed Lag (ARDL)/Bounds testing approach was adopted in this research in validating the long-run co-integrating relationship among the variables of inflation and wellbeing status in Nigeria for the period of the study.

In the course of the study, unit root test was conducted to test for stationarity and order of integration of the data using the Augmented Dickey-Fuller (ADF) statistics so as to avoid a spurious regression. This preliminary step in ARDL/Bounds testing, is equally necessary because the presence of an order of integration which is higher than I(1) such as I(2) will invalidate the use of the technique (Pesaran & Shin, 1999). The error correction model (ECM) was also used to test the speed of adjustment to equilibrium. E-View was used in analysing the obtained data.

The model for the study is as specified below:

$$\Delta \log \text{Lexp}_{t-i} = \lambda_0 + \sum_{i=1}^p \lambda_{1i} \Delta \log \text{Lexp}_{t-i} + \sum_{i=1}^p \lambda_{2i} \Delta \log \text{Inf}_{t-i} + \sum_{i=1}^p \lambda_{3i} \Delta \log \text{Unemp}_{t-i} + \sum_{i=1}^p \lambda_{4i} \Delta \log \text{Gdppc}_{t-i} + \sum_{i=1}^p \lambda_{5i} \Delta \log \text{Open}_{t-i} + \lambda_{6i} \Delta \log \text{Lexp}_{t-i} + \lambda_{7i} \Delta \log \text{Inf}_{t-i} + \lambda_{8i} \Delta \log \text{Unemp}_{t-i} + \lambda_{9i} \Delta \log \text{Gdppc}_{t-i} + \lambda_{10i} \Delta \log \text{Open}_{t-i} + \lambda_{11i} \text{ECM}_{t-i} + \mu_t$$

Where  $\log \text{Lexp}$  is log of Life Expectancy

$\log \text{Inf}$  is log of Inflation

$\log \text{Unemp}$  is log of Unemployment

$\log \text{Gdppc}$  is log of Gross Domestic Product per capita

$\log \text{Openness}$  is log of Openness, determining the extent of trade of the economy with the outside world.

ECM is the error correction term

$p$  is the dependent variable lag, while  $q$  is used for the lag of the independent variables.

$\lambda_0$  = constant term

$\lambda_{1i} - \lambda_{5i}$  are the short- run dynamic coefficients of the models

$\lambda_{6i} - \lambda_{10i}$  represent the coefficients of the long run equilibrium relationship.

$\mu_t$  = Stochastic Error term

The null hypothesis in the equation is that  $\lambda_{6i} = \lambda_{7i} = \lambda_{8i} = \lambda_{9i} = \lambda_{10i} = 0$

On estimation of the model, it is expected that inflation rate exerts a negative effect on wellbeing. The coefficient of Unemployment variable is expected to be negative, while GDP per capita and Openness are expected to be positive.

## PRESENTATION AND DISCUSSION OF RESULTS

Augmented Dickey Fuller (ADF) unit root test was employed to establish the stationarity of the variables used in the study. The variables were shown to be a combination of I(1) and I(0) series. As depicted on table 1, Life Expectancy and Inflation rate variables were stationary at level {I(0)}, while Unemployment, GDP per capita and Openness were stationary at first difference {I(1)} series. The mixture of order of integration therefore necessitated the use of the ARDL Bound Test to test for the presence of long run relationship among the variables. Thereafter, the Autoregressive Distributed Lag (ARDL) was employed to test the short run and long run equilibrium of the variables.

**Table 1: Unit Root Test Result**

Variables	ADF test Statistic (constant only)	ADF Critical Value (constant only)	Prob value	ADF test Statistic with trend	ADF Critical Value with trend	Prob value	Order of integration
Lexp	-0.5899	-3.670	0.8585	-7.633	-3.563	0.0000	I (0)
Inf	-2.913	-2.941	0.0531	-4.0111	-3.537	0.0169	I(0)
Unemp	-7.313	-2.943	0.0000	-7.289	-3.537	0.0000	I (1)
Gdppc	-3.633	-2.943	0.0097	-3.487	-3.537	0.556	I(1)
Open	-7.524	-2.943	0.0000	-4.704	-3.574	0.0040	I(1)

The result on table 2 shows that there is long run co-integration among the variables with the F-statistic being 5.272 which is higher than the lower and upper critical bound values. This implies that the independent variables are jointly significant in the relationship.

To examine the impact of inflation and other explanatory variables on the wellbeing in Nigeria, all the variables were logged. The result on Table 3 shows the value of  $R^2$  to be 0.996 which implies that 99.6% of the total variation in the wellbeing of Nigerians is occasioned by inflation rate, unemployment rate, GDP per capita, and trade openness. The table similarly indicates that there is trend among the variables showing that an increase in the explanatory variables will increase the explained variable. The F-statistic is significant at 1% which shows a goodness of fit of the model. The value of the Durbin-Watson (DW) statistic is 0.58 which is an indication of the absence of serial correlation in the model.

**Table 2: ARDL Bounds Test**

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	3.03	4.06
5%	3.47	4.57
2.5%	3.89	5.07
1%	4.4	5.72

Null Hypothesis: No long-run relationships exist  
 F-statistic = 5.272

Table 3 depicts the result of the Error Correction Model used to determine the short run relationship among the variables. It is theoretically required that the coefficient of the ECM must be less than one, must be negative and it must also be significant. In the analysis, the coefficient of the ECM is -0.097 at 1% level of significance, indicating that the value met the required properties. The value of the coefficient also indicates that there was a speed of adjustment of 9.7% between the short run and the long run of the co-integrating variables. Therefore, short run relationship could be inferred between people's wellbeing and inflation, unemployment rate, GDP per capita, and openness in Nigeria during the period of the study.

Furthermore, the results of the short-run estimation showed that inflation rate and openness negatively impacted life expectancy (-0.0024 and -0.0045 respectively), while unemployment and GDP per capita positively impacted on it (0.0007 and 0.0005 respectively). Inflation rate was very significant at 5% level, while openness was significant at 10% level. GDP per capita was highly significant at 1%, while unemployment was insignificant in its impact. By implication, about 0.24% of dampening of people's wellbeing was caused by a percentage change in inflation rate in Nigeria during the study period, while a percentage variation in the rate of opening of the country's economy to the external sector hampered people's wellbeing by 0.45%. The result further indicated that a percentage variation in GDP per capita brought an improvement at the rate of 0.05% to the wellbeing of Nigerian populace, while a variation in unemployment rate was not significant in its impact during the study period.

### The Error Correction Model Results

**Table 3: ECM Result of Short-Run Estimation of ARDL**

Variable	Coefficient	Standard Error	T-Statistic	Probability
C	3.770558	1.188811	3.171706	0.0034
DLOG(LEXP(-1))	0.902904	0.028964	31.17340	0.0000
DLOG(INF)	-0.002358	0.001105	-2.133410	0.0409
DLOG(UNEMP)	0.000698	0.003678	0.189816	0.8507
DLOG(GDPPC)	0.000524	0.000161	3.256133	0.0027
DLOG(OPEN)	-0.004454	0.002391	-1.863104	0.0719
D(@TREND())	0.020331	0.001605	12.66379	0.0000
ECM(-1)	-0.097096	0.017799	-5.455216	0.0000
R <sup>2</sup> = 0.9963 D.W. = 0.58 F-st = 5208.7 Prob = 0.0000				

The result of the long run relationship between the variables of people's wellbeing, inflation and other explanatory variables are as depicted in Table 4. This shows the coefficient of variable of inflation to be significant at 10% with the value of -0.0234, while the coefficients of the variables of unemployment, GDP per capital, and openness are shown to be 0.007, 0.005 and -0.0046 respectively. Only the coefficient of unemployment is also shown to be insignificant. The result implies that; a percentage change in inflation rate in the long-run dampened the wellbeing of people in Nigeria by about 2.42%; a percentage variation in GDP per capital improved wellbeing rate by 0.5%; a percentage variation in openness hampered wellbeing by 0.7%, while a percentage variation in unemployment rate caused no significant changes in wellbeing in the long run as indicated for the short run period also.

**Table 4: Long-Run Estimation of ARDL Approach**

Variable	Coefficient	Standard Error	T-Statistic	Probability
C	3.770558	1.188811	3.171706	0.0034
L(INF)	-0.024289	0.013325	-1.822878	0.0780
L(UNEMP)	0.007190	0.038644	0.186047	0.8536
L(GDPPC)	0.005392	0.001247	4.322257	0.0001
L(OPEN)	-0.045872	0.020190	-2.272025	0.0302
@TREND	0.020331	0.005888	3.453259	0.0016
R <sup>2</sup> = 0.8208 D.W. = 0.5847 F-st = 80.192 Prob = 0.0000				

$$EC = LEXP - (-0.0243*INF + 0.0072*UNEMP + 0.0054*GDPPC - 0.0459*OPEN)$$

### SUMMARY, CONCLUSION AND RECOMMENDATION

Augmented Dicker Fuller unit root test and Auto Regressive Distributed Lag (ARDL) technique were explored in this study to examine the relationship between inflation and people's wellbeing in Nigeria. The study made use of annual time series data on Nigerian's life expectancy (proxy of wellbeing) and inflation, while including unemployment, GDP per capita, and openness as control variables. The data cover the period of 1981 to 2019.

The study indicates evidence of short run and long run relationship between people's wellbeing and inflation in Nigeria during the period of the study (1980 to 2019), even with inclusion of other determining variables of wellbeing beside inflation. Inflation exhibited negative relationship at both short-run and long-run horizon implying that increased inflation rate hampers wellbeing status of Nigerian. This finding is in line with theory in literature and consistent with the findings of previous researchers such as Ogbebor, (2020) who recommended that other factors that determine standard of living aside inflation be included. GDP per capita exhibited positive relationship with wellbeing at both short-run and long-run, implying that increased GDP per

capita enhances wellbeing status of Nigerian. Gordon, (1990); Fischer, (1993); and also Doguwa, (2012) associated growth with low level of inflation, and increased income with better life style. Openness exhibited negative relationship with wellbeing at both short-run and long-run, implying that increased openness of the economy to the external sector is detrimental to people's wellbeing status in Nigeria. Abata *et al.*, (2012) attributed the inflation problem in the country to its undue preference for foreign products which results into great reliance on importations.

The study therefore recommends that the government should pursue an inward looking non-inflationary growth policies that will enhance the wellbeing status of the people of Nigeria. This could be achieved mainly by promoting productivity in the real sector and enhancing exportation in the country. An abysmal increase in money supply which is not commensurable with the level of production in the country should also be curbed.

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