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IMPACT OF INFLATION TARGETING POLICY AND MONEY SUPPLY CONTROL ON NIGERIA'S ECONOMIC PERFORMANCE

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Abstract
This study examines the impact of inflation targeting policy and money supply control on Nigeria's economic performance over the years 2000-2023. The study relied on various data obtained from CBN statistical bulletin of various issues. Using the ADF test GDP, INFR, INTR and MS were all found to be stationary at first difference. The Vector Error Correction Model (VECM) has been applied to show the relationship among the variables, which reveals a long run relationship. The study concludes that while inflation targeting and money supply control are essential for economic stability, their success depends on stronger policy coordination, fiscal management and addressing structural economic challenges.

Introduction

Among macroeconomists, inflation targeting (IT) is the prevailing school of thought right now. Inflation targeting has shown to be a successful framework for monetary policy in both developing and developed nations, according to Bernanke, Laubach, Mishkin, and Posen (1999), who reference many evaluations. Its widespread acceptance may be attributed to the fact that it safeguards central banks' autonomy, assures accountability, and lays out precise measures for gauging whether they accomplish their inflationary goals (Petursson, 2005; Kiruhara, 2005). As part of inflation targeting, central banks frequently pledge to maintain a certain rate of inflation for a set duration, typically one year (CBN, 2013). Other central banks, both in rich and developing countries, have said that their sole duty is to maintain price stability while keeping inflation to a minimum, after the IT regime's 1990 adoption by New Zealand. In addition to believing that "high" inflation is detrimental to the economy, the majority of people believe that stable prices are essential for long-term economic development and employment.

Theoretically, monetary policy is the most effective tool for limiting inflation and promoting long-term economic growth through free markets. For medium-term stabilisation purposes, monetary policy has shown to be the most flexible weapon among the several the government uses to influence and regulate the economy. Federal policymakers and the CBN have long recognised inflation targeting as the foundation of Nigeria's monetary policy. Meanwhile, the level of commitment from the CBN to the effective implementation of this framework is uncertain.

The money supply and other forms of readily available liquid assets facilitate the effective running of public and private sector economic processes, which impacts economic growth.

The interest rate is the cost that the private sector pays to borrow money from the money supply so that it can conduct business activities. The money supply is a powerful tool of monetary policy that has the potential to greatly impact a nation's economic growth.

2. Literature Review

2.1 Inflation Targeting

A consensus on what inflation targeting is has not yet been reached, but the idea has been broadly defined in a number of publications. Several writers, including Truman(2003), have characterised inflation targeting as offering a framework of "constrained discretion." Kuttner and Posen (2000), Bernanke and Mishkin (1997), Bernanke, Laubach, Mishkin and Posen (1999), King (2002), and others. Here, the inflation objective (which may be a range or a fixed number) acts as a limitation, and the leeway to accommodate different market and non-market variables is what we call discretion.

There is an attempt in the literature to distinguish between stringent inflation targeting (SIT) and fit (FIT). Inflation targeting in the near term takes precedence over more distant concerns about the real effects of monetary policy, as stated by Uchendu (2009), who claims that SIT is a subset of IT. The FIT is now in use by all central banks; it proposes that monetary policy should seek price stability via targeting inflation and business cycle stability at the same time (Uchendu, 2009).

Strictly speaking, it's basically a strategy for maintaining a certain inflation rate once the central bank has committed to it (Pierre, 1999). So long as inflation remains within the predetermined range, the central bank has the freedom (and the expectation) to regulate the economy, as highlighted out by Mordi (2008). Inflation must be kept under control and within acceptable bounds by the central bank if it begins to rise.

2.2 Money Supply

The total quantity of money in circulation within a nation is referred to as its "money supply" in economics (Ahuja, 2010). The popular belief states that the two primary parts of the money supply are the money in circulation and the demand balances held by everyone in the world. I want to make two things very clear about the money supply. To start, at any given instant in time, the total amount of cash that is circulated within an economy is known as the money supply. National income, which shows the value of goods and services produced per unit of time, usually measured in years, is dynamic, in contrast to the money supply, which is static. Another term for the amount of money that is in circulation is the money supply (Ahuja, 2010).

2.3 Economic Performance

The pace of increase in the actual GDP or per capita over a specific time frame is one way to characterise economic performance, as stated by McConnell and Brue (2005). The pace of economic expansion may be expressed in two ways: quarterly or annually. The second version takes the size of the population into account. Real gross domestic product per capita, often called per capita output, may be calculated by dividing the total real gross domestic product by the total population (McConnell and Brue, 2005). Economic growth and the role of money are hotly contested theoretical topics. Some examples of such theories are the Tobin model, the Gurley-Shaw models, the Mckinnon and Shaw models, and the basic Harrod-Damar model, all of which are part of the Neo-Classical growth theory. However, the focus of this piece is on the neoclassical growth theory. Traditional neoclassical growth theory is based on three main points: an increase in the supply and quality of labour (due to increasing

populations and levels of education), an increase in capital (due to savings and investments), and progress in technology (Todaro and Smith, 2009).

2.4 Empirical Literature

Developed and emerging countries alike embraced inflation targeting as their preferred monetary policy framework. Numerous models have been developed to forecast future inflation, with a primary emphasis on industrialised nations. Sekine (2001) attempted a structural model-based forecast for Japan using the traditional general-to-simple method, with the purpose of creating a fundamental inflation component as a balanced corrective model. In order to prove a long-term correlation in Japan's inflation process, the paper built an economic inflation forecast for the next year. It found that the output gap and surplus money were the main factors that caused inflation.

In order to help Norway shift its focus from the exchange rate to inflation, Barden, Jansen, and Mymoen (2003) created an econometric model. Lopez (2003) investigated the economy of Colombia to determine the best policy framework for addressing inflation. The limits between inflation and production variability, as well as the need of well defined guidelines for policy in inflation targeting, were examined in this study using Taylor's rule (1979). Maximising output gap, inflation, and instrumentation variance may be achieved by determining the best response function. Based on random simulations of the macroeconomic model of the Colombian economy, the results showed that Taylor's rule output variability was reduced in the inflation projection based rules, despite significant inflation and instrument variability (CBN, 2010).

To examine the impact of inflation targeting in thirteen developing nations, Ye and Lin (2008) employed several propensity score matching methodologies. Inflation targeting substantially decreased inflation and inflation fluctuation in these thirteen nations, according to their results. Bassey and Essien (2014) examined the main issues, difficulties, and possible results of using inflation targeting as a basis for Nigerian monetary policy. Research using a descriptive analytic technique concluded that inflation targeting isn't a silver bullet and might not significantly mitigate the real costs of disinflation in Nigeria, which include a decline in output and an increase in unemployment. If monetary authorities are politically committed and have the necessary executive capacity, as well as access to high-quality data in a timely manner, the study found that inflation targeting would have a far better chance of succeeding if put into practice.

Riti and Kamah (2015) examined the achievement of sustainable growth in Nigeria via inflation objective from 1970 to 2013 using the vector autoregressive (VAR) approach. The empirical findings of the VAR model indicate that the currency rate is the primary cause of inflationary pressure in Nigeria. This discovery emphasises how dependent on imports Nigeria's economy is. Odior (2015) looked into inflation targeting in developing countries with Nigeria as an example. Results show that changes in the money supply and prior inflation levels could considerably affect inflation in Nigeria, according to data obtained using the vector autoregressive (VAR) approach from 1970 to 2010. The study concluded that these variables necessitate further government intervention if Nigeria is to keep its inflation rate stable.

Audu and Amaegbesi (2013) examined the impact of changes in exchange rates on inflation targeting in Nigeria's economy using annual time series data spanning the 43 years from 1970 to 2012. Interest and exchange rates were among the many research factors that appeared to have a statistically significant relationship. The study found that in order to lower inflation through inflation targeting, more precise financial data collecting is required. In their 2016 study, Akuns, Obioma, Udoh, Uzonnwane, Adeleke, and Mohammed examined the continued

use of inflation targeting in a growth-focused imperative monetary policy using a VAR model based on the new Keynesian theory and data from Nigeria spanning 1990 to 2014. Two alternative policy frameworks were modelled to see how they might influence key macroeconomic indicators. According to these results, the Nigerian economy would be better off without full-fledged inflation targeting as it would not address issues like job creation, economic development, and currency rate instability.

3.0 Methodology

The descriptive approach makes use of descriptive statistics and patterns. Using this method, we can examine how the Nigerian government's efforts to control inflation and the money supply have affected the economy. This technique was chosen because it is less likely to be impacted by measurement errors and because it does not involve variables that are commonly seen in econometric analyses. This study relies on secondary data culled from many editions of the statistics bulletin published by the Central Bank of Nigeria. Our research also made use of a small number of previously published articles on inflation targeting.

3.1 Model Specification

In examining the effectiveness of monetary-fiscal coordination in tackling inflation in Nigeria, the model is specified thus:

RGDP=f (INFR, INTR, M2) …….(3.1)

Where:

GDP = Growth Rate of Gross Domestic Product
INFR = Inflation Rate
INTR = Interest Rate
M2 = Broad Money Supply

3.2 Functional Relationship between Variables

3.2.1 Gross Domestic Product (GDP) and Inflation Rate (INFR)

Mobius (2020) states that the standard definition of inflation is the difference between two dates used to quantify the change in prices of goods and services throughout the studied period. If the second number is smaller than the first, then customers whose purchasing power remains constant will have less money to spend in the future. Most nations employ a consumer price index (CPI) in some way since it is difficult and useless to measure the prices of all goods and services individually owing to differences in growth rates. Inflation rates for the most sought-after and pertinent goods and services are roughly reflected in it. By providing all decision-makers with a predictable image of the future, low and stable values in this dimension help the labour markets respond quickly to economic downturns and stabilise the economy (Barbosa, 2018).

In contrast, when inflation is strong or fluctuating quickly, consumers have less of an incentive to save money and businesses are compelled to charge higher prices for goods and services because they believe they will need to buy new, more expensive raw materials. As this momentum grows throughout distributed value networks, it might lead to a self-fulfilling prophecy effect. When people sense no immediate benefit in retaining money because of its depreciation, they are more likely to spend it, according to some experts (Kamaiah et al., 2018). Local businesses and manufacturing could benefit from this economic boost.

According to Sabillon (2019), the standard way to describe economic growth is as the disparity between two estimates of the real GDP. It is often adjusted for inflation and provides a handy indication of the nation's well-being. A country's gross domestic product (GDP) is the sum of all final goods and services produced inside the country and multiplied by the average selling price per unit. A common way to measure economic growth is by looking at how labour productivity and other variables are changing, which in turn causes per capita income to rise. Measurement of all expenditure, all income, or all value produced by producers are some of the alternative methods to GDP computation (Thomas, 2021). Now, according to a number of experts, there are ideal rates of economic growth that guarantee low inflation and unemployment, and these rates should not be surpassed (Mishra et al., 2021).

3.2.2 Gross Domestic Product (GDP) and Interest Rate (INTR)

Economists have always been curious in the correlation between ROR and GDP growth. We touch on two theories that offer relationship-related predictions briefly here.

McKinnon-Shaw: When a government sets a limit on how much money people can deposit, it's considered financial repression (McKinnon 1977; Shaw 1973). They draw the conclusion that real interest rates will rise if monetary limitations are relaxed and market forces are allowed to decide them. More people save money when real interest rates are higher, which helps the economy expand. So, according to their model, growth rates and real interest rates should go hand in hand.

With endogenous fertility choice in mind, Barro and Becker (1989) examine a model. It is well-known that, at steady state, real interest rates in the conventional growth model are provided by the inverse of the discount factor. According to Barro and Becker, the discount factor function is dependent on the economic birth rate. Consequently, real interest rates and fertility rates are related in the long stretch. In the long term, real rates of return fall in tandem with falling fertility rates. Economic growth is predicted to be inversely related to real interest rates according to this hypothesis.

The discount factor (a statement of preferences or the utility function) and real interest rates are typically represented in macroeconomic models as having a one-to-one relationship. It goes without saying that long-term rates do not fluctuate unless preferences alter. Barro and Becker included the concept of children into the preference side of the model, where the number of children influences the discounting rate. This proves without a reasonable doubt that real interest rates have a negative correlation with economic growth and a one-to-one correlation with fertility rates.

3.2.3 Gross Domestic Product (GDP) and Money Supply (M2)

Since achieving economic growth is a primary goal for governments around the globe, whether they are developed or developing, the correlation between money supply and output has recently surpassed all other topics in monetary economics in terms of academic interest. Keynesians and monetarists disagree on the direction of the link between the money supply and GDP.

Because of Friedman's assumption that money is the most stable function, monetarists have long maintained that changes to the money supply induce unforeseen shifts in nominal income.

Positive changes in income lead to raising the demand for money for transactions and the amount of money in circulation. According to Keynesians, this is because the money supply has a limited role due to the liquidity trap and the low investment elasticity of interest. Therefore, the direction of causality is from income to money rather than the other way around.

4.0 Data Presentation and Discussion of Results

4.1 Data Presentation

The data for the study is presented in Table 1 in Appendix;

4.2 Data Analysis

4.2.1 Stationarity Test

The Augmented Dickey-Fuller unit root test is run on the variables up to their 2nd difference. The result is presented in the table below:

Table 2: Unit Roots Test (ADF – Test)

Variable	T-ADF	Lag Length	Order of	1%	5%
Integration	Crit. Val	Crit. Val			
GDP	-8.2073**	1	1(1)	-3.7696	-3.0049
INFR	-3.9893**	1	I (1)	-3.7696	-3.0049
INTR	-4.5092 **	1	I (1)	-3.7696	-3.0049
MS	-5.4314 **	1	I(1)	-3.7696	-3.0049

Source: E views 10 Output

The variables GDP, INFR, INTR, and MS all have t-ADF values larger than -3.7696, -3.0049, and -5.0049, respectively, in the table above. This indicates that they are constant at first differencing and integrated at order 1.

4.2.2 Descriptive Statistics

The results of the descriptive statistics are presented in Table 3 below;

Table 3: Descriptive Statistics

	RGDP	INFR	INTR	M2
Mean	10.98239	3.820361	10.70192	9.378172
Maximum	12.81527	2.586016	19.51291	10.97632
Minimum	9.347353	-1.791759	9.67147473	5.757333
Std. Deviation	1.536448	0.434471	3.007424	1.557684
Skewness	-1.132917	-0.363997	0.047457	0.315277
Kurtosis	3.186364	2.053317	1.825739	2.544480
Jarque-Bera	9.546023	2.614670	2.544480	0.869537
Probability	0.008756	0.270540	0.280203	0.647415

Source: E-Views 10 Output

The table above shows that there is a wide money supply (M2) of 9.4%, an interest rate (INTR) of 10.7%, and an inflation rate (INFR) of 3.82%. One alternative, which is based on the RGDP growth rate, has a mean value of around 11%. On top of that, the standard deviation reveals how far these variables are from their respective means. Interest Rate (INTR) may fluctuate as much as 3% around its mean. Inflation rate (INFR) and broad money supply (M2) are left-skewed, whereas interest rates (INTR) and both are skewed to the right. If an indicator or variable has a kurtosis value, it means that it follows a normal distribution. Using the Jarque-Bera statistic at the 0.05 critical level, we discovered that two of the variables were substantially different from the other two. The fastest-growing Jarque-Bera value, at 9.54, belongs to the GDP growth rate.

4.2.3 Cointegration Analysis

So, we use Johansen's integration test to see whether there are any long-run correlations between the variables. A lag length of 2 is used for both the trace test and the maximum eigenvalue test. You can see the outcomes of both assessments in Table 4;

Table 4: Johansen Cointegration Test

Unrestricted Co-Integration Rank Test (trace)

Hypothesized No. Of CE(s)	Eigenvalue	Trace Statistics	Probability
None *	0.96122	111.6924	0.0000
At most 1 *	0.743139	43.44363	0.0442
At most 2	0.408599	14.90004	0.5829
At most 3	0.168284	3.869559	0.7609

Unrestricted Co-Integration Rank Test (Max Eigen Value)

Hypothesized No. Of CE(s)	Eigenvalue	Trace Statistics	Probability
None *	0.96122	68.24882	0.0000
At most 1 *	0.743139	28.54360	0.0214
At most 2	0.408599	11.63048	0.5102
At most 3	0.168284	3.869559	0.7609

Note: * Denotes rejection of the hypothesis at 0.05 level, order of variables; GDP, INFR, INTR and M2.

Source: E-Views 10 Output

The number of cointegrating equations for the trace is 2 and for the highest eigenvalue it is 2, as shown in Table 4 above, which shows the estimate findings. Cointegration of the variables is implied by this. Gross domestic product (GDP), inflation rate (INFR), interest rate (INTR), and money supply (M2) all have long-term correlations. Therefore, the VECM will be our go-to.

4.2.4 Vector Error Correction Model (VECM) Analysis

It is necessary to utilise VECM to assess the short-run characteristics of the cointegration series as the detection of cointegration implies a long-term equilibrium connection between the series.

The VECM regression equation is as follows:

$\Delta GDPt = \alpha 0 + \sum \beta i \Delta GDPt\text{-}i + \sum \gamma i \Delta Inflationt\text{-}i + \sum \delta i \Delta Interest\_Rate\ t\text{-}i + \sum \varepsilon i \Delta Broad\_Money\_Supplyt\text{-}i + \mu t.$

Where:

Δ represents the first difference operator (e.g., $\Delta GDPt = GDPt - GDPt\text{-}1$)

$\alpha 0$ is the constant term

βi, γi, δi, εi are the coefficients of the lagged variables

μt is the error term.

Table 5: Vector Error Correction Model Results

Items	Coefficient	Std. Error	T-statistic	P-value
C	-0.041840	0.02265	-0.61876	0.0238
R-Sq. =	0.575604			
A-R Sq. =	0.442980			
F. Stat =	4.340130 (0.006)			
DW Stat. = 1.8081				

(Numbers in the parenthesis are probability values).

Source: E-Views 10 Output.

The first row of coefficients in table 5 shows that the variables investigated (GDP, INFR, INTR, and M2) have a long-run connection. INFR, INTR, and M2 all have an impact on GDP, as seen by the number -0.041840. The connection is likely to reach a state of equilibrium in the future, as shown by the negative sign. There is a statistically significant association between the two variables since the associated coefficient's P-value is less than the significance threshold of 0.05. A combined explanation of GDP of 57.56% by INFR, INTR, and M2 was the R squared value of 57.56%. The overall model is fit since the P value of the F stat is less than 0.05, and the regression model is not spurious because the D-W test result is bigger than R-square.

5. Conclusion and Recommendations

With inflation objectives in place, such as fixed exchange rates or monetary policy targeting schemes, monetary authorities are less inclined to pursue short-run output increases to avoid the time-inconsistency problem. A possible way around some of the problems with fixed exchange rate solutions and monetary targeting is to use an inflation-targeting (IT) strategy. To further minimise velocity shocks, inflation targeting removes the focus from the link between monetary aggregate and nominal income, allowing for the consideration of all relevant variables in inflation prediction and the selection of an effective policy response.

The findings and policy implications of the research lead to the following recommendations:

The CBN should include the full implementation of IT into its monetary policy framework.

The government should enhance public and private sector planning to make the aims of Inflation Targeting (IT) policy goals evident.

The Nigerian Central Bank (CBN) should make monetary policy stability a top priority in order to reduce inflation, boost morale, and attract foreign investment.

To improve access to credit, stabilise interest and exchange rates, the International Monetary Fund (IMF) should institute the Inflation Target (IT) framework.

Given that most variables' shocks impact GDP immediately, the CBN should carefully evaluate policy options before implementing them.

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Appendix 1

Year	GDP (%)	INFR (%)	INTR (%)	M2 (%)
2000	5	6.9	-1.1	48.1
2001	5.9	18.9	12.1	26.4
2002	15.3	12.9	3	18.8
2003	7.3	14	9.9	13.5
2004	9.3	15	-2.6	20.7
2005	6.4	17.9	-1.6	20.7
2006	6.1	8.2	-5.6	22.6
2007	6.6	5.4	9.2	36.4
2008	6	11.6	6.7	87.8
2009	8	12.5	18.2	42.2
2010	8	13.7	1.1	14.9
2011	5.3	10.8	5.7	6.7
2012	4.2	12.2	6.2	21.7
2013	6.7	13.7	11.2	14.3
2014	0.3	10.8	11.4	0.8
2015	2.8	8	13.6	4.1
2016	-1.6	9	6.7	31.9
2017	0.8	15.2	5.8	1.4
2018	1.9	12.1	6.1	15
2019	2.2	11.4	4.5	6.4
2020	-1.8	13.2	5.4	11.6
2021	3.6	17	1.2	14.2
2022	3.3	18.8	0.9	17.4
2023	2.9	24.7	1.2	19.3

Source: CBN Statistical Bulletin (2023)