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The Causes of Persistent Inflation in Nigeria

Victor O. Asekunowo¹

This study sought to identify the traditional and institutional inflation variables responsible for inflation phenomenon and the magnitude of the contribution of the identified variables to the rise in general price level. Secondary data on key macroeconomic variables in the economy from 1974 to 2013 were used. The data collected were analysed using the Autoregressive Distributed Lag (ARDL) bounds test. The results showed that there existed a longrun co-movement among the variables. Also, the ordinary least squares estimate showed that Real Effective Exchange Rate, Lagged Consumer Price Index, Real Broad Money and Real Profits were statistically significant in influencing Consumer Price Index. The short-run relationship shows that 60% of disequilibrium errors from the previous year's shock converge back to the long-run equilibrium in the current year. The study therefore concluded that inflation in Nigeria, during the studied period, was driven by the pass-through of import prices to domestic prices via markup pricing by firms. This was aided by domestic inflation persistence. It is therefore recommended that domestically produced products of good quality and adequate quantity must be substituted for imported ones and a monetary policy stance that does not easily deviate from the set monetary target should be adopted by the Nigerian monetary authorities if persistent inflation is to be curbed in the country.

Keywords: Inflation, Real Exchange Rate Shocks, Pass-Through, Real Profits, Real Broad Money Supply, Inflation Persistence, Nigeria.

JEL CLASSIFICATIONS: E30, E31, E50, E58

1.0 Introduction

One of the fundamental goals of a modern economic system is to keep prices of goods and services stable at rates that would not be detrimental to the economic system. The attainment of this goal, of ensuring that prices do not rise continuously, is very crucial in that non-attainment of the goal carries with it dire micro and macroeconomic consequences. At the microeconomic level, the unfair wealth redistribution that may accompany an upward movement of prices could encourage hoarding of unspent income, increase the cost of borrowing and therefore constrain investment spending by

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businessmen. At the macroeconomic level, an upward inflationary pressure may make the export of goods and services in an economy to dwindle because the prices of tradables may become less competitive in the international markets thereby discouraging foreign purchases and consumption of such tradables. An offshoot of this is that the national income of the economy may fall with attendant adverse consequences on the economy's employment (increased unemployment), economic growth and possibly development.

Plausibly, it is for these reasons that managers of economies around the world strive strenuously to keep inflation rates at low and stable levels. The managers of the Nigerian economy are not without the fervour to have a low and stable inflation environment. But a retrospective look at the performance of the economy, for example, from 1974 which was the year the country's monetary policy regime changed from exchange rate targeting to the direct monetary targeting framework in response to the inflationary pressure resulting from increased public expenditure as a result of the reconstruction works after the civil war (CBN, 2014) and the monetisation of the petrodollars, to 2013 shows that the Nigerian economic environment may be anything but a low and stable inflation one. During this 40-year observation period, for instance, the average annual rate of headline inflation (inflation rate estimates based on the price movements of all essential commodities including food and energy) was a double-digit rate of 20.47 percent (CBN, 2008; CBN, 2010; CBN, 2011 and CBN, 2013). Figure 1 illustrates inflationary trend in the country during the study period.

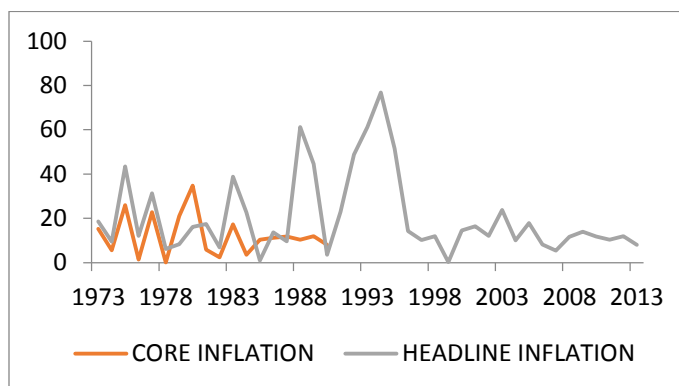


Figure 1: Inflation Rate Trend in the Nigerian Economy (1973 - 2013)

Figure 1 shows that headline inflation in the country has constantly hovered around double-digit figures for 30 out of the 40 observation years of this

study. Infact, it reached an all-time high of almost 80% in 1994. The story is not any different when core inflation (a more restrictive measure of inflation which excludes food and energy price movements) is considered. Figure 1 also shows that in 11 out of the 18 years of observation of this measure, the Nigerian economy experienced double-digit inflation with the highest figure recorded at about 35% in 2003.

Based on the foregoing, it could be reasonably deduced that the Nigerian economic environment has been and probably is still experiencing inflationary episodes and this may tempt one to call into question the credibility and efficacy of the country's monetary policy. It has been argued in some literature that inflationary episodes can emanate from three major sources. They can arise out of the ability of labour unions to use market power to demand for wage increases which are in excess of productivity gains in order to appropriate part of the profits accruable to entrepreneurs (often referred to as distributional conflict cause of inflation). Inflationary episodes can also be brought about by developments in the product markets where because of the existence of oligopolistic and/or monopolistic market structures (concentration of capital or high concentration ratio in the product market) firms may wield the market power that allows them to practice markup pricing. Lastly, inflationary episodes may occur as a result of some form of exogenous or endogenous shocks that may be driven by either exchange rate depreciation (pass-through effect) or an upward surge or spike in the price of a commodity like crude oil. In either case, shocks may adversely affect costs of production which firms can pass on to domestic prices. This depends though on the pricing power of firms, elasticities of the demand curves of consumer durables and nondurables and on how persistent inflation is in the economy.

There have been some studies on Nigeria which investigated the effect of exchange rate depreciation (a traditional cause of inflation) on the country's domestic inflation (see for instance, Ogundipe & Egbetokun, 2013; Boamah, 2013). But studies on institutional causes of inflation (causes emanating from product market and labour market sources) on Nigeria are not very visible. The specific objectives of this study are to: identify the traditional and institutional macroeconomic inflation variables which are responsible for this phenomenon, determine the magnitude of the contribution of each variable to the rise in general price level, explain the mechanism through which the identified variables influence the general price level and make recommendations on how best to tackle the scourge of persistent inflation in the country. The rest of the paper is arranged as follows: Section 2 reviews

literature that are relevant to the study, section 3 presents the methodology and data used in the study, section 4 presents and discusses the study's findings while section 5 concludes and makes recommendations.

2.0 Literature Review

The literature review section is divided into theoretical review and empirical review sub-sections.

2.1 Theoretical Literature

Theoretically, economists of different persuasions (Classists, Neo-classists, Keynesians, Post-Keynesians, Monetarists, Structuralists and Neo-structuralists) have contributed copiously to the literature on inflation. On definition, inflation is persistent increases in the general level of prices (Bannock *et al.*, 2003). Classical economists see money as just a "veil" in the sense that its increase would lead to a positive change in the general price level while leaving purchasing power of income, interest rate and output level unaffected (Javed *et al.*, 2010). The neo-classical economists also believe that inflation can be engendered by an unchecked increases in the money supply (Javed *et al.*, 2010). According to Weidenaar (1979) the monetary economists are of the view that once full-employment is attained, the only factor that can alter the price level is the availability of money in the economy. In other words, if the money in circulation in the economy increases two-fold, then the general price level would also increase two-fold.

The Keynesian economists hold the view that with an economy experiencing underemployment, an expansion of money in circulation, may in the shortrun, spur aggregate demand, employment and output (Javed *et al.*, 2010). In the longrun though, money supply in excess of potential output can be inflationary (Javed *et al.*, 2010). Weidenaar (1979) also expressed the Keynesian perspective on inflation as a phenomenon resulting from excessive spending (at full-employment) relative to available supply of goods at current prices, thus causing prices to rise in order for the goods market to clear. Jhingan (2003) expressed the structuralist economists' view on inflation as occurring in the longrun as a result of differences in some of the features of the service sector relative to the industrial sector. Such features are prices, productivity growth, elasticities of income and the wage rates between the two sectors. Bowman (2003) submitted that in explaining inflation, premium is put on costs by the post-Keynesians, thus they see wage demands by the unions,

commodity prices set by the firms, prices of imports set by foreign producers and markup as the root causes of inflation.

Commenting further, he submitted that the post – Keynesians disagree with the notion of a Wicksellian natural rate of interest which makes inflation to be constant, output operating at full-employment capacity and unemployment hovering around the natural rate. Under this regime, a downward deviation in interest rate would cause inflation and output to rise beyond full-employment and unemployment would reduce to below the natural rate. According to him, the post-Keynesians instead emphasise cost-push inflation which is the underlying cause of distributional conflict. Echoing a similar theme, Perry & Cline (2013) have submitted in their post-Keynesian and structuralist model that the variable that drives inflation the most is distributional conflict. Bowman (2003) agreed with this position taken by Perry & Cline (2013). Also agreeing, Filho (2000) concluded that to the post-Keynesians, neo-structuralists and Marxists, distributional conflicts arising from concentration of capital and workers' militancy will aggravate the susceptibility of the economy to inflation. According to them, in a regime where monetary and fiscal policies are not effective, and money supply is determined within the system, then monopolists and unionised labour wield a market power to determine the prices of goods and services without due regard for demand. As a result of this, inflation would emerge when there are increases in the markup or when the wage rate rises in excess of productivity gains (Filho, 2000).

But how do the market power of oligopolistic/monopolistic business firms, unionised labour and import prices (degree to which these can be passed on to domestic prices) spur inflation? The market power of firms is derived from firms' ability to practice markup pricing. In a perfect market, firms would produce at where marginal cost of production is equal to the market price which would make markup price to be equal to unity (Bowman, 2003; Shahor, 2011) and making the allocation of resources to be efficient (Shahor, 2011). However, in imperfect markets, firms wield the power to set prices at where marginal cost is lower than the market price, thus causing markup to exceed unity (Bowman, 2003 & Shahor 2011) causing inefficient allocation of resources (Shahor, 2011). So what are the factors which influence the ability of firms to practice markup pricing successfully? Taylor (2000) submitted that the amount of market power that firms believe or think they have and therefore can use to practice markup pricing, is purely a function of how well the product is differentiated from other products or how well other products

can serve as substitutes to the product and on the response of other firms to the firm's exercise of markup pricing power. Put differently, the pricing power of firms is a function of how other firms would react and on the utility maximising behaviour of consumers (Taylor, 2000).

In explaining why inflation reduced in most of the advanced economies of the world in the 1990s in the face of robust economic conditions, Bowman (2003) argued that firms' market power dwindled in those economies due to increased competition both domestically and internationally. He further mentioned the factors that can stimulate competition. These factors are globalisation, decreased regulation, new economy that is information technology driven and productivity growth. In other words, autarky, reduced deregulation, market structures that do not enjoy the spillovers of advances in information technology and loss of productivity may increase market power of firms.

Disagreeing with the position that increased competition may reduce the pricing power of firms, Ball & Romer (2002) presented consumer search model to show that low price dispersion and therefore the effectiveness of consumer search as a channel that forces firms to lower mark-ups, suggesting that higher price dispersion makes consumer search to be costly and firms would therefore increase mark-up. Also, Taylor (2000) submitted that it is price persistence that determines the direction that the price level would move. He utilised a model of staggered pricing in which producers are assumed to set prices in advance. If for instance, marginal cost increases, and prices are sticky, producers believing that such increase is temporary, would not increase prices. But, if the cost increase is seen by producers as permanent, they will likely pass a great part of it on as price increases (Taylor, 2000). So high price dispersion, costly or inefficient search by consumers can influence markup pricing.

Firms pricing power to practice markup pricing is profit-push variant of cost-push inflation. Another variant of cost-push inflation is one induced by the market power of organised labour. This is called wage – push inflation. Sometimes, these two feed on each other in which case a wage-price spiral would ensue. According to Javed *et al.* (2010), whenever firms increase prices, the cost of living of wage earners tend to rise and in a bid to compensate for a loss in welfare, workers demand for higher wages which also forces business firms to increase the prices of their products in order to

protect their profit margins. Some contributors claim though that it is organised labour that initiates the spiral.

The market power of workers is derived from unionisation. Given a workforce of a known size, the number of the workers in the workforce that are members of unions is known as the union density of the workforce (Lye & McDonald, 2006). If many workers in the economy are members of labour unions, then it is said that the union intensity of such economic system is high. Viewed from the prism of post-Keynesian paradigm, workers may not be compensated based on the incremental contribution of labour to output and are therefore forced to resort to a united front and some hostilities in negotiating wages (Perry & Cline, 2013). So, it is through the process of collective bargaining that unionised labour presses home its wage demands that may sometimes be in excess of productivity growth. Usually, the increased wages garnered by one union through collective bargaining may not be limited to the industry that that union belongs. When producers in a certain industry acquiesce to the wage demands of labour in that industry, a reference wage is set and in assessing the value of the wage earned by members of a sister union in another industry, they compare such wage to the reference wage (Lye & McDonald, 2006) and uses it as a benchmark upon which the wage demands of the sister union would be based, thus aggravating inflation.

It is not always as a result of the collective bargaining process of unionised labour that may trigger wage increases. For instance, Jaumotte & Morsy (2012) have submitted that productivity growth in the traded goods sector may encourage labour from non-traded goods sector to move to the former sector. A factor that may prevent this from happening is if producers raise wages in the sector with lower productivity. The effect of this would be that producers in the non-traded goods sector must raise the relative prices of their goods, thereby causing the overall price level in the economy to rise. This is what Mihaljek & Saxena (2010) have referred to as the “Balassa – Samuelson effect”.

Apart from the causes of inflation hitherto discussed, some strands of literature have mentioned that inflation can be caused by the pass-through of import prices to domestic inflation and also have identified some exogenous supply shocks as engendering inflation. Exchange rate pass-through (ERPT) is the extent to which a change in the exchange rate between an exporting and an importing country would affect the importing country’s import prices (Campa & Goldberg, 2001). Many contributors have pointed to different

factors as the causes of ERPT. Benigno & Faia (2010) mentioned the degree of market concentration, increase in the share of foreign products sold in a particular industry (which may stimulate competition) and globalisation as the causes of ERPT. Taylor (2000) saw the cause of ERPT as inflation persistence. It may be caused by microeconomic factors such as demand elasticities and market structures (Choudhri & Hakura, 2006). It may even be caused by low autonomy and integration (Holmes, 2006) in which case the pursuit of an independent monetary policy may be difficult. As for some exogenous supply shocks, it can be conceived of as events that suddenly change the price of a commodity or service (Javed *et al.*, 2010). A good example of this was the spike in the price of crude oil that happened in the 1970s.

2.2 Empirical Literature

A plethora of literature exists that looked at issues in the areas of cost-push (markup pricing of firms, and the market power of unionised labour), pass-through of import prices to domestic inflation and exogenous supply shocks.

Javed *et al.* (2010) sought to examine the validity of cost-push and monetarist diagnoses of inflation in the economy of Pakistan from 1971 to 1972 and 2006 to 2007. Quarterly data on consumer price index, wholesale price index, Gross Domestic Product, exchange rate, wheat support price, annual wage in the perennial industries, value of imported raw materials, narrow money supply, broad money supply and dummy variable that assumed a value of 1 when natural disaster occurs and a value of zero (0) when otherwise. Two OLS regressions were performed. One was to show the behaviour of consumer price index when exposed to supply-side or cost-push (wage and profit) influences and the other was to determine the response of consumer price index to changes in money supply and the lagged value of consumer price index. The results showed that exchange rate, annual wage in the perennial industries, value of imported raw materials, dummy for natural disasters, the lagged value of broad money and the lagged value of consumer price index all influenced consumer price index in the Pakistani economy.

Perry & Cline (2013) investigated the causes of the “great inflation moderation” of the period 1982 to 2006 in the US. The results of this study can be interpreted to mean that the variables that caused the inflation moderation can also cause inflation aggravation. Following the post-Keynesian tradition, data on consumer price index, Taylor rule differentials as

captured by the deviation of target interest rate from the target rate in moderating the output gap, exchange rate, import prices and wages were collected. A Vector Autoregression (VAR) model was used to determine the effects of innovations in Taylor rule differentials, oil prices, exchange rate, import prices and wages on consumer price index. The results of the impulse-response and the variance decomposition showed that the great moderation was caused by declining wages and import prices.

Lye & McDonald (2006) used a standard Philips curve range model to show that in the 1970s Australia, there was increased union power (union density). During this period, owing to the favourable disposition of the Arbitration Commission towards labour due to increased union density, labour was able to garner increased unemployment benefit (which was the reservation wage or reference wage upon which bargained wages were based). This caused the inflation barrier to shift to a higher rate of unemployment. In the 1980s, due to reforms in the labour market, union power waned and this shifted the inflation barrier to lower levels of unemployment.

Ogundipe & Egbetokun (2013) sought to determine the effect of exchange rate shocks on consumer prices in Nigeria. Collecting data on the nominal effective exchange rate, the real official exchange rate, the money supply and the consumer price index, Structural Vector Autoregression was used to determine the response of consumer price index to a one standard deviation shock to nominal effective exchange rate, the real official exchange rate, the money supply. The results showed that exchange rate pass-through in the country is fairly large. Audu & Amaegberi (2013) evaluated the effect of exchange rate fluctuation on inflation targeting in the Nigerian economy from 1970 to 2012. Using error correction model, they showed that interest rate and exchange rate explained inflation in the country. Akinbobola (2012) investigated if longrun relationships exist between monetary growth, exchange rate and inflation in Nigeria over the period 1986 to 2008. He utilised a Vector Error Correction Mechanism model to demonstrate that inflationary pressure in Nigeria is as a result of exchange rate and monetary policy, although real output has some positive effect in the longrun.

Boamah (2013) examined the extent and speed to exchange rate pass-through to inflation in countries of the proposed West African Monetary Zone (WAMZ). Monthly data on average bilateral exchange rate against the US dollar, consumer price index as proxy for import prices “as there are no available data on import prices” (Boamah, 2013; p.76) were collected.

Monthly data on inflation in the US were also collected. Vector Autoregressive Model was used to determine the extent and speed of exchange rate pass-through to inflation in these countries. The results of the impulse-response function showed that a high and fast exchange rate pass-through suggested that monetary policy may not do much to stabilise real exchange rates as changes in nominal exchange rate is immediately reflected in domestic consumer prices although Nigeria (the largest economy in the proposed union) has the lowest exchange rate pass-through and the extent of the pass-through is almost negligible. The results of the variance decomposition which highlighted the relative importance of the different variables in explaining domestic inflation, showed that the largest share of variation in domestic prices is explained by changes in prices itself and it revealed that Nigeria adjusted relatively quickly to restore the equilibrium relation when there is a short-term deviation from the long-run pass-through compared to other countries.

Holmes (2006) investigated the degree of pass-through from the US dollar exchange rate to consumer prices in the European Union (EU). Monthly data on consumer price index, the nominal exchange rate (domestic price of foreign currency) and foreign price index on 12 EU countries were collected. Panel data cointegration technique was used to measure whether there was longrun pass-through from the US dollar exchange rate to consumer prices in the EU. The results showed that the extent of exchange rate pass-through from US dollars to EU consumer prices declined and one of the reasons for this was ascribable to the credibility of monetary policy.

Maku & Adelowokan (2013) examined the macroeconomic determinants of inflation rate in Nigeria between 1970 and 2011. Autoregressive model was used to show that real output growth, broad money supply growth and previous inflation exerted positive influence on current inflation rate in Nigeria since independence till 2011 fiscal year. Ezeabasili *et al.* (2012) looked at the effect of fiscal deficits on inflation in Nigeria using a data that spanned 36 years i.e. from 1970 to 2006. They used Vector Autoregression model to show that there exist a positive but insignificant relationship between fiscal deficit and inflation but were able to show that there is a positive longrun relationship between money supply and inflation in Nigeria.

3.0 Methodology and Data

3.1 The model specification

Two models were utilised to analyse the data collected on the macroeconomic variables relevant to the study. The first model is an econometric model showing the relationship between inflation and the forces that drive inflation in Nigeria. It is of the form:

$$\text{CPI} = \lambda_0 + \lambda_1 \text{CPI}(-1) + \lambda_2 \text{RWG} + \lambda_3 \text{RGDPG} + \lambda_4 \text{RPFT} + \lambda_5 \text{REER} + \lambda_6 \text{CROI} + \lambda_7 \text{D} + \lambda_8 \text{RM}_2 + U_i \quad (1)$$

Where:

CPI	=	Consumer Price Index
λ_0	=	Estimator of the intercept term
λ_1	=	Estimator of Lagged Inflation variable
CPI (-1)	=	Lagged Inflation variable
λ_2	=	Estimator of Real Wages variable
RWG	=	Real Wages variable
λ_3	=	Estimator of Real Output Gap variable
RGDPG	=	Real Output Gap variable
λ_4	=	Estimator Real Profits variable
RPFT	=	Real Profits variable
λ_5	=	Estimator of Real Effective Exchange Rate variable
REER	=	Real Effective Exchange Rate variable
λ_6	=	Estimator of the Index of Crude Oil Prices variable
CROI	=	Index of Crude Oil Prices variable
λ_7	=	Estimator of Dummy (Institutional) variable
D	=	Dummy (Institutional) variable which captures the degrees of union density and product market regulation. Variable = 1 when workers' membership in union is high (common with democratic regimes in Nigeria) and value = 0 when worker's membership in unions is low (common with non-democratic regimes in the country). Also, variable = 1 when product market is regulated via enforcement of tax laws, permit laws, zoning laws and environmental laws (common with democratic regimes in the country) and variable = 0 when product market is not regulated (common with non-democratic regimes in the country).
λ_8	=	Estimator of Real Broad Money Supply variable.
RM ₂	=	Real Broad Money Supply variable.

U_i = Stochastic Disturbance Term.

The second model used in the analyses of the data is an Autoregressive Distributed Lag (ARDL) model as in Pesaran *et al.* (2001). The ARDL model is of the form:

$$\begin{aligned} \Delta CPI = & \alpha_0 + \sum_{i=1}^n \alpha_{1i} \Delta CPI_{t-i} + \sum_{i=0}^n \alpha_{2i} \Delta RWG_{t-i} + \sum_{i=0}^n \alpha_{3i} \Delta RGDPG_{t-i} \\ & + \sum_{i=0}^n \alpha_{4i} \Delta RPFT_{t-i} + \sum_{i=0}^n \alpha_{5i} \Delta REER_{t-i} + \sum_{i=0}^n \alpha_{6i} \Delta CROI_{t-i} \\ & + \sum_{i=0}^n \alpha_{7i} \Delta D_{t-i} + \sum_{i=0}^n \alpha_{8i} \Delta RM_{2t-i} + \beta_1 CPI_{t-1} \\ & + \beta_2 RWG_{t-1} + \beta_3 RGDPG_{t-1} + \beta_4 RPFT_{t-1} + \beta_5 REER_{t-1} \\ & + \beta_6 CROI_{t-1} + \beta_7 D_{t-1} + \beta_8 RM_{2t-1} + e_i \end{aligned} \quad (2)$$

Where: Δ = First Difference Operator, α_0 = Drift Component, e_i = White Noise.

To ascertain if longrun relationships exist among CPI, CPI (-1), RWG, RGDPG, RPFT, REER, CROI, D and RM_2 , the ARDL testing procedure which utilises F-test is employed. The test is about testing an hypothesis of no cointegration (null hypothesis) among the variables vis-a-vis an hypothesis of existence of cointegration (alternative hypothesis) among the variables. The hypothesis can be stated thus:

$$H_0 \text{ (Null): } \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9 = 0$$

$$H_A \text{ (Alternative): } \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9 \neq 0$$

The null hypothesis means that the variables are not cointegrated while the alternative hypothesis means that the variables are cointegrated. Pesaran *et al.* (2001) gave the lower and upper bounds on the critical values for the asymptotic distribution of the test statistic. If the computed F-statistic falls below the lower bound, it implies that the variables are I (0) and therefore there is no cointegration. If the test statistic should exceed the upper bound I (1), then it can be interpreted to mean that the variables are cointegrated. A test statistic that falls between I (0) and I (1) renders the result inconclusive.

An unrestricted error correction model can be specified. The error correction model is of the form:

$$\begin{aligned} \Delta\text{CPI} = & \alpha_0 + \sum_{i=1}^n \alpha_{1t} \Delta\text{CPI}_{t-i} + \sum_{i=1}^n \alpha_{2t} \Delta\text{RWG}_{t-i} + \sum_{i=1}^n \alpha_{3t} \Delta\text{RGDPG}_{t-i} \\ & + \sum_{i=1}^n \alpha_{4t} \Delta\text{RPFT}_{t-i} + \sum_{i=1}^n \alpha_{5t} \Delta\text{REER}_{t-i} + \sum_{i=1}^n \alpha_{6t} \Delta\text{CROI}_{t-i} \\ & + \sum_{i=1}^n \alpha_{7t} \Delta\text{D}_{t-i} + \sum_{i=1}^n \alpha_{8t} \Delta\text{RM}_{2t-i} + \lambda\text{EC}_{t-1} + t \end{aligned} \quad (3)$$

Where: λ = The parameter showing speed of adjustment to the equilibrium after a shock and must have a negative sign, EC = Residuals obtained from estimated cointegration model (2).

To determine the goodness of fit of the ARDL model, diagnostic test is carried out. The diagnostic test involves evaluating the serial correlation, functional form, normality and heteroscedasticity associated with the model.

3.2 Data Requirement

Secondary annual data on some macroeconomic variables in the Nigerian economy relevant to the study were collected. The period of observation was from 1974 to 2013. The year 1974 was chosen as the commencement of the study period because this was the year during which the average price level in the country began to rise due to the monetisation of the petrodollars and increased spending embarked upon by the military on post-civil war infrastructural reconstruction projects coupled with the Udoji awards to the Nigerian workers. The year 2013 was chosen as the terminal year of the study because the agency (CBN) that published most of the data used, released data on macroeconomic variables up to 2013 when work started on the study in 2015. The relevant traditional and institutional inflation-causing variables are: Nigerian Inflation Rates, Nominal Wages (proxied by aggregate Nominal Compensation of Employees), Nominal Profits (proxied by aggregate Nominal Operating Surplus of Businesses), Nominal Exchange Rates of the Nigerian Naira vis-à-vis the US dollars, Nominal Gross Domestic Product figures, Nominal Broad Money Supply (M_2) [all the foregoing are sourced from CBN Statistical Bulletin (various issues) and CBN Annual Report and Statement of Accounts (various issues)], US Inflation Rates sourced from:

www.data.worldbank.org/indicator/FP.CPI.TOTAL.ZG,
www.us.inflationcalculator.com/inflation/historical-inflation-rates), and
Crude Oil Prices figures sourced from:
www.inflationdata.com/inflation/inflationrate/historicaloilpricetable.asp).

The data on headline and core inflation from 1974-2013 and 1996-2013 respectively were specifically sourced from CBN Statistical Bulletin (2008, p.180; 2011, pp. 177-178 and 2013, p.157). While the data on headline inflation spanned a period of 40 observation years, the data on core inflation captured only 18 observation years. The reason being that CBN (the agency which published all the data on the Nigerian economy used in this study) commenced publishing data on this measure of inflation in 1996. The data collected on headline and core inflation were used to generate Figure 1 of the study.

With the exception of the inflation rates and Crude Oil Prices figures, all other figures were deflated in order to remove the inflation biases inherent in them. The Nigerian inflation and US inflation figures were used to construct consumer price indexes (CPIs) of the two countries using 1974 as the base year. Also, the Crude Oil Prices Index (using 1974 as the base year) was constructed. When the nominal figures of Wages, Profits and Broad Money Supply were deflated with the Nigerian CPI they became Real Wages (RWG), Real Profits (RPFT) and Real Broad Money Supply (RM₂).

Similarly, the nominal Gross Domestic Product figures were divided by Nigeria's CPI (with 1974 as the base year) or deflated to get the Real Gross Domestic Product (RGDP) figures. The nominal exchange rates, the CPIs of the US and Nigeria were used to compute the Real Effective Exchange Rates (REER) using Gustav Cassel's Purchasing Power Parity (PPP) doctrine for the period under observation. The choice of US CPI is because the US is Nigeria's major trading partner. Its trade weight is greater than any other country that the country (Nigeria) trades with. Also, available literature have mentioned that domestic prices of trading partners can be captured by either the CPI or wholesale price index (WPI). The CPI or WPI allows us to make inter-country comparisons between the tradables of the two countries. According to Opoku-Afari (2004, p. 1), "real effective exchange rate is the measure of nominal exchange rates adjusted for price differentials between the home country and its trading partners". So, the essence of using the PPP to calculate real exchange rate is basically to demonstrate how the domestic

price levels of trading partners can influence the real exchange rates between their currencies. *À la* the law of one price, an exchange rate determined under this regime should enable the residents of Nigeria and the US to purchase the same market basket of goods and services in Naira and the dollar. When this happens, PPP is said to have a value of unity. Any deviation from the equilibrium PPP would be corrected by the activities of the arbitrageurs.

However, in order for this to happen, some assumptions must be made. First, transportation costs and barriers to trade should not exist. Second, costs of non-tradable inputs should not feature in firms' production functions. Third, perfect information about markets must be available to importing and exporting firms. Fourth, identical market baskets of goods and services must be consumed by the economic agents. Fifth, capital account transactions should not occur. But in the real world, these assumptions cannot hold and PPP may not always assume a value of unity, real exchange rates would be misaligned causing currencies' overvaluation and undervaluation. This explains why during the study period, the Nigerian Naira was both overvalued and undervalued relative to the base year.

For this study, to calculate the real exchange rate for 1974 for instance, the nominal exchange rate for 1974 (base year) was used to multiply the CPI figure of Nigeria in the base year. The product of this multiplication was divided by the CPI figure of the US in 1974. The outcome of this division became the real exchange rate of the Nigerian Naira vis-à-vis the US dollar for 1974. For the subsequent years, the nominal exchange rate of the Nigerian Naira vis-à-vis the US dollar in the base year (1974) was used to multiply Nigeria's CPI in a particular subsequent year. The product of the multiplication in the particular year was divided by the US CPI figure of the particular year to derive the real exchange for that particular year.

The formular utilised in computing the real exchange rates is of the form:

$$\text{REER} = \frac{ePd}{P_f}$$

Where:

e = Nominal exchange rate between the Naira and the US dollar usually in a base year which in this instance is 1974 when a unit of the dollar exchanged for 63 kobo.

Pd = The inflation rate of Nigeria.

P_f = The inflation rate of the US.

Further treatment of the RGDP was performed in order to derive the Real Output Gap (RGDPG) figures. The RGDPG figures were needed to show the degree to which the monetary authorities was able to successfully set the real interest rates in consonance with the Taylor rule such that the RGDPG would be close to zero or at the potential output level. A capacity utilisation figure was used (as suggested in Jahan & Mahmud, 2013) to generate the potential output. The capacity utilisation figure in 1978 was the highest at about 79 percent (CBN, 2008) in the series and the computed RGDP figure for that year was ₦0.53 billion. This RGDP figure was the closest to the potential output and was used to compute the percentage deviations of the real output gap from itself for the years in the study. The RGDPG is computed thus:

$$RGDPG = \frac{RGDP_D - RGDP_{1978}}{RGDP_{1978}} \times 100$$

Where:

$RGDPG$ = Real Output Gap.

$RGDP_{1978}$ = Real Potential Output.

$RGDP_D$ = Real Output in deviation years (pre and post 1978).

3.3 Method of Data Analysis

The data used for the study are of time-series in origin. They may therefore trend, whereby the series may present means that vary with time. When used in regressions, such regressions may be dubious or spurious. In order to avoid the problems associated with dubious or spurious regressions, there was therefore a need to detrend the data series. The Augmented Dickey – Fuller (ADF) and Phillips – Perron unit root tests were applied to the series to determine the orders of integration or stationarity of the variables and when required, appropriate differencing was applied.

Also, there was a need to ascertain if the variables in the series showed a longrun co-movement. If the variables display an admixture of (0), (1) and (2) orders of integration, then a cointegration test as developed by Johansen would be the appropriate test to apply. The computed likelihood ratios would then be used to determine if there is/are any cointegrating vector/s. However, if the orders of integration are an admixture of I (0) and I (1) orders of integration, then the ARDL bounds test for cointegration as in Pesaran *et al.* (2001) would be the appropriate test to apply. The attractiveness of the ARDL bounds test as expressed in Frimpong & Oteng-Abayie (2006) are firstly, the

cointegration relationship can be estimated with OLS once the lag order is known. Secondly, no pre-testing of the variables for unit root is needed as required by the Johansen approach. Thirdly, it is applicable whether or not the model is I (0) or I (1) or mutually cointegrated. Fourthly, it is quite efficient whether the sample size is finite or small. For this study, the ARDL bounds test was carried out using Microfit 5.0.

4.0 Results and Discussion

In this section, the results of the ADF, PP unit root tests, ARDL bounds tests for cointegration, the estimated longrun coefficients of the ARDL model, the error correction representation of the ARDL model and the ARDL VECM model diagnostic tests are presented.

Table 1: The Results of Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) Unit Root Tests performed on the variables.

(i) S/N	(ii) Variables	(iii) ADF Statistics	(iv) Order of Integration	(v) PP Statistics	(vi) Order of Integration
1	CH	-3.1	I(0)	-3.58	I(0)
2	RWG	-5.42	I(1)	-7.97	I(1)
3	RGDPG	-3.29	I(0)	-4.49	I(0)
4	RPFT	-3.37	I(0)	-4.38	I(0)
5	REER	-2.97	I(0)	-3.99	I(0)
6	CROI	-5.72	I(1)	-8.76	I(1)
7	RM2	-6.55	I(1)	-3.58	I(0)

ADF Critical Value = -2.90 at a 5% level

PP Critical Value = -2.90 at a 5% level

Source: Computed by Author

In Table 1, the ADF test results showed that CPI, RGDPG, RPFT and REER were stationary at level forms, indicating that they did not possess unit roots. RWG, CROI and RM₂ all possessed unit roots hence they were differenced once to make them integrated. The PP test results showed that CPI, RGDPG, RPFT, REER and RM₂ did not possess unit roots because they were all integrated in level forms. However, RWG and CROI exhibited signs of unit roots, so they were differenced once before achieving stationarity. D was not subjected to the ADF and PP tests. The Table clearly shows that the stationarity properties of the variables in models used in the study is an admixture of I (0) and I (1), thus making the use of ARDL bounds testing technique for cointegration very appropriate for the study.

Table 2: ARDL Bounds Test Results for Cointegration

(i) F-Statistic	(ii) Critical Value		(iii) Conclusion
	Lower Bound	Upper Bound	
30.43	2.97	4.24 (1%)	Cointegration
	2.43	3.56 (5%)	
	2.16	3.24 (10%)	

Note: Asymptotic critical values bound are obtained from Pesaran *et al.* (2001) Table CI (i), Case 5: Unrestricted intercept and unrestricted trend.

Source: Computed by Author using Microfit 5.0.

Having established that the variables are an admixture of I (0) and (1) orders of integration and none is I (2), the ARDL bounds test for cointegration was carried out. Table 2 shows that the F-Statistic derived from the ARDL bounds test is 30.43. When this was compared with the critical values obtained from the Pesaran table at 5% level of significance, its value exceeded both 2.43 and 3.56 for I (0) and I(1) respectively. Based on this, it can be said that the variables are cointegrated or show longrun relationships (co-movements).

Table 3: Estimated Long-run Coefficients using ARDL Approach.

Estimate based on Schwarz Bayesian Criterion.

Dependent Variable is CPI.

39 Observations used for Estimation [1975 to 2013].

Regressor	Coefficient	Standard Error	T-Ratio [Prob.]
CPI [-1]	0.398	0.109	3.643 [0.00]
RWG	-2.644	2.223	-1.189 [0.24]
RGDPG	-0.015	0.007	-2.128 [0.04]
RPFT	1.158	0.646	1.794 [0.08]
REER	22.502	4.34	5.185 [0.00]
CROI	-0.009	0.008	-1.071 [0.29]
D	86.722	57.282	1.514 [0.14]
RM2	8.108	4.04	2.007 [0.05]
R2 = 0.52			D.W. Statistic =
Adj. R2 = 0.41			F-Statistic = 30.4
Source: Computed by Author Using Microfit 5.0			

The estimated coefficients of the longrun relationships in Table 3 show that the variables that drive inflation in the Nigerian economy are: CPI (-1) which is the lagged value of CPI which also captures inflation permanence and persistence or inflation expectations in the country, REER which captures the extent of import prices pass-through to domestic inflation, RPFT which captures the extent by which business firms can practice markup pricing and

RM₂ which captures the credibility of the monetary authorities policy stance among the Nigerian economic agents. CPI (-1), REER and RM₂ are statistically significant at a 5% level while RPFT is highly significant at a 10% level. The estimators attached to the variables are also rightly signed. They therefore conformed to *a priori* expectations as expressed in model (1). In specific terms, a 1% positive change in CPI (-1) i.e. inflationary expectations would cause inflation in Nigeria to rise by about 0.40%. A 1% positive change in REER would trigger about 23% change in inflation in the country. A 1% positive change in RM₂ would make inflation to rise by about 8% in Nigeria. A 1% positive change in RPFT would result in inflation increasing equiproportionately by about 1%.

The mechanism by which CPI (-1), REER, RPFT and RM₂ drive inflation in the country is as follows: an increase in REER (depreciation) in the foreign exchange market may be demand triggered in which case surges in domestic demand for raw materials inputs or finished products from abroad may occur. It may even be triggered by the actions of foreign producers who may use their pricing power to increase the prices of these products. Since the US dollar is the hegemonic currency, the prices of most of these imports are quoted in that currency, causing more units of the Nigerian naira to exchange for a unit of the hegemonic currency. This would cause the marginal costs of production of Nigerian businessmen to increase. According to Taylor (2000), if businessmen perceive the increase in marginal costs to be temporary in a regime of price stickiness, they would not use markup pricing to increase their prices in order to protect their profit margins. However, if they perceive the increase in marginal costs to be permanent or persistent, they would use markup pricing to increase the prices of their products.

Recall that RM₂ is statistically significant. This suggests that the Nigerian businessmen may have perceived the Nigerian monetary authorities' attempts in the past at taming inflation as being unsuccessful and hence not credible because inflation has always persisted in the economy. As a consequence, Nigerian businessmen used the pricing power they have to raise the prices of their products. This may be because the Nigerian product markets are not without some monopolistic structures with some measure of concentration of capital. These monopolists no matter how few they are, practice markup pricing. So, inflation can be said to be endogenous and exogenous shocks driven in Nigeria.

RWG, CROI and D are not statistically significant at a 5% level. RGDPG is statistically significant at this level but bore a wrong sign. Also, RWG and CROI bore wrong signs. RWG did not contribute to inflation in the country for the following reasons: in Nigeria, union density is not high hence the labour unions do not have the power to negotiate wage increases that exceed productivity gains through collective bargaining. Neither can the unions in Nigeria, through any arbitration panel, introduce unemployment benefits for workers. So, this variable did not contribute to inflation during the study period.

The statistical insignificance of the institutional variable (D) may be largely due to the fact that since the labour unions in the country do not have the market power to negotiate wage increases in excess of productivity gains, there was no need for successive Nigerian governments during the study period to embark on reforms in the labour market in response to a wage- price spiral.

The RGDPG variable did not contribute to inflation during the study period because throughout the period, the average capacity utilisation rates (proxy for output gap) in the manufacturing sector of the country from 1975 to 2010 stood at 50 percent (CBN, 2008; CBN, 2013). So, the economy cannot be adjudged to be operating at anywhere near its full-employment potential.

CROI did not contribute to inflation in the county during the study period because apart from the oil price spikes of the early and late 1970s, the world has not witnessed any oil price shock that is that dramatic. The petrodollars that accrued to the country back then engendered inflation when they were monetised. Subsequently, crude oil prices have risen but not dramatically. It must be pointed out that since the late 1990s, the world has witnessed episodes of dramatic dips in crude oil prices.

It must not go unmentioned that many studies have been carried out on inflation dynamics in Nigeria. The present study has mentioned some of these studies (see for instance, Ogundipe & Egbetokun, 2013; Maku & Adelowokan, 2013; Audu & Amaegberi, 2013; Ezeabasili *et al.*, 2012; and Akinbobola, 2012). The point of departure of the findings of this study from those that preceded it lies in the fact that the earlier studies focused on only the traditional causes of inflation, while the present study focused on both the institutional and traditional causes of inflation. Through this approach, the present study was able to clearly bring out the mechanism by which exchange

rate shocks are passed on to domestic prices by way of the pricing power of firms in the face of a seemingly impotent monetary policy stance of the nation’s monetary authorities as evidenced by inflation persistence in the country during the study period.

Table 4: Error Correction Representation of the Selected ARDL Model.
 ARDL (1) Selected based on Schwarz Bayesian Criterion.
 Dependent Variable is Δ CPI.
 39 Observations used for Estimation [1975 to 2013].

Regressor	Coefficient	Standard Error	T-Ratio [Prob.]
Δ RWG	-2.644	2.223	-1.189 [0.24]
Δ RGDPG	-0.015	0.007	-2.128 [0.04]
Δ RPFT	1.158	0.646	1.794 [0.08]
Δ REER	22.502	4.34	5.185 [0.00]
Δ CROI	-0.009	0.008	-1.071[0.29]
Δ D	86.722	57.282	1.514 [0.14]
Δ RM2	8.108	4.040	2.007 [0.05]
ecm (-1)	-0.602--	0.109	-5.517[0.00]
R2= 0.56			
Adj R2= 0.41			
D.W statistic = 2.23			
Source: Computed by Author using Microfit 5.0			

The error correction version of the longrun relationship is presented in Table 4. The coefficients of the short-run dynamics are essentially the same with the coefficients of the long-run relationships. The coefficient or estimator (λ) of the error correction (ecm) variable is -0.602 [prob. = 0.00]. The variable bore a negative sign and is highly significant. This implies that following a short-run disequilibrium, 60% of disequilibrium errors from the previous year’s shock converges back to the long-run equilibrium in the current year. This speed of adjustment is very respectable.

Table 5: ARDL VECM Model Diagnostic Tests

R ²	0.519
Adjusted R ²	0.410
F-Statistic	4.784 [0.001]
D.W	2.227
Serial Correlation	2.489 [0.115]
Functional Form	2.536 [0.111]
Heteroscedasticity	0.010 [0.920]
Normality	10.795 [0.005]

Source: Computed by Author using Microfit 5.0

Table 5 presents the ARDL VECM model diagnostic tests. Since the statistics of serial correlation, functional form, heteroscedasticity tests are not statistically significant, then the model can be adjudged to have passed these tests. However, the statistic for the non-normal errors (normality) is statistically significant. This can be ignored because according to the central limits theorem, a sample size of more than 30 may not need to conform to the normality test. Since the number of years of observation for this study is 40, then the normality test result can be disregarded.

5.0 Conclusion and Recommendations

5.1 Conclusion

Based on the findings in (4.0), the following can be concluded: Firstly, inflation in Nigeria during the study period was as a result of increases in real exchange rates which probably had origins in either endogenous demand shocks or exogenous foreign producer pricing shocks which caused the marginal costs of Nigerian producers to increase. Secondly, there existed inflation persistence in the economy that was not effectively curtailed by the monetary authorities. Thirdly, as a result of this persistence, Nigerian businessmen were able to pass the increases in marginal costs of production on to the Nigerian consumers in form of increases in the prices of consumer durables and non-durables produced in the country.

5.2 Recommendations

Based on the conclusions in (5.1), the following are recommended:

1. **Substitution of Domestically Produced Goods for Imported Goods**

It is very true that Nigerians rely heavily on foreign sources for the supplies of finished goods consumed by households and raw-materials used by the industries. Some of these finished products and semi-processed raw-materials can be produced locally in the country. To encourage local production of these goods, governments at all levels in the country should encourage business firms and individuals to innovate through research and development (R&D). It is through R&D that processes and products can be developed. The products that are obtained from these efforts may substitute for the foreign produced ones if they are of good quality and adequate quantity. Given that business firms may be reluctant to spend on R&D due to the social nature of innovation/inventions (business firms may not be able to fully appropriate the returns on innovations/inventions due to easy diffusion), nonetheless, the onus is still on governments in the country to constantly encourage R&D efforts in economic agents, especially the business firms by granting R&D subsidies to those of them that truly carry out R&D. These subsidies may be in form of tax-cuts, accelerated depreciation on capital or some other forms of inducements.

2. **Adoption of a Consistent Monetary Policy Stance**

The monetary policy stance of any nation must be seen as credible. In other words, once the policy has been pronounced, strenuous efforts must be made to follow the policy through to logical conclusions and results without wanton abandonment. This would engender trusts in economic agents and expectations would be formed based on this. The Nigerian monetary authorities should control the nation's money supply such that the real rate of interest is doggedly set in consonance with the Taylor rule. This should be complemented though, with a regime of fiscal policy that would not counteract the monetary policy stance. Once inflation starts to wane, economic agents would perceive the monetary authorities as being credible in taming inflation, expectations would be formed based on this and inflation persistence would be curbed.

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