

## AN ECONOMETRICS ANALYSIS OF THE EFFECTS OF HOUSEHOLD CONSUMPTION PATTERN ON INFLATION IN NIGERIA

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### ABSTRACT

Nigeria has experienced several periods of high debt, inflation as well as currency fluctuations with comparatively high interest rate. These factors have culminated into increasing price of goods and services which necessitated this study to examine the impact of household consumption expenditure on the price level between 1970 and 2019 using annual time series data in an Autoregressive Distributed Lag Model (ARDL) and other accompanied econometrics tests. The result shows household consumption expenditure in Nigeria to be deficient just as excessive negative effects of interest rate and exchange rate on the price level was noticed. On that note, the Nigeria government was urged to spur increase in the level of productivity in the country via massive investment in agriculture and also the need for the government to increase the tariffs for goods that can be locally manufactured in the country as a means of encouraging local production at affordable prices for Nigerian consumers was admonished.

**Keywords:** *Analysis, Effects, Household Consumption Pattern, Inflation, Nigeria*

**JEL Classification:** D1, D11 & D13

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### INTRODUCTION

In economics, household consumption expenditure is one of the most important parts of aggregate demand. In most national economies, it constitutes the greater proportion in the region of 60% of the gross domestic product (GDP) and as such, is an essential factor for economic analysis of aggregate demand (Ugboho, 2019 and Organisation for Economic Co-operation and Development (OECD), 2009). The final consumption expenditure otherwise called private consumption is refers to the market value of all goods and services produced including capital products such as cars, washing machines and home computers purchased by

the household, and all the payments and fees to government to obtain permits and licences (World Bank, 2015). It does not include procurement of dwellings, but encompasses the imputed rent for owner occupied houses (Ugboho, 2019).

A fundamental global fact remains that household consumption, income and wealth are still regarded as the main determinants of standard of living of the people (Gerstberger and Yaneva, 2013). As such, the study of consumer behaviour or pattern plays a key role in both microeconomics and macroeconomics. Since the study macroeconomics relates to aggregates, macroeconomists are only interested in two aggregate issues. That is aggregate savings and aggregate investment. Aggregate savings is the proportion of income not consumed that flows through the financial system to create the national supply of capital. On the other hand, aggregate investment creates additional stock of capital (Ezeji and Ajudua, 2015). Both aggregate savings and investment behavioural pattern have a powerful influence on an economy's long term productive capability.

The fact that household consumption expenditure represents the lion share for most national output, understanding the dynamism of aggregate consumption and expenditure is quite crucial in gauging macroeconomics variations or fluctuations and the business cycle (Gerstberger and Yaneva, 2013). Because of its high share in the GDP, household consumption expenditure is given due consideration in most macroeconomic policies for fiscal planning. The interest of policy makers is to forecast how the consumers will react to income fluctuations. In terms of consumers, the consumption phenomena requires a technical and proactive decision making, for which a consumption function reveals such behavioural relationship in macroeconomics.

Evidence from economic literature indicates that, over the years, Nigeria has experienced several periods of high debt, inflation as well as currency fluctuations with comparatively high interest rate (Ugboho, 2019). These factors have culminated into increasing price of goods and services. The resultant effect is the declining purchasing power on the people. Nigeria has an agrarian economy that thrived essentially on agriculture and still employs the largest percentage of labour. In reference to World Bank (2015), the agriculture sector of Nigeria has been listed as one of the major exporters of cash crops. The category of farming mainly practiced in Nigeria is subsistence farming which does not require the use of heavy machineries. Small as these farms are, their aggregate produce covers for over 80% of the total food production and on average about 33% of the land mass is being cultivated (Gisaor and Iyortsuun, 2018).

Nigeria has been blessed with different weather seasons which permit the growing of many crops that can be grown in the world tropical hemisphere. The government has also provided incentives and finances to promote large scale agriculture through various policies and programmes. Despite these efforts, other factors have still stall productivity such as to low soil fertility in some regions and low technical knowhow in terms of cultivation. Progressively, since agriculture is responsible for the highest employment of the total labour force, it therefore implies that majority of households earns their living through agriculture which in turn is the source of income, upon which each household expenditure is based in accordance with individual household's budget. Changes in household expenditure during the periods of volatile farm incomes (post planting and post-harvest periods) affects the household consumption patterns and the price level of goods and services because of the changes in budget.

To achieve diversification, the Nigerian government degraded the economy of the nation, thereby realizing that the neglect of the other sectors needs to be revisited. As a result of this, numerous large scale projects were put in place to foster economic diversification such as import substitution and export promotion industrialization and Anchor Borrowers Scheme for agriculture (Ugboho, 2019 and Ezeji and Ajudua, 2015). In spite of the government effort, Nigeria has become a major importer of different agricultural and industrial produce with escalating cost of goods and services affecting the population. To this end, the purpose of this study is to investigate the impact of household consumption expenditure and other macroeconomic variables on inflation in Nigeria using an Autoregressive Distributed Lag Model (ARDL). This study hopes to provide current empirical information on the effect of household consumption expenditure and these macroeconomic variables on inflation.

## **2.1. Conceptual Clarifications**

### ***2.1.1. Household Consumption Expenditure***

There are varying views relating to household consumption. Ugboho (2019) gave a general consideration that it is the final purpose of economic activity, and the level of consumption per person that is viewed as a central measure of an economy's productive success. Thus, consumption is among the key determinants of well-being of citizens at the global level. Generally, a country's economic performance is affected by a business cycle, which consists of:

prosperity, recession, depression and recovery. A major feature of a business cycle is movement of gross domestic product (GDP), which determines the health of a country's economy. GDP is the total monetary value of goods and services produced in an economy within a specific time, usually a year. A GDP growth rate direction is a major determinant of a country's stage in the cycle. A positive growth rate of GDP indicates a healthy economy whereas; a negative growth rate reflects a poor health condition of the economy.

This major adverse effect of unhealthy economy is the declining Consumer Confidence Index (CCI) resulting from a widespread decline in consumers' purchasing power. CCI is described as an indicator, which uses consumers' optimism about the economy to measure their confidence in the economy (Karagöz, 2015). The more optimistic consumers are about the economy, the higher is their ability and propensity to spend and grow the economy. In Nigeria, since the economy recorded a negative GDP growth rate in the first quarter of 2016, the CCI has either been declining or very weak. For example, surveys indicated that CCI fell from 64.8 points in the last quarter of 2015 to 59.9 points in the first quarter of 2016, dropping by 4.9 points (NOIPolls, 2016); the index further dropped by 3.5 points in the second quarter, recording 56.4 points (NOIPolls, 2016); it remained low at 56.79 in the third quarter (NOIPolls, 2016); and 58.1 points in the fourth quarter of the year.

Agri, Mailafia, and Umejiaku (2016) concluded that consumers in Nigeria have lost confidence and have bad faith in the economy and the government during recession. The recession in Nigeria is unusually characterized by a high inflation rate with costs of goods and services shot up to the 'roof top' and consumers' purchasing power significantly depressed. This situation is described as stagflation, a period of rising prices and falling output (Nelson and Nikolov, 2001). This is similar to a situation in South Africa during the 2008-2009 recessions. The recession led to the higher prices of food and transportation in the country (Zulu, 2011).

The consequence of the recession in Nigeria is inability of many consumers to maintain their previous levels of consumption due to a depressed purchasing power. There is consensus among scholars that consumers' spending is severely affected by a recession (Ugboho, 2019). In reaction, many consumers in Nigeria may have altered their consumption patterns by abandoning consumption of luxury goods for necessities, buying less of goods, changing apartments to low-cost ones, driving less and switching to public transport as a mode of commuting, changing children's schools to low-cost schools, abandoning or reducing

ostentatious social life and so on (Ugboho, 2019 and Central Bank of Nigeria (CBN), 2017).

### **2.1.2. Inflation**

There is no universal consensus about the concept of inflation. According to Gordon (1984) and Barro (1997), the neo-classical economists regarded inflation *“as a destroying disease born out of lack of monetary control whose results undermine the rules of business, creating havoc in markets and financial ruin of even the prudent”*. Barro (1997) defined inflation as the rise in the general level of prices of goods and services within an economy over a period of time due to deficiency in either aggregate demand or aggregate supply or both. Barro’s definition embraces both aggregate demand and supply hence provides a wider perception to the concept of inflation than the neo-classical view. To Tsembe (2008), inflation is the persistent increase in the general price level without a corresponding increase in output. Inflation is a general and continuous increase in prices of goods and services.

The general consensus here is that inflation occurs when the general price level rises such that each unit of currency buys fewer goods and services. Consequently, inflation also reflects erosion in the purchasing power of money and affects critically the standard of living of the people. Most economists generally seem to agree that in the long run, inflation has the potential of hurting the growth and progress of an economy. This fear is expressed by Abah (2009:180) who stated that *“inflation has the potential of derailing the economy from the path of sustainable growth and development”*.

Inflation is indeed a central issue in the contemporary economy hence the need to examine its effects on economic growth of national economies. Other economic concepts closely related to inflation include: deflation – a fall in the general price level; disinflation – a decrease in the rate of inflation; stagflation – a combination of inflation, slow economic growth and low employment and reflation - an attempt to raise the general price level to counteract deflationary pressures (Barro, 1997). Since there are many possible measures of the price level, there are many possible measures of price inflation. Most frequently used terms refer to a rise in a broad price index representing the overall price level for goods and services in the economy. The Consumer Price Index (CPI), the Personal Consumption Expenditure Price Index (PCEPI) and the GDP deflator are some of the broad price indices. In the context of this work, inflation represents the sustained and persistent increase in the general price of goods and services within a period of time measured by the consumer price index.

### **2.1.3. Global Measures of Inflation**

There are several methods of measuring inflation in the world. Let us consider the following few methods:

**Consumer Price Index (CPI):** Inflationary rate is estimated by calculating the inflation rate of a price index, usually the CPI (Blanchard, 2000). The CPI measures prices of a selection of goods and services purchased by a typical consumer (Mankiw, 2002). It is derived from the percentage increase in the composite price index between two successive periods. These periods may be monthly, quarterly, annually or even longer periods. The monthly and quarterly rates of inflation may not take account of seasonality. Long periods will be too long to account for any short run economic mishap that persists. Therefore, annual rates are usually preferred because; it takes account of seasonality and also allows monetary authorities to take appropriate macroeconomic policies aimed at combating the inflation menace through the budgetary instrument (Burda, 1997). In measuring inflation on annual basis, we obtain a twelve month moving average of composite CPI for the consecutive periods, divide the latter period's average by the previous period's average and multiply the results by 100. The CPI is determined by previous year's inflation rate, less the current year's inflation rate, divided by the current year's inflation rate, multiplied by 100.

**Producer Price Indices (PPIs):** The PPIs measures average changes in prices received by domestic producers for their output. This according to Blanchard (2000) differs from the CPI in that price subsidization, profits and taxes may cause the amount received by the producer to differ from what the consumers paid. There is also typically a delay between an increase in the PPI and any eventual increase in the CPI. The PPI measures the pressure being put on producers by the costs of their raw materials. This could be passed to the consumers or could be absorbed by profits or offset by increasing productivity.

**Commodity Price Indices (CPIs):** This measures the price of a selection of commodities. In the present, commodity price indices are weighted by the relative importance attached to the components to the all in cost of an employee (Blanchard, 2000).

**Core Price Indices:** The core price index is used because food and oil prices can change quickly due to changes in supply and demand conditions in the food and oil markets. It can be difficult to detect the long run trend in price levels when those prices are included. Therefore, most statistical agencies also

report a measure of core inflation which removes the most volatile components such as food and oil from a broad price index like the CPI. Because, core inflation is less affected by short run supply and demand conditions in specific markets, Central Banks rely on it to better measure the inflationary impact of current monetary policy (CBN, 2017).

**The GDP Deflator:** The GDP deflator is a measure of the price of all the goods and services included in the GDP. The GDP or implicit price index measures price behaviour with reference to the GDP as purchased by consumers, business firms and government. In terms of the GDP deflator inflation is indicated when national income (nominal GDP) is rising faster than national real income (real GDP). The GDP deflator is obtained by dividing the GDP at current price (nominal GDP) by GDP at constant prices (real GDP) multiplied by 100.

$$GDP\ deflator = \frac{Nominal\ GDP}{Real\ GDP} \times 100$$

It is conventional to multiply by 100 to obtain an index number that takes on the value 100 for the base years.

**Regional Inflation Measures:** This is the calculation of inflation rate based on different regions, countries and continents of the world. The essence according to Blanchard (2000) is to determine which region has higher inflation rate and why?

**Historical Inflation:** Before collecting consistent econometric data became standard for governments, and for the purpose of comparing absolute, rather than relative standards of living, various economists have calculated or imputed inflation figures. Most inflation data before the early 20<sup>th</sup> century was computed based on the known costs of goods, rather than compiled at the time. It is used to adjust for the differences in real standard of living for the presence of technology (Burda, 1997).

**Asset Price Inflation (API):** This is to enable the authorities capture the undue increase in the prices of real or financial assets, such as stock and real estate. While there is no widely accepted index of this type, some Central Banks have suggested that it would be better to aim at stabilizing a wider general price level inflation measure that includes some asset prices, instead of stabilizing CPI or core inflation only. The reason according to Blanchard (2000) is that by raising interest rates when stock prices or real estate prices rise, and lowering

them when these asset prices fall, Central Bank might be more successful in avoiding bubbles and crashes in asset prices.

**The CPI versus GDP Deflator:** Conceptually, the GDP deflator would appear to be a better measure of price inflation. It measures the overall price behaviour of goods and services in a country as demanded and consumed by the government, business enterprises and households. It also reflects the importance of the various items in the current market basket of produced goods (CBN, 2017). It is however limited by its broad coverage and considerable time lag associated with the computation of data. The figures are obtained only on annual basis and cannot be used for short term policy analysis (CBN, 2017). On the other hand, the CPI has a restricted coverage. The index does not take account of price inflation experienced by business enterprises since it is based on survey of household expenditure. The CPI also refers to base year market baskets and weights, which can become less relevant over years. However, the CPI is the most widely used measure of inflation in most developed and developing countries especially with respect to consumers' welfare, the index is useful because it provides indication as to the price changes, thereby permitting the measurement of changes in real income of consumers.

## 2.2. Theoretical Framework

The determinants of consumption expenditure have influenced economists, such as Keynes (1936), Duesenberry (1949), Friedman (1957) and Ando and Modigliani (1963). Keynes (1936) laid the foundation of modern consumption theories. According to Keynes, current real income is the primary determinant of consumption, and the interest rate has no effect on consumption decisions for the reason that income and the substitution effect of the interest rate eliminate each other. Keynes made three salient points from his proposition. First, consumption expenditure depends mainly on absolute income for the current period. Second, consumption is a positive function of the absolute level of current income, and third, the more income derived, the more the consumption expenditure in that period (Jhingan, 2002).

A different theory was suggested by Duesenberry in 1949 in which he posited that current consumption is not influenced merely by the current level of absolute and relative income but also by levels of consumption attained in the previous period. Duesenberry also put forward the theory of consumer behaviour that lays stress on the relative income of an individual rather than on



absolute income as a determinant of an individual's consumption. His theory is therefore called the relative income theory of consumption.

Friedman in 1957, advanced a hypothesis regarding consumption behaviour, called the permanent income hypothesis, according to which the consumption of an individual depends on permanent income rather than on the current level of income. Ando and Modigliani (1963), beginning in the early 1950s, put forward a theory known as the life-cycle hypothesis, according to which an individual plans an even consumption profile over his or her lifetime, which depends not so much on current income but on expectations of income over the whole life cycle. These theories have their similarities and differences in their implications for stabilization policy and they seem to suggest that household consumption can indirectly be affected by macroeconomic factors that affect income.

### **2.3. Selected Empirical Reviews**

The link between household consumption and inflation has been investigated by different studies from developing economies. Some of these studies in Nigeria are examined below: Adedeji and Adegboye (2013) conducted a study on the determinants of private consumption expenditure (PCE) in Nigeria, using a time series data that covers the periods 1975 and 1998. From the results obtained, it was indicated that only disposable income portrayed a significant influence on PCE within the period of study. Alimi (2013) investigated the relationship between consumption expenditure and income according to Keynes' absolute income hypothesis in Nigeria between 1970 and 2011 using multiple regression and other econometrics tests, and concluded that as income increases, the average propensity to consume is reduced. Audu (2012) in an investigative study on the dynamic analysis of fiscal policies on consumer's spending in Nigeria: a time series approach, using the ordinary least squares technique and data collected for the period 1970–2010, the study depicts that inflation rate and interest were the key variables that affect consumer spending.

Similarly, Fasoranti (2012) conducted a study in Akoko North West Local Government Area of Ondo State. The study examined the determinants of consumption among rural dwellers in the local government area. Results show that current income, expected pension fund, shares and durable assets are positively related to consumption while expected future income and deposits in banks are negatively related. Akekere and Yousuo (2012) investigated the

impact of change in GDP on private consumption expenditure in Nigeria over the period 1981-2010 using multiple regression analysis. Their findings showed that GDP has a positive and significant impact on private consumption expenditure. From the above empirical studies, it can be seen that no current researcher's knowledge exists on household consumption pattern and inflation in Nigeria in recent times. This is the research gap left to be filled by this study.

### 3.1. Methodology

The research design employed is the ex post facto research which aims at determining the relationship between household consumption pattern and inflation in Nigeria. The study relied only on secondary annual time series data covering 1970 to 2019; the period marked a phase of policy changes leading to the introduction of the structural adjustment programme in 1986. The data was obtained mainly from the Central Bank of Nigeria (CBN) statistical bulletin, National Bureau of Statistics (NBS) various issues, CBN Annual Reports and Statement of Accounts. Both the Keynesian and Duesenberry theories have established a theoretical relationship between household consumption income and inflation as follows:

$$INF = f(HCE) \quad (3.1)$$

Where, INF = Inflation Rate and HCE = Household Consumption Expenditure.

Equation (3.1) presents a simple and functional relationship between household consumption expenditure and inflation in Nigeria. The equation is a non-stochastic relationship which implies that all changes in the INF are accounted for by changes in the HCE. In reality however, INF is influenced by various factors such as gross domestic product (GDP) and interest rate (INTR) and exchange rate (EXR), volume of domestic investment (INVT) and population growth (POP). All these are added to the model to render it a multiple regression model as follows: The relevant econometric model for estimation is equation (3.2) explicitly specified thus:

$$INF = a_0 + b_1HCE + b_2GDP + b_3INTR + b_4EXR + b_5INVT + b_6POP + \mu \quad (3.2)$$

An ARDL representation of long run equation (3.3) can be specified as follows:

$$\begin{aligned} \Delta LINF = & a_0 \sum_{i=1}^p a_{1i} \Delta INF_{t-1} + \sum_{i=1}^p a_{2i} \Delta HCE_{t-1} + \sum_{i=1}^p a_{3i} \Delta GDP_{t-1} + \sum_{i=1}^p a_{4i} \Delta INTR_{t-1} \\ & + \sum_{i=1}^p a_{5i} \Delta EXR_{t-1} + \sum_{i=1}^p a_{6i} \Delta INVT_{t-1} + \sum_{i=1}^p a_{7i} \Delta POP_{t-1} + \lambda ECM + \zeta \end{aligned} \quad (3.3)$$

#### 4.1. Analysis and Discussion of Results

**Table 4.1: Descriptive Statistics**

	<i>INF</i>	<i>HCE</i>	<i>GDP</i>	<i>INTR</i>	<i>EXR</i>	<i>INVT</i>	<i>POP</i>
Mean	19.11277	69.27728	299389.8	19.95809	68.97851	4207777.	2.592364
Median	12.90000	68.80082	205222.1	22.00000	21.80000	70809.50	2.540870
Maximum	72.90000	84.19696	868879.5	31.90000	386.0000	78236002	3.287650
Minimum	1.600000	52.54617	4219.000	7.850000	0.600000	8799.900	2.495280
Std. Dev.	16.65719	6.921640	256085.6	6.238285	91.12101	15872951	0.136391
Skewness	1.613899	-0.093681	0.492035	-0.349317	1.697804	4.444813	3.042016
Kurtosis	4.783869	3.132677	1.983926	2.273436	6.214807	21.02057	15.40705
Jarque-Bera	26.63503	0.103219	3.918239	1.989636	42.81923	790.7092	373.9443
Probability	0.000002	0.049700	0.040983	0.069791	0.000000	0.000000	0.000000
Sum	898.3000	3256.032	14071322	938.0300	3241.990	1.98E+08	121.8411
SumSq.Dev.	12763.25	2203.819	3.02E+12	1790.145	381939.7	1.16E+16	0.855713
Observation.	47	47	47	47	47	47	47

*Source:* Author's Computation using Eviews 10

Descriptive statistics in Table 4.1 shows positive skewness for INF, GDP, EXR, INVT, and POP and negative skewness for HCE and INTR, implying that the distribution was skewed to the right. On kurtosis, the result revealed that only HCE almost satisfied its symmetrical condition of the expected value of three (3). GDP and INTR had values less than three which implies that the distribution of the variables is flat or platykurtic. On the other hand, INF, EXR, INVT and POP had values greater than three, indicating the distribution to be peaked or leptokurtic. However, the probability of all the variables was statistically significant at 1%, 5% and some at 10% level of significance. This gives way for the rejection of the hypothesis that the data set is approximately abnormal.

**Table 4.2: ADF Stationarity Test**

	<i>ADF Test Statistic</i>	<i>0.05 Critical value for ADF Statistic</i>	<i>Order of Integration</i>
INF	-3.767008	-2.922449	I(0)
D(INF)	-7.096715	-2.925169	-
HCED	-5.682878	-2.925169	I(0)
(HCE)	-11.25841	-2.926622	-
GDPD	0.032657	-2.926622	-
(GDP)	-6.129609	-2.929734	I(I)
INTRD	-2.788923	-2.922449	-
(INTR)	-9.189471	-2.923780	I(1)
EXRD	0.941885	-2.922449	-
(EXR)	-6.674677	-2.923780	I(I)
INVTD	-1.166831	-2.936942	-
(INVT)	-3.206510	-2.941145	I (1)
POPD	0.517006	-2.928142	-
(POP)	-5.535501	-2.928142	I(I)

*Source:* Author's computation using Eviews 10

The result of ADF stationarity test in Table 4.2 above shows that some of the variables-INF and HCE to be stationary at levels while the GDP, INTR, EXR, INVT and POP were not stationary at levels. After the first difference; all variables became stationary at 5% level of significance but were not integrated of the same order. Thus, with all the variables not having the same order of integration but a mix order of co-integration as shown in the result of the ADF unit root test, the use of Johansen co-integration has collapsed, necessitating the use of Bounds co-integration test.

**Table 4.3: Result of the Bound Test**

<i>F-statistic</i>	<i>Alpha Level</i>	<i>Critical Bound</i>		<i>Decision</i>
		<i>Lower Bound</i>	<i>Upper Bound</i>	
9.56	5%	2.45	3.61	Co-integrated

*Source:* Author's computation using Eviews 10

Table 4.3 above indicates the calculated F-statistic to be 9.56. Given the upper bound critical value of 3.61 which is less than the F-statistic, the null hypothesis of no co-integration is rejected, implying long-run co-integration

relationships exist amongst the variables. This leads to the estimation of the long run relationship and the associated short-run dynamics.

**Table 4.4: Estimated Long Run Coefficients**

ARDL (4, 4, 3, 4, 4, 2, 4) selected based on Schwarz Bayesian Criterion

Dependent variable is INF: Estimated from 1970 to 2019

<i>Regressors</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>T-Ratio</i>	<i>Prob.</i>
HCE	-1.702	0.300	-5.671	0.0002
GDP	8.145	2.225	3.667	0.0043
INTR	-2.018	0.345	-5.846	0.0002
EXR	-0.289	0.048	-5.954	0.0001
INVT	9.916	2.076	4.785	0.0007
POP	80.40	29.003	2.772	0.0197

*Source:* Author's computation using Eviews 10

The result of the long-run estimates of the ARDL in Table 4.4 revealed GDP, INVT and POP to be positively related with INF in Nigeria during the period of analysis while HCE, INTR and EXR to be negatively related with INF in the long-run. This suggests clearly that the household expenditure in Nigeria is deficient alongside the high cost of borrowing in Nigeria and the worsening rate of exchange against major currencies of the world. The general cost of borrowing has remained high amidst depreciation of the naira despite the financial crisis and the present havoc been caused by the outbreak of the COVID-19 pandemic.

This result has corroborate evidence with Ugboho (2019) who recently reported that, over the years, Nigeria has experienced several periods of high debt, inflation as well as currency fluctuations with comparatively high interest rate. These factors have culminated into increasing price of goods and services. The resultant effect is the declining purchasing power on the people. Nigeria has an agrarian economy that thrived essentially on agriculture and still employs the largest percentage of labour. This portends danger as deficient consumption level of the households signifies poverty and unemployment capable of putting the Nigerian economy under serious jeopardy in terms of growth and development. All the variables are statistically significant at 1% level; this implies series effect on the general price level of goods and services in Nigeria.

**Table 4.5: ECM for the Selected ARDL**

ARDL (4, 4, 3, 4, 4, 2, 4) selected based on Schwarz Bayesian Criterion

Dependent variable is INF: Estimated from 1970 to 2019

<i>Regressors</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>T-Ratio</i>	<i>Prob.</i>
HCE	-0.48	0.15	-3.11	0.01
GDP	0.01	2.52	5.04	0.00
INTR	-3.12	0.43	-7.12	0.00
EXR	-1.08	0.14	-7.38	0.00
INVT	4.39	6.22	7.05	0.00
POP	10.02	44.9	-2.23	0.04
ECM	-3.04	0.29	-10.34	0.00

*R-Squared* :0.937; *R(Adj) Squared* : 0.840; *DW-statistic*: 2.062; *F.statistic* & Prob. 9.66 (0.0000)*Source*: Author's Computation Using Eviews 10

Table 4.5 above revealed the coefficient of the lagged error correction term (-3.04) to be negative but statistically significant at the 1% level. The negative and significant coefficient is an indication of co-integrating relationship among the variables. The magnitude of the coefficient implies that about 304% of the disequilibrium caused by previous year's shocks converges back to the long-run equilibrium in the current year. The coefficient of multiple determinations ( $R^2$ ) is 0.937 and the adjusted value is 0.840 indicating that about 93.7% of total variation or a change in the price level is explained by changes in the explanatory variables in the model while the remaining 6.3% is explained by other factors not explicitly captured in the model. The Durbin-Watson statistic of 2.062 shows positive serial correlation but within the normal bound of 2. The probability of F-statistic is statistically significantly at 1% level of confidence, which implies the ARDL model is robust and fit.

The ECM result has further replicated the long run estimates showing HCE, INTR and EXR to be negatively related with the price level while GDP, INVT and POP to be positively related with the level of prices in the short-run. This is a clear justification that household expenditure in Nigeria is weak with negative effect on the escalating price level. The econometrics result has consistently shows household expenditure, interest rate, exchange rate to have worsened the price level in Nigeria except the needed policy measures are immediately introduced and implemented.

Furthermore, the stability tests - Cumulative Sum of Recursive Residuals (CUSUM) detecting systematic departure of the  $\beta_j$  coefficients that results in a

systematic sign on the first step ahead forecast error and the Cumulative Sum Squares of Recursive Residuals (CUSUMSQ) useful when the departure of the coefficients from constancy is haphazard rather than systematic but that involves a systematic change in the accuracy of the estimated equation as observations are added. Both are derived from the residual of the recursive estimation known as recursive residuals. Under the null hypothesis of perfect parameter stability, both the CUSUM and CUSUMSQ statistics are zeros. Given that the expected value of a disturbance is always zero, a set standard error bands is usually plotted around zero and any statistic lying outside the band is taken as evidence of parameter instability. Plots of CUSUM and CUSUMSQ in figures 4.1 and 4.2 respectively showed that both statistics fall within the critical bounds implying that, all the coefficients of the estimated model for are stable over time.

The Breusch-Godfrey serial correlation Langrange Multiplier (LM) contained in Table 4.6 below is used to evaluate the assumptions popularized

Figure 4.1: CUSUM Stability Test

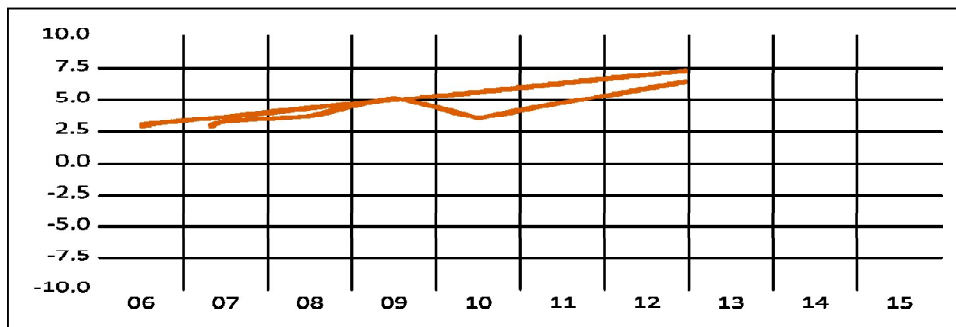
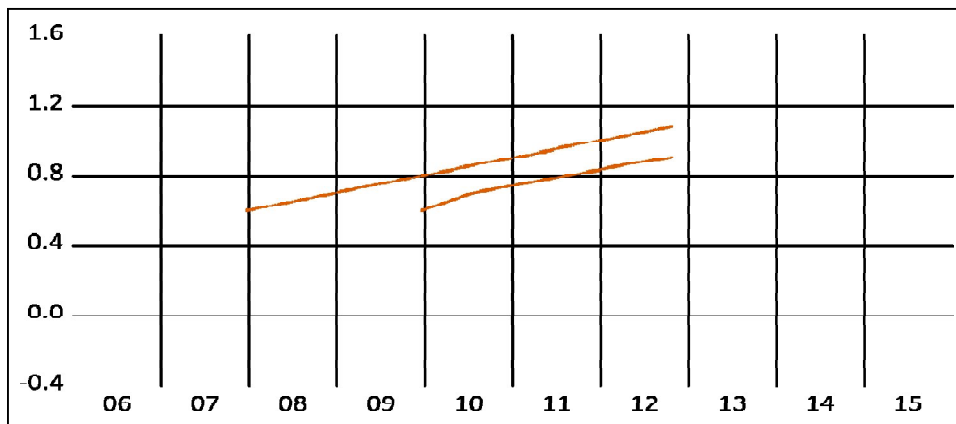


Figure 4.2: CUSUMSQ Stability Test



by Gauss-Markov known as Best Linear Unbiased Estimator (BLUE). The null hypothesis of the test is that there is no serial autocorrelation in the residuals up to the specified lag order. The BG-LM serial correlation test reported F-statistic value of 0.1938 with a significant probability of 0.00009. We therefore reject the null hypothesis, implying that the model is free from serial correlation. On the other hand, the Breusch-Pagan-Godfrey test as a chi-squared test which depends on an appropriate threshold for heteroscedasticity to occur has been applied. The test reported an F-statistic value of 0.9785 and statistically insignificant probability value of 1.0000. We therefore fail to reject the null hypothesis which implies variances of the model are homoscedastic (constant).

**Table 4.6 Model Residuals**

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	2.028632	Prob. F(2,8)	0.1938
Obs*R-squared	14.13298	Prob. Chi-Square(2)	0.0009
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.389023	Prob. F(31,10)	0.9785
Obs*R-squared	22.96078	Prob. Chi-Square(31)	0.8506
Scaled explained SS	3.059623	Prob. Chi-Square(31)	1.0000

*Source:* Author's Computation Using Eviews 10

### 5.1. Conclusion and Recommendations

The econometrics result of this study shows a deficient household expenditure incapable of influencing the price level exists in Nigeria. In addition to that, the escalating prices of goods and services and depreciating value of the naira have negatively affected the price level, resulting into severe consequences on Nigerians. Therefore, the following recommendations are made:

- (i) The Nigeria government is urged to spur increase in the level of productivity in the country via massive investment in agriculture. This is capable of increasing the standard of living of the people through increased consumption and income.
- (ii) There is also the need for the government to increase the tariffs for goods that can be locally manufactured in the country. This is capable of encouraging local production and at affordable prices within the reach of Nigerian consumers.



- (iii) As a deliberate policy measure, policymakers in Nigeria should develop policy strategies that can encourage the consumption of locally made goods. The current level of consumption of foreign goods does not augur well with the Nigerian economy and particularly the currency.
- (iv) There is also the need for inflation targeting and expectation forecasting for both the short run and long run. This is the only means through which the excessive effect can be truncated with appropriate policy measures.
- (v) Government should take a leading role in the development of modern infrastructure to cushion the effect on the cost of transportation of goods from point of production to that of consumption so as to encourage free government of goods and services.

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