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THE VALIDITY OF THE PHILLIPS CURVE THEORY IN DEVELOPING COUNTRIES: NIGERIA'S EXPERIENCE IN HER PURSUIT OF ECONOMIC GROWTH AND DEVELOPMENT GOALS (1980 – 2018)

Dr. J.B. Orie is an Associate Professor of Economics, Department of Economics, College of Social & Management Sciences, Gregory University Uturu, Abia State, Nigeria.

Dr. Ifeanyichukwu K. Ibekwe was of the Department of Geography & Environmental Science Faculty of Social Sciences, University of Calabar, Calabar, Cross River State, Nigeria.

ABSTRACT

The control of inflation and unemployment in any economy is germane in the management of economic growth and development. The effective control of these macroeconomic variables is responsible for the economic stability experienced in some well managed economies. When they are ineffectively controlled, they could lead to economic woes which many nations pass through these days. Economic policy makers depend on the propositions of the Phillips curve theory to adjust inflation and unemployment in the economy depending on the desired direction of either of the two economic evils. In other words, a certain percentage of one variable could be tolerated at the expense of the other variable in order to achieve a desired economic goal at a time. Therefore, according to Phillips curve hypothesis, inverse relationship exists between inflation and unemployment. In some economies there exists positive and significant relationship between inflation rate and the rate of unemployment, causing stagflation, thereby invalidating the theory of Phillips curve. Therefore, this paper aims at examining the validity of Phillips curve theory in developing countries with particular reference to Nigeria from 1980 – 2018. The paper employs the Augmented Dickey-Fuller (ADF) test for unit root to test the stationarity or otherwise of the time series data obtained from the Central Bank of Nigeria, the National Bureau of Statistics, the World Bank, etc. We also deployed the Autoregressive Distributed Lag (ARDL) bounds testing technique to examine the long run relationship among the variables in the model. In addition, we employed the error correction technique for the correction of disequilibrium and to determine the speed of adjustment in the long run. The result shows that unemployment has a negative effect on inflation, though statistically insignificant. This confirms the existence of Phillips curve postulations in Nigeria within the period of the study (1980 – 2018). This paper therefore recommends that economic policy makers in Nigeria should diversify the economy by de-emphasising overdependence on oil, promote agriculture, create more jobs, create conducive economic environment for business to thrive, fight corruption and poverty, boost investment, improve ease of doing business, and promote small scale businesses. Furthermore, fighting all forms of insurgency is germane for the economy to grow.

Keywords: Unemployment, Inflation, Phillips Curve, Diversification, Growth

1.0 INTRODUCTION

All economies in the world, whether developed or developing desire low inflation and unemployment rates so as to achieve economic stability necessary for growth and development. Hence in the 1960s, nations deployed the propositions of the Phillips curve hypothesis to achieve inflation and unemployment control predicating their policies on the trade-off between inflation and unemployment.

In Nigeria, particularly in the 1970s, the oil boom era promoted inflation. Government adopted inflationary policies such as the Udoji salary awards in 1974 that enriched the pockets of public and civil servants. In the 1980s the structural adjustment programme (SAP) introduced by the Babangida-led Federal Government in 1986 distorted some macroeconomic variables causing high rate of inflation. During the period 1986 – 1992, the rate of inflation averaged 31.5 percent and from 1995 to 2007 stood at 12.3 percent (Orji & Okafor, 2015). The decline was as a result of democratic dispensation and the pursuit of public debt reduction of the Obasanjo regime (1999 – 2007). The Yaradua/Jonathan administration from 2007 to 2015 experienced fiscal indiscipline that put pressure on the inflation rate in the country which has been on the rise since then (Adebowale, 2015).

Another macroeconomic variable that hinders or encourages economic growth and development, depending on the direction of its movement, is unemployment rate. A high unemployment rate connotes output loss to the economy. The rate of unemployment measures the percentage of those willing and able to work but cannot find employment (Oye, 2011). It also captures the frequency, duration and incidence of unemployment. Gbosi (1997) defined unemployment as a situation in which people who are willing and able to work at the prevailing rate are unable to find jobs. Central Bank of Nigeria (CBN) (1993) defined unemployment rate as the percentage of persons among the labour force (15 – 65 years of age) excluding students and those medically unfit, available for work but do not find work.

Unemployment reduces the Gross National Product (GNP) of a nation, and by extension, contributes to the low standard of living of the people. This has characterised the state of affairs in Nigeria since the deregulation of the economy in 1986 (Gbosi, 2005). Records from the National Bureau of Statistics (NBS) put unemployment rate in Nigeria in 1970 at 4.3%. By 1980, it had risen to 6.4%. In the 1980s unemployment rates in Nigeria averaged 5.44%; between 1990 and 1999, the average rate of unemployment stood at 2.94%; between 2000 and 2009, the average rate jumped to 11.97%; and between 2010 and 2019 it climbed further to 12.93%. The Nigerian government says that the unemployment rate could reach 33.5% in 2020 (www.premiumtimesng.com).

The two scenarios of inflation and unemployment trends in Nigeria from 1980 to 2018 show, from the periphery, that there is no inverse relationship between the rate of unemployment and the rate of inflation which negates the postulations of Phillips (1958) that there is a permanent trade-off between the rate of unemployment and the rate of inflation. In other words, if policy makers desire to reduce unemployment, they must accept a higher rate of inflation. In line with the postulations of Phillips (1958), there is evidence to show that the United Kingdom, the United States of America and other advanced economies adopted the Phillips recommendations in the 1960s. However, in the case of Nigeria, particularly since 1987, there appeared to be no permanent trade-off between unemployment and inflation. For example, in the 1980s, the average Nigeria's unemployment and inflation rates stood at 6.4% and 6.9% respectively, while in the 2000s, Nigeria's average inflation rate was 27.4% and average unemployment rate stood at 9.5%. The rates of unemployment and inflation have been rising simultaneously leading to what Musgrave and Musgrave (1976) described

as stagflation. Stagflation refers to a situation where an economy moves into a recession or depression while there is a continuing substantial rate of inflation (Gbosi, 2005).

2.0   LITERATURE REVIEW
2.1   THEORETICAL/CONCEPTUAL REVIEW
2.1.1 CONCEPTUAL LITERATURE REVIEW ON UNEMPLOYMENT

The International Labour Organisation (ILO) opines that only those belonging to the age group of 15 - 65 years of age should be included in the labour force of a country. According to Briggs (1973) unemployment is the difference between the amount of labour at current wage rate and working conditions and the amount of labour not hired at these levels. Gbosi (1997) in his view defines unemployment as a situation in which people who are willing to work at the prevailing wage rate are unable to find jobs. National Bureau of Statistics (NBS) defines unemployment as the proportion of the labour force that is available for work but did not work for at least thirty-nine (39) hours in the week preceding survey period.

Marx (1859) noted that unemployment is as a result of the unstable capitalist system through which unemployment rate perpetuates causing labourers to settle for fair wages. Marxists argue that to eliminate unemployment completely, capitalism must be abolished completely, replacing it with socialism.

Keynes (1936) held the view that increased unemployment is as a result of a fall in the aggregate demand in the economy. Phillips (1958) in his study on unemployment and rate of money wage in the British economy observed that increase in unemployment in the economy causes inflation to drop which he referred to as a trade-off between the two variables. His conclusion was that as employment level increases, inflation rises, but as unemployment increases, inflation falls as the purchasing power of the economy becomes weaker. Taylan (2012) noted that as an individual is searching for job, firms are also searching to fill vacant spaces. He concluded that wages therefore decides for both the individual and the firm.

2.1.2 CONCEPTUAL LITERATURE REVIEW ON INFLATION

There are numerous literature on the causes or determinants of inflation in both developed and developing economies. These factors include changes in money supply, credit to government by the banking system, government deficit expenditure, low industrial production, high food prices, volatility in internal price of crude oil, interest and exchange rates, regular upward review of public sector wages among others. Inflation adversely affects the overall growth, financial sector development, and the poor in the society. Inflation causes uncertainty in prices in goods and services, discourages savings, decelerates consumption, and poses serious threat to the overall macroeconomic stability in the economy and high social costs (Bawa, Abdullahi & Ibrahim, 2016).

In the view of Friedman (1963), inflation is always and everywhere a monetary phenomenon, in the sense that it is and can be produced only by a more rapid increase in the quantity of money than in output. This position strengthens the views of the monetarists that money is indeed a significant variable in determining the behaviour of consumer prices and a critical channel of monetary policy transmission in both advanced and developing economies.

Keynes (1936) opined that the first impact of increase in the quantity of money is a fall in the interest rate, resulting to increase in the volume of investment, raising the level of effective aggregate demand, and through the multiplier effect, output, income, employment

and price level will increase. Keynes was of the view that increase in the quantity of money has indirect and non-proportional relationship with general price level.

Masha (2000) showed in his study that inflation episodes in Nigeria since 1970s were largely driven by the growth of money supply and some factors that characterised the economy such as climatic conditions, wage increases, the structure of production, currency devaluation and changes in terms of trade. Mordi (2007) observed that between 1988 and 1994, inflation increased to 57% and 72.8% in 1995. He attributed these increases to excess money supply, scarce foreign exchange and severe shortages in commodity supply, as well as continual labour and political unrest following the annulment of the June 1993 general elections by the Babangida administration.

Some authors have also attributed past inflation (inflation inertia) to the current level of inflationary pressure as their own explanation of the cause of inflation in Nigeria. In their study, Adenekan and Nwana (2004) estimated 0.64 degree of inflation inertia as the cause of inflation in Nigeria.

2.2   EMPIRICAL LITERATURE ON UNEMPLOYMENT AND INFLATION

Phillips (1958) using historical data from the United Kingdom labour market from 1861 to 1957 found that the growth rate of nominal wages was negatively correlated with the rate of unemployment, that is, low unemployment rates tended to be associated with rapidly rising wages while high unemployment rates were associated with slowly rising wages. Phillips further showed the strength of the unemployment versus wage change relationship seemed to depend on the level of unemployment. In his analysis, he demonstrated that, when unemployment was low, decreases in unemployment tended to be associated with high increases in wage inflation, when unemployment was high, decreases in the unemployment rate seemed to produce small changes in wage growth rates.

Durevall (1998) using inflationary data in Brazil for the period 1968 – 1985 found that the degree of inertia, as indicated by the coefficient value of lagged inflation was 0.41 degree. The author further confirmed that an increase in money growth or oil price inflation increases overall inflation in the country and that inflation increases when the rate of devaluation of the exchange rate increases, while it decreases when output growth rate increases.

Cevik and Teksoz (2013) used Libyan annual data for the period 1964 – 2010, and employing cointegration technique and error correction model investigated inflation dynamics in Libya. Results from the study confirmed inflation inertia to be a key determinant of consumer price inflation in the country. Also, the results showed that government spending, money supply growth, global inflation, exchange rate, imposition and subsequent removal of international sanctions played central roles in the Libyan inflation process.

Kabundi (2012) employed single-equation error correction model based on the quantity theory of money to ascertain the main factors causing inflation in Uganda. The result revealed that both external and domestic factors affect inflation in Ugandan economy. The identified factors include money supply growth, world food prices, domestic demand and supply effects in the agricultural sector, energy prices and inflation inertia.

In Pakistan, Butt and Jamal (1988) examined the factors causing inflation in the economy by applying the monetarist approach. The result in contrast to the monetarist theory showed that monetary growth variables failed to provide adequate explanation to the inflationary pressure in Pakistan economy. Therefore, monetary policy may not be an effective tool for

restoring price stability in the Pakistan economy. Rather, the result revealed that changes in expected cost of holding money balances play significant role in the inflationary process in Pakistan economy. On the other hand, Chaudhary and Ahmad (1996) tested monetary and structural variables to identify the major determinants of inflation in Pakistan. Unlike Butt and Jamal (1988), they found that only constant growth in money supply does significantly affect inflation and however remarked that inflation is not purely a monetary phenomenon in Pakistan. Their results showed that structural variables such as growth of the service sector, deficit financing of the budget through public debt, and import prices were significant determinants of inflation in Pakistan economy.

Lim and Papi (1997) using Turkish data found that monetary variables play significant role in the inflationary process. They observed public sector deficits and inertia factors also contribute to the inflationary pressures. They further concluded that policy makers' commitment to active exchange rate depreciation on several occasions in the past 15 years that preceded their study also contributed to the inflationary process.

In Tanzania, Laryea and Sumaila (2001) found that output and monetary factors were the main determinants of inflation in Tanzanian economy in the short-run, while parallel exchange rate also played a key role, in addition to output and monetary factors in the long-run. They remarked that inflation in Tanzania is caused mainly by monetary factors than by real factors, going by the magnitudes of elasticities of price with respect to both money and output. They concluded that inflation is a monetary phenomenon in the country.

In Ethiopia, Wolde and Rafael (2008) in their study indicated that money supply and deficit financing seem to have a significant effect on the Ethiopian inflationary process. They indicated that controlling the growth of money and narrowing the budget deficits can be useful policy tools for Ethiopia's long-term macroeconomic stability and growth.

In the case of Ghana, Adu and Marbuah (2011) used econometric models to empirically analyse factors that account for inflationary dynamics in Ghanaian economy. They found a combination of structural and monetary factors, including real output, nominal exchange rate, broad money supply, nominal interest rate and fiscal deficit as major causes of inflation. They however concluded that output growth rate has the strongest impact on inflation in the country.

Oyejide (1972) investigated the impact of deficit financing on inflation and capital formation in Nigeria by relating the domestic money supply to inflation using Fisher's equation. The result showed a direct correlation between the general price level and rate of deficit financing over the period of the study (1957 – 1970) and concluded that less emphasis on deficit financing would reduce the growth of price inflation in Nigeria.

In the same vein, Akinnifesi (1984) using variables such as money supply, lagged money supply, credit to government by the banking sector, government deficit expenditure, industrial production, and food prices as factors causing inflation confirmed that changes in the above variables jointly explained inflationary pressure in Nigeria. The study, using annual data for 1960 – 1983 for the empirical examination emphasised that increases in government expenditure financed by monetisation of oil revenue and credit from the banking sector were responsible for the expansion of money supply, and by extension, contributed significantly to inflationary pressures in Nigeria.

In the case of the relationship between unemployment and inflation in the Nigerian economy, Umaru and Anono (2012) investigated these variables between 1977 and 2009

using the Augmented Dickey-Fuller techniques. The study examined the unit root property of the series, after which Granger causality test was conducted to determine the direction of causation between unemployment and inflation. Also, cointegration test was conducted using Johansen cointegration technique to examine the long-run relationship between the variables. In addition, ARCH and GARCH techniques were employed to determine the existence of volatility in the time series. The results revealed that inflation impacted negatively on unemployment. The Granger causality test result showed that there is no causation during the period. The cointegration test confirmed a long-run relationship between the variables, while the ARCH and GARCH tests revealed that the time series data exhibited a high volatility clustering during the period of the study. Therefore, the study recommends the use of Phillips' theory to achieve a desired reduction in unemployment and inflation.

In the Jordanian economy between 1984 and 2011, Zeaud (2014) investigated the existence of trade-off relationship between unemployment and inflation using ADF and Johansen cointegration techniques. The results showed no causal relationship between the two variables in Jordanian economy between 1984 and 2011. The results confirmed that there is no trade-off relationship between the two variables in Jordan.

In Sri Lanka, between 1990 and 2012, Thayaparan (2014) investigated the effect of inflation and economic growth on unemployment, using Augmented Dickey-Fuller and causality tests as well as ordinary least squares technique. The results of the unit root tests showed that Gross Domestic Product (GDP) was stationary at level while unemployment and inflation were non-stationary at level. These two variables were made stationary at first difference. The regression results revealed that the coefficient of inflation is negative and showed statistically significant influence on unemployment while GDP showed positive coefficient but no significant effect on unemployment. The study concluded that only inflation significantly reduces unemployment and GDP positively, but GDP insignificantly influences unemployment. The result of the Granger causality test revealed that there is a unidirectional causality between inflation and unemployment.

Joel and Johannes (2010) investigated the relationship between inflation and unemployment in Namibia between 1971 and 2007 using unit root test, Johansen cointegration and error correction models. The results validated the Phillips curve theory in Namibia within the period. The study therefore recommended that to reduce unemployment, aggregate demand must be increased and stimulated.

In the same vein, Funmitaka (2007) investigated the existence of the Phillips curve. The author analysed the relationship between inflation and unemployment in Malaysia from 1975 to 2004, using unit root test, Johansen cointegration, vector error correction models, and Granger causality tests. The results showed the existence of Phillips curve propositions in the Malaysian economy for the period 1975 – 2004. The study recommended a trade-off between the two variables for effective inflation and unemployment control in the economy.

Prasanna and Gopakumar (2009), using unit root, Johansen cointegration, error correction models, investigated the relationship between inflation, economic growth and unemployment in India from 1973 to 2008. The results proved a trade-off relationship between inflation and unemployment in the long-run. Therefore, the study recommended the use of Phillips curve prescriptions in the control of inflation and unemployment.

Saaed (2007) examined the relationship between inflation and economic growth in Kuwait, using annual data on real GDP and CPI for the period 1985 – 2005. The results confirmed a

long-run relationship between the variables. The results further showed a strong inverse relationship between inflation (proxied by CPI) and GDP in Kuwait. The study recommended the use of Phillips curve hypothesis in the control and management of the variable in the economy.

The reviewed empirical literature covering 16 developing countries including Nigeria showed that there are divergent findings and conclusions regarding the causes of inflation and unemployment in developing countries and the nature of relationship between the two macroeconomic variables. While a good number of them confirmed the inverse relationship between inflation and unemployment by validating the Philips curves hypothesis, others revealed the existence of no permanent trade-off between the variables by confirming stagflations in some countries, a situation of positive relationship between the variables, causing economic depression and recession.

While many of the scholars employed few variables such as money supply, deficit financing, Gross Domestic Product and inflation inertia to determine causes of inflation in their respective countries of study, this paper expanded its variables by including interest rate, exchange rate and total Federal Government expenditure to examine the causes of inflation in Nigeria from (1980 – 2018).

In the case of Nigeria, reviewed empirical studies from Oyejide (1972), Akinnifest (1984) Umaru & Anono (2012), Onwioduekit (2006) and Ola-David & Oluwatobi (2012), covered short periods, using variables such as deficit financing, credit from the banking sector, gross domestic product and inflation inertia. This paper covers a longer period of thirty eight (38) years, employing more variables such as interest rate, exchange rate, Federal Government expenditure, money supply, and real Gross domestic product making it unique among the existing literature. The study confirms the existence of Philips curve hypothesis in Nigeria between 1980 and 2018.

3.0   METHODOLOGY

The study used inferential method as a research design in evaluating the validity of the Phillips curve theory in developing countries with particular reference to Nigeria for the period 1980 – 2018. The analytical techniques used in the analysis included the Augmented Dickey-Fuller (ADF) test for unit root to test the stationarity or otherwise of the time series data. The Autoregressive-Distributed Lag (ARDL) bounds testing technique was also used to examine the long-run relationship among the variables in the model. In addition, we deployed the ordinary least squares (OLS) for estimation and the error correction technique for the correction of disequilibrium and to determine the speed of adjustment in the long run.

The data used for the analysis were from secondary sources: time series data on relevant macroeconomic variables on the Nigerian economy from 1980 to 2018 obtained from the Central Bank of Nigeria (CBN), the National Bureau of Statistics (NBS), the World Bank, Federal Ministry of Finance and National Planning, Abuja, and the Debt Management Office (DMO), Abuja.

4.0   MODEL SPECIFICATION

The study focussed on the evaluation of the validity of Phillips curve theory in developing countries with particular reference to Nigeria from 1980 to 2018. Therefore the model specification is as follows:

$$INFL = b_0 + b_1 UNEMP + b_2 INTR + b_3 EXCH + b_4 TFGEXP + b_5 MS + b_6 RGDP + \mu$$

Where,

$INFL = Inflation$

$UNEMP = Unemployment$

$INTR = Interest\ rate$

$EXCH = Exchange\ rate$

$TFGEXP = Total\ federal\ government\ expenditure$

$MS = Broad\ money\ supply$

$RGDP = Real\ Gross\ Domestic\ Product$

$\mu = Stochastic\ variable\ (representing\ other\ variables\ not\ included\ in\ the\ model)$

$b_0 = Intercept$

$b_1 - b_6 = The\ coefficients\ (parameter\ estimates)$

A priori expectations: Economic theories postulate that inflation and unemployment are negatively related. Real GDP is also expected to be have a negative relationship with inflation rate while exchange rate, interest rate, total federal government expenditure, and broad money supply have positive relationship with inflation rate. Symbolically, the *a priori* expectations are:
$b_1,\ and\ b_6 < 0;\ b_2, b_3, b_4, and\ b_5 > 0$

5.0   RESULTS AND DISCUSSION OF FINDINGS

5.1   STATIONARITY TEST

We used the Augmented Dickey-Fuller (ADF) test for unit root to test whether or not each of the time series was stationary and to also determine the order of integration of the variables.

The results of the unit root tests are presented in Table 1 below:

Table 1 – Results of Unit Root Tests

Augmented Dickey-Fuller (ADF)							
	Level			First Difference			
Variables	None	Intercept	Trend	None	Intercept	Trend	Order
INFL	-1.982299*	-3.204646*	-3.928879*	-6.109246**	-6.023204**	-5.937410**	I(0)
EXCH	3.342891	1.805879	-1.858255	-3.742041**	-4.258914**	-4.615739**	I(1)
INTR	0.115175	-3.304027*	-3.396104	-6.117120**	-6.091711**	-6.301223**	I(0)
MS	2.433758	7.639453	2.432829	1.195453	0.679683	-4.707589**	I(1)
RGDP	5.295782	2.705324	-2.429560	-7.239829**	-9.531958**	-11.72059**	I(1)
TFGEXP	4.127560	4.118153	1.536988	0.418880	-0.595191	-4.829106**	I(1)
UNEMP	-0.068255	-1.174197	-2.397129	-5.931589**	-5.689694**	-5.807703**	I(1)

Source: Author's computation using Eviews 9
** and * indicate rejection of the Null hypothesis at 1% and 5% respectively

Under the ADF unit root test, we reject the null hypothesis of non-stationarity of a time series when the computed tau statistic is greater than the critical value of the ADF tau statistic. From the results in Table 1 above, it can be seen that our model is mixed of variables which are I(0) and I(1). Inflation rate (INFL) and Interest rate (INTR) were stationary at level, while the remaining variables – Exchange rate (EXCH), Money supply (MS), Real GDP (RGDP), Total federal government expenditure (TFGEXP), and Unemployment rate (UNEMP) – all became stationary after taking their first difference. This result justifies our use of the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration.

5.2   COINTEGRATION TEST

Regressing a non-stationary time series on another non-stationary time series may yield spurious regression, but if the linear combination of the series is stationary, we could say that the variables are cointegrated and that the regression is no longer spurious (Engle & Granger, 1987). We say that variables are cointegrated if they have a long run, equilibrium, relationship.

For this study, we employed the ARDL bounds testing technique proposed by Pesaran, Shin, and Smith (2001) to examine the long run relationship among the variables in the model. The critical values for the bounds test are based on assumptions regarding whether the variables in the model are I(0) or are I(1). The result of the ARDL bounds test is presented in Table 2 below:

Table 2 – ARDL Bounds Test for Cointegration

Variables	F-statistic	Critical Value Bounds			Decision
		Significance	I(0)	I(1)	
INFL, EXCH, INTR, MS, RGDP, TFGEXP, UNEMP, & INTERCEPT	3.984720*	10%	2.12	3.23	Cointegration
		5%	2.45	3.61	
		2.5%	2.75	3.99	
		1%	3.15	4.43	

Source: Author's computation using Eviews 9

** and * indicate rejection of the Null hypothesis at 1% and 5% respectively

Source of Asymptotic critical value bounds: Pesaran, Shin, and Smith (2001), Restricted intercept and no trend (k = 6)

The F-statistic of 3.984720 is higher than the upper bound critical value at the 5 per level (3.61), suggesting the presence of cointegration among the variables in the model. The null hypothesis of no cointegration is therefore rejected. This implies that inflation rate (INFL) is bound by a long run relationship with the six explanatory variables (EXCH, INTR, MS, RGDP, TFGEXP and UNEMP) in Nigeria during the period covered by the study. We used restricted intercept and no trend for the bounds testing and the selected ARDL representation for the model is ARDL (2, 1, 0, 0, 2, 0, 0).

5.3   REGRESSION RESULTS

The results of the long run coefficients estimated using ARDL approach and the error correction estimation for the ARDL model are presented in Tables 3 and 4 below:

Table 3 – Estimated Long run coefficients

Estimated Long run Coefficients – Dependent Variable: INFL				
ARDL model selected on Akaike Information Criterion (AIC)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.794394	19.841952	-0.040036	0.9684
EXCH	-0.057933	0.113821	-0.508981	0.6152
INTR	1.048023	0.735328	1.425244	0.1665
MS	-0.001525	0.002868	-0.531790	0.5996
RGDP	0.001023	0.000924	1.107196	0.2787
TFGEXP	-0.000666	0.010880	-0.061191	0.9517
UNEMP	-0.153961	0.725668	-0.212165	0.8337

Source: Author's computation using Eviews 9

Table 4 – Error Correction Results

Error Correction representation of the ARDL model – Dependent Variable: INFL				
ARDL model selected on Akaike Information Criterion (AIC)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INFL(-1))	0.443860	0.170194	2.607965	0.0151
D(EXCH)	-0.323013	0.171795	-1.880225	0.0718
D(INTR)	0.915483	0.654505	1.398742	0.1742
D(MS)	-0.001333	0.002478	-0.537648	0.5956
D(RGDP)	-0.005886	0.002808	-2.096477	0.0463
D(RGDP(-1))	-0.001572	0.000948	-1.658550	0.1097
D(TFGEXP)	-0.000582	0.009508	-0.061168	0.9517
D(UNEMP)	-0.134491	0.636609	-0.211261	0.8344
ECM(-1)	-0.873534	0.175883	-4.966552	0.0000
R-Squared				0.594824
Adjusted R-Squared				0.416547
Durbin-Watson stat				2.288876
F-statistic				3.336508 (0.006064)
Serial correlation: LM Test				0.776929 (0.4715)
Heteroskedasticity: Breusch-Pagan-Godfrey				0.754561 (0.6790)

Source: Author's computation using Eviews 9

Results from the long run model (Table 3) show that interest rate (INTR) and real GDP (RGDP) have statistically insignificant positive relationship with inflation rate (INFL) in the long run, while exchange rate (EXCH), money supply (MS), and total federal government expenditure (TFGEXP) each has a negative but statistically insignificant impact on inflation rate at the 5% level. These results imply that interest rate and real GDP both have positive relationship with inflation rate, that is, increase in interest rate and increase in real GDP lead to increase in inflation rate, whereas increase in exchange rate, money supply, and total federal government expenditure impact on inflation negatively, though not statistically significant.

In the short run model (Table 4), the coefficient of the ECM variable has the correct negative sign (-0.873534) and is statistically significant at the 1 percent level. This provides further evidence on the cointegrating relationship among the variables in the model. The coefficient of the ECM shows a very high speed of adjustment back to equilibrium, with about 87.4 percent deviations from an equilibrium path arising from the model in the previous year being restored in the current year.

The short run coefficients indicate that inflation inertia, measured by the estimated coefficient of lagged inflation (0.445) is positive and statistically significant at the 5 percent level. This implies that lagged inflation has a positive impact on current inflation in Nigeria within the period of the study. Real GDP was found to have a statistically significant negative (-0.005886) impact on inflation in the short run. This means that high RGDP reflected in more output will help to reduce prices and inflation. Similar result (-0.001572)

was observed in the case of lagged RGDP meaning that previous year RGDP has negative effect on the current year's inflation rate.

The short run results further reveal that unemployment rate exerts (-0.134491) a negative effect on inflation, but statistically insignificant. This confirms the existence of Phillips curve postulations in Nigeria within the period covered by the study.

In the same way, the coefficients of exchange rate (-0.323013), money supply (-0.0013333), and total federal government expenditure (-0.000582) all have negative impact on inflation, though not statistically significant. Also, the short run impact of interest rate on inflation is found to be positive (0.915483), though not statistically significant.

The adjusted coefficient of determination (adjusted R^2) shows that the explanatory variables accounted for 41.65 percent of the total variation in inflation, while the R^2 shows about 60 percent. The F-statistic of 3.336508 (with probability of 0.006064) shows that on the overall, the model was statistically significant, while the Durbin-Watson statistic of 2.288876 suggests that the model is free from serial autocorrelation.

The results from the Breusch-Godfrey serial correlation LM test indicate the absence of serial correlation of the residuals while the Breusch-Pagan-Godfrey test shows that the residuals were homoskedastic-consistent at the 5 percent level.

6.0   POLICY RECOMMENDATIONS BASED ON FINDINGS

The empirical results of this study showed a negative relationship between inflation and unemployment in Nigeria within the period of the study. This result validates the Phillips curve postulations in Nigeria. Following this finding therefore, we recommend the following policy measures:

i)   Therefore, government should pursue the control of inflation and unemployment by employing Phillips curve principles. More importantly government should diversify the economy, by opening up industries, promote agriculture, create more jobs, creating conducive economic and political environment for businesses to thrive, fighting corruption and poverty, boosting investment, by improving ease of doing business and promoting small scale businesses.

ii)   The monetary authorities should moderate its current policy stance on interest rate, exchange rate, money supply and federal government expenditure in favour of low inflationary rate, while boosting employment creation. They should be more proactive in fighting unemployment and inflation and avoid stagflation using monetary and fiscal policy measures at their disposal to stabilise the economy and achieve the desired macroeconomic objectives.

iii)   Growth in real Gross Domestic Product (RGDP) should be pursued by all stakeholders in the economy in view of the negative relationship between real GDP and inflation as shown by the empirical result. Boosting Gross Domestic Product obviously will bring low prices of goods and services in the economy and reduce inflation.

7.0 CONCLUSION

The presence of high inflation and unemployment problems in the Nigerian economy is a major source of concern for the government and people of Nigeria because of their effects on the economic, social, and political life of the people. Therefore this study attempted to examine the Phillips curve hypothesis as a relevant tool for regulating inflation and unemployment in the economy. The findings revealed that Phillips curve hypothesis is relevant in Nigeria. Therefore, there is need for monetary authorities in Nigeria to rely on the postulations of Phillips curve theory in the management of inflation and unemployment in the economy.

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