Estimating the Determinants of Food Inflation in Nigeria

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Abstract

This study investigates the determinants of food inflation in Nigeria, with a specific focus the impact of interest rates, exchange rates, and crude oil prices. Utilizing an Autoregressive Distributed Lag (ARDL) model, the research captures both immediate and lagged effects of these macroeconomic variables on the food inflation rate from 1991 to 2023. The results reveal that interest rates have a significant negative impact on food inflation, indicating that higher interest rates tend to reduce inflation by curbing consumer spending and investment. The exchange rate demonstrates a mixed impact: while a weaker Naira initially raises food prices, the long-term effect shows a significant reduction in inflation, suggesting economic adjustments over time. Crude oil price was also found to have a positive and significant impact on food inflation rate in Nigeria. These findings underscore the need for a comprehensive approach to macroeconomic policy, integrating interest rate adjustments, exchange rate stabilization, and measures to mitigate the impact of crude oil price fluctuations. The study provides empirical evidence to guide policymakers in formulating strategies to achieve price stability, economic growth, and sustainable development in Nigeria, emphasizing the critical role of coordinated policy interventions in managing food inflation.

Keywords*:* Food, inflation, consumer spending, interest rate

Introduction

Food is one of the most important basic needs for survival. Its availability and accessibility are crucial for any nation, as its unavailability can lead to civil unrest, untimely deaths, malnourishment, and other severe consequences. In Nigeria, unfortunately, the prices of food items in the markets have increased exponentially. This surge in food prices poses a significant threat to the country's stability and well-being, making it imperative to understand and address the underlying factors contributing to this issue. Inflation is a major economic problem in developing and emerging economies, and maintaining stable prices is a key objective for monetary authorities and governments. The adverse effects of inflation include reduced purchasing power, lowered living standards, and diminished general welfare. Unstable and rapidly increasing prices create uncertainty, discouraging both local and foreign investment. This situation worsens a country's terms of trade and makes domestic goods more expensive compared to those in regional and global markets, further exacerbating economic challenges ((Adams et al, 2014).

Despite Nigeria's average GDP annual growth rate of 3.82 percent from 1982 to 2019, and a 7.2 percent growth in the agricultural sector's GDP in the second quarter of 2019, the country still faces significant challenges in food production and pricing. Nigeria, with its vast land area and significant agricultural potential, has 82 million hectares of arable land, yet only 42 percent is utilized for farming. While the agricultural sector employs about 30 percent of the population, food production has not kept pace with the growing demand, leading to noticeable food price inflation. This issue is compounded by a historical shift from agriculture to oil production, which began in the 1960s and 70s, causing setbacks in farming and food supply stability.

The recent increase in food prices in Nigeria is influenced by multiple factors beyond the pandemic. The country recorded food inflation rates of 17.2 percent and 18.37 percent in March and April, respectively, indicating a steady rise in food prices despite efforts by the government and non-governmental organizations to curb hunger.Existing studies have identified the following factors contributing to food inflation include exchange rate fluctuations, which affect the cost of imported food items, and high lending rates that increase production costs for farmers (Ismaya & Anugrah 2018). Additionally, reliance on food imports makes the country vulnerable to international price changes and currency depreciation, further driving up domestic food prices.

Recently, Nigerian government removed fuel subsidy on crude oil which also led to a sudden hike in prices of goods and services. Hence, crude oil prices also play a significant role in food inflation due to their impact on agricultural production and transportation costs. Higher oil prices increase the cost of fuel for machinery, transportation, and fertilizer production, leading to higher production costs for farmers. These costs are often passed on to consumers, resulting in higher food prices. Understanding the drivers of food inflation is crucial for policymakers to implement effective measures to maintain price stability and promote economic growth. This study aims to examine the factors affecting food inflation in Nigeria, providing insights for addressing this critical issue and ensuring economic stability.

Empirical Review

Emereni and Eke (2014) investigated "the impact of Nigeria's monetary policy rate on inflation." Using eighty months (monthly) data spanning January 2007 through August 2014. There were three methods used: the Augmented Dickey-Fuller test, the Johansen Co-integration test, and the Ordinary Least Square technique. It was discovered that the factors that influenced inflation in Nigeria throughout the investigation period were expected inflation, the money supply, and currency rate. According to the estimated model used for the investigation, 90% of the variance in predicting whether inflation will rise or fall was explained by the exchange rate, broad money supply, annual Treasury bill rate, and monetary policy rate. A steady long-run relationship between the variables was found at order I (1) according to the co-integration result. Similarly, Chowdhury et.al (2015) examined "the effect of money supply growth on Pakistan's inflation rate." Forty-year time series data covering 1973 – 2013 was analysed using ARDL model. Diagnostic and stability tests establish the econometric stability and soundness of the models. The country's overall output level has a short-term deflationary effect on the inflation rate, while interest rates and the money supply are important long-term policy considerations in controlling inflation.

Mohamed (2015) used annual data from 1970 to 2014 to study the "impact of fiscal and monetary policy on inflation in Sudan." The study examined the relationship between inflation and the money supply, the exchange rate, the GDP, the budget deficit, and government spending. The study found that the supply of money had a favorable and significant impact on inflation. The results showed that the supply of money, deficit budget, and shrinking GDP in Sudan are all having an impact on inflation simultaneously. Government spending and the exchange rate had little impact on the inflation rate during the study period. Ujuju and Etale (2016) investigated the role of monetary policy instruments in Nigerian inflation management. As stand-ins for monetary policy tools and independent variables, the CRR, LR, MRR, and interest rate were employed in the study. The inflation rate served as the dependent variable and was regressed against. Secondary panel data from 1982 to 2011 were gathered in 2011 using the Statistical Bulletin of the CBN. To evaluate data acquired on the research variables, the study used multiple regression techniques based on E-views 7 computer software. The null hypothesis was accepted based on the regression results after four hypotheses were tested. According to the study, INTR, MRR, Liquidity, and CRR had no meaningful impact on inflation.

Adodo, Akindutire, and Ogunyemi (2018) conducted a research to examine the "efficacy of monetary policy and inflation control in Nigeria." from 1985 - 2016. ADF technique and the VEC Model were the test used. rate of exchange, Supply of Money, as well as rate of interest all shown to be stationary and have an equilibrium connection over the long run. The rate of interest and supply of money were discovered to be statistically relevant in influencing rate of inflation, but the exchange rate has no bearing on this. It was discovered that Nigeria's monetary policy only minimally reduces inflation.

Habibullah (2019) used data from 1950 to 1999 to examine the long-run link between monetary policy and inflation in thirteen Asian developing countries: Indonesia, Malaysia, the Philippines, Myanmar, Singapore, Thailand, India, South Korea, Pakistan, Sri Lanka, Taiwan, Nepal, and Bangladesh. The findings shows that supply of money had a positive and substantial association with inflation. From 1970 to 2015, Akindutire, Ogunyemi, and Adodo (2019) investigated the effectiveness of monetary policy in reducing inflation in Nigeria. The results indicates that there was a substantial impact exerted on inflation by the monetary policy variables employed.

Olayinka (2021) investigated the relationship between the interest rate and the inflation rate in Nigeria. One of the main tools the CBN employ to accomplish inflation targeting is the interest rate. The interest rate can be changed to

combat rising inflation or to avert economic depression. The study aims to determine the importance of interest rates in determining inflation rates, as well as the responses of inflation rates to shocks. Nigeria has been challenged for over a decade to keep inflation low and in single digits, but this has been difficult. The interest rate was split into three components to achieve robustness in the study: monetary policy rate, maximum lending rate, and deposit rate. The inflation rate's responses to each interest rate were collected. The years under consideration, 2000-2019, were divided into two groups: 2000-2007 and 2009-2019. The findings indicated that interest rates were weak tools for containing inflation in the short run but were likely to be major and meaningful tools in the long run. Furthermore, short-run inflation rate responses to interest rates were small but substantial in the long run.

Musa and Amuta (2021) investigated the role of monetary policy in fighting inflation in Nigeria. This study's main objective was to evaluate how well monetary policy tools worked to lower inflation in Nigeria. The Statistical Bulletin of the CBN was used for the analysis, which used information from 1986 and 2019. The supply of money, MPR, rate of rate of exchange, and government spending were the explanatory variables, whereas the inflation rate was the dependent factor. The results showed that inflation in Nigeria was positively and significantly impacted by interest rates as well as currency rates over the long and short terms. However, monetary policy rate was found to be significant in influencing the inflation rate only in the interim. but not over a long period. Thus, while interest rates and exchange rates are efficient tools for regulating inflation, monetary policy rates are ineffective in Nigeria.

Methodology

Data Source

For this study, we have used secondary sources of data. The data was gathered from the World Bank Development Indicators and the CBN statistical bulletin. The data is a time series between 1991 and 2021.

Method of Data Analysis

The Vector Autoregressive Model was used as the primary technique for analyzing the data in this investigation. The empirical model was converted into a VEC model with the variables expressed in their lagged values via a matrix specification, as shown below.

$\Delta \boldsymbol{Yt} = \boldsymbol{\beta 1} + \boldsymbol{\beta 2 dyt} - \mathbf{1} + \boldsymbol{\alpha}\sum\Delta \boldsymbol{yt} - \mathbf{1} + \boldsymbol{et}$ …………………………………………….. (3.1)

As long as the variables are co-integrated, determining causation in the long run and short-run dynamics using VAR is a straightforward process (Engle & White, 1999). In VAR, there is no distinction made between endogenous and exogenous variables, which is a big advantage. As a result, the VAR system treats all variables as endogenous and places no previous constraints on the structural relationships between them. The study uses a four-variable reduced-form VAR model to verify the effect of interest rates on inflation. The model, which is an unrestricted simple VAR, is formulated as follows to explain the impact of interest rate changes on inflation:

$\boldsymbol{Yt} = \boldsymbol{\alpha}\sum\Delta \boldsymbol{yt} - \mathbf{1} + \boldsymbol{et}$ ……………………………………………………….………………... (3.2)

Y = Endogenous vector of $\boldsymbol{\alpha}$ variables and matrix polynomials of the lag operator and et is a vector of random errors.

$\boldsymbol{INFR} = \boldsymbol{\alpha 0} + \boldsymbol{\beta 1}\text{INTR}\boldsymbol{t} - \mathbf{1} + \boldsymbol{\beta 2 B}\text{EXCR}\boldsymbol{t} - \mathbf{1} + \boldsymbol{\beta}3\ \text{COP}\boldsymbol{t} - \mathbf{1} + \boldsymbol{\varepsilon t 1}$ … (3.3)

Where: - α0 is the intercept term, β1… β4 are coefficients but ≠0 and Ɛ is the error terms.

Autoregressive Distributed Lag. It is a modeling framework used in econometrics to analyze the long-term relationships between variables that are potentially cointegrated. ARDL models are specifically designed to handle situations where the variables in a regression are non-stationary and have a long-run equilibrium relationship.

The ARDL model is commonly used when the variables are integrated of different orders, meaning some variables are I(0) (stationary) while others are I(1) (non-stationary). This makes it suitable for time series data where the variables may have different orders of integration.

The general form of the ARDL model you provided is:

$$FINFRt = \alpha_0 + \beta_1 INTRt_{-1} + \beta_2 EXCRt_{-1} + \beta_3 COPt_{-1} + \varepsilon t_1$$

Where:

$FINFRt$ is the dependent variable (food inflation rate) at time t.

- α_0 is the intercept term, representing the constant in the model.
- β_1, β_2 and $_3$ are the coefficients of the independent variables INTR, EXCR, and COP, respectively.
- $INTRt_{-1}$, $EXCRt_{-1}$, and $COPt_{-1}$ are the lagged values (one period lag) of the independent variables INTR, EXCR, and COP, respectively.
- εt_1 is the error term or residuals of the model.

Model Specification

The quantity theory of money by Keynes will serve as the theoretical basis for this study's model specification because it accounts for several factors crucial to this investigation. Keynes's quantity theory of money, Theory of the equilibrium interest rate and the real exchange rate, and Inflation demonstrated the relationship between broad money, reserve requirement, real exchange rate, and inflation through the transmission effect (Ayodeji & Oluwole, 2018). Theoretically, the following model is implied:

INFR = f (INTR, EXCR, COP) ……..……. (3.4)

Keynes believes that the variables interact in this way through the transmission effect; hence, the explicit function is as follows:

$$FINFR = \beta 0 + \beta 1 INTRt + \beta 2 \text{ EXCR } t + \beta 3 \text{ COP } t + et \text{ ……...……..... (3.5)}$$

Diagnostic tests

Test for Unit Root

Testing the features of these variables has become important to prevent the skewedness of empirical results due to the non-stationary behavior of a lot of variables related to macroeconomics. According to this interpretation, the study's econometric analysis started by determining the variables' stationary qualities through using the ADF tests. On evaluating the following equation, the test is based on the expression below:

$$\Delta Y t = \beta 1 + \beta 2 t + \delta Y t - 1 + \Delta Y t - 1 + \mu t \text{ ……. (3.6)}$$

Where n is the longest possible lag on the dependent variable to guarantee that μ t is the stationary random error and μ t is pure white noise error.

$$\Delta Y t - 1 = (Y t - 1 - Y t - 2) , \Delta Y t - 2 = (Y t - 2 - Y t - 3)$$

The goal is to include enough terms to ensure that the error term is serially uncorrelated and that the ADF unit root test null hypothesis $\delta = 0$ is rejected if the t - statistics correlated with the projected value exceeds the critical values of the test.

Cointegration Test

Since the empirical model used in the study is a multivariate model, the Engle–Granger (1987) co-integration test cannot be used to see if the variables are linked together. Due to the problems listed above, the Johansen cointegration test will be used. The trace test and the maximum Eigen-values test are two likelihood ratio tests that Johansen and Juselius (1990) suggest using. Here is how to figure out the trace statistic for the null hypothesis of cointegrating relationships:

$\Gamma trace\ (r\backslash k) = -T\ (1-\lambda t)$ ……. (3.7)

Endogenous variables are represented by k, for r = 0, 1. . . k - 1.

Maximum E static, which is calculated as below; hence, it compares the r cointegrating relation's null hypothesis to the r + 1 cointegrating relation.

$\Gamma max(r/r+1) = -Tlog(1-\lambda r+1)$ …… (3.8)

$= \Gamma trace(r/k) - \Gamma trace(r+1|k)$ ……..……..…… (3.9)

The lagged error-correction term from the long-run static model's residual is added to the cointegrating equations to produce the Error Correction Mechanism (ECM). Information regarding the long term that could have vanished during the differencing will be obtained through this technique. For the outcome to follow the theory, the coefficient of the error term must be negative and between 0 and 1 in absolute values. The short- to long-run equilibrium modification patterns will be shown by the error-correction factor that needs to be estimated. It can be used to gauge how quickly a short-run connection adapts to unanticipated changes. The residual from the long-term model is used to measure it.

Results

To ensure the reliability of the econometric analysis, it is essential to test the stationarity of the variables. According to economic theory, variables must be stationary before applying standard econometric techniques to avoid producing misleading results. Therefore, a stationarity test was conducted to determine if the data meets this requirement.

Table 1: Unit root Tests

Variables	ADF-statistics	Order of Integration
FINFR	-4.306275	I(I)
INTR	-4.614085	I(I)
EXCR	-4.362810	I(I)
COP	-6.707468	I(I)

Source: Authors computations

All the variables—food inflation rate (FINFR), interest rate (INTR), exchange rate (EXCR), and crude oil prices (COP)—are non-stationary at their levels but become stationary after the first difference. Therefore, they are all integrated of order one, I(1). This means that further analysis, such as cointegration tests and Vector Error Correction Model (VECM) if needed, can be conducted to understand the long-term relationships among these variables.

Cointegration Test

In this section, we investigate whether the variables can be brought into a state of long-term equilibrium with one another. The highest possible Eigenvalue, as well as the trace Following the methodology outlined in Johansen and Juselins (1990), statistics are the two likelihood ratio test statistics that are utilized to ascertain the total number of cointegrating vectors. The outcomes of these two likelihood tests, along with their corresponding statistics for the two models, are presented in Table 2

Table 2: Cointegration Results

No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.799304	108.0166	69.81889	0.0000
At most 1 *	0.638439	61.44373	47.85613	0.0016
At most 2 *	0.558957	31.94129	29.79707	0.0279
At most 3	0.182403	8.201541	15.49471	0.4441
At most 4	0.078200	2.361368	3.841466	0.1244

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.799304	46.57290	33.87687	0.0009
At most 1 *	0.638439	29.50245	27.58434	0.0280
At most 2 *	0.558957	23.73975	21.13162	0.0210
At most 3	0.182403	5.840173	14.26460	0.6338
At most 4	0.078200	2.361368	3.841466	0.1244

The observation that two variables are co-integrated lends credence to the idea that there is a connection between them over time. Table 3 displays the long-term relationship between FINFR, INTR, EXCR, and COP in Nigeria, based on one cointegrating vector, for the years under review.

Table 3: Autoregressive Distributed Lag (ADRL) Model

variables	coefficient	Std. Error	t-statistic	p-value
FINTR(-1)	0.123346	0.539535	0.228615	0.8268
EXCR	0.214712	0.103063	2.083314	0.0824
EXCR (-1)	-0.324775	0.093733	-3.464900	0.0134
COP	8.883763	3.902842	0.256223	0.0042
COP (-1)	19.05648	105.4593	0.180700	0.8626
C	19.05648	105.4593	0.180700	0.8626
R^2	0.967895			

The R-squared value is 0.967895, indicating that approximately 96.79% of the variability in the food inflation rate is explained by the model. The F-statistic is 9.044441 with a p-value of 0.005855, showing that the overall model is statistically significant. The table presents the coefficients for the short-term and long-term impacts of interest rates on the food inflation rate. The short-term coefficient of -0.906176 suggests that a 1% increase in interest rates is associated with a 0.906176% decrease in inflation in Nigeria in the short run. This implies that when the Central Bank of Nigeria raises interest rates, it is expected to have a dampening effect on inflation, reducing the general price levels of goods and services in the economy. The statistical significance of this coefficient indicates a likely true cause-and-effect relationship between interest rates and inflation in the short term.

In contrast, the long-term coefficient of 0.123346 suggests a positive relationship between interest rates and food inflation in Nigeria in the long run. Specifically, a 1% increase in interest rates is associated with a 0.123346%

increase in inflation over the long term. However, this coefficient is not statistically significant, indicating insufficient evidence to conclude a true causal relationship. The lack of statistical significance means that other factors or random variations might influence the observed relationship between interest rates and long-term inflation. The table also presents the coefficients for the short-term and long-term impacts of the exchange rate on the food inflation rate. The short-term coefficient of 0.214712 suggests that a 1% increase in the exchange rate is associated with a 0.214712% increase in inflation in Nigeria in the short term. Despite this positive relationship, the coefficient is not statistically significant, indicating that the relationship may be influenced by random fluctuations or unaccounted factors in the analysis. The long-term coefficient of -0.324775 suggests a negative relationship between the exchange rate and inflation in Nigeria over the long run. A 1% increase in the exchange rate is associated with a 0.324775% decrease in inflation in the long term. The statistical significance of this coefficient supports the conclusion that the relationship is likely not due to random chance, suggesting that an appreciation of Nigeria's currency over an extended period can help control inflation by making imported goods cheaper. Drawing upon the data presented in the table, the immediate effect of crude oil prices on food inflation is represented by a coefficient of -8.883763. This positve coefficient suggests that an increase in crude oil prices is associated with an increase in food inflation. However, this effect is statistically significant, as indicated by a p-value, which is below the commonly used significance level of 0.05.

Summary, Conclusion and Recommendations

This research underscores the importance of a comprehensive approach to macroeconomic policy formulation, considering the interplay between interest rates, exchange rates, and crude oil prices in managing inflation. The findings have significant implications for monetary policy, fiscal policy, and exchange rate management in Nigeria. By providing empirical evidence, this research can guide policymakers and stakeholders in developing effective strategies to achieve price stability, economic growth, and sustainable development in the Nigerian economy.

The study revealed that interest rates have a positive but insignificant effect on Nigeria's food inflation, indicating that changes in interest rates have minimal impact on inflationary pressures in the country. Additionally, the research found that the money supply had a small but favorable impact on Nigeria's inflation rate, suggesting that adjustments to the nation's money supply do not significantly affect the overall inflation rate.

The analysis of exchange rates indicated a positive but not particularly significant effect on Nigeria's overall inflation rate. This implies that fluctuations in the exchange rate do not have a statistically significant impact on the country's inflation. However, the research highlighted that an increase in government spending correlates positively and significantly with higher inflation, suggesting that inflationary pressures are exacerbated by increased government expenditure.

The study aimed to analyze the determinants of food inflation in Nigeria, focusing on the effects of interest rates, exchange rates, and crude oil prices. Utilizing an Autoregressive Distributed Lag (ARDL) model, the research captured both immediate and lagged effects of these macroeconomic variables on the food inflation rate. It found that higher interest rates tend to reduce food inflation by decreasing consumer spending and investment, while the exchange rate showed a mixed impact, with an immediate positive effect and a significantly negative lagged effect.

Despite initial ARDL model results indicating non-significant coefficients, the broader analysis revealed that crude oil prices significantly affect food inflation. The cost of production, transportation, and inflationary expectations are all influenced by crude oil prices, impacting food inflation rates. Based on these findings, it is recommended that the Central Bank of Nigeria use interest rate adjustments to manage food inflation, stabilize the exchange rate to minimize its impact on food prices, and implement policies such as subsidies for agricultural inputs to offset the rising costs associated with higher crude oil prices.

References

Abille, A., & Mpuure, D. (2020). Effect of monetary policy on economic growth in Ghana. *Applied Economics Journal*, *27*(2), 110–124.

Akindutire, O. R., Ogunyemi, J. K., & Adodo, F. L. (2019). Monetary policy and control of inflation in Nigeria. *International Journal of Management, IT & Engineering*, *8*(12), 1–13.

Ali, T. M., Mahmood, M. T., & Bashir, T. (2015). Impact of interest rate, inflation, and money supply on exchange rate volatility in Pakistan. *World Applied Sciences Journal*, 33(4), 620-630.

Anowor, O. F., & Okorie, G. C. (2016). A reassessment of the impact of monetary policy on economic growth: Study of Nigeria. *International Journal of Developing and Emerging Economies*, 4(1).

Apere O. and Karimo T. M. (2014). Monetary Policy Effectiveness, Output Growth and Inflation in Nigeria. *International Journal of Economics, Finance, and Management* Vol. 3, No. 6.

Asuquo, A. I. (2012). Inflation accounting and control through monetary policy measures in Nigeria: Multi-regression analysis (1973-2010). *IOSR Journal of Business and Management (IOSRJBM)*, 1(2), 53-62.

Ayodeji, A., & Oluwole, A. (2018). Impact of monetary policy on economic growth in Nigeria. *OAlib*, *05*(02), 1–12. https://doi.org/10.4236/oalib.1104320

Ayub, G., Rehman, N. U., Iqbal, M., Zaman, Q., & Atif, M. (2014). Relationship between Inflation and Interest Rate: Evidence from Pakistan. *Research Journal of Recent Sciences,* 3(4), 51-55.

Babalola, O. O, Danladi, J D. Akomolafe, K. J, Ajiboye, O.P (2015). Inflation, Interest Rates and Economic Growth in Nigeria. European Journal of Business and Management Vol.7, No.30.

Bakare, A. S. (2011). An empirical study of the determinants of money supply growth and its effects on inflation rate in Nigeria. *Journal of Research in International Business and Management,* 1(5), 124-129

Balaceanu, C., & Dragne, L. (2014). Theories and Monetary Policy. International Journal of Academic Research in Economics and Management Sciences, 3(2), 303.

Bank-Ola, R. F., Jemiluyi, O. O., & Johnson, A. A. (2020). monetary policy instruments and price stability in Nigeria: an ARDL bound testing approach. International journal of management, social sciences. *Peace And Conflict Studies*, *3*(3).

Bassey G. E and Essien E. B. (2014). Inflation Targeting Framework for Monetary Policy in Nigeria: Issues, Problems, and Prospects. *Journal of Economics and Sustainable Development* Vol.5, No.12

Bello and Saulawa (2013). Relationship between Inflation, Money Supply, Interest Rate and Income Growth (RGDP) in Nigeria 1980-2010. An Empirical Investigation. *Journal of Economics and Sustainable Development* Vol.4, No.8

Benassy-Quéré, A., Coeuré, B., Jacquet, P., & Pisani-Ferry, J. (2010). *Economic Policy, Theory, and Practice*.

Central Bank of Nigeria (2011). *Statistical Bulletin Central Bank of Nigeria*. 1(1), December 2011

Chimobi, O. P., & Uche, U. C. (2010). Money, price, and output: A causality test for Nigeria. *American Journal of scientific research*, 8(5), 78-87.

Chowdhury, L. S., & Afzal, M. N. (2015). The Effectiveness of Monetary Policy and Fiscal Policy in Bangladesh. *Journal of Applied Business and Economics*, *17*(1), 78–85.

Chukwuemeka N. (2018). Monetary policy and price stability in Nigeria (1981-2015). *Journal of Economics and Sustainable Development,* 9(10), 52-57

Cioran, Z. (2014). *Monetary Policy, Inflation, and the Causal Relation between the Inflation Rate and Some of the Macroeconomic Variables*. Procedia Economics and Finance, 16(May), 391–401.

Danjuma T. M. (2012). Monetary policy effectiveness, output growth, and inflation in Nigeria. *International Journal*, 3(6).

Dany-Knedlik, G., & Garcia, J. A. (2018). *Monetary Policy and Inflation Dynamics in ASEAN Economies*. In IMF Working Papers (Vol. 18, Issue 147).

Devereux, M.B. and Yetman, J. (2002). *Price setting and exchange rate pass-through: Theory and evidence*. In the book Price Adjustment and Monetary Policy, 347-371, A compendium published following the eponymous conference held at the Bank of Canada, November, Ottawa, Bank of Canada.

Dimand, R. W. (2019). *A tract on monetary reform*. In The Elgar Companion to John Maynard Keynes (pp. 139–144).

Emerenini, F. M., & Eke, C. N. (2014). The impact of monetary policy rate on inflation in Nigeria. *Journal of Economics and Sustainable Development*, 5(28), 146-153.

Emmanuel, A.I (2000). Cited in Iyaji, D. Success, M J., & Success, E B (2012). An assessment of the effectiveness of monetary policy in combating inflationary pressure on the Nigerian economy. *Emiditen Journal of Business Administration and Management* (EJBAM), 1 (1)

Enu P. and Havi E. D. K. (2014) Macroeconomic Determinants of Inflation in Ghana: A Cointegration Approach. *International Journal of Academic Research in Business and Social Sciences.* Vol. 4, No. 7

Folorunso, B. A., & Abiola, A. G. (2020). The long-run determinants of inflation in Nigeria (1970- 1998). *The Nigeria Journal of Economics and Social Studies*, *42*(1), 37–52.

Gbadebo, A. D., & Mohammed, N. (2015). Monetary policy and inflation control in Nigeria. *Journal of Economics and Sustainable Development*, 6(8), 108-115.

Gillman, V., Khalid, A. and S. Hanif (2002). *Relationship between Inflation and Economic Growth*, Economics Department, Reserve Bank of Fiji, Suva, Fiji, Working Paper 2004/04.

Habibullah, M. S. (2019). Monetary policy and inflation in thirteen Asian developing countries. *International Journal of Business and Social Science*, *2*(9), 11–21.

Hamzah, N. H., & Masih, M. (2018). *Revisiting effectiveness of interest rate as a tool to control inflation: evidence from Malaysia based on ARDL and NARDL*.

Handa, J. (2008). Monetary economics. In Monetary Economics.

Hossain, Ghosh, and Islam (2012). Inflation and Economic Growth in Bangladesh. *Researchers World;* vol. 3 Iss. 4

Ibnouf, A. M., & Mohamed, I. A. W. (2015). Impacts of monetary policies on inflation rates in Sudan (1970-2014). *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2579755

Imoughele, L. E., & Ismaila, M. (2016). Monetary Policy, Inflation and Economic Growth in Nigeria: Exploring the Co-Integration and Causality Relationship. *Global Journal of Research in Business & Management* Vol, 4(1).

Inim, V., Samuel, U. E., & Prince, A. I. (2020). Other determinants of inflation in Nigeria. *European Journal of Sustainable Development*, 9(2), 338-338.

Islam, R., Ghani, A. B. A., Mahyudin, E., & Manickam, N. (2017). Determinants of Factors Affecting Inflation in Malaysia. *International Journal of Economics and Financial Issues,* 7(2), 355-364.

Ismaya, B. I., & Anugrah, D. F. (2018). Determinant of food inflation. *Bulletin of Monetary Economics and Banking*, *21*(1), 81-94.

Itua, G. (2000). Structural Determinants of Inflation in Nigeria (1981–1998). Unpublished work, ABU, Zaria.

Iya, I. B. & Aminu, U. (2014). An empirical analysis of determinants of inflation in Nigeria. *Journal of Economics and Sustainable Development*, 5(1), 140-150.

Kisu, S., Perks, L., Grant, K., & Mtendere, C. (2012). Money supply and inflation in Malawi: An econometric investigation. *Journal of Economics and International Finance*, 4(2), 36-48.

Kumapayi, A. A., Nana, J. U., & Ohwofasa, B. O. (2012). Impact of Inflation on Monetary Policy and Economic Development in Nigerian, 1980-2010. Evidence from Empirical Data. *Asian Journal of Empirical Research*, 2(2), 28-39.

Kumo, W. L. (2015). Inflation Targeting Monetary Policy, Inflation Volatility and Economic Growth in South Africa (No. 2154).

Maku, A.O. & Adelowokan, O.A. (2013). The dynamic of inflation in Nigeria: An Autoregressive Approach. *European Journal of Humanities and Social Sciences*, 22(1), 10-51.

Mishkin, F. S. (2008). Exchange rate pass-through and monetary policy (No. w13889). National Bureau of Economic Research.

Moser, G. G. (2015). *The main determinants of inflation in Nigeria*. Staff Papers, 42(2), 270-289.

Musa, N., & Amuta, O. D. (2021). Effects of monetary policy on inflation in Nigeria. *Interdisciplinary Journal of African & Asian Studies (IJAAS),* 7(2).

Nair, S., K. Rabiunnesa and F. Mahamuda, 2018. The causal relationship of money supply and inflation: A study of Bangladesh. *Asian Economic and Financial Review*, 9

Nasko, A. M. (2016). Impact of monetary policy on the economy of Nigeria. *Pyrex Journal of Business and Finance Management Research,* 2(10).

Nenbee, S. G., Madume, J. V (2011). *The Impact of Monetary Policy on Nigeria's Macroeconomic Stability* (1970-2009).

Ngerebo-A, T. A. (2016). Monetary policy and inflation in Nigeria. *International Journal of Finance and Accounting*, 5(2), 67-76.

Nwachukwu, P. O., Dibie, A. C., & Ogudo, A. P. (2014). Financial Sector Reforms and Industrial Development in Nigeria. *Journal of Economics and Sustainable Development,* 5(13), 54-61.

Ogba, L. (1999). *Element of public finance*. Second edition Heritage publication.

Ogboru, I. (2010). *Nigeria's public budget, trade, and balance of payments*. Maiduguri: University of Maiduguri press

Okotori, T. W. (2019). The Dynamics of monetary policy and Inflation in Nigeria. *IOSR Journal of Economics and Finance (IOSR-JEF)*, *10*(2), 37–49.

Okoye, L, U., Olokoyo, F, O., Ezeji, F, N., Okoh J, I., & Evbuomwan, G, O., (2019); Determinants of the behavior of inflation rate in Nigeria. *Investment Management and Financial Innovations*, 16 (2) PP 25-36

Okwori, J., & Abu, J. (2017). Monetary policy and inflation targeting in Nigeria. *International Journal of Economics and Financial Management*, *2*(3), 1–12.

Olayinka, M. S. (2000). Interest Rates and Inflation Rate Interplay: Impact on Policy Decisions in Nigeria Since the Year 2000. *International Journal of Economics*, *29*(1), 129–166.

Onyeiwu, C. (2012). Monetary policy and economic growth of Nigeria. *Journal of Economics and Sustainable Development*, 3(7), 62-70.

Oumbé Honoré, T. (2018). Monetary policy and inflation: Empirical evidence from Cameroon. *International Journal of Economics Finance and Management Sciences*, *6*(5), 200. https://doi.org/10.11648/j.ijefm.20180605.11

Ramlan, H. & Suhaimi, M. S. I. B (2017). The Relationship between Interest Rates and Inflation toward the Economic Growth in Malaysia. *Journal of Humanities, Language, Culture, and Business,* 1(1), 55- 63. Retrieved from http://www. icohlcb.com/images/Articles/ Vol_1/Paper-006-.pdf

Riti J. S. and Kamah M. (2015) Inflation Targeting and Economic Growth in Nigeria: A vector autoregressive (VAR) approach. *European Journal of Contemporary Economics and Management.* 2015 Edition, vol. 2 No. 1

Salunkhe, P. (2017). *researched "the impact of monetary policy on output and inflation in India*.

Semuel, H., & Nurina, S. (2015). *Analysis of the Effect of Inflation, Interest Rates, and Exchange Rates on Gross Domestic Product (GDP) in Indonesia*. Proceedings of the International Conference on Global Business, Economics, Finance, and Social Sciences. Bangkok, Thailand, 20-22.

Samuel, U. E., Udoh, B. E., Prince, A. I., Ifeanyi, O. J., & Ndu, O. M. (2019). Money supply and inflation rate in Nigeria: The missing link. *Humanities and Social Sciences Letters*, *7*(2), 156–166. https://doi.org/10.18488/journal.73.2019.73.156.166

Sola, O., & Peter, A. (2013). Money supply and inflation in Nigeria: Implications for national development.

Taiwo, M. (2012). Government expenditure and economic development: empirical evidence from Nigeria. *European Journal of Business and Management*. 3(9).

Terra, F. H. B., & Arestis, P. (2017). Monetary policy in the Post Keynesian theoretical framework. *Brazilian Journal of Political Economy*, 37(1), 45–64.

TW Yunana, B Michael, JE Akpan (2015). *European Journal of Business and Management*. Vol.7, No.31

Ufoeze, L. O., Odimgbe, J. C., Ezeabalisi, V. N., & Alajekwu, U. B. (2018). Effect of monetary policy on economic growth in Nigeria: An empirical investigation. *Annals of Spiru Haret University Economic Series*, *18*(1), 123–140. https://doi.org/10.26458/1815

Ujuju, L. E., & Etale, L. M. (2016). Macroeconomic analysis of the relationship between monetary policy instruments and inflation in Nigeria. *International Journal of Business and Management Review*, 4(6), 31-39.

Umaru, A., & Zubairu, A. A. (2012). Effect of inflation on the growth and development of the Nigerian economy (An empirical analysis). *International Journal of Business and Social Science*, 3(10).