



Money Supply Movement and Food Inflation in Nigeria

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Abstract

Among the major macroeconomic objectives of any nation is to ensure higher economic growth without significant and persistent upward trend in the general price level. No wonder monetary authorities do emphasis low inflation-output growth. In Nigeria, all efforts of the Central Bank of Nigeria (CBN) to achieve single digits inflation over the years have been abortive. Against this background, this paper examines the impact of money supply on food inflation in Nigeria using monthly data between 1996:01 and 2021:12. The augmented Dickey-Fuller test of unit root is to check the stationary of money supply growth and food inflation. Thereafter, an autoregressive distributed lag model (ARDL) model is specified in order to capture both contemporaneous and effects of money supply on food inflation and the model is estimated using the ordinary least squares (OLS) estimation technique. The results reveal that money supply has contemporaneous effect on food inflation. No evidence of lagged effect is found. It is therefore concluded that controlling the growth in money supply is an effective measure to control food inflation.

Keywords: Money supply, Growth, Food inflation, Contemporaneous effect, Lagged effect, ARDL model, Nigeria.

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Contribution of this paper to the literature

This study contributes to the existing literature by examining the impact of money supply on food inflation in Nigeria. Contemporaneous and lagged effects of money supply on food inflation are empirically investigated.

1. Introduction

Among the major macroeconomic objectives of any nation is to ensure higher economic growth without significant and persistent upward trend in the general price level. This persistent upward movement is called inflation. Though low and moderate inflation are desirable for economic growth, inflation becomes problematic, especially when it goes beyond control. No wonder monetary authorities do emphasis low inflation-output growth. Inflation statistics shows that the last time Nigeria achieved a single digit overall inflation rate and food inflation were January, 2016 and May, 2015 when the monthly overall inflation rate and food inflation rate were put at 9.6 percent and 9.8 percent respectively. All efforts of the Central Bank of Nigeria (CBN) to re-achieve single digits inflation since this period has been abortive. For instance, the CBN raised cash reserve ratio (CRR) in January, 2015 from 20 percent to 22.5 percent in March, 2016 before it was later raised to 22.7 percent in January, 2020. Liquidity ratio (LR) was also raised from 25 percent in 2010 to 30 percent in 2011. The monetary policy rate (MPR) was put at 14 percent, 13.5 percent and 11.5 percent in 2016, 2019 and 2020 respectively. Studies on the impact of money supply growth on inflation are not scarce. However, researchers who have examined the impact of money supply growth on inflation have found mixed results. While [Nasir, Waheed, and Nasir \(2021\)](#) show that money supply is a major driver of inflation, findings in [Amassoma, Sunday, and Onyedikachi \(2018\)](#) and [Smauel, Udoh, Prince, Okoh, and Ndu \(2019\)](#) reveal that money supply is not a major driver of inflation. This study therefore relies on the monetarist theory of inflation and contribute to the existing debate by examining the impact of money supply growth on food inflation in Nigeria. In order to differ from the existing literature, the study examines both the contemporaneous and lagged effect of money supply on food inflation in Nigeria using up to date monthly data (1996:01 – 2021:12). This paper is divided into five sections. Section 1 deals with introduction. Sections 2, 3, 4 and 5 deal with empirical review, methodology, empirical analysis respectively.

2. Empirical Review

A lot of research papers has been published on the impact of money supply on inflation, both within and outside Nigeria. Few of these studies are documented below.

[Joshi \(2021\)](#) estimates autoregressive distributed lag (ARDL) and error correction (EC) models to examine the effect of money supply on inflation in Nepa using annual data between 1964 and 2019. The findings reveal that money supply exerts positive significant influence on inflation in the country. [Simwaka, Ligoya, Kabango, and Chikonda \(2012\)](#) examines the relationship between money supply and inflation in Malawi using Granger causality test and Error correction model approach. The results link inflation in Malawi to both monetary (money growth). [Nasir et al. \(2021\)](#) applies ARDL cointegration approach to investigate the impact of money supply on inflation in Pakistan. The findings reveal the existence of both long run and short run relationship between the variables. [Batarseh \(2021\)](#) examines the nature of the relationship between money supply and inflation in the Jordanian economy, using Johansen cointegration approach and the Granger Causality test. Cointegration test results indicate that there was no causal link between the money supply and inflation in the long run. Granger Causality test result shows a unidirectional causality running from the money supply M1 to inflation in the short run. [Mbongo, Mutasa, and Msigwa \(2014\)](#) investigates the effects of money supply on inflation in Tanzania. The results of OLS and ECM techniques reveal that money supply and exchange rate have significant impact on inflation in the short and long run. [Amassoma et al. \(2018\)](#) determines the influence of money supply on inflation in Nigeria using co-integration and error correction model approaches. It is found that money supply does not significantly influence inflation both in the long and short run. [Ikezam \(2018\)](#) checks the extent to which components of money supply influence inflation rate in Nigeria using Granger causality test and ordinary least squares approach. currency in circulation, demand deposit and savings deposit are found to be negatively related to inflation, while net foreign asset and time deposit are positively related to inflation in Nigeria. [Mbutor \(2014\)](#) investigates the extent to which inflation depends on money supply in Nigeria with the Vector Error correction technique. The results indicate a persistent positive relationship between inflation and money supply. [Smauel et al. \(2019\)](#) applies Johansen co-integration, Granger causality tests and vector error correction model to investigate the missing link between money supply and inflation in Nigeria. The results show that non-monetary factors of political instability, corruption, poor basic infrastructure among others rather than money supply influence inflation in the country. [Inam \(2014\)](#) examines the relationship between money supply and inflation in Nigeria, using a multivariate co-integration regression technique. The results confirm the existence of a long run relationship between money supply and inflation in Nigeria. However, there is no causality is found between money supply and inflation. [Emerenini and Eke \(2014\)](#) applies the ordinary least square (OLS) method, Johansen cointegration test and Granger Causality test to investigate the impact of monetary policy rate on inflation in Nigeria. The findings indicate that expected inflation, exchange rate and money supply influence inflation, while annual treasury bill rate and monetary policy rate do not. [Akinbobola \(2012\)](#) examines the dynamics of money supply, exchange rate and inflation in Nigeria, using vector error correction approach. The findings reveal that money supply and exchange rate have significant negative effects on inflationary pressure in the long run, while real output growth and foreign price changes have positive effects on inflationary pressure.

3. Methodology

3.1. Model Specification

Relying on the monetarist theory, the researcher used two variables. Food inflation rate is used as the explained variable, while growth of money supply (calculated as $100 \times$ first difference of log broad money supply) is the explanatory variable. The research model is therefore implicitly specified as follow:

$$\text{FINF}_t = f(\text{GM2}_t) \quad (1)$$

Where:

FINF = Food inflation rate.

GM2 = Growth of broad money supply.

t = time

The econometric model version of Equation 1 is specified as follows:

$$FINF_t = \beta_1 + \beta_2 FINF_{t-1} + \beta_3 FINF_{t-2} + \beta_4 GM2_t + \beta_5 GM2_{t-1} + u \quad (2)$$

Where:

FINF, GM2 and t are as previously defined;

u is the error term;

β 's are the parameters to be estimated;

β_4 = contemporaneous effect of growth of money supply on inflation.

β_5 = lagged effect of growth of money supply on inflation.

β_4 & $\beta_5 > 0$.

The first and second lags of the regressands are included in order to correct serial correlation in the model. This type of model is known as autoregressive distributed lag (ARDL) model

3.2. Estimation Techniques

The research analysis follows three stages. Stage one deals with the preliminary analysis of the variables of the study. These include (1) descriptive statistical properties of the variables in order to unravel the silent features of these variables and (2) unit root test using Augmented Dickey Fuller test to test for the stationarity of the variables. In stage two, the study coefficients of the model in Equation 2 using ordinary least square (OLS) estimation technique. In stage three, the researcher carries out post estimation (diagnostic) tests of the estimated model in order to ensure the models are reliable. The tests used in post estimation stage are out are ARCH test for heteroscedasticity, Breusch-Godfrey Serial Correlation LM test for serial correlation, Ramsey RESET test for linearity and CUSUM test for parameter stability.

3.3. Data Source and Study Scope

The study used monthly data between January, 1996 and December, 2021 to examined the impact of growth of money supply on food inflation in Nigeria. Data on the two variables used (inflation and money supply) are retrieved from the Central Bank of Nigeria Statistical Bulletin (2020).

Table 1. Descriptive summaries.

Variables	Mean	Minimum	Maximum	Std. Dev.	CV	Jarque-Bera	Obs.
GM2	1.579	-28.673	39.538	4.595	2.910	5439.015(0.0000)	312
FINF	12.176	-17.502	39.535	9.0472	0.743	65.180(0.0000)	312

Note: GM2 and FINF are growth rate of broad money supply and food inflation rate respectively.

4. Empirical Analysis

4.1. Preliminary Analysis

Table 1 shows the descriptive statistical properties of the variables of interest. On average, monthly growth rate of money supply (GM2) and monthly food inflation rate stood at 1.58 percent and 12.18 percent respectively. The minimum and maximum values show that growth rate of money supply fluctuated between -28.67 percent and 39.54 percent, while food inflation rate fluctuated between -17.50 percent and 39.53 percent. The coefficient of variation which allows for relative comparison of variable variability (or volatility) reveals growth of money supply is more volatile than food inflation rate during the period under study. The Jacque Berra test values reveal that none of the variables is normally distributed.

Table 2. Unit root test- augmented dickey fuller test.

Variables	Intercept only	Intercept & Trend	None
GM2	-21.828(0.000)	-21.970(0.000)	-19.172(0.000)
FINF	-3.659(0.005)	-4.213(0.005)	-1.637(0.096)

Table 2 depicts the augmented Dickey-Fuller test values with their respective associated probability values in parenthesis. The results show that both growth rate of money supply and food inflation are stationary at level.

Table 3. ARDL results.

Estimated Short Run Model Results			
Variables	Coefficients	t-statistics	p-value
FINF (-1)	1.079***	19.100	0.000
FINF (-2)	-0.154***	-2.757	0.006
GM2	0.091**	2.313	0.021
GM2(-1)	0.032	0.814	0.416
C	0.657	1.991	0.047
R ² /Adj. R ²	0.881/0.880		
F-statistics	565.511***(0.000)		

Note: *** and ** indicate significant at 1 percent and 5 percent respectively.

4.2. Model Estimation

Table 3 shows the estimated model results. It is revealed that both the first and second lags of food inflation rate have significant impact on current food inflation rate. While the first lag impact is positive, the second lag impact is negative. The results further show that food inflation rate is positively related to growth of money supply

that one percentage increase in money growth in current month is associated with about 0.09 percent increase in food inflation in the current month in the short run. However, food inflation in the current month does not significantly respond to money growth rate in previous month. It can therefore be concluded that that money growth has only contemporaneous but no lagged effect on food inflation rate in Nigeria, at least within the period of under investigation.

The R-squared and adjusted R-squared which capture explanatory power of the model shows that the model explains about 88 percent variation in inflation rate. This result is in line with the findings of Nasir et al. (2021) and Joshi (2021) but contradicts the findings of Amassoma et al. (2018) and Smauel et al. (2019).

4.3. Post Estimation Tests

Table 4 shows the results of heteroscedasticity test and serial correlation test. ARCH effect test and LM test values are not significant. This indicates that errors are homoscedastic and not serially correlated respectively.

Table 4. Heteroscedasticity test and serial correlation test.

Tests	Values	Remark
ARCH Test	0.003(0.957)	Homoscedasticity
Breusch-Godfrey Serial Correlation LM Test	0.557(0.957)	No Serial Correlation

Table 5 shows Ramsey RESET test for linearity of the model and all the three test values are not significant. It is concluded that the model is linear and therefore well-specified.

Table 5. Ramsey RESET test for linearity.

Test	Value	P-Value
t-statistic	0.302	0.763
F-statistic	0.091	0.763
Likelihood ratio	0.092767	0.761

Figure 1 depicts CUSUM test for parameter stability. Since the recursive residuals line falls within the 5 percent critical bounds, it is concluded that the estimated model parameters are stable for the study period.

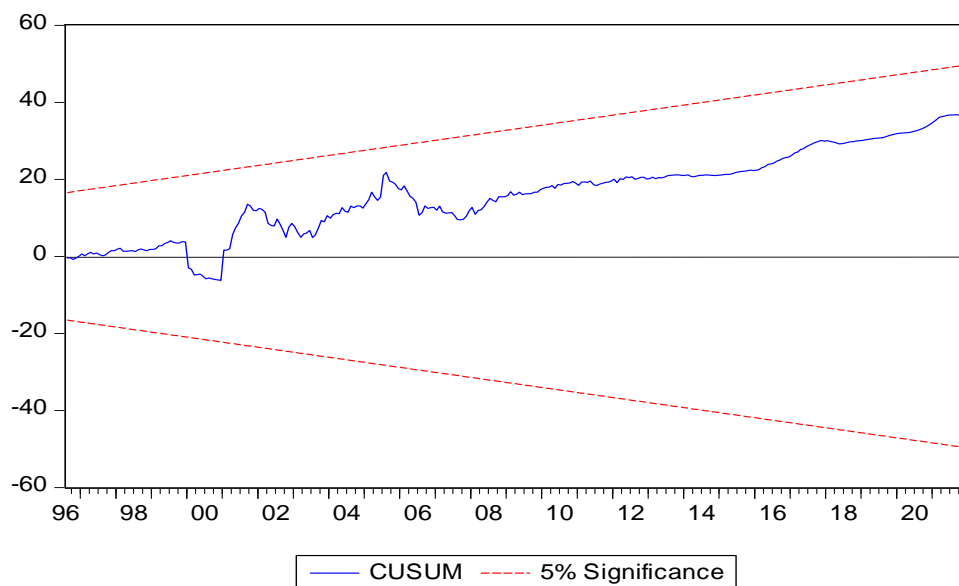


Figure 1. CUSUM Test for parameter stability.

5. Conclusion

In this study, the researcher investigates the impact of money growth and inflation in Nigeria. The findings reveal that growth of money supply has contemporaneous but no lagged impact on food inflation in Nigeria. In other words, the growth of money supply influences food inflation without delay in transmission. It is therefore concluded that controlling the growth in money supply is an effective measure to control food inflation.

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