Investigating the Effects of Inflation on Welfare:
A Study of Selected Non-Income Welfare Indicators in Nigeria

By
[1] **Shema'u SABO-ADAMU**
[2] **Timothy OladayoPopoola,**
[3] **Adamu Usman ABUBAKAR**
[1,2 &3] Department of Economics, Ahmadu Bello University, Zaria

Abstract

Nigeria is currently experiencing high rates of inflation. This is driven by conditions which include rising prices globally and domestic factors such as overheating economy and removing of fuel subsidies by the federal government. While provision of quality Education and Health services to the people is key to improving their well-being, a healthy and skilled human capital is required for both growth and human development. Accordingly, the paper investigated the effects of inflation on non-income welfare indicators, particularly, Education and Health indicators in Nigeria. The study used an empirical analysis employing annual time series data sourced from the World Bank Development Indicators (WDI, 2023) from 1986 to 2021. The study's contribution to the existing knowledge differs from other studies and took a development perspective rather than other researches commonly relating inflation and growth. The findings indicate that inflation has adverse effects on non-income indicators represented by Education and Health. Inflation reduces the non-income welfare, particularly the primary school enrolment and average life expectancy. These results suggest that, as the rate of inflation increases, the welfare of Nigerians decreases. Meaning, more Nigerians would fall into poverty as their welfare decline and their life span may be shortened. The paper recommends the federal government should focus more on macroeconomic policies that curtail inflationary pressures, the independence of CBN combined with practical and data-driven monetary policymaking to sustenance, the objectives of price stability, and fiscal discipline should be sustained to avoid undue aggregate demand pressures which drive up prices. Further, there should be monitoring and evaluating progress of the relief measures put in place to cushion the negative effects of fuel subsidy removal.

Key words: Inflation, Welfare, Education, Health, Nigeria   JEL: 010

1. Introduction

The wellbeing of the people has long been a goal of developing countries. Traditionally, real money balances are viewed as consumption goods and inflation as a tax on real balances (Balley, 1956 and Friedman, 1969). This explains the welfare cost of inflation which encompasses changes in social welfare. Inflation affects poor people directly via a decrease in their real wages due to the short-run rigidity of nominal wages. If any savings exist, they usually keep it in liquid form. Thus, it generally decreases the real value of such saving. However, if inflation is unforeseen, the poor will be disproportionately harmed as they have weaker bargaining power and are unable to cushion against inflation (Pasha &Palanivel, 2004). This is indeed important to countries such as Nigeria where the poverty rate has reached an alarming

state, and over 98 million people are considered poor in 2019 (National Bureau of Statistics, NBS, 2020). Additionally, Buheji (2022) observed that one of the main strategies to reduce high poverty is to increase non-income welfare. In fact, this is largely associated with ensuring distribution of growth equitably in an economy, and also increase access to basic social welfare indicators. Thus, providing quality education and health services to people is one of the major ways of improving well-being of the citizens, as both provide an economy with healthy and skilled human resources needed for especially pro poor growth and development (Woldemichael, Kidare&Shimles, 2022; Maher, Zhon& Tang, 2022).Vaish (2011) and Dwivedi (2009) noted that, inflation is one of the major threats to achieving welfare. Hence, countries all over the world strive to keep inflation rates as low as possible, because of the negative effects on both income and non-income welfare indicators. Despite the various attempts by both monetary and fiscal authorities in Nigeria, evidence reveals that inflation remains increasing, such that, the average rate of inflation in the periods of 2011 and 2017 was 12.5 percent (Central Bank of Nigeria, CBN, 2017) which has escalated to about 21.82 percent in December, 2020 and currently, it rose from 22.79 percentin June, 2023, to 26.72 percent in September the same year(NBS, 2023).This is evident that inflation rate in Nigeria is high and above the minimum threshold of a single digit, as recommended in the literature (see, for instance, Vaish, 2011). Hence, the objective of this paper is to evaluate the effects of inflation on non-income welfare indicators in Nigeria. To achieve the objective, the study is guided by the following research questions:

i.   What are the effects of inflation on health indicators?

ii. What is the impact of inflation on education indices?

Thus, the paper is divided into 5 sections, 2 contains the literature review, while 3 the methodology, 4 is the presentation of results and discussion and section 5 concludes.

2.   Literature Review

This section contains the review of relevant theoretical and empirical literature, starting with clarification of the major concepts of the study, followed by the theoretical link and previous empirical studies.

2.1.   The conceptual clarification:

Inflation is seen as a sustained rise in the price level which leads to low productivity. When productivity becomes low, the economy is likely to experience low growth and low development. The strength and stability of the purchasing power of money can be adversely affected by inflation, which influences individuals' ability to acquire needed goods and services, consequently affecting their general welfare. This paper looks inflation effects on the other aspect of welfare, which is the non-income welfare indicators especially health and education. In terms of measurement, the rate of inflation is measured by the percentage change in the price index, which may be wholesale price index, producer price index, retail price index, or consumer price index. In Nigeria, like other developed and emerging economies, inflation is measured as the percentage change in the consumer price index (CPI). This which aggregates the price of a representative basket of goods and services purchased by the average consumer, and obtained through periodic survey of consumer prices (CBN, 2017).

On the contrary, the non-income welfare indicators are direct measures of economic development and well-being in a given society or country (UNDP, 2020). These indicators include life expectancy, health status, educational attainment, housing status, nutritional condition, among others. These provides information about living standard and welfare of people (Ahmad, 2022). They show whether there is improvement or not in human development. An improved health, increase human capital, which leads to high income and higher income increases productivity, spending and investment. While improved learning leads to an increase in human capabilities, which assists in exploring more opportunities that

lead to higher income and growth, and ultimately increase in general welfare (Stieveny & Julunggono, 2022).

2.2. Theoretical Literature:

Inflation is theoretically based on the quantity theory of money which theorized that a crucial factor causing persistent increase in general price level is the quantity of money in circulation. However, Sen (1983) argued that economic growth and the expansion of goods and services are necessary for human development. This is known as capability approach. These capabilities ranges from the physical ones, such as, nourishment, adequate cloth, and shelter, to more complex social achievement like taking part in society someone belongs to. He then observes that different people and societies typically differ in their capacity to convert income and commodities into valuable achievements. One of the main insight from the theory is that, economic development should be conceived and measured directly in terms of functioning and capabilities, instead of resources or utility. According to him, the central feature of economic well-being is the ability to achieve functioning. That is, individual's ability to be safe, well nourished, educated, healthy, among other things. The chief strength of Sen's approach is the measure of non-income welfare indicators, for instance, education, and health (Sen, 1985 cited in Sabo-Adamu, 2023).

2.3. Empirical Literature:

Previous empirical results, which are mostly on the relationship between inflation and growth are characterized by mixed findings and hence, this study builds on the previous research by taking a different dimension other than the relationship between inflation and growth but on welfare (non-income). Apriori, an adverse relationship is expected between inflation and non-income welfare indicators in Nigeria.

Researchers have empirically examined the effects of inflation on both income- and non-income welfare indicators in both developed and emerging nations including Nigeria. For instance, from Generalized Autoregressive Conditional Heteroskedasticity (GARCH) and

Panel Vector Autoregressive (PVAR) methods among others. Three strands of the literature were cited here. The first one relates to studies on inflation and growth.For instance, Ahmad (2022) investigated the relationship between inflation and economic growth in Pakistan from Autoregressive Distributive Lag (ARDL) method. The findings indicate that inflation is negatively affecting economic growth in the long-run of Pakistan's economy.While Bashir (2022)examines the impact of inflation on economic growth in Nigeria. He also used the ARDL and suggests inflation impacted negatively on growth. The study by Nene, Ilesanmi and Sekome (2022) found a conteray result when they investigated the impact of inflation on uncertainty in selected African and European countries. They found that inflation targeting policy is significant in reducing economic uncertainty and improve economic growth or well-beings. In addition, Olamide, Ogujiuba and Maredza (2022) considered the impact of inflation on economic growth in developing countries from dynamic panel regression methodology. The authors' findings indicate that inflation have a negative relationship with economic growth. This result suggests that as the rate of inflation or cost of living is increasing, the income and non-income welfare indicators would decline. For the effects of inflation on economic growth in Tanzania for the period of 1970 and 2020, the study by Sanga, Kangolo and Mnogya (2022) employed co-integration and vector error correction model (VECM) techniques. Their result show that inflation had an insignificant effect on Gross Domestic Product (GDP) in the short-run, but in the long-run the effects is statistically significant. Stieveny and Julunggono (2022) examined the relationship between inflation, exports and imports on Indonesia's economic growth. The study used co-integration and Error Correction Model (ECM) for the periods of 1985 and 2019. It was found that inflation has no significant effect in the short-run and long-term on economic growth. The findings are mixed. E.g. Nene *et al.* (2022) was positively related to welfare, but Olamide*et al.* (2022), Stievary and Julunggono (2022), and Ahmad

(2022) were negatively linked to well-being; and Sanga *et al* (2022) found mixed results. Numerous authors such asWoldemichael, Kidare and Shimles (2022) argued that economic growth can be too broad to represent the general welfare of citizen. Thus, there is need to examine the effect of inflation on specific welfare indicators, such as health indicators, education indicators, electricity, and sanitations.

The second strand of studies are those that were devoted to the impact of inflation on health indicators. These includeSalatin and Boderi (2014)Monsef and Mehrjardi (2015),Panahi andAleemran (2016),Garcia, Rabago and Ocat (2019), Kidane and Woldemichael (2020), Lawal, Osinubi& Bisiriyu (2021), and Woldemichael*et al.* (2022).Salatin and Boderi (2014) from Generalized Moment Method (GMM) for selected middle-income countries from 1997 to 2011, found that inflation rate also has inverse impact on women's life expectancy, but was positive on female mortality. In sum, these groups of studies suggest that the impact of inflation on health indicator are mixed. Monsef and Mehrjardi (2015) estimated the impacts of macroeconomic factors on life expectancy in 136 countries during 2002 and 2010. Their panel regression results show that inflation was negatively related with life expectancy (a health indicator) significantly.Panahi and Aleemran (2016) assessed the effect of inflation on life expectancy in Middle-East and North Africa countries (MENA) from panel regression. The result indicates that a unit increase in inflation rate decreases life expectancy by 3.17 units. Garcia, Rabago and Ocat (2019) focused on the impact of inflation on health factors in 120 selected countries. From this study's regression analysis, it was found that inflation rate of a country significantly predicts its health indicators, because the inverse effects was indicated.

Kidane and Woldemichael (2020) estimated the impact of food inflation on health in Ethiopia, but found that higher inflation resulted to rising under-five deaths.Lawal*et al.* (2021) who examined the causality between inflation and life expectancy in Nigeria for the period of 1980 and 2019, found no causality effect running from inflation to life expectancy. Their finding suggest that inflation is not significant to affect health indicator – life expectancy – in Nigeria. This result is contrary to the finding of Kidane and Woldemichael*et al.* (2022) who investigated the relationship between food inflation and child health in Ethiopia. The empirical analysis from the Ethiopia Demographic and Health Survey data revealed that exposure to 1 percent higher inflation leads to increase in the risk for under-five stunning by 0.95 percent.

In terms of the third strand of literature, these are those studies that estimated the impact of inflation on educational indicators. Example, Sequeira (2021) estimate the relationship between inflation, economic growth and education expenditure. It was also found that rising inflation related with high educational expenditures.While Dragton and Faruqubarson (2022) examined the impact of inflation on early years spending in England from 2001 and 2021. They found that while consumer prices had risen by 7 percent, the prices in the economy as a whole had risen by 9 percent and thereby the prices facing childcare and their education provision were 11 percent for the periods of study. Their finding suggests that the impact of inflation on educational indicator for children is higher than they are in the years earlier. And Maher, Zhon and Tang (2022) examined the impact of inflation on education expenditure in Egypt. They found that rising inflation has a deleterious effect on education expenditure in Egypt significantly. Generally, studies on the effects of inflation on non-income welfare indicators – particularly health and educational indicators – are somehow limited in the literature for developing countries such as Nigeria.

3. The Empirical Model And Data

The model specification for this study is guided by the literature, specifically, the study by Ahmad (2022) and Woldemichael*et al.* (2022). Thus, it is specified as follows:

$$W_i = f\ (Inflation) \qquad\qquad (1)$$

where W_i is the non-income welfare indicators such as, health proxy by Average Life Expectancy (LE) and education proxy by Primary School Enrolment, inflation is proxy by Consumer Price Index (CPI).

The relationship between inflation and these non-income welfare indicators are affected (controlled) by other variables, such as Population Growth Rate (PGR) and Per Capita Income (PCI). Therefore, equation (1) can be modified as shown as follows:

$$W_i = f\ (Inflation,\ Population\ growth\ rate, per\ Capita\ Income) \qquad (2)$$

To empirically estimate the model, stochastic linear regression model was employed. To examine the effect of inflation on health as specified as follows:

$$ALS = \alpha + \beta_1 INF + \beta_2 PGR + \beta_3 PCI + \mu \qquad\qquad (3)$$

Where ALS represents Average Life Span, INF Inflation, PGR Population Growth Rate, CPI is Consumer Price Index, α represents constant or intercept, β_1, β_2, and β_3 are slope coefficients, while μ is the error term.

To examine the effects of inflation on education, the next equation is specified as:

$$PSE = \alpha + \beta_1 INF + \beta_2 PGR + \beta_3 PCI + \mu \qquad\qquad (4)$$

Where PSE represents Primary School Enrolment, others are as defined earlier. Thus, LE and PSE are the dependent variables, while IFN, PGR, and PCI are independent variables. The data is annual time series sourced from the World Bank African Development Indicators (WDI, 2023a) and the scope of the study is from 1986 and 2021.

Augmented Dickey Fuller (ADF) unit root test was employed to check the time series property of the variables. The ADF unit root test is specified as shown in equation 5:

$$\Delta y_t = \alpha_0 + \alpha_1 t + \phi y_{t-1} + \sum_{i=1}^{p} \partial_i \Delta y_{t-i} + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots (5)$$

Where Δ is first difference operator, α_0 is intercept, α_1 is a trend coefficient, t is trend term, ρ is a lag order of the autoregressive process, and ε_t is the error term.

4. Results And Analysis

The descriptive statistics of the dependent and independent variables used in the estimations are shown in Table 4.1. Consumer price index average in Nigeria is 18.86 with standard deviation of 16.67. On the other hand, the mean of life expectancy and primary school enrolment is 48 years and 89.7%, respectively. This implies that Nigeria needs to do more in improving the non-income welfare indicators (see World Bank, 2023b).

4.1. Preliminary Analysis

Figure 1 shows a line graph for the variables under consideration. GDP was at the lowest point in 1981 while its highest point was in 2002. INF had its lowest and highest points in 2007 and 1995 respectively. RINT was relatively stable within the period of study. EXR was always on the increase, with the highest value in 2019 and GOV was stable during the period under consideration.

Table 4.1: Descriptive Results

Variables	Observations	Mean	Standard Deviation	Minimum value	Maximum value
CPI	36	18.8625	16.6781	5.42	72.87
LE	36	48.78394	2.719566	45.487	52.91
PSE	36	89.70985	6.523075	78.66348	102.1081
PGR	36	2.603632	0.095178	2.406363	2.764062
PCI	36	1338.412	918.0513	270.0275	3200.953

Source: Author's computation

Table 4.2: Unit root Test

	ADF Test		Order of Integration
Variables	Level	First Difference	
CPI	-2.717 **	-2.995 **	I(0)
LE	-0.036	-2.465 *	I(1)
PSE	-2.263 **	-3.087 **	I(0)
PGR	-0.016	-2.619 *	I(1)
PCI	-0.672	-2.974 *	I(1)

Source: Authors' computation

The unit root test results are contained in Table 4.2. The results show that the consumer price index (CPI) and primary school enrolment (PSE) are stationary at level, while average life expectancy at birth (LE), population growth rate (PGR), and per capita income (PCI) are stationary at first difference. Therefore, the study estimated the effects of inflation on primary school enrolment and life expectancy.

Table 4.3: Regression Results for Inflation and Health indicator (Average Life Expectancy)

	Coefficient	S.E	t-stat	p. value	Remarks
CPI	-0.0118	0.0112	-1.06	0.297	Negative & insignificant at 10%
PGR	-4.1349	1.7834	-2.32	0.027	Negative & significant
PCI	0.0027	0.0002	13.44	0.000	Positive & significant at 1% level
Constant	56.1156	4.6580	12.05	0.000	Positive & significant at 1% level

***Source:** Authors' computation*

The results for the effects of inflation on health is presented in Table 4.3. It indicates that consumer price index, and population growth rate are negatively related to the non-income welfare proxy by health indicator (average life expectancy) in Nigeria. However, the per capital income is positively associated with the average life expectancy. The findings for CPI is statistically insignificant at 10% level, however, it shows that an increase in inflation rate in Nigeria would decrease the non-income welfare indicator, particularly the average life expectancy in the country. This finding is in line with the results of Ahmad (2022), Olamide*et al.* (2022) as well as Stievary and Julunggono (2022), that inflation is negatively linked to well-being. Table 4.4 contains the results for inflation and education.

Table 4.4: Regression Results for Inflation and Education indicator (Primary School Enrolment)

	Coefficient	S.E		t-stat	p.val	Remarks
??????	-0.0196	0.0673		-0.29	0.772	Negative &insignificant at 10%
??????	34.4888	10.7279		3.21	0.003	Positive & significant
??????	-0.0014	0.00012		-1.20	0.240	Negative & insignificant at 10%
Constant	2.2456	28.0196		0.08	0.937	Positive & insignificant at 10%

Source: Authors' computation

The result on the effects of inflation on education is presented in Table 4.4. It is found that consumer price index is negatively related with the non-income welfare proxy by educational indicator (primary school enrolment) in Nigeria. However, the population growth rate and per capital income are positively associated with the primary school enrolment (education). The results suggest that as inflation rate in Nigeria increases by 10%, the primary school enrolment will decrease by 0.1%.The findings for inflation (CPI) is statistically insignificant at 10% level. It means that an increase in inflation rate in Nigeria reduces the non-income welfare, particularly the primary school enrolment in the country. This finding is also in agreement with the results of Ahmad (2022), Olamide*et al.* (2022), Stievary and Julunggono (2022) who reported adverse effects of inflation on welfare.

5. Conclusion

The study examined the effects of inflation on non-income welfare indicators, particularly, Education and Health in Nigeria empirically with the use of regression analysis. Annual time series data sourced from the World Bank Development Indicators (2023) from 1986 to 2021 was used. The findings indicate that inflation has adverse effects on non-income indicators represented by Education (Primary School Enrolment) and Health (Life Expectancy at Birth). These results suggest that as the rate of inflation increases, the welfare of

Nigerians decreases. Meaning, more Nigerians would fall into poverty as their welfare declines. The paper's policy recommendation is that the federal government should focus more on reducing inflation rate in the country, especially through both monetary and fiscal policies. For instance, macroeconomic policies that curtail inflationary pressures, the independence of CBN combined with practical and data-driven monetary policymaking to sustenance the objectives of price stability, fiscal discipline should be sustained to avoid undue aggregate demand pressures which drive up prices. Further, unstainable fiscal costs measures which mostly benefit households with higher incomes should be avoided as well as monitoring and evaluating progress of the relief measures put in place to cushion the negative effects of fuel subsidy removal.

References

Ahmad, T. (2022). Investigating the relationship between inflation and economic growth: A case of Pakistan. *Asiana 1*(1), 1-8

Aleemran, S.A. &Panahi, H. (2016). Effect of inflation, health expenditure and urbanization on life expectancy in Middle-East and North Africa countries. *Journal of the Iranian Institute for Health Science Research, 4*:346- 351

Bashir, D. (2022). The Impact of Inflation on Economic Growth in Nigeria, International Journal of

Dragton, N. &Faruqubarson, W.A. (2022). *Early years spending in England (2001 and 2021): Impact of Inflation.* England

Dwived, D.N. (2009). Managerial Economics. 7th Edition, Vikas Publishing House, delhi, India

Kidare, D. &Woldemichael, A. (2020). 'Does inflation kill? Exposure to food inflation and child mortality. Food Policy. 92:101838

Lawal, N.A., Osinubi, K.B., &Biririyu, S.O. (2021). Inflation and life expectancy in Nigeria: A Granger Causality approach. *Economica, 17*(5):241-248 Inflation Report. NBS Abuja.

Nene, S.T., Ilesamin, K.D. &Sekome, M. (2022). Effect of inflation targeting policy on the uncertainty and economic growth in selected Africa and European countries. *Economies.* 10.67

Olamide, E., Ogujiuba, K. &Maredza, A. (2022). Inflation and economic growth in developing countries: Panel data approach. *Economies* 10:67

Pasha, H.A., &Palanivel, T. (2004). Pro-poor Growth and policies, the Asian Experience, UNDP

Sabo-Adamu, S. (2023). Food Security and Human Development: Trends and Implications for the Nigerian Economy in *Environment and Sustainable Development Handbook*, 2023, Nigerian

Accounting and Finance Studies, Vol. 5, No. 2, www.scholink.org/ojs/index.php/ijafs

ISSN 2576-2001 (Print) ISSN 2576-201X (Online)

Buheji, M. (2022). Impact of Post-Pandemic Inflation on Global Poverty: A Holistic Perspective. *International al Journal of Management. 13*(5):11-23

CBN (2017). Central Bank of Nigeria Annual Report. CBN, Abuja

Maher, M., Zhao, Y. & Tang, C. (2022). Inflation and education expenditure: Evidence from Egypt. *Journal of Economics and Sustainable Development. 13*(4):71-82

Monsef, A. &Mechijandi, A.S. (2017). Economic factors and life expectancy in 136 countries during 2002 and 2010. *Payesh. 10*(5):567-574

NBS (2020). 2019 Poverty and Inequality in Nigeria. NBS, Abuja

NBS (2023). Consumer Price Index and

Defence Academy, Kaduna.

Salatin, P. &Bideni, M. (2014). Effects of Inflation on Women's health in selected Middle-income countries. *African Journal of Health Economics, 3(1): 39-51*

Sanga, G.J., Kangolo, M., &Mnogya, R. (2022). Effect of inflation on economic in Tanzania for the period from 1970 to 2020. *International Research Journal of MMC. 3*(5), 12-27

Sequeira, T.H. (2021). Inflation, economic growth and education expenditure. *Economic Modelling.* P.105475

Stievary, G.M. &Julunggono, G. (2022).

Inflation, exports, and imports on Indonesia's growth. *Journal of Management, Accounting, General Finance, 1*(3), 1-4

UNDP (2020). Health indicators in Nigeria. United Nations

Woldemichael, A, Kidare, D., &Shimles, M. (2022). Food inflation and child health in Ethiopia. *The World Bank Economic Review*, 1-17

Vaish, M.C. (2011). *Macroeconomic Theory*. 14th Edition. Vikas Publishing House, Delhi, India

World Bank (2023 a) . World Bank Development Indicators. Washington D.C., United States

World Bank (2023b). *Global Economic Prospects, 2023*. Washington, D.C., United States