



THE RELATIONSHIP BETWEEN UNEMPLOYMENT AND INFLATION IN NIGERIA

Sadiq Alhaji Abubakar
(elsadiq89@gmail.com)
+2348036153347

Department of Economics, Ibrahim Badamasi Babangida University Lapai, Niger State, Nigeria

Abstract

The study investigates the relationship between inflation and unemployment in Nigeria from 1981 to 2017. The unit root and F-Bound test were employed to test the stationarity of the variables and long run relationship between inflation and unemployment while ARDL ECM technique was adopted to analyse the data obtained. The result of the analysis confirms the existence of long run relationship between inflation and unemployment while the variables were stationary at level and first difference respectively. Furthermore, findings depict that in the long run, there was a positive relationship between inflation and unemployment while in the short run, the result found an inverse relationship between inflation and unemployment. The result of ARDL ECM indicates a 92% of speed of adjustment in the short run disequilibrium back to equilibrium. The study recommends that expansionary monetary policy through reduction of rate of interest stimulates consumption and investment which leads to aggregate demand and in turn leads to employment.

Keywords: Inflation, Unemployment, ARDL, Nigeria

1. Introduction

Nigerian economy has witnessed series of challenges. The greatest amongst them are inflation and unemployment. The duo has maintained a rising trend over the years especially unemployment. People within the working age i.e. 15-64 years of age who are willing to work but could not secure any for themselves sum up the Nigerian labour force. However, these age bracket people do not include retirees, students, home keepers and stay-at-home work or not interested (Njoko & Ihugba, 2011). Inflation and unemployment are issues that are fundamental to the financial existence of every nation. Unemployment is classified as one of the major obstruction to every nation's social advancement. It is also an avenue for underutilisation of a nation's labour assets, creating welfare misfortune regarding lower yield, thereby promoting lower and prosperity (Raheem, 1993). Inflation on the other hand is regarded as a disease as well as pervasive economic phenomenon in which its effects are felt to differing degree by every economic agent. Macroeconomic policies are formulated and implemented aiming at achieving targets in the economy such as stability in price and attaining full employment.

The relationship between inflation and unemployment was initially propounded by Phillips in 1958. The theory established a stable negative relationship between inflation and unemployment such that if one variable increases, the other variable declines; although, this practically explains economy. The relationship was named after him tagged "Phillips Curve".



Evidence of Phillips curve was subsequently documented by Samuelson and Solos (1960) for the US. They affirmed the postulation of Phillips 1958 that depicts a negative relationship between inflation and unemployment. They also revealed that the relationship occur because low unemployment is always associated with high aggregate demand such that there is a rise in wages and prices throughout the economy. Despite the fact that prominent scholars have given much attention to find out the relationship between inflation and unemployment over years, Nigerian scholars and economists within the academic circle are not left out in their quest to find out the connection between inflation and unemployment in the context of Nigeria. Prominent amongst other scholars include; Philips (1987), Samuelson (1960), Solow (1970), Phelps (1967), and Friedman (1968). However, the findings of their various studies have been a contradicting one.

2. Literature Review

Theoretical Framework

Phillips Curve: Unemployment Inflation nexus - The Phillips curve examines the relationship between unemployment and inflation (money wage changes). A. W. Phillips (1958), in his empirical evidences established an inverse relationship between the rate of unemployment and inflation (change in money wage). Phillips' evidences depicted that when unemployment is high, rate of inflation (money wage) is low. This is so because employers are not under pressure to increase wage rate. On the other hand, when unemployment is low, inflation (money wage) is high. Reason is that when the demand for labour is high and there are only few unemployed in the economy, employers who want to meet up with the high demand have no choice than to increase the wage rate higher to attract the scarce or limited labour.

Furthermore, Phillips revealed a second factor that led to the inverse relationship between unemployment and inflation. The factor identified was the nature of business activity. In a period of rising business activity when unemployment is accompanied with increasing demand for labour, the employers will bid up wages. On the contrary, if labour is decreasing and unemployment is rising, employers will be reluctant to grant wage increase. Rather, they will reduce wages, but workers and unions will be reluctant to accept wage cuts during such periods. Consequently, employers are forced to lay off workers, thereby causing high rate of unemployment. Thus when the labour market is depressed, a small reduction in wage could lead to a large increase in unemployment. Based on these evidences, Phillips concludes his argument that the relationship between rate of unemployment and inflation (money wage) would be a highly nonlinear. This is called the Phillips Curve.

Keynesian Theory of Unemployment:- The Keynes states that employment depends on effective demand, effective demand result in output, creates income and income provides employment. Thus he regards employment as a function of income. Also, effective demand depends on the aggregate supply and demand function. Since Keynes assumes that aggregate supply was stable, he concentrates on the aggregate demand to fight depression and unemployment (Thirlwa, 1979). Hence, Keynesian economists see the lack of demand for jobs as potentially resolvable by government intervention. Their prescription for reducing unemployment is excess spending by government to boost employment and increase in aggregate demand. They further suggested



intervention through an expansionary monetary policy that increases the rates, thereby leading to an increase in non-governmental spending (Haris, 2005).

Classical Theory of Unemployment - The classical view of unemployment states that the economy will achieve full employment if wage and prices are flexible. This view attests that unemployment occurs when wages rise too high to maintain equilibrium. When wages go up, firms can't afford to pay as many workers, so some may be laid off or fired, thereby increasing unemployment. When this happens fewer people have money to buy things, so demand goes down and prices tend to go down. Because unemployment is high, more people are looking for work giving firms more choice in who they hire and for how much. This results in decreasing wages. The classical view claims that the unemployment rate will always go through cycles, but in the end, will always correct itself to the natural unemployment rate (Powers, 2012).

Traditional Keynesianism Interpretation of the Philip Curve - In the tradition Keynesianism, the Philip curve plays two roles in the evolution. They focus more on the market goofs and money thereby giving little or no attention to the labour market and its connections with the market goods. Secondly, since Philip curve was flexible for macroeconomist, such policy turned into sliding on Philip curve, this slide depicted a compromise between inflation and unemployment. Increase in unemployment might require an expansionary measures thereby resulting to a fall in unemployment but the consequence will be on the general price level because there will be an increase in the price level. However, if the people go against the persistent increase in the price level of goods and services, restrictive measures may be adopted by the government, then inflation will fall and unemployment will rise.

Review of Empirical Studies

Many empirical works have tried to examine the relationship between unemployment and inflation across the globe. For instance, Aminu and Abdulrahman (2012) investigated the relationship between unemployment and inflation in Nigeria for the period 1977 to 2009 using the Augmented Dickey-fuller techniques, Granger Causality test and volatility in the series. The results indicated that inflation impacted negatively on unemployment. The causality test revealed that there is no causation between unemployment and inflation in Nigeria and a long-run relationship exists between both the variables. Umoru and Anyiwe (2013) examined the dynamics of inflation and unemployment in Nigeria using the Vector error correlation model over a period of twenty seven years. The study finds evidence of stagflation in Nigeria over the period. They also found that Nigeria is managing a shocking rate of inflation together with a severe recession as the unemployment rate rise astronomically. Taiwo and Folorunso (2013) examined the existence and stability of Philips relation for Nigeria, using series data from 1970 to 2010. Augmented Dickey Fuller and Philip Peron unit tests were employed to check for stationary. The estimate shows that relationship between the change in inflation rate and unemployment rate is theoretically negative in the short run; a low unemployment rate leads to an increase in the inflation rate and therefore an acceleration of the price level. The relations become non existence in the long run with positive relationship between unemployment and inflation signifying stagflation.

Orji, Anthony and Okafor, (2015) examined the inflation and unemployment Nexus in Nigeria by testing of the original Philips Curve proposition holds for Nigeria. The study adopted a



distributed lag model with data covering the period 1970 to 2011. The consumer’s price index (a measure of inflation rate) was regressed on unemployment rate, growth rate of money supply, budget deficit, real gross domestic product, interest rate. The result reveals that unemployment is a significant determinant of inflation and that there is a positive relationship between inflation and unemployment rate in Nigeria. Matthew and Udom (2014) examined the short and long run impact of unemployment and inflation in Nigeria, to pin-down the direction of causality between inflation and unemployment and rate of adjustment from the short run disequilibrium to the long run equilibrium. The Ordinary Least Square method (OLS) and Generalised Least Square (GLS) were adopted to analyse the time series data from 1970 to 2013. The regression result support the Philips curve in the short run, which shows a negative relationship between inflation and unemployment. The Granger Causality test shows that there is no causation between inflation and unemployment in Nigeria. Also, the Johnson Co integration test shows a negative relationship between unemployment and inflation in the long run. The generalised least square technique was used to analyse the EMC and the result shows that it will take approximately two years for the disequilibrium in the short run to be cleared.

3. Methodology

Model Specification

The model was fashioned from the empirical analysis of Oriavwote and Ukawe (2018). Also, GDP is incorporated in the model in order to give a robust empirical result. The model in its functional form is as follows:

$$INFL_t = f (UNEMP_t, GDP_t) \dots\dots\dots 1$$

For empirical computation, equation (1) transforms to:

$$INFL = \lambda_0 + \lambda_1 Unemp + \lambda_2 GDP + \mu \dots\dots\dots 2$$

The apriori expectations of the independent variables from theory are: $\lambda_1, \lambda_2, > 0$

Where,

- INFL = Inflation Rate in percentage
- UNEMPL = unemployment rate in percentage
- GDP = Gross domestic product
- t = number of time-series observation
- μ = error term

Variables Measurement

The variables captured in the model specified in this study were measured as follows: Unemployment: Unemployment refers to the share of the labour force that is without work but available for and seeking employment (ILO 2019).GDP is the gross domestic product. It is measured as the quantum of goods and services that are being produce within the economy with a specific period of time usually a year (WDI, 2014). Inflation is the persistence general rise in price of goods and service over a specific period of time in an economy, it influences the up and down activities of the economy either positively or negatively, that is moderate or hyper. It represents independent variable in this research work. It is measured in percentage (World Bank, 2014).



Techniques of Data Analysis

The study employs the time series data regression analysis with the assumption of fixed and random effect; where the intercept in the regression model is allowed to differ across time in recognition of the fact that each variable may have some special characteristics of its own. The Autoregressive distributed lag (ARDL) model is used to analyse the data collected. The t-statistics is used to determine the level of significance of the explanatory variables on the dependent variables. The Granger causality test is then conducted to determine the cause and effect relationship among the included variables.

4. Result

Unit Root Test

Phillips-Perron Test for Stationarity - Employing the Phillips-Perron test, unit root test was run on the variables individually.

Table 1: Unit Root Test

Variable	Philip Perron Statistics	5% Critical Value	Order of Integration
INF	-4.159905	-2.981038	I(I)
UNE	-5.390362	-2.986225	I(I)
GDP	-4.281466	-2.976263	I(0)

Source: Author's computation using E-views.

Table 1 shows the extrapolated result for the Phillips-Perron statistics and the critical values at 5%. There appears to be a mixture of levels and first difference stationarity at 5% level of significance. Hence, we ran the co-integration test to see if the variables have a long-run relationship using the ARDL Bounds test approach.

Bounds Test for Co-Integration

Given the unit root properties of the variables, we proceeded to implement the bounds test cointegration procedure, since there is a mixed order of integration.

Table 2: Bounds Test

Test Statistics	Value	K
F-Statistics	21.61810	
<i>Critical Value Bound</i>	I(0)	I(I)
1%	4.13	5.0
5%	3.87	3.1

Source: Author's computation using E-views

The result in Table 2 shows that the variables are co-integrated, because the F statistics exceeds the upper bound critical value according to peasant *al.* (2001) at both 1 percent and 5 percent level of significance. In other words, there is long run relationship between the variables.

Interpretation of Coefficients

Table 3 shows the long run regression result of the model. From the result, it was observed that the constant which is the slope of the intercept obtained a coefficient of -68.95313. This means that if all explanatory variables are held constant, inflation rate in the economy would be negative at -68.95%.



Table 3: Long run Result

Dependent Variable: INF				
Variable	Coefficient	Std.error	T-statist	Prob
Constant	-68.9531	24.3490	-2.8318	0.0163
UNE	20.3896	5.3188	3.8334	0.0028
GDP	-0.7602	0.2758	-2.7565	0.0187

Source: Author's computation using E-views

Furthermore, the leading explanatory variable (unemployment) depicts a positive coefficient of 20.38963, meaning that a unit increase in unemployment rate in Nigerian economy will result to an increase in the inflation rate by about 20.4%, though it was statistically significant at 5% level of significance. GDP on the other hand was significant at 5% level of significance with a coefficient of -0.917122. This however, means that a unit increase in GDP will lead to a decline in inflation rate by about 0.92%.

R^2 which shows the goodness of fit of the model revealed a value of 0.899032 which means that the variations in the changes that are being caused by explanatory variables stood at 89.90% approximately.

Table 4: Short-run ECM Result

Dependent Variable: D(INF)				
Variable	Coefficient	Std.error	T-statist	Prob
D(UME-1)	-22.29293	2.615664	-8.522855	0.0000
D(GDP-1)	0.540987	157030	3.44511	0.0053
ECT	-0.917122	0.087422	-10.4907	0.0000

R-squared: 0.899032, Durbin-Watson: 2.299727.

Source: Author's computation using E-views

Table 4 above revealed the short run dynamic result of the model specified in the chapter three above. In the short run, the coefficient of unemployment was negative 22.3. This means that there is an inverse relationship between inflation and unemployment in the short run in Nigerian economy such that if unemployment increases by one percent, inflation rate will drop by about 22.3% and the variable was found to be significant at 5% level of significance. Similarly, GDP has a positive relationship with inflation rate in Nigeria; as such, if a unit increase occurs in GDP, inflation rate in the economy will eventually rise by about 0.54%. Also, the variable was significant at 5% level of significance. The result shows a negative value of Error Correction (ECT) with a coefficient of -0.917122 and a probability t-statistics of 0.0000 revealing a statistical significance of the Error Correction. This indicates that if eventually disequilibrium surfaces in the economy, it will be adjusted by a speed of about 92% in the following year.

Granger Causality

The results from the causality test conducted using the Granger causality technique presented in Table 5 shows that there is no causality running between any of the included variables.



Table 5: Granger Causality

Null Hypotheses	Observation	F-Statistics	Prob
UNE does not Granger Cause INF	36	1.46740	0.2543
INF does not Granger Cause UNE	36	0.42523	0.6594
GDP does not Granger Cause INF	36	0.12552	0.8827
INF does not Granger Cause GDP	36	0.1569	0.8563
GDP does not Granger Cause UNE	36	0.12795	0.8806
UNE does not Granger Cause GDP	36	0.17181	0.8434

Source: Author's computation using E-views

Discussion of Findings

This study finds through the causality test that there is no evidence of causation between the two variables during the period of study. In fact, there is no causality either ways in the variables. This lends support to Milton Friedman's thoughts that there is no trade-off between unemployment and inflation. Hence, it can be applied to the Nigerian setting. One of Reasons for this could be the foreign labour, which is not involved in the unemployment rate calculation. Therefore, it may hinder the trade-off between the two variables in the short run. The issue of foreign labour relates to foreigners who come to work in Nigeria, thereby displacing citizens in the labour market. This concurs with the findings of Umaru and Zubairu (2012) and Al-Zeaud (2014). In a situation where there is no causality between unemployment and inflation, it means that an attempt to reduce either may most likely not affect the other. When there is a high or low rate of unemployment, it does not increase inflation neither does it decrease it.

Given the regression results above, the long run coefficients of unemployment was positive at 20.83963. This means that when all explanatory variables are held constant, a unit increase in unemployment will lead to an increase in inflation rate by 20.82%. However, in the short run, the result found an inverse relationship between inflation and unemployment in Nigeria. The short run findings conform with the theory postulation of Phillips Curve (1956) which says that there is always an inverse relationship between inflation and unemployment in the economy such that, when one variable rises, the other decline. However, the result of the long run explains the case of stagflation where both inflation and unemployment are both increasing at the same time in Nigerian economy. The findings of the long run was also in line with the finding of Orji et al (2015) that revealed a positive long run relationship between inflation and unemployment in Nigeria. Furthermore, the coefficient of the ECT was rightly signed -0.917. This means that whenever disequilibrium appears in the short run, it will be adequately and sufficiently adjusted back to long run equilibrium by about 92% speed of adjustment.

5. Conclusion and Recommendations

The study was carried out to investigate the relationship between inflation and unemployment in Nigeria from 1981 to 2018. Having conducted the empirical analysis of the study, the findings of the study are however summarised as follows: the result obtained from the empirical study depicts that there is no causality in any way between inflation and unemployment in Nigeria. The findings show that there was a positive relationship between inflation and unemployment in Nigeria in the long run. The findings show the case of stagflation in the long run in Nigeria. In the short run, result shows that lag order 1 and 2 are inversely related to unemployment while lag order 0 on the other hands has a positive relationship between it and unemployment in



Nigeria. A further look at Error Correction Term (ECM) shows the speed of adjustment required in the short run to adjust disequilibrium back to long run. The ECT shows 91.7% speed of adjustment required to adjust disequilibrium.

Philips (1957) propounded the Philips curve revealing that there is an inverse relationship between inflation and unemployment in every economy and his postulation has been a pillar for macroeconomic justification of these macroeconomic variables. Having conducted the study in the context of Nigeria with more emphasis on previous research work conducted by researchers regarding the relationship between inflation and unemployment in Nigeria, given the outcome of the empirical evidence of this study, the research work is concluded on the basis that there is no inverse relationship between inflation and unemployment in Nigeria within the period under study.

The following policy recommendations were made based on the findings of the study: implementation of monetary policy which success depends on the efficiency of the banking sector. The banking sector which comprises the commercial banks they are the major players of the banking sector therefore, there should be an effective and efficient regulation of the banks by the CBN. Expansionary monetary policy through reduction of rates of interest stimulates consumption and investment (aggregate demand and aggregate investment). This will lead to reduction of unemployment since aggregate demand will lead investment which in turn leads to employment. Government should ensure that the environment is created in such a way that it will be favourable to all sort of business. Favourable policies should be put in place that will encourage business (investment) and low rate of interest since lower interest rate on loans is capable of stimulating the economy. Again, basic infrastructures such as good road network, power, communication network and security should be adequately and sufficiently provided in order to encourage investment.

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