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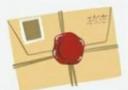- **Name of your Financial Institution**
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INTRODUCTION

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The BULLION is committed to the dissemination of research findings and information about its research interests.

The ancillary purpose of this journal is to encourage discourse among persons working in various sectors and disciplines, as well as in other contexts. Consequently, our editorial policy promotes the submission of non-technical papers from diverse disciplinary perspectives. Our preference is for papers that are not loaded with econometrical tools and terminologies or complex economic models that would require specialized knowledge to decode and understand.

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GUIDELINES

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2. The article **should not be more than twenty-five (25) pages** of **4000 – 7000 words in length**. It should be typed with 1.15 line spacing option, with a margin of 1.25 and 1.13 inches on the left and right sides, respectively. The font type to be used is **"Arial"** with font **size "14" for headings** and **size "12" for the body** of the article.

3. The manuscript must be accompanied with a letter of submission written in English. Submission of a paper is assumed to imply that its contents represent original and unpublished work and is not under consideration elsewhere for publication.

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7. The purpose and scope of the article should be clearly stated in an abstract summarising the article's essential findings. The abstract should be typed on a separate page and should be *italicised* and **not more than 100 words in length**. In addition, the JEL classification code (s) as well as keywords should be clearly indicated on the abstract page.

8. The author's institutional affiliation and necessary background information on the article should appear at the foot of the first page. Footnote to the text should be listed at the end, followed by the list of references

9. The honorarium for authors of accepted papers in the Bullion is ₦80,000 per paper and for reviewers ₦30,000 per paper.

10. References for quotations or statements should be in parentheses in the text, not as notes. e.g. Mordi (2010:20) or Mu'azu (2014).

CBN BULLION: GUIDELINES FOR CONTRIBUTORS

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Adenuga, A. O. and O. Evbuomwan (2011). "Understanding the Bretton Woods Institutions (BWIs) with Particular Reference to the International Monetary Fund (IMF)" *CBN Bullion*. Vol. 35 No. 4, October – December, pp. 10-15.

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   g. Be in clear contrast to the background
   h. Not have "red eye"

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- The article must be based on original research, not to have been published or submitted in part or whole for publication elsewhere. All articles will first undergo an internal vetting process including a plagiarism check to determine its suitability and its degree of originality. Articles that pass the internal vetting will then undergo the peer review process in accordance with generally accepted standards
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We look forward to receiving your submissions.

Global Food Inflation: How Vulnerable is Nigeria?

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Research Department
Central Banking of Nigeria

(All views herein expressed are solely mine
and do not necessarily represent or reflect
those of the Central Bank of Nigeria where I work.)

Abstract

The Covid 19 pandemic and the ongoing Russia-Ukraine war have substantially hiked global food prices, affecting domestic inflation. It impacted advanced economies as much as it impacted emerging markets and developing economies including Nigeria. This is happening despite numerous efforts by the Nigerian authorities to boost domestic food supply to restrain growing food insecurity, reduce the sensitivity of prices in Nigeria to external shocks and thus stabilize domestic inflation. This study determines the level of vulnerability of the Nigerian economy to global food price increases and examine if CBN intervention, with reference to the anchor borrowers' program, helps to moderate the pass-through. The study uses data covering the period 1992M1 to 2022M11 to estimate the impulse response function directly from the baseline projections and found that Nigeria's inflation is highly sensitive to increases in global food prices with a substantial pass-through, though less than one. The study also found that although the Anchor Borrowers Programme (ABP) slightly moderated the initial response, the pass-through is not significantly altered. The study, therefore, suggests the need for both fiscal and monetary authorities to strengthen efforts to boost the production of foods locally by making the agricultural sector more attractive, particularly for youths, as well as develop new strategies for managing government silos.

1.0   Introduction

What started as transitory inflation with the commencement of the Russian-Ukraine war is becoming permanent. It transited from commodities to durable goods, and gradually progressed into services and wages (Foroohar, 2022).The recent trend in inflation undoubtedly shocks the world. Headline, core, energy, and food inflation oscillated beyond their targets in not only emerging markets and developing economies (EMDEs), but also in the world's most advanced economies. For instance, the US inflation rate jumped to 7.9% in February 2022 and continued to rise until it peaked at 9.1% in June 2022. France, Germany, and the UK witnessed a similar trend which saw a jump from 4.2%, to 5.1%, and 6.2% respectively in February 2022. The inflationary spiral in France, Germany, and the UK persisted until it reached multi-decades highsof7.1%, 10.4%, and 11.1% respectively in October 2022.

The situation is more worrisome in EMDEs as the trend is yet to be reversed. The inflation rate has been consistently on the rise in Egypt, Ghana, and Nigeria and stands at 21.3%,54.1%, and 21.47% respectively in November/December 2022.This is happening despite the deployment of all known monetary and fiscal policy measures to tame the tide (Saphir, 2022). Most central banks have long started monetary tightening through interest rate hikes, virtually synchronizing the monetary policy cycle all over the world. Besides rate hikes, some central banks particularly in advanced countries have largely reduced their balance sheet sizes which were expanded during the Covid-19 pandemic, believing that although monetary policy measures can hardly resolve the supply-side

inflation crisis but can at least curb the demand-related inflation component of the tide (Adrian & Natalucci, 2022).Economists seem to be reaching a consensus that this inflationary trend defies the standard economic theory which postulates that inflation becomes uncontrollable only under a regime with a prolonged mix of monetary and fiscal policies conducive to upward price adjustments (Agarwal &Kimball, 2022).

Barret (2022) blamed this recent inflationary trend on energy and food, contending that since the beginning of 2021, the average contribution of food inflation to the headline inflation surpasses the overall average of inflation between 2016 and 2020, implying that food inflation within this short period impacted severely more on the living standard of people globally than the overall inflation did in the last five years prior to the Covid 19 pandemic. The global rise in food prices therefore can have dire consequences for the world populace with a more and severe impact on low-income countries (WBG, 2022). The World Bank global economic prospects report for June 2022 further expressed fear that, if by the end of 2022, the inflationary trajectory is not curtailed, nearly one hundred million people in EMDEs are likely to fall into extreme poverty as higher food prices will devastate discretionary income. This is more so considering that the upward trend in prices is in the agricultural sector and more prominent in South Asia and Sub-Sahara Africa (SSA)including Nigeria which has bad precedence of higher prices of food items (Gold, 2021).

Over the years, Nigeria has introduced various initiatives to boost food supply to enhance food security as well as tame inflation arising from the occasional upsurge in food prices due to its seasonal nature. Analysts are of the view that the initiatives were largely successful as they boosted domestic food output. That notwithstanding, the country is drastically affected. The inflation rate has been on the rise without any signs of a reversal soon and the global food and energy crisis is taking the blame(Mohammed, 2022).This reignited the

interest of researchers in the pass-through of the global food and energy price shocks to domestic prices. While much has been done on global energy price pass-through to Nigeria's inflation (Kpagih, Cilliford & Odungweru, 2022; Kpagih, Chinda, & Akidi, 2022), nothing is done on global food price pass-through, hence the need for this study.

The objective of the study, therefore, is to examine the channels that global food prices impact inflation in Nigeria and determine the magnitude of the pass-through as well as examine if the intervention in the real sector of the economy by the Central Bank of Nigeria (CBN), with emphasis on Anchor Borrowers Program (ABP), has helped in moderating the pass-through. In other words, the study is an attempt to examine how vulnerable is Nigerian economy to global food prices. Has the CBN intervention program (ABP) helped in moderating this vulnerability?

To achieve these objectives, the study is divided into five sections including this introduction. Section two brings to the fore, the relevant theories in support of the phenomenon while section three details the methodology and data-related issues. Section four presents the result and discusses the findings while section five concludes the study and offers a handful of policy insights.

See Figure 1.
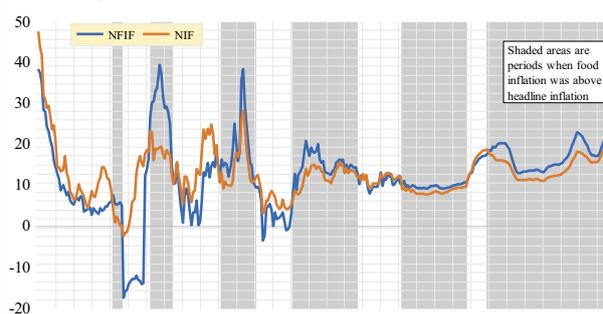
Figure 1: Headline and Food Inflation for Nigeria, 1996M1 to 2022M11
Note: NIF stands for Nigeria's inflation rate while NFIF is Nigeria's food inflation rate

1. Theoretical Foundation and Empirical Literature
2.1 Theoretical Foundation

There are various known theories of inflation including the quantity theory popularly known as the monetarist view or Friedman proposition, the Keynesian theory, the cost-push theory, the structuralist view, the fiscal theory of price level

(FTPL), and the open economy view which is now been refer to asthe globalist view (Tumala et al, 2018, 2019; Yaaba & Shettima, 2022). The focus of this paper is on the globalist view of inflation.

The globalist view arises from the long observation of the internationalization across countries of financial markets, and goods and services as well as the co-movement of prices across countries. The accelerated globalization, especially from the 1990s, has integrated the world economy such that the propagation of shocks across economies is as instantaneous as the domestic slacks, and thus affecting domestic macroeconomic outcomes. This external influence on the domestic economy fundamentally influences price levels as against the former assumption of a temporary shift in inflation (Attinasi, & Balatti, 2021). The proponents of this view, therefore, suggested the consideration of the role of global factors in inflation prediction models, besides the known measures of slack in the domestic economy.

According to the Globalists, there is a link among terms of trade, import prices relative to domestic production, or trade with low-cost economies on inflation measures. Using an accounting identity, they opined that import price can be decomposed as:

$$\frac{\Delta \pi}{\pi_{t-1}} = \sum_j \left[\frac{\pi_{j,t} - \pi_{HC,t}}{\pi_{t-1}} \Delta \alpha_{j,t} \right] + \sum_j \alpha_{t-1} \left[\frac{\Delta \pi_{j,t} - \Delta \pi_{HC,t}}{\pi_{t-1}} \right] + \frac{\Delta \pi_{HC,t}}{\pi_{t-1}} \quad (1)$$

The first term of the right-hand side represents the difference in the price level between each low-cost country *j* and the high-cost countries *multiplied* by movement in the country *j*'s imports share. The second term in the equation demonstrates the effect of movements in import prices from low-cost countries on prices in high-cost countries. The third term represents other influences of price inflation from high-cost countries. Overall, this portrays that inflation reflects three factors, namely: the price of locally produced goods, the difference between the price of locally produced goods and those of imports, and the switching by households between the two.

According to Attinasi, & Balatti (2021), the increasing discussion around "the Globalization of inflation hypothesis" is highly critical considering the need to incorporate it in the monetary policy decision-making process by central banks if it holds. If the impact of globalization is transitory as earlier assumed, central banks only need to look through it, if it affects price movement and wage-setting behavior of firms, it should be considered in the inflation persistent component and thus have implications for monetary policy.

2.3 Past Empirical Literature

Earlier studies found that fluctuations in the prices of food in the global food market played a significant role in the domestic prices of both advanced and developing economies. For instance, Lee, & Park (2013) found that there is a significant pass-through of global price inflation to domestic inflation, but it is larger for emerging markets and developing economies (EMDEs). Among the EMDEs, the pass-through was found to be higher for Asian countries. The authors further argued that the pass-through and the transmission in some African countries are incomplete and moderate due to high domestic production. This study corroborated those of Sharma,(2003); Conforti,(2004); Headey, & Fan, (2008); Ianchovichina, Loening, & Wood,(2012); and IMF, (2011). Headey & Fan (2008) are of the view that government intervention in developing countries could account largely for the less-than-full transmission of the global food price hike. Davide et al (2015) submitted that global food prices significantly affect domestic inflation of advanced economies from the 1960s until the 1990s after which the impact began to decline until it became less persistent. He, therefore, submitted that the global food price shock of the 2000s affected the EMDEs more than the advanced economies. The study attributed the variations in the impact to variations in the share of food in the domestic CPI baskets. The EMDEs have a larger share of food in the domestic CPI basket than the advanced countries, hence the larger impact of the food price shock.

In avector autoregressive (VAR) framework,

Selliah, Applanaidu& Hassan (2015) use Sri Lankan monthly data from 2003M1 to 2013M12 and found a strong cointegration between global food prices and inflation in Sri Lanka. Using the structural vector autoregressive (SVAR) technique Kapusuzoglu, Liang, & Ceylan (2018) found that global food prices did not only affect inflation but also the value of the domestic currency (The Turkish Lira, TRY) during the period.Distefano, Laio, Ridolfi, & Schiavo (2018) found that income-importing countries are among the shock propagators and that although developing countries are vulnerable, they have over time gradually learned how to absorb those shocks and global food prices are now only weakly correlated with domestic inflations. Utilizing monthly data from2007M1 to July 2019M12 ofsix EMEs of Brazil, China, India, Sri Lanka, Thailand, and Turkey,the study by Sahoo,Kumar, & Gupta (2020) found the short-term responsiveness (elasticities) of domestic inflation to global food price shock to be between 0.02 and 0.16 for the study countries with large divergence in the long run.

El-Karimi, & El-Ghini (2020a) adopted the Breitung & Candelon (2006) technique on data spanning 1998 to 2018 and found that there is a significant transmission from energy and food prices to domestic inflation although the relationship is asymmetrical. El-Karimi,&El-Ghini (2020b) again determine the pass-through of global food prices to Moroccan domestic inflation using SVAR from the period 2004 to 2018 and found that the positive impact is significant arising from the large share of the imported food in the food component of the domestic inflation basket. The transmission however varies across commodities with cereals and oils transmitting the highest impact. The study further confirms that the impact is asymmetrical as positive and negative changes to global food price shocks exert a varying degree of impact on domestic prices. Lemaire & Vertier (2022) found that the global commodity price surge since 2020 has led to rise in inflation in Africa. Using a novel estimation approach, the study recorded a pass-through of 30.0% of inflation in Africa with the impact being more severe in lower-income countries

with a larger share of food in the consumption basket. In the same vein, Oku et al, (2022) used the data on five of the most consumed foods in fifteen SSA countries and found that the sampled countries are highly vulnerable to the vagaries of global food prices with a pass-through of nearly one. Although the pass-through differs across countries such that those countries with vibrant local production or lower share of food in the consumption basket receive less impact. Other factors that contributed to the variations in impact include the strength of monetary and fiscal policies and transportation infrastructure.

1.   Methodology and Data
3.1   Implementation Techniques
The Channels of Transmission

To examine the channels that global food prices impact inflation in Nigeria, the study adopted the following framework in line with Davide et al., (2015).

$$\pi_t = \pi_t^N W_t^{\alpha} \qquad (2)$$

Where π_t stands for headline consumer price index, N is non-food, α represents the composition of food in the *CPI* basket, t is time dimension and, $W_t^{\alpha} = \pi_t^F / \pi_t^N$ implying the ratio of food CPI to non-food CPI. If equation (2) is first differenced, in logarithmic format, headline inflation can be represented as:

$$\pi_t = \pi_t^N + \alpha \Delta log w_t \qquad (3)$$

It can be deduced from equation (3) that headline inflation tends to deviate from core inflation when there is a shock to food prices. With this representation, three different channels are identifiable, namely: one, the weight of food; two, the gauge of shocks of food price; and three, the nexus with New Keynesian views on the probable impact of monetary policy on prices in a small open economy with downward sticky prices.

Following Davide et al., (2015), the study estimates the impulse response function directly from the baseline projections to examine the impact of global food prices on Nigeria's inflation (Stock & Watson (2007), Auerbach & Gorodnichenko, (2013)).

Thus the estimated equation becomes;

$$\pi_{t+k} = \alpha_t^k + \sum_{j=1}^{l} \gamma_j^k \pi_{t-j} + \beta_k \delta_t \pi^{int} + \varepsilon_t^k \qquad (4)$$

Where π is the Nigerian CPI depicts inflation persistence in Nigeria, β_k stands for the impact of global food prices on Nigerian inflation at each period k, δ_t is the share of food in Nigeria's CPI, and represents the global food price index (GFPI). The optimal lag length (l) is determined through lag order selection criteria using a combination of information criteria such as the Akaike, Schwartz, and Hannan-Quinn criteria. The horizon (k) is equal to 1,2,3,...,10.

To retrieve the impulse response functions (IRFs), the study plotted the estimated β_k confidence bands for the resultant IRFs computed using the standard deviations of the estimated coefficients.EViews 12 is used to plot the graphs.

Augmenting Channels with Money Supply

Like Davide et al., (2015), this study also examines the implication of aggregate demand in Nigeria on the overall inflation to give insight into the potential efficacy of monetary policy in curbing inflation. This is done by augmenting equation (4) by adding the broad money supply growth rate (M^g) as another independent variable. Thus, equation (4) is reformulated as:

$$\pi_{t+k} = \alpha_t^k + \sum_{j=1}^{l} \gamma_j^k \pi_{t-j} + \beta_k \delta_t \pi^{int} + \varpi_t M_{t-1}^g + \varepsilon_t^k \qquad (5)$$

M_t^g is the growth rate of the broad money supply, and all other variables are as defined under equation (4).

CBN Intervention- The Anchor Borrowers Program

To determine if the interventions of the CBN in the real sector of the economy help in moderating the passthrough of global food price inflation to domestic inflation, the dataset is disentangled into two periods, namely: the period before the commencement of the Anchor Borrowers Program (ABP) (1992M1 to 2014M12) and the period thereafter (i.e., 2015M1 to 2022M11).Equations (4) and (5) are then re-estimated across those two periods.

The Pass-through to Domestic Food Inflation

To quantify the magnitude of the pass-through to domestic inflation of global food inflation, the study in line with Davide et al., (2015) estimates another model of the form:

$$\pi_t^{dom} = \alpha + \sum_{j=1}^{12} \beta_j \pi_{t-j}^{dom} + \sum_{k=0}^{12} \gamma_k \pi_{t-k}^{int} + \varepsilon_t^k \qquad (6)$$

Where stands for food inflation in Nigeria, ais a constant term, β_j denotes the coefficient of domestic food inflation, γ_k is the coefficient of the global food price inflation, represent global food inflation and is the error term. The pass-through is derived as:

$$Pass - through = \frac{\sum_{j=1}^{12}(\gamma_k)}{1 - \sum_{j=1}^{12}(\beta_j)} \qquad (7)$$

3.2   Data Issues

The data used for the estimation are obtained from various sources as detailed in Table 1.The data covers the period 1992M1 to 2022M11.

Table 1: Data Sources and Description

S/No	Data	Description	Source
1	Headline Consumer Price Index	Nigeria	CBN Statistical Database
2	Food Consumer Price Index	Nigeria	CBN Statistical Database
3	Headline Inflation	Nigeria	CBN Statistical Database
4	Food Inflation	Nigeria	CBN Statistical Database
5	Broad money supply	Nigeria	CBN Statistical Database
6	Global Energy Price Index	Global	Federal Reserve Bank of St. Louis
7	Global Food Price Index	Global	Federal Reserve Bank of St. Louis
8	Global Food Price Index	Global	Food and Agriculture Organization (FAO)
9	Meat Price Index	Global	Food and Agriculture Organization (FAO)
10	Dairy Price Index	Global	Food and Agriculture Organization (FAO)
11	Cereals Price Index	Global	Food and Agriculture Organization (FAO)
12	Oils Price Index	Global	Food and Agriculture Organization (FAO)
13	Sugar Price Index	Global	Food and Agriculture Organization (FAO)

4. Analysis of Results and Discussion of Findings

4.1 Descriptive statistics, Unit Root Tests, and Correlation

To get a glimpse of the basic properties of the data, the descriptive statistic of the variables is carried out and the results presented in Table 2. Scrutiny of the table shows that there are three hundred and seventy-one (371) observations per variable. Interestingly, the mean observations for both global food price indexes, namely *GFPI_FAO* and *GFPI_Louis* are very close at 87.10 and 88.40, respectively. While *GFPI_FAO* recorded minimum and maximum observations of 50 and 159.71, the minimum and maximum observations for *GFPI_Louis* are 55.14 and 161.73 respectively. All variables are positively skewed except Nigeria's food inflation (*NFIF*) which recorded -0.29 skewness.

Table 2: Summary Statistics

Variable	Mean	Max.	Min.	SD	Skewness	Kurtosis	JB	Prob.	Obs.
GFPI_FAO	87.10	159.71	50.47	26.27	0.51	2.24	24.97	0.00	371
GFPI_LOUIS	88.40	161.73	55.14	25.66	0.41	2.12	22.43	0.00	371
GEPI_LOUIS	124.27	376.41	30.84	73.67	0.76	2.86	35.69	0.00	371
CrPI	88.83	173.52	48.62	31.64	0.65	2.38	32.21	0.00	371
DPI	86.85	156.49	40.08	32.33	0.44	1.99	27.75	0.00	371
MPI	84.37	125.92	51.10	17.61	0.14	2.05	15.31	0.00	371
SPI	82.12	183.24	31.81	31.72	0.79	3.28	39.41	0.00	371
M^g	23.36	89.34	-8.86	17.00	1.26	4.91	155.01	0.00	371
NCPI	120.59	490.90	3.39	115.93	1.28	3.86	113.26	0.00	371
NFCPI	142.06	571.32	20.56	131.66	1.43	4.26	136.47	0.00	371
NFIF	12.46	39.53	-17.50	9.03	-0.29	5.11	64.47	0.00	371
NIF	18.68	89.57	-2.49	17.08	2.16	7.19	560.39	0.00	371

Note: *GFPI = global food price index, GEPI = global energy price index, CrPI = cereals price index, DPI = diary price index, MPI = meat price index, Mg = growth rate of money supply, NCPI = Nigeria consumer price index, NFCPI = Nigeria food consumer price index, NFIF = Nigeria food inflation rate, NIF=Nigeria inflation rate, OPI = Oils price index, SPI =Sugar price index. FAO and LOIUS indicate that the data is sourced from Food and Agriculture Organization (FAO) and Federal Reserve Banks Saint Louis, respectively.*

The study adopted a variety of unit root test techniques to confirm the level of stationarity of the variables. These include Levin, Lin & Chu (2002), Lm, Pesaran & Shin (2003), Augmented Dickey-Fuller (ADF) and Phillips Perron (PP). The tests utilized all the available scenario in the test equation, which are: individual intercept and trend, and none. The lag length follows Akaike Information Criterion (AIC) with bartlett Kernel estimation and Newey-West bandwidth selection approach. The results are presented in Table 3. The results show that all the variables are collectively (1) across all the techniques and scenario.

Table 3: Unit Root Test

Series: CrPI, DPI, GEPI_LOUIS, GFPI_FAO, MPI, Mg, NCPI, NFCPI, OPI, SPI						
	Indiv. Intercept		Indiv. Int. & Trend		None	
	Level	1st Diff.	Level	1st Diff.	Level	1st Diff.
Null: Unit root (assumes common unit root process)						
Levin, Lin & Chu t*	14.2592	-24.7312***	15.6134	-34.333***	7.7826	-24.329***
Breitung t-stat			0.9153	3.9693		
Null: Unit root (assumes individual unit root process)						
Im, Pesaran and Shin W-stat	3.87585	-31.6609***	2.62105	-31.302***		
ADF – Fisher Chi-square	20.5716	871.31100***	28.8128	838.462***	10.7451	944.098***
PP – Fisher Chi-square	1066.9200	36.4077**	1189.55	43.685**	14.932	1162.78***

Note: **Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality. The subscripts *** and ** implies significance at 1.0 and 5.0%, respectively. The series tested for unit root are: CrPI, DPI, GEPI_LOUIS, GFPI_FAO, MPI, Mg, NCPI, NFCPI, OPI, SPI. The results are obtained from EViews version 11.*

Figures 1 to 6 present the correlation between different variables. This is done to ascertain the degree of the association between the variables so as to gain an insight into the characteristics of the variables prior to estimation. The study adopts two approaches to the correlation analysis. While the first approach considers Confidence Ellipse, the second approach utilized the regression line technique. Figures 2a to 4b which display the result of the correlation show that there is high degree of positive correlation between the variables.

Fig 2a: Correlation between Global Food Price Index & Nigeria Consumer Price Index (using Confidence Ellipse).

Fig.2b: Correlation between Global Food Price Index& Nigeria Consumer Price Index (using Regression line)

Figure 3a: Correlation between Meat Price Index & Nigeria Consumer Price Index (using Confidence Ellipse).

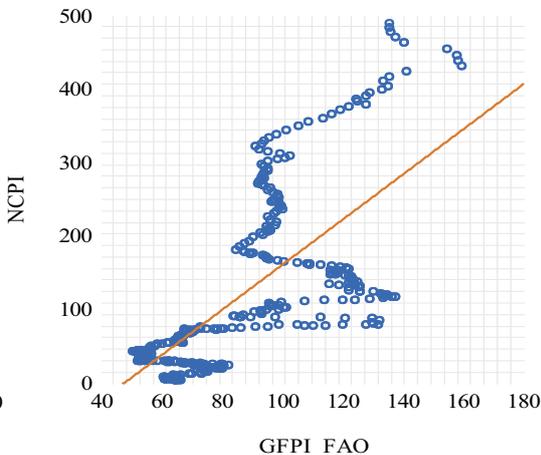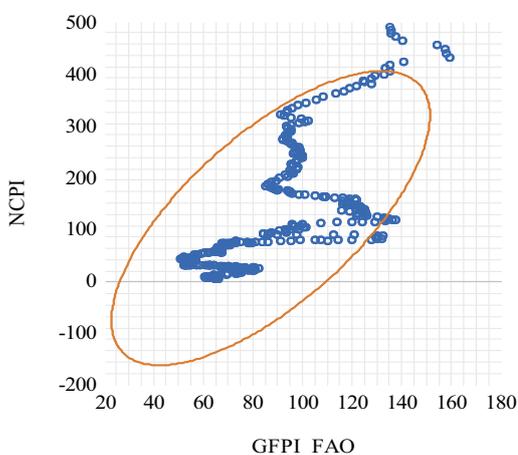Figure 3b: Correlation between Global Food Price & Nigeria Consumer Price Index (using Regression line)

Fig. 4a: Correlation between Cereals Price Index & Nigeria Consumer Price Index (using Confidence Ellipse).

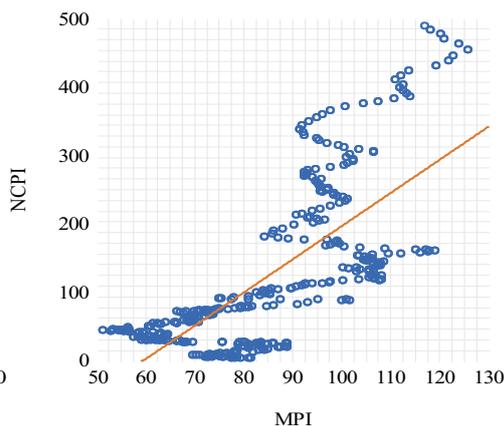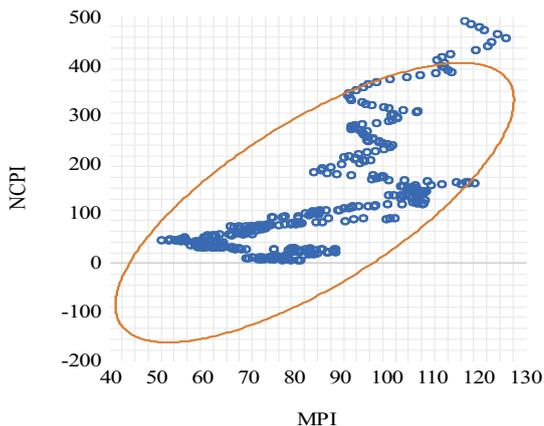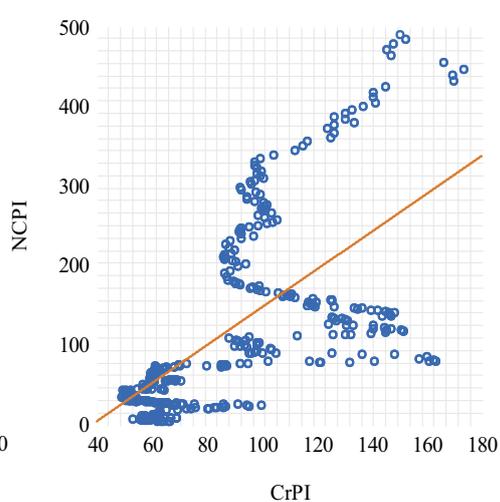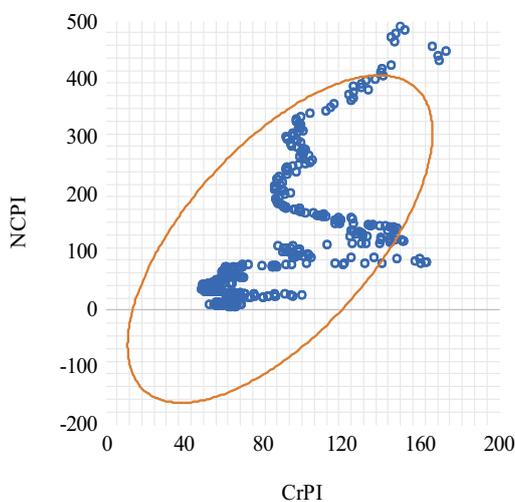Fig. 4b: Correlation between Cereals Price Index & Nigeria Consumer Price Index (using Regression line)

1.1 Baseline Estimation Results – All Period

Table 4 presents the baseline results covering the period 1992M1 to 2022M11. The results reveal a positive and significant impactof global food price inflation on Nigeria's inflation. This is strongly supported by the IRF as contained in Figure 5. Besides,Table 4 reveals evidence of inflation persistence throughout the ten months horizon. Succinctly, Figure 5 indicates that shocks to global food prices exerts positive and enduring influence on domestic prices throughout the horizon. The result suggests that shock to global food price index, given a scenario of 50.7% share of food in the domestic CPI baskettypically contribute about 0.813% to the rise of domestic inflation at the initial period and this contribution increases gradually and unabated. This is because the response of domestic prices never shows sign of dissipation throughout the observation period.

Table 4: Results of the Baseline Estimates

K	δ_t	β	γ_{t-1}		γ_{t-2}		N	R^2
0	0.507		0.451	(0.046)***	0.021	(0.014)	371	0.99
1	0.507	0.813	0.123	(0.048)***	0.065	(0.144)	372	0.99
2	0.507	1.223	1.870	(0.112)***	-0.888	(0.111)***	373	0.99
3	0.507	1.437	1.901	(0.141)***	-0.926	(0.140)***	374	0.99
4	0.507	1.556	1.910	(-0.166)***	-0.941	(0.164)***	375	0.99
5	0.507	1.627	1.832	(0.819)***	-0.871	(0.187)***	376	0.99
6	0.507	1.673	1.793	(0.208)***	-0.838	(0.206)***	377	0.99
7	0.507	1.708	1.811	(0.225)***	-0.863	(0.225)***	378	0.99
8	0.507	1.737	1.892	(0.241)***	-0.950	(0.239)***	379	0.99
9	0.507	1.763	0.094	(0.021)***	-1.154	(0.253)***	380	0.99
10	0.507	1.788	0.099	(0.022)***	-1.455	(0.267)***	381	0.99

Note: *** *implies significance at 1.0%. Figures in parenthesis are clustered robust standard errors. The notation δis the share of food in the domestic CPI basket and remains constant throughout the observation period since the composition of food in Nigeria's basket has not changed, β measures the impact of the global price index on domestic inflation, γ is inflation persistence, and N represents the number of observations which grows by one as the k increases.*
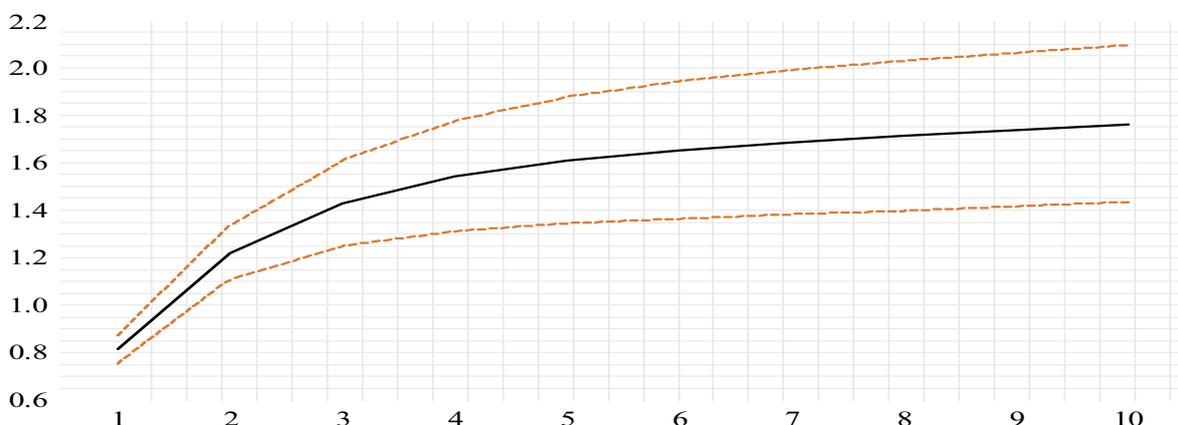
Figure 5. The impact of global food price index on Nigeria Consumer Price Index

Note: The thick black line is the impulse response function (IRF), the red dotted lines are 90.0% confidence bands. The figure depicts the response of Nigeria CPI to 1.0 percentage point change in global food price index. The immediate response (t=0) is not included in the plot.

Since the global food price index consist of various other indices, the study explores which of the indices really exert more pressure on the domestic inflation. This is done by considering each of the sub-indices. The results are reported in Figures 6a to 6d. From the figures, the direction of responses and level of endurance of the responses are similar. The

difference stemmed from the initial responses. While the initial response of domestic inflation to cereal price index (CrPI) is larger at 0.84, those of domestic inflation responses to Diary Price Index (DPI), and Sugar Price Index (SPI) are 0.81 each, then followed by the Meat Price Index (MPI) which stands at 0.80.

Response of NCPI to CrPI
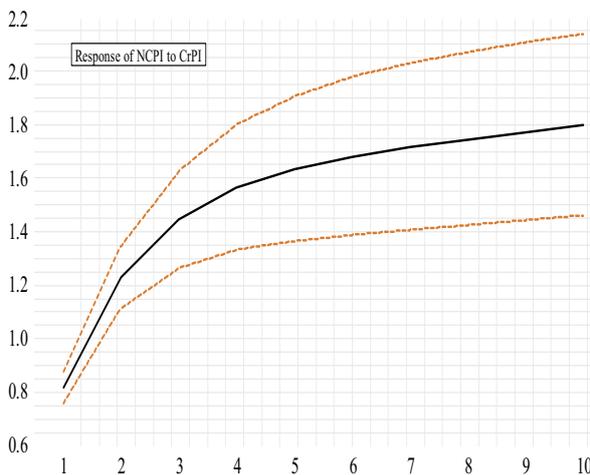
Fig. 6a: NCPI Response to CrPI

Response of NCPI to DPI
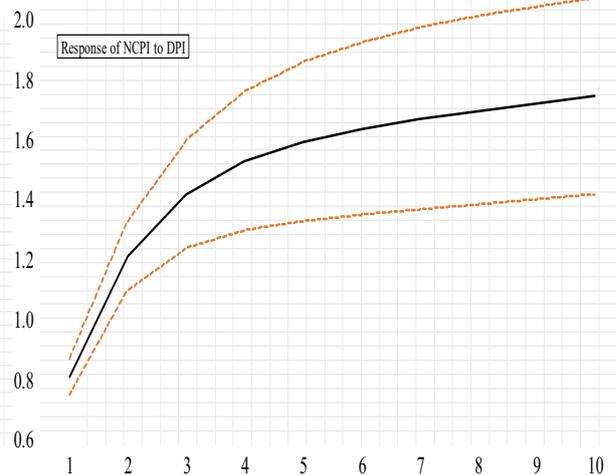
Fig. 6b: NCPI Response to DPI

Response of NCPI to MPI
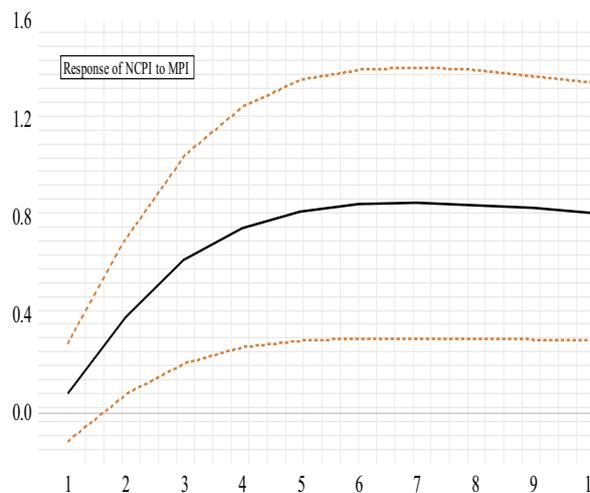
Fig. 6c: NCPI Response to MPI

Response of NCPI to SPI
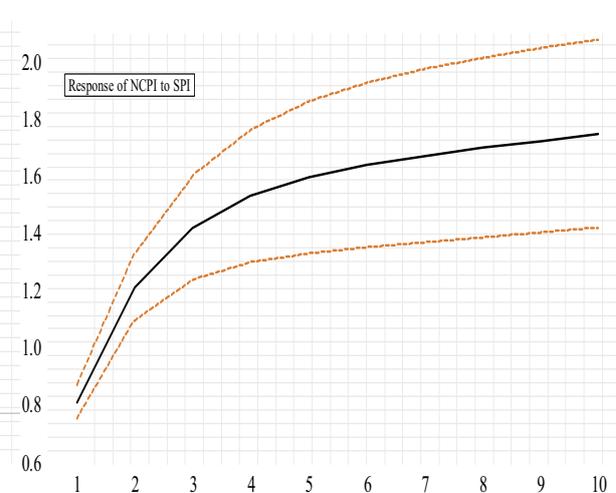
Fig. 6d: NCPI Response to SPI

4.2   Global Food Price Inflation and Money Supply

Figure 7 presents the results of Equation (4) attempting to show if the inclusion of the growth rate of monetary aggregate (Broad money supply – M2 from 1992M1 to 2009M12, and M3 thereafter) can help moderate the impact of global food inflation on domestic price levels. In other words, the result incorporates aggregate demand which is generally agreed to be the primary

determinant of inflation in the domestic economy in line with the monetarist view (Humphrey,(1975); Dwyer & Hafer, (1999)).The implication is that if with the inclusion of monetary aggregates, the response of domestic price is moderated then it can be submitted that since monetary policy can control money supply, it can therefore help moderate the impact. Cursory examination of the figure, however, reveals that the response of NCPI to global food price index remain largely

the same even with the inclusion of monetary aggregates. This goes to show that the intervening role of monetary policy in curtailing

inflation arising from shock to global food prices is very small.

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Response of NCPI to GFPI_FAO

Response of MSG to GFPI_FAO
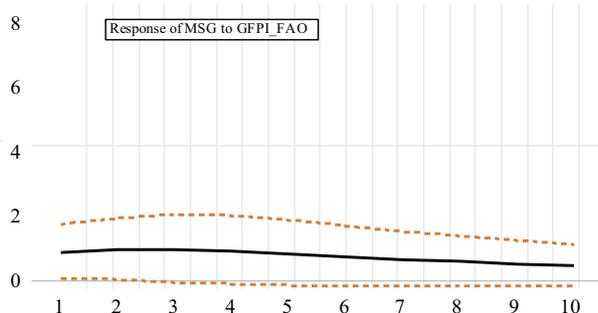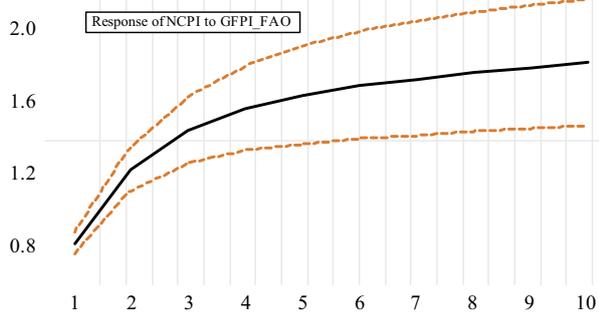
Figure 7. The impact of global food price shock Nigeria Consumer price index with themoderating effect of monetary policy

Note: The thick black linesare the impulse response functions (IRFs), the red dotted lines are 90.0% confidence bands. The figures depict the responses of Nigeria CPI and money supply growth rate (MSg) to 1.0 percentage point increase in global food price index. The immediate response (t=0) is not

4.3 Impact of CBN Intervention – Anchor Borrowers Program

We are of the view that the Anchor Borrowers Program (ABP) have boosted domestic food supply that has the tendency to enhance the country's food security which can in-turn fairly shield the country from external vulnerabilities arising from at least global food price increases.

Therefore, to unmask the possible change in the response of domestic inflation to rise in GFPI

arising from the CBN interventions, the study disentangles the study period into two:"pre-CBN interventions" and "post-CBN Interventions". While the pre-intervention covers the period from the commencement of the study to the period when CBN introduced the ABP (1992M1 to 2014M12), the post-intervention started from the beginning of ABP till end of the study period (2015M1 to 2022M11).

Response of NCPI to GFPI_FAO

Response of NCPI to GFPI_FAO
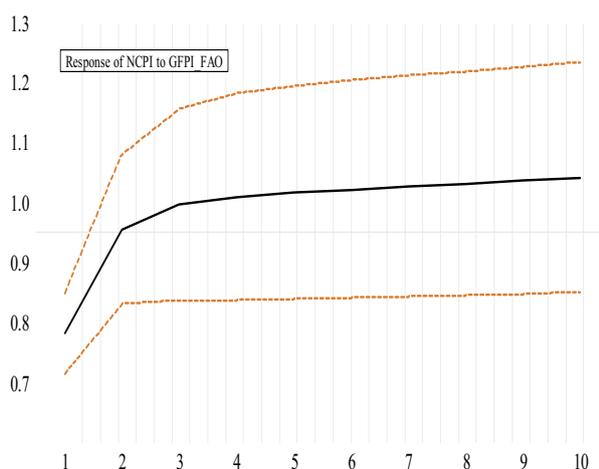
Fig .8 a : GFPI shock vs Nigeria CPI Fig pre -CBN Intervention
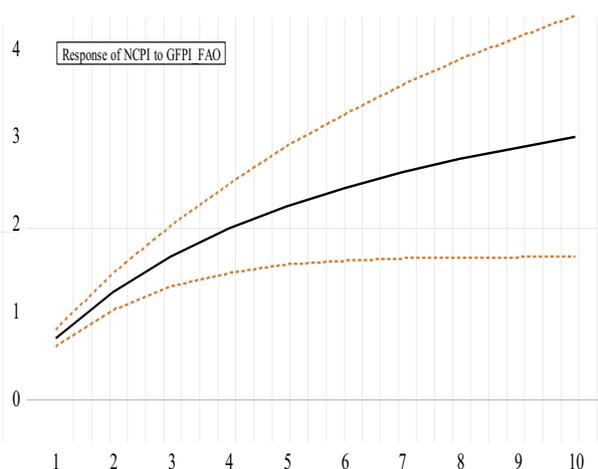
8 b : GFPI shock vs Nigeria CPI post - CBN Intervention

The results presented in Figures 8a and 8b only slightly support the hypothesis that CBN intervention (ABP) might have reduced the impact of global food price index on domestic inflation in Nigeria. From close examination of Figures 8a and 8b,m two distinctive features are imminent: one, the magnitude of the initial response varies, and two, the endurance differs. This goes to say that while the magnitude of the initial response is lower post-intervention (0.70 against 0.74 pre-intervention), the response is long lasting post-intervention.

The Pass-through to Domestic Inflation

The results of the estimated Equation (6) and the application of Equation (7) yields Figure 9 which suggests that the pass through is 0.53. In other words, the pass-through to domestic inflation, in the long run, of a 1.0% shock to global food prices is less than one (i.e., 0.53). This implies that the pass-through is incomplete. The reasons are obvious. One, the headline inflation basket is in line with the classification of individual consumption by purpose(COICOP2018) and comprises of items far more than foods. The food share in the consumption basket in Nigeria is about 50.7%. Two, a fair number of food items in the global food price index are also produced domestically. Three, managed floating exchange regimes practiced in Nigeria at most part of the study period could also limit the pass-though. Four, the global food price index is composed of items that does not necessarily reflect the consumption bundles of Nigerians. For instance, some items in the meat and cereals price index.

To determine if the pass-through is also affected by the CBN intervention, Equation (6) is re-estimated along the dividing periods (pre- and post-interventions) and Equation (7) is applied in each case to estimate the pass-through and the reports are reflected in Figure 9. Astonishingly, the figure shows that the pass-through is not significantly moderated by the intervention of CBN in the agriculture sector. The passthrough for the entire period stands at 0.53 while it is 0.61 pre-intervention, and the post-intervention yields 0.59.
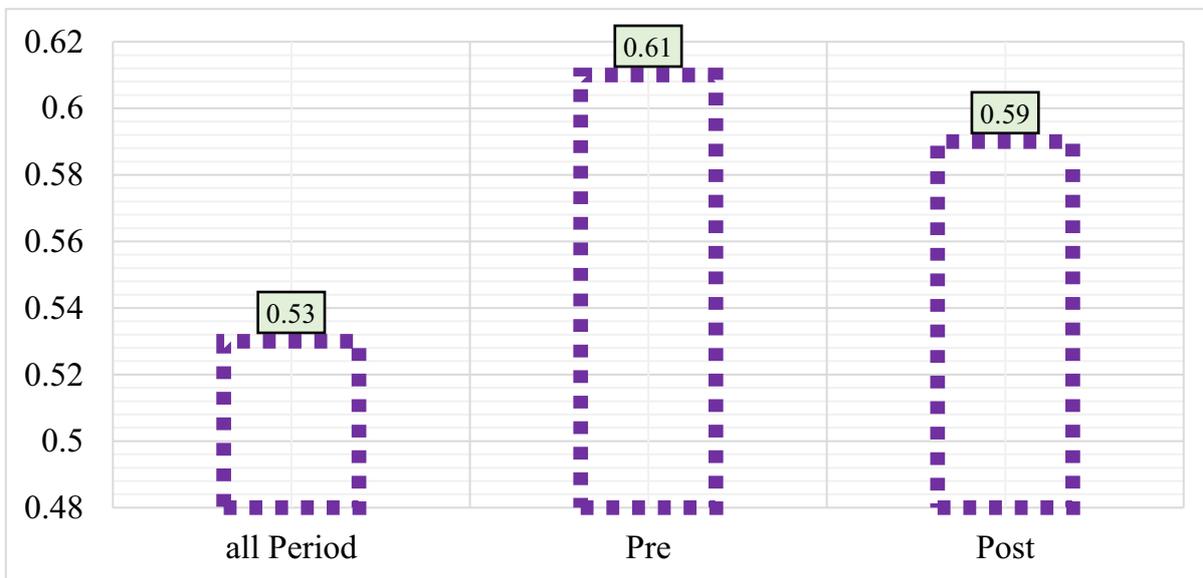
Figure 9: Pass-through from Global Food Inflation to Domestic Inflation
Note: All-period covers the entire study period, while Pre refers to pre-CBN intervention period (1992M1 to 2014M12) and Post implies post-CBN intervention covering the period 2015M1 to 2022M11). The pass-through is derived in line with Equation (7).

Robustness Check

The Global Food Price Index (GFPI) is compiled by more than one institutionand the response of domestic inflation to the GFPI may vary depending on the GFPI in use. Thus, as a way of checking the robustness of the estimation to a different measure of GFPI, Equation (4) is re-estimated using GFPI compiled by Federal Reserve Bank of Saint Louis (GFPI_LOUIS) and the result as presented in Figure 10 reveals that

the difference is very negligible. The difference is that the initial response of domestic inflation in the case GFPI_Louis is a little milder at 0.80 when compared to that of GFPI_FAO which starts at 0.81. All other things, thereafter, including the slow rate of dissipation, and the pattern of rise are the same. This therefore suggest that the initial result that considers GFPI_FAO is well fitted and robust enough for interpretation (Figure 10).

Response of NCPI to GFPI_Louis
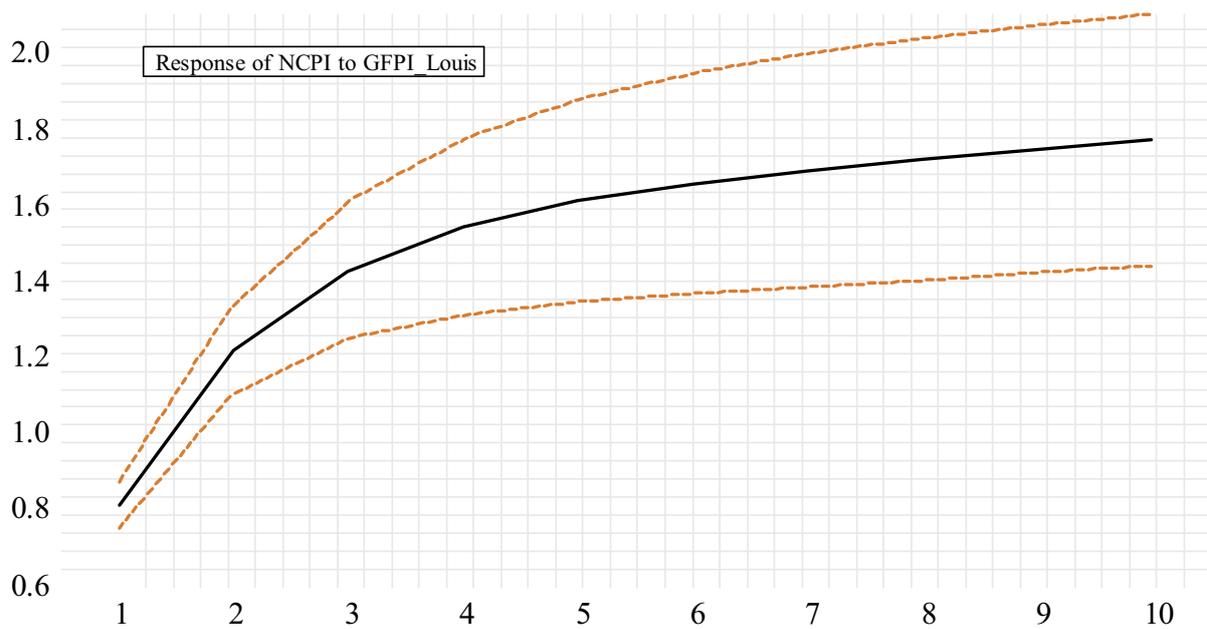
Figure 10: The impact of global food price shock Nigeria Consumer Price Index usingLoius Index

Note:The thick black line is the impulse response function (IRF), the red dotted lines are 90.0% confidence bands. The figure depicts the response of Nigeria CPI to 1.0 percentage point increase to global food price index computed by the Federal Bank of Saint Louis. The immediate response (t=0) is not included in the plot.

1.   Conclusion and Policy Options

The impact of the recent rise in the global food prices, due to Covid 19 pandemic and Russia-Ukraine war, on domestic inflation seems not to have spared any country. It affected advanced economies as much as it impacted the EMDEs including Nigeria. This is happening despite frantic effort by the government and CBN to enhance domestic food supply to curtail growing food insecurity, reduce the sensitivity of prices in Nigeria to external shocks and thus stabilize domestic inflation. This study is an attempt to examine the transmission of global food prices to Nigeria's inflation, the

magnitude of the pass-through as well as the efficacy of the CBN intervention, with reference to ABP, in moderating the pass-through.

The results show that although the impact varies slightly across food groups but generally the global food prices are significantly transmitted to domestic inflation in Nigeria. The domestic inflation responds slightly more to cereals prices, followed by diary and sugar products, and then meat. Although the pass-through is not complete but it's substantial. It is 0.53 for all period, 0.61 for the period prior to the intervention and 0.59 for post intervention

period, implying that the pass-through is not significantly moderated by the CBN intervention. Moreso, the intervention only slightly moderated the impact in the form of the initial responses to shocks to global food prices, but the impact seems to be long lasting after the intervention program.

Overall, Nigeria can be said to be vulnerable to global food prices despite the intervention effort of the CBN. The substantial but incomplete pass-through can largely be attributed to a number of reasons which include the large share of food in the consumption basket, larger part of which are still imported. In other words, although, there is a significant domestic production of food, but importation is still substantial. Other contributing factors could be imports tax such as custom duties and excise tax, border closure as well as the fact that domestic consumption pattern does not perfectly fit the global food indices consumption basket as not every product in the global basket is consumed in Nigeria. Worse still, is the instability in foreign exchange market which fuels continuous depreciation of the value of the domestic currency and thus strengthen the pass-through.

There is therefore the need for both fiscal and monetary authorities to strengthen effort to boost production of food locally. Governments at all levels should focus on making the agricultural sector more attractive particularly for the youths to venture into. The focus should go beyond boosting commodity food output through mechanization, to value addition through processing. The CBN should concentrate her intervention effort mostly in the agricultural value chain, with emphasis on food items that are largely imported while can be produced locally. There is the need for developing new strategies for managing the government silos. Good management of government food reserves can help moderate the sensitivity of the domestic inflation to global food price volatility. Strategies should cover timing of purchases and releases as well as quantity in both cases. These suggestions, if well implemented, are highly likely to moderate the dependence on imported foods, reduce the vulnerability of the economy to external shock of food prices and hence curb imported inflation.

Footnotes

[1]Dr. Yaaba is a staff of the Statistics Department, Central Bank of Nigeria. All views herein expressed are solely mine and do not necessarily represent or reflect those of the Central Bank of Nigeria where I work.
[2]See figure 1

[3]Also referred to as the "globalization of inflation hypothesis".

[4]Remember core inflation is the same as non-food inflation in Nigeria. It is computed as "All items less food".
[5]Also see Woodford, (2003)
[6]According to the author, this approach does not require the imposition of the dynamic restrictions as contained VAR of autoregressive distributed lag format.

[7]Davide et al., (2015) are of the view that the result is likely to be sensitive to the choice of lag, hence the adoption of this approach to lag selection.
[8]Considering the lag in collecting data, the study assumes that contemporaneous response might not present a true picture. In other words, change in the prices of food in the global economy is assumed to impact domestic prices with at least one month lag.
[9]Unlike Davide et al., (2015), this study is not concerned about the potential bias in the estimation considering that uses time series data.

[10]Anticipated moderation in response.
[11]COICOP comprises of 15 divisions, 63 groups, 186 classes, and 338 sub-classes.

[12]Including food and agricultural organization (FAO), World Bank, Federal Reserve Bank of Saint Louis etc.

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Financial Sector Development: The Road to Growth and Poverty Reduction in Sub-Saharan Africa

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Abstract

This study measures the impact of financial sector in promoting economic growth and wellbeing in Sub-Saharan Africa (SSA). The study employed panel cointegration techniques from annual data spanning from 2011-2019. The results of the Granger causality test reveal that bi-directional relationship exists between financial sector development and economic growth in the long-run. In addition, the results of the Generalized Method Moment (GMM) indicate that financial sector development is positively related to economic growth and inversely related to poverty. Therefore, for rapid economic growth and poverty reduction in SSA, the countries must have sound financial systems for effective financial intermediation and inclusiveness.

1.0   Introduction

The role of financial sector in spurring economic growth and livelihood in developing countries cannot be overemphasized, given the pivotal role it plays in enabling the flow of funds to productive sector of the economy. Financial reforms are often carried out to ensure that financial institutions are properly positioned to carry out their financial intermediation roles effectively. The process of mobilising funds from savers to individuals and businesses in the form of credit is called financial intermediation. This process helps convert saving into investment, and it would be more effective when the financial system is properly working. The literature has shown that a sound and healthy financial sector accelerates economic activities and thereby improve living standards.

In recent years, in addition to the conventional ways of alleviating poverty, inclusive economic growth and financial inclusiveness are considered essential strategies for poverty reduction in developing countries (Omar & Inaba, 2020). The United Nations (UN) often emphasised the importance of financial inclusion in improving livelihood and poverty reduction in the developing economies. Financial inclusion means providing equal access to basic financial services and resources for people including the vulnerable groups (Tsouli, 2022). The UN sees it as an important avenue for providing economic opportunities for poor households, and called for increased financial inclusion through financial sector reforms. For instance, the Sustainable Development Goals (SDGs) often emphasize this as a stepping stone towards reducing poverty in developing economies.

Also, the role of international financial organizations toward promoting financial inclusion agenda has been very positive. For instance, the Asian Development Bank (ADB) committed fully to have a stable and all-inclusive financial system in Asia and the Pacific region for sustainable growth and wellbeing (Asian Development Bank, 2019). Similarly, the Africa Development Bank (AfDB) has undertaken some projects to promote access to financial service by the people, the Africa Digital Financial Inclusion Facility (ADFIF), Financial Sector

Deepening and Financial Inclusion Project (PASFIF), among others.

Consequently, the financial sectors in SSA countries have recorded considerable progress regarding increased access to financial services, in modern technology employment, competition, and efficiency (Otchere *et al.*, 2017). Nevertheless, the sector still faces some challenges; the unbanked population in rural areas is still high, credits to small and medium enterprises (SMEs), and infrastructural employment are still low compared to other developing regions of the world. The poor infrastructural facilities, such as electricity, transport and communication systems in the rural areas of SSA countries can hinder the financial inclusion projects in the region.

The World Bank (2019) poverty statistics reported that the progress in poverty reduction is remarkable. Between year 2000 and 2015, over 802.1 million people were lifted out of extreme poverty in fifteen countries; seven from SSA and eight from Asia. Also, the recently released World Bank (2022) report showed that more than half of the African countries have more than 35% extreme poverty rates. These numbers are relatively large when compared to poverty rates in South Asia. This distribution of poverty indicates that countries with the largest share of people living in poverty are shifting from South Asia to SSA. Similarly, the PovcalNet –a software developed to allow researchers to estimate the extent of poverty level in the world, based on available information from the World Bank– estimate showed the top twenty countries with poverty, eighteen are from Africa. In the next decade, extreme poverty will become a predominantly SSA phenomenon.

According to Ozili (2020), a well-inclusive financial system enables low-income people to access credits/capital, enhance their ability to undertake profitable investments, and thus improve their income. In recent years, several reforms have been carried out in SSA countries to spur growth and reduce pervasive poverty. Despite this, the rate in poverty is still high and varies across countries. The slow pace of poverty reduction amidst considerable improvement in financial sector performance has motivated this study. This study explores how financial development in SSA promotes economic growth and improves wellbeing.

Although many studies (Alam & Alam, 2021; Bolarinwa *et al.*, 2021; Zhu et al., 2021; Kaidi & Mensi, 2020; Saidu & Marafa, 2020; Efendi and Sunanu, 2020; Appia *et al.*, 2020) investigated the relationships between economic growth and financial development, there are very few studies on the subject in the case of SSA. Therefore, this study used panel data and also extends the analysis to examine the impact of financial sector on poverty reduction. The study also incorporated in the model to capture the potential roles of rapid increase in population and inflation rates in the continent.

This study would contribute to literature in the following ways: First, the study used data of 41 of SSA countries, thus providing enough insight with more focused policy implications. The policymakers and international development agencies would find it helpful in designing policies to address poverty through financial sector reforms. Second, it can be used as a reference material for subsequent research works in the area of finance and livelihood improvement. The rest of the paper is structured as follows: The following section reviews related literature. The third section describes the methodology and sources of data. The fourth presents the empirical results and discussion. Section 5 provides a summary of the main findings of this study and concludes.

2. Literature Review
2.1 Theoretical Highlights

There are many theoretical frameworks on the finance, growth and poverty nexus in the literature. However, this study is based on two ideas that prevail in the debate over how financial development affects well-being: the public good theory of financial inclusion and the vulnerable group theory of financial inclusion, as in Ozili (2020).

The public good theory of financial inclusion contends that providing formal financial services to everyone should be treated as a public good. As a public good, gaining access to essential financial services is nonexclusive and nonrivalry; no one should be exempted from accessing financial services. Also, access to one person increases the amount available to others.

Therefore, providing financial access to the entire population will make everyone better off. As highlighted in Ozili (2020), the advantages of the public good theory are: first, it emphasizes on equal access to financial services regardless of economic status, demographic differences, or geographical location. Secondly, it suggests that having access to financial services lies with the government being the first critical stakeholder and this requires effective public intervention. Thirdly, the public good theory of financial inclusion recognizes the financial service providers as promoters of financial inclusion.

The vulnerable group theory of financial inclusion contends that financial inclusion projects are aimed at providing equal access to financial services, including the underprivileged members of the society such as the young unemployed people and the physically challenged. It is opined that the vulnerable can be carried along by ensuring that all transfer payments such as social cash transfers in favor of the vulnerable members of the society, should be paid into their formal accounts. This can make them feel that they are included, which also allows them to have access to credits. The merits of this theory are that the financial inclusion problem can be addressed by targeting the vulnerable groups, the theory classified the vulnerable as the financially excluded people, and going by the theory, it may be cost-effective to target the underprivileged members for financial inclusion rather than targeting the entire population.

2.2 Empirical Review

This section reviewed the related literature on financial sector development and economic performance in developing countries. Samargandi *et al*. (2015) examined the relationship between financial development and economic growth (1980-2008) in 52 middle-income countries using pooled mean group. They found an inverted U-shaped relationship between financial sector development and growth in the long run. The study suggests that in middle-income countries, financial development exerts less influence on growth. The finding from the dynamic panel threshold model shows a non-monotonic effect between the financial sector and growth.

Bist (2018) explores the effects of financial sector on economic growth in selected low-income countries using data from 1995 to 2014, and the panel cointegration results revealed the presence of long-run cointegration between the two variables. This suggests financial development exerts a significant and positive influence on economic growth in the selected countries. He further extended the analysis to test whether this relationship exists in the case of individual countries by using time-series data on a single-country basis. It was reported that in most countries, financial development positively influences growth. The study concludes that expanding the volume of credit to the private sector provides an enabling environment for the private sector to grow and thus promote economic growth.

Samargandi *et al*. (2014) use Saudi Arabia as an example of oil producing economy to investigate the effect of financial development on the oil and non-oil sector's growth from 1968-2010. They employed Autoregressive Distributed Lag (ARDL) bounds test approach. The results suggest a positive and significant relationship between financial development and non-oil sector growth. Still, the financial sector development was found to exert less influence on the growth of the oil sector. This suggests that the impact of financial industries on aggregate income might be positive but can vary across industries.

Samargandi and Kutan (2016) examine the effects of the financial sector on economic growth across BRICS member states using Global Vector Autoregressive (GVAR) model. They report that financial development has positive spillover effect on growth in some of the BRICS countries, specifically China and India. The study concludes that for the private sector credits shocks to boost the economic growth for all the BRICS member countries, financialization needs to be strong. Similarly, Beck *et al*. (2000) used the GMM technique from average cross-country data from 1960 to 1995 and found that financial development accelerates total factor productivity.

In another related study (Motaghi *et al.*,2020) from selected member countries of the Organization of Islamic Cooperation (OIC) on the impact of financial development on growth and other potential factors that can affect growth. The

study found that the influence of financial development on domestic production was less than government spending and was significant in influencing economic growth. This suggests that the financial sector's contribution to the growth of the private sector is less in the OIC countries. The limited effect of combined financial development index of the OIC member countries on poverty was attributed to due to inefficiency in their financial sector.

Aggarwal and Mehra (2013) explore the links between the components of financial sector and growth using the Cointegration test. The study was motivated by the rapid banking sector development, stock market and economic growth experienced in India. The findings of the study indicate that market capitalization has contributed to growth in income. The findings suggest a bidirectional relationship between per capita income and financial development. The increase in per capita income encourages people to invest more in the stock market and thus increases market capitalization.

Akinlo and Egbetunde (2010) investigate the financial development-economic growth nexus for ten countries in SSA differently using the vector error correction model. The results for each country indicate that financial development and economic growth are cointegrated, but causality directions vary. The Central African Republic, Congo Republic, Gabon, Nigeria, and Zambia found a unidirectional relationship from financial development to economic growth, except Zambia from the opposite direction. Meanwhile, evidence of bidirectional relationship was reported for Kenya, Chad, South Africa, Sierra Leone, and Swaziland. From the results, we can see the importance of financial sector development in driving economic growth. Hence, an appropriate policy is needed to reposition the financial institutions in Africa.

Keho (2017) examines the nexus between financial sector and growth using five African countries covering 1970-2013. The results of the ARDL show that variables are cointegration, indicating that financial development economic growth are positively related. In a similar study by Puatwoe and Piabuo (2017), three different measures of financial development were used: deposit to GDP, broad money, and domestic

credit to the private sector to GDP to investigate their short and long-run impact on economic growth in Cameroon. The study reports long-run and positive relationships between all the financial development measures and economic growth. The short-run results suggest that money supply, public expenditure, and economic growth are positively related, while bank deposits, private investment, and economic growth are inversely related. On the other hand, the long-run test found that financial development positively impacts financial sector reforms.

Aye (2013) used Johansen co-integration test to explore the finance, economic growth, and poverty nexus. The findings show that a long-run relationship exists between financial deepening, economic and poverty and the results revealed no presence of long-run relationship in the variables. At the same time, the short run indicates a unidirectional relationship between economic growth and finance. The study recommends a more robust policy approach that would help strengthen the financial sector to contribute effectively to development.

3. Materials and Methods
3.1 Sources of Data
The study employed annual panel data over the period 2011-2019, data sourced from World Bank (2020). The period was chosen principally because during this period the GDP growth rate in the region had been relatively high, but the rate of poverty reduction was too low. The study used data from 41 SSA countries. However, the SSA comprises 48 countries, and the countries were chosen based on data availability.

3.2 Methods
The study used panel vector error correction model (VECM), and Wald Test to examine the long and short-run causality between financial integration and economic growth. The Generalized Methods of Moment (GMM) for analyzing the impact of financial sector development on economic growth and the impact of financial development on poverty reduction. The GMM accounted for probable endogeneity in the explanatory variables and increased model efficiency, especially when the

explanatory variables were persistent (Arellano and Bover, 1995). GMM is an analytical tool for dynamic panel models in which the number of cross-sections exceeds the time frame (N > T).

3.3 Model Specification

In this section, the models are specified, the first and second equations modelled the causality between financial sector development and growth. The third and the fourth equations modelled the financial development-economic growth and financial development-poverty reduction impacts, respectively.

$$\text{LFD}_{it} = \alpha + \beta_F \text{LEG}_{it} + \varepsilon_{it} \qquad 1$$

$$\text{LEG}_{it} = \alpha + \beta_K \text{LFD}_{it} + \varepsilon_{it} \qquad 2$$

$$\text{LEG}_{it} = \alpha + \beta_1 \text{LEG}_{it-1} + \beta_2 \text{LFD}_{it} + \beta_3 \text{LTO}_{it} + \beta_4 \text{LINF}_{it} + \beta_5 \text{LPOP}_{it} + \lambda_i + \varepsilon_{it} \qquad 3$$

$$\text{LPR}_{it} = \alpha + \delta_1 \text{LPR}_{it-1} + \delta_2 \text{LFD}_{it} + \delta_3 \text{LTO}_{it} + \delta_4 \text{LINF}_{it} + \delta_5 \text{LPOP}_{it} + \lambda_l + \varepsilon_{it} \qquad 4$$

Where:

FD represents financial development, EG denotes economic growth, TO represents Trade openness, INF denotes inflation rate and POP is the population. PR stands for poverty reduction. L represents log of the parameters, is the individual-specific effect ᵢ represents the disturbance terms.

3.4 Data and Measurement

The study used real GDP for economic growth. This study followed World Bank (2005) and Saidu and Marafa (2020). While GDP per capita was used for poverty rates. It was obtained by dividing GDP by population. However, the most common proxy for poverty used in the literature is the poverty headcount ratio calculated using household consumption expenditure (Wang *et al.*, 2020; Wossen *et al.*, 2019; Imai *et al.*, 2012; Perez-Moreno, 2011). The lack of long-period poverty data in many African countries compelled us to use the GDP per capita.

For the measure of financial development, the study used a generally accepted proxy, the domestic credit to private sector by banks. This proxy was used because the private sector is critical to economic growth for many developing economies (Abeka *et al.*, 2021). Financial development is defined as the volume of funds provided to businesses by financial institutions such as loans, overdrafts, and other advances.

For the trade openness, total of imports and exports to GDP was used. The study used this measure because imports and exports are essential to economic growth for several SSA countries (Onakoya et al., 2019). The study used consumer price Index (annual %) for the inflation rate. While the population is the total number people in the sampled countries. In essence, the population is included in the model because the rapid increase in population in several SSA countries is an essential determinant of poverty (Mustapha & Said, 2015).

4. Results and Discussion

4.1. Panel Unit Root Test

The stationarity of the variables was tested to avoid the possibility of spurious regressions. The study used Levin, Lin & Chu t* (LLC's) test and (Augmented Dickey-Fuller -Fisher Chi-square. The results are summarized in Table 1. The unit root tests were conducted with no trend and intercept. The optimal lag lengths are obtained automatically with the SIC. The results indicate that all six variables are stationary at the level except the GDP per capita (poverty rate). However, the first difference results indicate the stationarity of the variable. This implies that all the variables contain a panel unit root and are integrated of order 1. This justifies the Johansen Fisher Cointegration test approach to test the variables' long-run relationship.

Table 1: Panel unit root test with no trend and intercept

	LLC Test		ADF Test	
	Level	First difference	Level	First difference
LPR	68.104 (0.140)	-13.391 (0.000)	96.536 (0.205)	157.596 (0.000)
LFD	-10.004 (0.000)	13.048 (0.000)	142.431 (0.0001)	160.163 (0.000)
LEG	-15.311 (0.000)	-33.495 (0.000)	184.731 (0.000)	283.086 (0.000)
LTO	9.496 (0.000)	18.038 (0.000)	117.069 (0.000)	203.153 (0.000)
LIN	10.258 (0.000)	25.361 (0.000)	148.427 (0.000)	246.735 (0.000)
LPO	-16.038 (0.000)	-20.566 (0.000)	448.225 (0.000)	308.162 (0.000)

Source: EViews

4.2. Causality Test: Financial Development and Economic Growth Model

To determine the causal relationships between financial development and economic growth in sub-Saharan Africa, the study first employed Johansen's (1998) Fisher panel Cointegration tests for the existence of a long-run relationship between the two variables. The results in Table 2 reveal a long-run relationship between financial development and economic growth in SSA. This means financial development and economic growth move together in the long run.

Table 2: Fisher's panel cointegration test results

	Fisher statistic (from trace test)	Prob.
None	22.03***	0.0002
At most 1	11,71**	0.0196

Notes: ***, ** indicate 1% and 5% level of significance respectively.
Source: EViews

A panel-based VECM and Wald coefficient test were used to examine long- and short-run relationships. The first step estimation of the long-run parameters in Eq. (1) and Eq. (2) were carried out to find the residuals consistent to the deviation from equilibrium. In the second step, we estimate the parameters of the short-run adjustment. The resulting equations were used with the panel Granger causality test. The error correction term, (ETC -1) results in Table 3 indicate that a long-run bi-directional causality exists between financial development and economic growth.

Table 3: Causality test results of financial development and economic Growth

Dependent variable	Sources of causation		
		Short run	Long run
	ΔLFD	ΔEG	ECT (-1)
ΔLFD	-	9.5014*** (0.0086)	-0.3759*** (0.0000)
ΔLEG	3.1996 (0.2019)	-	0.1058*** (0.0000)

Source: EViews

This means that economic growth and the financial development caused each other in the long run, and the whole system would return to equilibrium at 37.59% and 10.58% for financial development and economic growth models, respectively. The results based on the Wald coefficient test indicate that there is a short-run causality running from economic growth to financial sector development. The results conform with our priori expectation; in the short run financial sector development granger cause economic growth, while in the long run, both growth and financial development causes each other. An economy needs serious infrastructural development for business to thrive (Mustapha et al. 2018), which requires huge capital investment from the financial sector. Similarly, robust and sustained economic growth is necessary for financial deepening and, thus, economic growth.

4.3 Results of the Generalize Method of Moment (GMM)

In this section, we analyse the results of the two models: the financial development-growth

model and the financial development-poverty model. Before examining the main results of the GMM, the multicollinearity test and outlier test were conducted to confirm the suitability and consistency of the model. The variance inflation factor (VIF) was used for the multicollinearity test. The examination revealed a mean VIF of 1.03, which indicates the absence of a multicollinearity problem. While the scatter plot for Cook's was used to test the outlier, it found low leverage or small residuals. The serial correlation and Sargan tests show the models' post-estimation tests, including instrument validity and reliability. All the tests were valid as the null hypothesis that over-identification restrictions are valid could not be rejected. The second-order-serial correlation AR (2) test also suggest that AR (1) is valid and is

consistent with the theory.

4.3.1 The Correlation Matrix

The correlation matrix shows that all the two dependent variables (poverty level and economic growth) positively correlate with financial development. The correlation also exhibits negative relationships between the primary independent variable, the financial development, and the control variables, such as trade openness, inflation rate, and population, as reported in Table 4. The correlation reveals no evidence of multicollinearity problems among the variables under study since none of the estimated coefficients among the independent variables is greater than 0.75 using the cut-off line set by Tabachnick and Fidell (2007).

Table 4: Correlation matrix of the variables

	PR	FD	EG	TO	INF	POP
PR	1					
FD	0.05	1				
EG	-0.14	0.013	1			
TO	-0.07	0.083	0.091	1		
INF	-0.09	0.069	-0.06	0.02	1	
POP	-0.29	0.095	0.091	0.09	0.03	1

Source: EViews

4.3.2 Results of the Financial Development and Economic Growth Model

The results based on Arellano Bover's two-step system GMM in Table 5 reveal that all the variables carry positive signs and are statistically significant at 1%. The results suggest that a 1% increase in financial development will lead to a 0.0927% increase in economic growth in the sample countries. The trade openness, inflation rate, and population growth coefficients suggest that a 1% increase in each tends to increase economic growth by 0.0473%, 0.0147%, and 0.2922%, respectively. The results show that finance, trade openness, and population variables have positive and significant effects on economic growth in SSA.

Table 5: GMM results

Variables	Economic Growth	Poverty
EG (-1)	0.347*** (0.000)	-
LPR (-1)	-	0.884*** (0.000)
LFD	0.093*** (0.000)	-0.004*** (0.000)
LTO	0.047*** (0.000)	-0.007*** (0.000)
LINF	0.0147*** (0.001)	-0.003*** (0.000)
LPOP	0.292*** (0.000)	0.049*** (0.000)
Constant	0.456*** (0.000)	0.895*** (0.000)
Obs.	297	297
Sample period	2011 – 2019	2011 – 2019
Number of codes	41	41
No. of instruments	40	41
Sargan (p value)	36.756 (0.342)	32.455 (0.544)
AR (1)	-2.5495 (0.012)	-1.461 (0.144)
AR (2)	-0.902 (0.535)	-0.902 (0.367)

Notes *, **, and *** indicate significance levels of 10%, 5%, and 1% respectively. Probability values are in parenthesis.
Source: EViews

Analysis of the other variables that may affect growth and poverty variables

The coefficient of trade openness in the growth model is positive and statistically significant. This implies that trade liberalization policy benefits the real sector's growth. This conforms with the apriori expectation that the free movement of goods and services between and within African nations could spur growth. This result corroborates previous findings (Musila & Yiheyis, 2015; Lawal et al., 2016; Esther & Ezeuchenne, 2017) of other related studies in Africa and African countries. The study also suggests that the inflation variable positively affects economic growth. This implies that higher inflation induces growth in the real sector and vice versa. The financial development that largely depends on effective financial intermediation could lead to inflationary dangers due to the increase in the money supply in an economy. This conforms with Motaghi et al. (2020) in selected member countries of the Organization of Islamic Cooperation. The population variable is inversely related to economic growth in SSA. That is, an increase in population has also contributed to the growth of the SSA economies, which is not the case in studies on individual countries in the region. This agrees with the endogenous growth theory that an increased population is not a problem when accompanied by technological progress. This can also fit into the discussion of the financial sector-induced growth in Africa propelled by advancement in financial services technology (Fintech).

4.3.3 Results of the Financial Development- Poverty Model

The results based on Arellano Bover two-step system GMM reported in Table 5 revealed that financial development has a negative and significant effect on poverty reduction. This means that a 1% increase in financial development will decrease poverty by 0.0041% in the sample countries. The findings from the other variables of trade openness and inflation rate indicate that a 1% increase in these variables tends to reduce poverty by 0.0069% and .0027%, respectively. This analysis demonstrates that the financial development, trade, and inflation rate-led poverty reduction hypothesis holds in sub-Saharan Africa as the

variables significantly affect poverty reduction. The negative relationship between trade openness and poverty reduction agree with our apriori expectation that trade openness could reduce the poverty rate in SSA. Trade openness encourages imports and exports, and the unrestricted mobility of capital can increase production and thus reduce poverty. There are different ways through which trade openness would reduce poverty some are direct, and others are indirect: through its effects on price reduction, employment opportunities, increase in public revenue, and so on. This study corroborates studies such as Manni and Afzal (2012).

The coefficient of the inflation rate also carries a negative sign, implying that the relationship between inflation and poverty in SSA is inversed. This agrees with the priori expectation that high and rising prices of goods and services can increase the poverty rate. High and chronic inflation imposes welfare costs on society, making intermediation more expensive and restraining financial development. The effects affect people with low incomes even more because they lack the power to manage the impact as they do not hold assets that provide a hedge against inflation (Mustapha & Khalid, 2013). The results also show a direct relationship between population and poverty in SSA. The rapid increase in population rates, low per capita income, and large household size in the continent could seriously impact livelihood.

Conclusion

The study explored whether the financial sector in SSA contributes to economic growth and poverty reduction. It is motivated by the low rate of decline in poverty rates in the region despite the remarkable progress recorded in the financial sector in recent years. The literature revealed that financial sector development has contributed to the noticeable decline in poverty rates across Asian countries.

The findings from the empirical exercise can be summarized as follows: first, we found a long-run relationship between financial development and economic growth. Second, The ECT (-1) in both financial development and economic growth models were negative, signifying that systems are returning to equilibrium at 37.59% and 10.58%,

respectively. Third, a bi-directional Granger causality between financial development and economic growth was found in the long run. While unidirectional relationship was found in the short run. Forth, the dynamic panel GMM model suggests that financial development significantly impacts poverty reduction in SSA countries. Therefore, we conclude that financial sector reforms contributed to growth and poverty reduction in SSA. Therefore, there is a need to formulate effective policies that

would strengthen the financial institutions in SSA to adequately support the real sector of the economy and reach out to the weak and vulnerable population.

The limitation of this study is that the study did not use disaggregated data on financial sector development. Therefore, future research should explore the relationship using disaggregated data and look at the indirect effects of the financial sector on growth and poverty reduction.

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Electronic Banking and Cashless Economy in Nigeria: An Anatomy of the CBN Policies

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Abstract

This study is intended to examine the influence of electronic banking in attaining the cashless economy in Nigeria. The ex-post facto research design is used in this study and secondary data was collected from the CBN Annual Statistical Bulletin of 2021. The result for this study shows that electronic banking has a significant influence on the level of cash in the economy. It is therefore recommended that awareness, structures and laws be strongly set in place to encourage the use of electronic banking channels such that Nigeria can harness the benefits of the cashless economy one of which is the reduction in cost of printing money notes amongst others that leads to economic growth.
Keywords: Transparency, Accountability, Financial Market, Market Capitalization
JEL: G2

1.0   Introduction

The banking sector in Nigeria has evolved over the years. From the traditional means of banking where customers have to be physically present in the banking hall before they could transact to a more convenient and faster means of electronic banking that allows customers to transact from the comfort of their homes or any location using their personal electronic devices like mobile phone, laptops, or any internet web enabled devices. Since the adoption of e-banking in Nigeria, deposit money banks have invested massively in technology to ensure a seamless and effective functioning of the electronic channels that aid customers transactions. In a bid to leverage on the usefulness of electronic banking to drive economic growth and lower the cost on monetary policy, the CBN introduced the "cashless" policy in 2012 (Thisday, 2023). The idea of the cashless policy was to ensure that customers carry out their banking transactions which include funds transfers, payments of bills, loan collection and others using the electronic channels (mobile banking, internet banking, ATM, POS and USSD).

Since the introduction of the cashless policy, there have been challenges that affected the effective implementations of the policy. These challenges revolve around inadequate sensitization of customers about the policy, slow internet penetration in the local areas, absence of power infrastructure in some parts of the country, inadequate monitoring of the policy by the regulator and customers bias for cash. In this regard, various studies have been carried out to examine issues that revolve around electronic banking. For instance, electronic banking has been examined to check its influence on the customers of the financial institutions (Chen & Jiang, 2022); the potential of cashless society (Abu,

2018; Asamoah, 2021); security risks associated with electronic banking (Hutapea & Wijaya, 2021) amongst others but there seem to be a paucity of literature that examine the influence of electronic banking on cashless policy in Nigeria.

Therefore, the objective of this study is to examine the effect of the electronic banking channels in the effective implementation of the CBN cashless policy and make adequate recommendations to strengthen the policy to ensure it achieve its intended goals.

2.0 Conceptual Review

The main concepts (electronic banking, mobile banking, internet banking, automated teller machine, point of sales (POS) and cashless economy) in this study are reviewed below in this section.

2.1. Electronic Banking

According to Olumide (2014) electronic banking is the use of internet enabled devices to carry out banking transactions conveniently from any location (home, office, anywhere) without necessarily having to be in the banking hall before transacting. Electronic banking is enabled using different channels across different electronic devices. The channels include mobile banking, internet banking, ATM, POS, and USSD while the electronic devices are any internet enabled devices like mobile phone, laptop and internet enabled wrist watches. The required customer authentication and authorization take place electronically without manual intervention before transactions are consummated. Different security and control features are built into electronic banking channels to ensure that the

transactions are non-repudiated and secured.

2.2. Mobile Banking

The use of mobile phones to carry out banking transactions is known as mobile banking (Khan, 2021). A customer with an internet enabled mobile device can carry out transactions from his or her phone as long as the customer has an account with the particular bank. Barnes and Corbitt (2003) in their study describe mobile banking as a channel that enables a customer to interact with his/her bank through the use of mobile phones or personal digital assistant (PDA). This means that as long as a bank has implemented electronic banking, her customers can connect seamlessly and transact from the comfort of their homes using their mobile phones and PDAs. Mobile banking has become the toast of most customers simply because of the massive phone penetration (Omotosho, 2021), ease of use and convience to carry around. While dicussing the benefits of mobile banking, Purohit and Arora (2021) opined that for any governement to achieve financial inclusion where the active poor will be brought into the financial net, adoption of mobile banking plays a key role, as it can be operated from any phone whether internet enabled or not. This invariably means mobile banking can be used to drive financial inclusion thereby wideing the tax net as the government can easily monitor customers transaction and generate the require taxes.

On the other hand, there are challenges that have affected and still affecting the mobile banking adoption and growth across the world and Nigeria in particular. These challenges include security of the technology platform, regulatory compliance and absence or inadequate infrastructural facilities (Purohit &

Arora, 2021; Abu, Bolarinwa, & Akpoviroro, 2018; Osahon & Yomere, 2015; Okereke, 2016).

2.3. Internet Banking

The internet has facilitated communication as well as transaction between customers and their banks. Thus, the medium for transacting convienently without customers necessarily visiting the bank using the web is called internet banking (Udo & Oghenekaro, Cashless policy and its impact on the Nigerian economy, 2019). Internet banking is carried out across a banking paltform over the web. This means that for customers to sucessfully transact across the web, the bank must have implemented an internet banking platform which is secure, easy to use and functioning optimally. The beauty of the internet banking platform is that it can be operated from any device that has access to the internet and a web browser. Like the mobile banking, there are challenges affecting the growth and adoption of internet banking across the country. These challenges include, epileptic power supply, issues of fraud, poor network and other issues (Ejiobih, et al., 2019).

2.4. Automated Teller Machine (ATM)

The ATM is one of the oldest electronic banking medium that has been implemented in Nigeria. The ATM was first installed in Nigeria by the National Cash Register (NCR) for the defunct Societal Generale bank in 1989 and gained ground since then (Jegede, 2014; Olumide, 2014). The ATM enables bank customers to withdraw cash from the ATM machine without having to enter the banking hall as the machines are installed either within the banking premises or at strategic location within major cities like malls, markets, amusement parks, motor parks and other choice locations. Besides withdrawals of cash, the ATM functionalities have been enhanced to include bills payment, acceptance of deposits and funds transfers. According to Adaeze (2021) one of the major challenges facing the adoption and usage of ATM by bank customers is the issue of fraud that has plagued the electronic banking platform. These frauds range from phishing, outright stealing of debit card and PIN, debit card swap and shoulder surfing to memorize debit card PAN and PIN. However, the CBN has mandated the DMBs through her policy framework to institute controls such anti-skimming device, set up anti-fraud desk to urgently respond to customers' fraud complaints and a host of other controls aimed at strengthening the security built within the ATM to restore customer's confidence.

2.5. Point of Sale (POS) Device

The POS terminal is a portable device that allows bank customers to transact from their accounts at merchant locations outside the bank premises. POS terminal has been defined by various researchers (Nworie & Okafor, 2023; Ogbonna & Virtus, 2020; Ekechukwu & Mbah, 2019; Eleberi, 2022) in terms of convenience, ease of usage and mobility. The POS device is a small portable machine with the capability to read and authenticate customer's card and PIN with added features that enable bank customers to carry out transaction they would have hitherto conducted inside the banking hall. Such transactions include fund transfers, bills payments, cash withdrawals and cash deposits. The POS has its challenges as it is also plagued with reports of fraud which has made bank customers to be skeptical of its adoption and usage (Udo & Oghenekaro, 2019).

2.6. Cashless Economy

Cash is required when making payment for goods

and services as well as settling debt obligations. However, with the advent of technology, various channels have been designed to enable bank customers to transact without necessarily using physical or paper currency. An economy can be classified as a cashless economy when the government deliberately limit the use of paper currency for transactions and advocate the use of electronic banking channels (Adurayemi & Christopher, 2023). Umanhonlen, Umanhonlen, and Omoruyi (2015) argued that the government embarks on driving a cashless economy with the objective of adequately managing the cash in circulation, improving its monetary policy and increasing its tax revenue by widening the tax net. This means that cashless economy is a stimulus for economic growth and can be used by the government to drive its monetary and fiscal policy agenda.

3.0 Theoretical Framework

This study is hinged on the theory of technology acceptance theory which was said to have been developed by Fred Davis and Richard Bagozzi in the 1989 (Adams et al. 1992). The theory explains how users actually rely on technology to carry-out their tasks. The theory assumes that the perception of users in respect to the ease in utilization and the benefits accrued from the use of the technology will directly influence their need and use for such technology.

This theory was further developed by adding more assumptions to predict users need for a new technology. Venkatesh and Bala (2008) added that the level of trust and the perception of the risk associated with a new technology will also influence the level of use of the technology.

Chuttur (2009) regards the assumptions of the theory to be vagued which cannot be easily determined or measured. Wu and Wang (2005) opined by showing empirical proof that ease of usage of a new technology is not determining factor by potential users of technology on whether to use it or not.

However, Bagozzi (2007) in supporting the validity of the theory stated that the assumptions behind the theory might not always be the primary determinant factor but that it is one of the factors that influence users' decision.

This theory fits into this work by explaining the relationship between electronic banking (technology) and the cashless economy level of Nigeria. From the theory we can explain that a high cash level signifies that the electronic banking channels have not been fully accepted in the Nigerian economy. It explains that if electronic banking technology is accepted, then the level of cash supply will be limited.

3.1. Review of Empirical Literature

Many studies (Nworie & Okafor, 2023; Eleberi, 2022; Ogbonna & Virtus, 2020; Ekechukwu & Mbah, 2019; Osahon & Yomere, 2015) have been conducted to determine the effect of electronic banking on cashless economy as well as electronic banking on productivity. The results from these studies are however mixed. Osahon and Yomere (2015) examined the impact of e-banking on cashless policy. The study examines the benefits and challenges of cashless policy in the Nigerian economy and found that the cashless policy offers immense benefits to the Nigerian banking sector. It however recommended that adequate infrastructure and legal framework should be provided to enhance the implementation of the policy. However, the

study made use of assumptions in arriving at the income generated from cashless transactions by asserting that all banks' accounts are current account. Also, the study did not use empirical analysis to arrive at its conclusion rather it employed content analysis.

Elechukwu and Mbah (2019) assessed the impact of e-banking channels on economic growth of Nigeria. The study employed the secondary data which was analyzed using statistical tools and concluded that mobile transfer and POS have both negative and positive impact on economic growth for different years but the ATM had a positive impact on economic growth across the years. The study recommended that there should aggressive awareness campaign on e-banking. Similarly, Eleberi (2022) investigated the impact of electronic banking on economic productivity in Nigeria using secondary data sourced from the CBN statistical bulletin from the period 2009 - 2019. The data were analyzed using OLS and findings revealed that e-banking channels have mixed effect on economic productivity of Nigeria and as such while the ATM and mobile banking have positive effect on economic productivity, point of sales machines have negative effects on productivity. The study however recommends that CBN should put measures in place to enhance the usage of point of sales since it has negative impact on economic productivity in Nigeria

In a bid to evaluate the prospect and challenges of cashless policy in the Nigeria economy, Abu, et al. (2018) used survey research design to examine the impact of the cashless policy on performance of commercial banks in Nigeria. The study discovered that cashless policy has a positive impact on performance of commercial banks and recommended that power infrastructure should be provided to support effective functioning of the bank electronic equipment. The study however only used 184 sets of questionnaire from 8 banks in Lagos to generalize. This sample and number of banks used may not be a true representation of the entire population and thereby leading a gap that is addressed in the current study. Ogbonna and Virtus (2020) supported Abu et al (2018) and argued that cashless policy has influenced economic performance especially as it relates to POS and ATM transaction payment patterns. The study went further to recommend that banks should invest more in their e-banking channels to enhance efficiency of the devices as it will help increase the banks' profitability.

Olurin, Olubukunmi and Akintola (2021) used secondary data obtained from the CBN statistical bulletin to examine the effect of electronic banking on profitability of deposit money banks in Nigeria. The study concluded that the internet banking channel has an insignificant effect on profitability of DMBs while ATM has a significant effect. The study recommended that banks should sensitize their customers about the convenience of using the e-banking channels to enhance its adoption. However, results from a similar study conducted by Ekechukwu and Mbah (2019) who employed secondary data which was analyzed using statistical tools showed that mobile transfer and POS have both negative and positive impact on economic growth for different years but the ATM had a positive impact on economic growth across the years. The study recommended that there should be aggressive awareness campaign on e-banking.

In a study to examine the effect of electronic

banking on entrepreneurial development in Nigeria, Okafor (2021) used econometric techniques which involves Augmented Dickey Fuller and Philip Perron tests for Unit Roots and the Ordinary Least Square (OLS) to determine the impact of electronic banking on entrepreneur development in Nigeria. The study concluded that e-banking has a positive impact on entrepreneurial development in Nigeria and recommended that the government should provide the required infrastructure such as power supply to ensure adequate functioning of the bank channels. The study also recommended that banks should set up effective customer service desk to respond adequately to customers' complaints. Obananya, Nwangwu and Okoye (2021) conducted a similar study using a survey research design and aligned with Okafor (2021) that electronic banking has a significant impact on entrepreneurial development in Anambra state.

Udo and Oghenekaro (2019) investigated the effect of cashless policy on the economy. The study examined individual electronic banking channels on the economy and found that there is a negative relationship between Cheques Cleared Value (CHEV), Automated Teller Machine Payment Value (ATMV), Point of Sale Value (POSV) and Mobile Payment Value in Nigeria (MOBP) and the Nigeria economy on one hand and a positive relationship between ATM, WEB, NEFT and Nigerian economy. Findings from Okereke (2016) revealed that automated teller machine, mobile banking and internet banking are not significant in influencing economic growth thereby negating the conclusion reached by Udo and Oghenekaro (2019

3.2. Gap in Literature

Based on the review of existing literature, it is clear that studies have been carried out on electronic banking and also on cashless policy. However, there seem to be a methodological gap as few studies have examined the influence of electronic banking on cashless policy or on the level of cash supply. Therefore, this study is aimed at evaluating the influence of electronic banking on cashless policy in Nigeria.

4.0   Methodology

The research method adopted in this study is the quantitative research method. This method allows for the variables in this study to be measured and analyzed in order to draw inferences. Furthermore, the research design used in this study is the ex-post facto research design which means that data from past events that have occurred were gathered. The secondary data gotten for this study was collected from the Central Bank of Nigeria (CBN) statistical bulletin 2021. The time frame for this study spanned from 2009 to 2019. This is because of the available data contained in the bulletin which is the latest produced. The multiple regression model was used to analyze the influence of electronic banking on cashless economy in Nigeria. while the analysis of variance (ANOVA) was used to test the significance of the result. The regression model used in this study is specified below:

$Y = F(X)$

Where

Y = Cashless Economy (Dependent Variable)

X = Electronic Banking (Independent Variable)

Mathematically, this can be rewritten as:

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e_i$

Where

β_0 = Intercept where the level of cashless economy where electronic banking is zero

$\beta_1 X_1$ = Electronic Banking (Independent Variable)

$\beta_2 X_2$ = Mobile Banking (Independent Variable)

$\beta_3 X_3$ = Internet Banking (Independent Variable)

$\beta_4 X_4$ = Automated teller machine (Independent Variable)

$\beta_5 X_5$ = Point of Sales (Independent Variable)

e_i = error term

5.0. Data Analysis and Discussion of Findings

The descriptive and inferential statistics result of the study is presented below:

Table 1. Descriptive Statistics

Table 1. Descriptive Statistics

	Mean	Std. Deviation	N
Cash_Supply	29921.7836	6814.05686	11
ATM	3581.1091	2319.65162	11
POS	798.2773	1087.73137	11
Internet_Banking	171.3036	210.39356	11
Mobile_Banking	900.3764	1513.97396	11

Source: Researcher's Computation (2023)

Table 1 shows that out of the four proxies (ATM, POS, internet banking and mobile banking), ATM has more transactions than any of the other electronic channels. The result also shows that internet banking is the least used channel. Furthermore, the result shows that on the average, electronic channels are not heavily used as the total average value of the electronic channels account for approximately 18% of the total cash supply in the Nigerian economy.

Table 2		**Shapiro-Wilk W test for normal data**			
Variable	Obs	W	V	z	Prob > z
ATM	11	0.91108	1.440	0.671	0.25115
POS	11	0.76469	3.810	2.723	0.00323
Internet Banking	11	0.69640	4.916	3.339	0.00042
Mobile Banking	11	0.65227	5.630	3.683	0.00012

Source: Researchers Computation (2023)

Table 2 shows the result of the Shapiro-Wilk W test result check for normality of the data. It is used in place of Jarque Bera test for normality as it best handles non-asymmetric data and small groups below 50. The result shows that none of the variables have a result lower than 0.05 as shown on the 'w' column, this shows that the data used is normally distributed and therefore the regression model set will be adequate to rightly predict the dependent variable correctly.

Test of Hypothesis

H_0: Electronic banking does not have a significant effect on the cashless economy level in Nigeria.

Table 3. Regression Result

Source	SS	df	MS		
				Number of obs =	11
				F (4, 6) =	33.70
Model	444530331	4	111132583	Prob > F =	0.0003
Residual	19783381.7	6	3297230.28	R-squared =	0.9574
				Adj R-squared =	0.9290
Total	464313713	10	46431371.3	Root MSE =	1815.8

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Cash Supply |    Coef.   Std. Err.     t    P>|t|    [95% Conf. Interval]
-------------+----------------------------------------------------------
ATM          |  3.150844   .727105    4.33   0.005    1.371683    4.930006
POS          |-5.902882   5.925092   -1.00   0.358   -20.40106    8.595296
Internet     |  12.36016   11.47226    1.08   0.323   -15.71146   40.43178
banking
Mobile       |  2.627944   2.319263    1.13   0.300   -3.047088    8.302976
banking
_cons        |  18866.92   1701.488   11.09   0.000    14703.53    23030.32
------------------------------------------------------------------------
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Source: Researchers Computation (2023)

Table 3 shows that the independent variable (electronic banking) which is represented by mobile banking, ATM, internet banking and POS and mobile banking all explain the dependent variable (cashless economy) which is represented by cash supply by 92.9%. Furthermore, the result shows the computed p-value is 0.000, this is lower than the set p-value 0.05. Therefore, the alternate hypothesis which states that 'electronic banking does have a significant effect on the cashless economy level in Nigeria' is accepted. The coefficient results show that ATM, mobile banking and internet banking all have a positive influence on the dependent variable while POS has an inverse influence on the dependent variable. Based on the only ATM has a significant influence on the level of cash supply.

5.1. Discussion and Policy Implication of Findings

The result from this study shows that electronic banking channels have a strong and significant influence on the level of cash in the Nigerian economy. This position is in tandem with the position of (Elechukwu & Mbah, 2019) who pointed out that there is significant influence of electronic banking in the level of cashless economy in Nigeria. This is however contrary to the position of Udo and Oghenekaro (2019) who opined that the cashless level of economy doesn't have a significant influence on the economic growth. These findings can be juxtaposed to point out that there is low level of acceptance of electronic banking channels among the populace and hence the level of cash in the economy is much which is not influencing the economic towards growth. Omojola et al. (2022) showed that there is still a low level of financial inclusion among the teeming Nigerian populace which is also a function of electronic banking. This occurrence can be explained with the assitance of the technology acceptance theory as electronic banking not being easy to use or not having enough benefits to motivate the populace to use or probably possessing low trust in the technology by the populace or the high risk involved. Audu (2020) explained that transparency and accountability will actually influence users judgement in taking

decisions.

6.0. Conclusion and Recommendation

This study was designed to examine the influence of electronic banking on the cashless economy level in Nigeria. The result of the data analysis shows that each of the electronic banking channels has high level of influence on the level of cash in Nigeria. In conclusion, the study reveals that electronic banking has a significant influence on the cashless economy status in Nigeria. From the finding of this study, it shows that electronic banking has a strong correlation with the cashless economy level of Nigeria. This means that electronic banking has a significant influence on the level of cash in the Nigerian economy.

Based on this, it is therefore recommended that electronic banking channels be promoted to allow the teeming population recognize benefits of electronic banking channels. Most especially the POS channel should be promoted and encouraged to be used more by businesses as it will lead to a decrease in cash supply as evidenced in the result from this study. In addition, the electronic banking channels should be made easy to use such that users and potential users will be motivated to deploy their use. Finally, nationwide financial literacy on the benefits of cashless economy should be promoted and the CBN should ensure that there is improved security on the electronic banking mediums so that the populace feel safe to use it.

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Appendix 1. Secondary Data

Year	ATM N' Billion	POS N' Billion	Webpay N' Billion	Mobile Pay N' Billion	Cash Supply N' Billion
2009	548.60	11.03	84.15	1.27	19,159.02
2010	399.71	12.72	25.05	6.65	21,155.91
2011	1,561.74	31.02	59.61	18.98	24,479.46
2012	1,984.66	48.01	31.57	31.51	27,252.36
2013	2,828.94	161.02	47.32	142.80	29,581.21
2014	3,679.88	312.07	74.04	346.47	29,806.73
2015	3,970.25	448.51	91.58	442.35	28,832.61
2016	4,988.13	759.00	132.36	756.90	34,534.37
2017	6,437.59	1,409.81	184.60	1,102.00	35,422.79
2018	6,480.09	2,383.11	675.92	1,974.25	39,160.93
2019	6,512.61	3,204.75	478.14	5,080.96	39,754.23

Source: CBN Statistical Bulletin (2021)

Asymmetric Impact of Oil Price and Exchange Rate Movements on Price Inflation in Nigeria

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Abstract

Fears about the magnitude and duration of exchange rate pass-through to consumer prices have grown in many developing countries, especially for a country like Nigeria that exports crude oil and imports refined products. Increase (decrease) in oil price interact with exchange rate with far reaching implications on price level. This study examines the asymmetric impact of oil price and exchange rate on price inflation in Nigeria. We employ the Non-linear ARDL approach to capture the magnitude of the change of both the increase and the decrease in the oil price and exchange rate on inflation. First, our result indicates that an increase in the oil price (OP+) has a greater impact on CPI than a decrease in the oil price (OP-). The evidence that the impact of OP+ is greater than OP- on price inflation, implies that the government needs to implement various energy policy measures to offset the inflationary impact of positive oil price shock. The result of asymmetric effect of exchange rate on price level shows that an appreciation (depreciation) of the naira in relation to US dollar or a positive (negative) shock to the exchange rate leads to a positive (negative) response from inflation. The recommendation from the study is that the Central Bank of Nigeria should implement a combination of monetary and fiscal measures to control inflationary pressure. This could include adjusting interest rates to stabilize the currency and employing targeted fiscal policies to support domestic industries affected by higher input costs, as well as strengthening local refining efforts to excessive dependence on oil import.

1.0   Introduction

The maintenance of price stability by containing inflationary pressure has been considered as one of the most important responsibilities of central banks and monetary authorities globally. Also, some of the roles of monetary authorities include maintaining financial stability, monitoring the capital flows and sustaining economic growth. Achieving these objectives have become more challenging in recent time, especially after the great inflation period of 1970–80 s and the Global Financial Crisis 2007–08 (Nasir & Wu, 2015). Besides the additional challenges and triple mandates of maintaining the price as well as financial and economic stability, containing inflation remains the most herculean task. In order to achieve the mandate of stabilizing price level, many countries have adopted the strategy of explicit inflation targeting (see Bernanke et al., 2001). For a small open economy like Nigeria, the dynamics of inflation is linked to the external as well as the internal balances. In other words, globalization and liberalization of the global economy and the accompanying high volume of trade and cross-border investments, trade and an uninterrupted international capital flows are now evident (Pham et al. 2020). These cross-border inflows of capital and investments have had far-reaching implications on economic growth and inflation (Huynh & Burggraf, 2020). Also, these inflows of capital come with capital flight and reversals as evident in the 1997 Asian financial crisis. The crisis significantly affected the ability of monetary authority to achieve price stability, in response

many countries adopted a managed-float exchange rate regime as an antidote to much volatile capital inflows (Calvo & Reinhart, 2002).

The response of monetary authority to currency movement is underpinned by development in price level and the extent to which they are impacted by exchange rate movement. However, such response requires information from sources of the currency movement as well as the economic characteristics of the country (Ha et al. 2020). The importance of understanding the underlying forces behind exchange rate pass-through (defined as the percentage increase in consumer price index as result of a percentage increase in depreciation), is the risk of policy mis-steps in the event of more frequent currency movement. In other words, the nature of the macroeconomic shock that triggers an exchange rate movement plays a key role in determining the size of the associated pass-through (Forbes et al., 2018). For a small open economy like Nigeria that export crude oil and import refined petroleum products, the price of crude oil is important in the dynamics of inflation. For instance, in the event of an increase in oil price, net oil exporting countries gain in terms of higher revenue.

On the contrary, the impact of higher oil price on net importer is an increase in cost of production as well as cost of living (Salisu et al., 2017; Choi et al., 2018). However, the margin of impact between net oil importer and net exporter varies, as revenue gain by net exporter can be used to stabilize price level through both fiscal and monetary intervention thus, resulting to oil price having insignificant impact on price level (Iwayemi and Fowowe, 2011; Choi et al., 2018; Vu and Nakata, 2018). Empirically, rise in oil price has been attributed to be inflationary irrespective of whether the country in question is net importer or exporter of oil (Sek, 2017; Husaini et al., 2019a).

The impact of currency movement (appreciation or depreciation) on the price inflation varies across countries and according to the degree of dependency in the global market. Too much dependency on imported inputs requires strong currency value for price stability (Abeysinghe and Yeok, 1998; Fisher and Huh, 2002). Less dependency on imported inputs may give a country the leverage to be more competitive in the global market compared to when a country is too dependent on imported production inputs (Abeysinghe and Yeok, 1998; Husaini et al., 2019a). Generally, oil price and

exchange rate are two most important factors shaping the dynamics of inflation in a small open economy like Nigeria. As such, understanding the behavior of price in relation to oil price and exchange rate fluctuation is essential for policymakers to implement appropriate policies that will guarantee price stability. Suggestively, rising GDP is meaningless if inflation is not accounted for thus, maintaining price stability is crucial for meaningful growth rate in an economy.

Previous empirical studies on exchange rate pass-through in Nigeria employed different methodologies such as Granger causality tests, vector autoregression (VAR), cointegration and vector error correction framework, smooth transition regression model and unrestricted error correction method (UECM). This study reexamines exchange rate pass-through to inflation in Nigeria in an asymmetric framework, the objective of this paper is to examine the asymmetric impact of the oil price and the exchange rate on CPI using non-linear ARDL.

To achieve the above objective, the paper is structured into five sections. Following the introduction is section two, which is concern with the theoretical and empirical literature reviews. Section three looks at the data and methodology. In section four, we present the empirical results and section five concludes the paper with summary and policy recommendations.

2.0 Literature Review
2.1 Theoretical Literature

There are several theories in macroeconomics that provides the building block in investigating the relationship between energy consumption, inflation, economic growth etc. These theories include the Phillips curve economic theory, aggregate demand-aggregate supply model, the theory of rational expectations, and the quantity theory of money. These theories are pivotal in shedding light on the nexus between energy price and inflation. For instance, the Phillips curve illustrates how unemployment and inflation are interconnected. As per this concept, a surge in the demand for products and services leads to a positive boost in the demand for labor. Consequently, this results in a slight increase in inflation due to the upward push on wages. As a consequence, the public adjust their expectations of inflation and wage requirements. After this adjustment in expectations, the initial

surplus demand for labor diminishes, and employment returns to the initial equilibrium unemployment rate. However, the economy tends to operate at a higher inflation rate (Fregert, 2007). An additional theory that explains inflation dynamics is the aggregate demand-aggregate supply (AD-AS) model. According to this theory, if there is a rise in aggregate demand or a reduction in aggregate supply, it can cause inflation to escalate because of excessive demand and limited resources. This model emphasizes the significance of regulating the equilibrium between demand and supply to sustain both price stability and economic growth (Mankiw 2014).

The theory of rational expectations posits that individuals form expectations about future inflation based on all available information, including past trends and current economic conditions. According to this theory, people make rational predictions about price increases, and these expectations significantly influence their behavior, such as wage negotiations and purchasing decisions. Therefore, any attempt by the government or central bank to reduce unemployment through expansionary monetary policies may lead to temporary reductions in unemployment, but this will be offset by an equal increase in inflation. In essence, the theory underscores the idea that people's rational expectations play a crucial role in determining the actual inflation rate in the economy (Muth 1961: Alstadheim et al 2021). Another theory that seeks to explain the relationship between money supply, inflation and economic growth is the quantity theory of money attributed to the work of Friedman in 1963. According quantity theory of money, an increase in money supply will lead to more money chasing the same quantity of goods thus, leading to increase in inflation (Wei and Guo, 2016). As such, this theory highlights the significance of monetary policy in maintaining price stability (Jareno ˜ et al., 2023; Nasir et al., 2023). Finally, an important aspect of oil price-inflation nexus is that of market power. Uncompetitive practices in the global oil market, especially by OPEC members, leads to excessive market power responsible for higher prices (Vaitilingam, 2022: Colgan, 2014) Building on the aforementioned theoretical foundations, the next section explore literature on the asymmetric impact of oil price on price inflation.

2.2 Conceptual Framework

Nigeria is heavily reliant on imported oil for its energy needs. It also has a significant crude oil export sector that contributes to its foreign exchange reserves. Inflation control is a key priority for the country's central bank. Over the years, global oil prices have surged due to geopolitical tensions in major oil-producing regions and a surge in global demand. This has led to an increase in the cost of production for industries such as manufacturing, transportation, and agriculture in Nigeria. The increase in global oil prices has directly impacted the cost of production for domestic industries, leading to higher prices for goods and services. Additionally, the depreciation of the local currency has further amplified the cost of imported goods, contributing to overall inflationary pressures. The flow chart in Figure 1 illustrates how the interplay between oil prices, exchange rates, and inflation can create significant challenges for an emerging economy like Nigeria. Effective policy responses that consider both monetary and fiscal tools are crucial to maintaining price stability and supporting sustainable economic growth in the face of external shocks.

Below is the framework about the influence of oil price and exchange rate on inflation based on the theoretical framework described in section 2.1 While rise in oil price will increase cost of production which could be passed on to consumers in form of higher prices, the import dependent nature on refined petroleum product will lead to excessive demand for foreign currency leading to depreciation of domestic currency. Depreciation of domestic currency will further add to the inflationary pressure in the country.

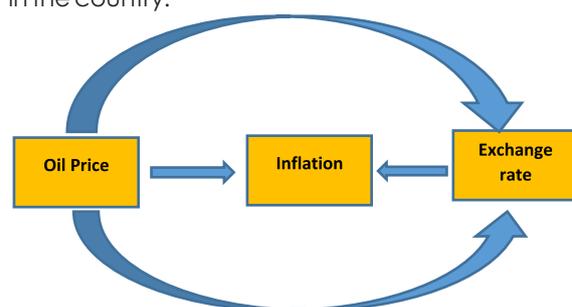Figure 1. Conceptual Framework on Oil Price-Exchange Rate-Inflation Nexus
Source. Author's Design

2.3 Empirical Literature

Evidence of incomplete exchange rate pass-through (ERPT) abounds for both developed and emerging market economies, however empirical literature on cross-country studies shows significant divergence across countries, leading to fundamental question about the underlying factors

driving ERPT (Ca' Zorzi et al, 2007). Although, the empirical evidence of ERPT is stronger in emerging countries compared to their developed counterpart (Choudhri and Hakura, 2006). According to the hypothesis put forward by Taylor (2000), the responsiveness of prices to exchange rate fluctuations depends positively on inflation. Subsequent cross-country studies on ERPT appear to support Taylor hypothesis.

Exchange rate movements are only partly transmitted to domestic prices, with the effects dissipating through the production chain, according to a large body of literature. Pass-through to consumer prices emerges via a variety of pathways, these range from direct effects via energy and other commodity prices to indirect effects via import prices, wage formation, and profit markups (Bacchetta and Van Wincoop, 2003; Burstein and Gopinath, 2014; Ito and Sato, 2008). Even for internationally traded goods, various forms of market segmentation may explain incomplete pass-through due to various trade frictions or firms' ability to practise price discrimination across international locations. Nominal rigidities may also contribute to the persistence of such deviations over time, resulting in a dwindling ERPT all across production chain (Ha et al 2020).

There are basically two reasons why central banks are concern about exchange rate fluctuations among others. The first reason is that such fluctuations reflect development in the price level. The mechanism through which fluctuation in exchange rate affect price level is known as exchange rate pass-through in the literature. It refers to the effect of a change (either increase or decrease) in the exchange rate on the overall price level (Nasir & Vo, 2020). The concept of pass-through is key to overall price stability of a country and constitutes an important element for allocative efficiency. Second, since the 2008 global financial crisis, exchange rate fluctuations become heavily weighted by central banks and constitutes an important aspect of financial stabilization efforts (Nasir & Du, 2018).

Citci and Kaya (2023) examine the connectedness of exchange rate uncertainty and inflation, in an economy with a flexible exchange rate and price rigidities. In this case, importers carry exchange rate risk by imposing a premium for the risk they face, which lead to increase in consumer prices. This pricing behavior provides a channel between exchange rate uncertainty and overall price level. The panel result of the 149 countries indicated that exchange rate has a significant and positive result on inflation. Their results also showed nonlinear effect of exchange rate uncertainty on inflation. This indicates that an increase in exchange rate uncertainty will lead to a corresponding decrease on its effect on inflation.

Hussaini and Lean (2021) examine the asymmetric impact of oil price and exchange rate on the disaggregated price inflation in Indonesia, Malaysia, and Thailand. The result shows that an increase in oil price has a greater impact on the producer price index (PPI) than the consumer price index (CPI) in all countries. Though, in Thailand a fall in the oil price is significant in reducing both CPI and PPI. Furthermore, a depreciation of exchange rate (an increase in the exchange rate) is significant in causing an increase in both the CPI and PPI in all countries. However, an appreciation in exchange rate (a decrease in the exchange rate) failed to reduce both the CPI and PPI in all countries. They recommend that policymakers continue their energy incentive programs, however, the distribution of the energy incentive should be improved to ensure that the benefit reaches the targeted group.

Bello and Sanusi (2019) used the Smooth Transition Regression model to estimates a nonlinear augmented New Keynesian Philips Curve for Nigeria for the period 1995Q1 to 2018Q2. The empirical evidence reveals the existence of two inflation regimes during the period under review. The results show that regime change in inflation is largely caused by exchange rate (transition variable) depreciation or devaluation of the naira. Also, the paper finds that the threshold in exchange rate devaluation (depreciation) that triggers a regime switch from low to high inflation regime. Overall, while the New Keynesian model has been successful in explaining some aspects of inflation dynamics, it has limitations and may not be able to fully capture the complexity of inflation dynamics in the real world.

Abiodun et al (2016) used the Johansen approach to cointegration and a vector error correction methodology to examine the exchange rate pass-through effect at the aggregate level into import and consumer prices in Nigeria for the period 1995Q1 – 2015Q1, and found the exchange rate pass-through into Nigeria's CPI inflation to be

incomplete. The long run pass-through elasticities were found to be 0.24 and 0.30 for the baseline and alternative models. However, the paper did not consider the impact of non-linearity in the relationship between exchange rate and price level. Also, Mathias (2015) examine the effect of exchange rate changes on consumer prices in Nigeria using recursive vector autoregression (VAR) model using quarterly data from 2000 to 2013. The result show that exchange rate fluctuation has a positive and insignificant effect on consumer prices and that the increase in consumer prices are mainly due to own shocks and the increase in money supply in the long run. However, all these studies in Nigeria do not consider the non-linear effect of both exchange rate and oil price in the dynamics of inflation in Nigeria. As such, the objective of this paper is to examine the asymmetric impact of oil price and exchange rate on CPI by employing the nonlinear autoregressive distributed lag model (NARDL).

3.0 Methodology
3.1 Model Specification
In order to explore the asymmetric impact of the oil price and exchange rate, respectively, on price inflation in Nigeria, this paper employed the non-linear ARDL model that account for other potential determinants like money supply and interest rate. The non-linear ARDL model accounts for nonlinear and asymmetric effect of exchange rate and oil price on inflation. In terms of the control variables (M2 and IR), we follow Lacheheb and Sirag (2019), and Husaini et al. (2019). We employed CPI as our endogenous variable and the model is specified as follows;

$$CPI_t = \propto_0 + \beta_1 OP_{t-1}^+ + \beta_2 OP_{t-1}^- + \beta_3 EX_{t-1}^+ + \beta_4 EX_{t-1}^- + \beta_5 M2_{t-1} + \beta_6 IR_{t-1} + \varepsilon_t \quad \text{----------1}$$

Where CPI denotes consumer price index a proxy for inflation, OP denotes oil price, EX denotes exchange rate in local currency units, and M2 is a measure of nominal money supply and IR is the interest rate.

In the theoretical literature, money supply and interest rate are positively related to price level (Schiller and Gebhardt, 2016). In other words, when money supply increases, it is expected to lead to increase in price level (Onis and Ozmucur, 1990). This is because it will result to increase in aggregate demand, thus pushing up prices. Similarly, increase in interest rate leads to increase in return to investment, thus people become wealthier than

before due to increase in income. Without a corresponding increase in aggregate supply, this will lead to increase in price level (Urich and Wachtel, 1984). However, Volcker's approach to controlling inflation stems from the demand pull perspective which characterized his commitment to raising interest rates to high levels to significantly reduce inflation rates. Volcker believed that controlling inflation was crucial for maintaining long-term economic stability. He believed that high inflation could erode the purchasing power of a currency and lead to economic instability. To combat this, he advocated for a tight monetary policy, often resulting in high interest rates. Both variables (money supply and interest rate) were included to avoid omitted variable bias. Due to the role of oil price as a key production input and it's uses in essential activities, as such, an increase in the oil price leads to a rise in the cost of production, which is passed on to the price of goods and services causing inflation (Schiller and Gebhardt. 2016; Husaini et al., 2019a; Salisu et al., 2017).

3.2 Data and Methodology
To account for the asymmetric relationship between the oil price and exchange rate on CPI which are our main independent variables of interest, this study uses a cointegrating nonlinear autoregressive distributed lag (NARDL) model of Shin, Yu and Greenwood-Nimmo (2014), wherein regressors can be decomposed using the partial sum of positive and negative changes. This method allows the model to exhibit only long-run asymmetry, only short-run asymmetry or combined short and long-run asymmetries. Following the work of Lacheheb and Sirag (2019), the approach to NARDL requires us to decompose a time series, OP_t and EX_t into

two series (OP_t^+), (EX_t^+) and (OP_t^-), (EX_t^-) as follows:

$$OP_t^+ = \sum_{j=1}^{t} \Delta OP_t^+ = \sum_{j=1}^{t} Max(\Delta OP_t^+, 0),$$

$$OP_t^- = \sum_{j=1}^{t} \Delta OP_t^- = \sum_{j=1}^{t} Max(\Delta OP_t^-, 0)$$

$$EX_t^+ = \sum_{j=1}^{t} \Delta EX_t^+ = \sum_{j=1}^{t} Max(\Delta EX_t^+, 0),$$

$$EX_t^- = \sum_{j=1}^{t} \Delta EX_t^- = \sum_{j=1}^{t} Max(\Delta EX_t^-, 0)$$

Where $\Delta OP_t^+, \Delta EX_t^+$ and $\Delta OP_t^-, \Delta EX_t^-$ are the partial sum of oil price and inflation respectively. In line with Shin et al (2014) the NARDL model can be stated as

$$\Delta CPI_t = \propto_0 + \varphi_1 CPI_{t-1} + \varphi_2^+ OP_{t-1}^+ + \varphi_3^- OP_{t-1}^- + \varphi_4^+ EX_{t-1}^+ + \varphi_5^- EX_{t-1}^- + \varphi_6 M2_{t-1} +$$

$$\varphi_7 IR_{t-1} + \sum_{i=1}^{p} \omega_i \Delta CPI_{t-1} + \sum_{i=0}^{q} \partial_i \Delta OP_{t-1}^+ + \sum_{i=0}^{r} \sigma_i \Delta OP_{t-1}^- + \sum_{i=0}^{s} \pi_i \Delta EX_{t-1}^+ +$$

$$\sum_{i=0}^{t} \theta_i \Delta EX_{t-1}^- + \sum_{t=i}^{u} \gamma_i \Delta M2_{t-1} + \sum_{t=i}^{v} \rho_i \Delta IR_{t-1} + \varepsilon_t \text{---------------------------2}$$

The coefficients of long-run estimate of inflation and exchange rate series can be tested using the Wald test for the null hypothesis are $\varphi_2 = \varphi_3$ for oil price and $\varphi_4 = \varphi_5$ for exchange rate respectively. Eqn. 2 implies that the model may exhibit asymmetries in both the short- and the long-run, only in the long-run or only in the short-run. The positive and negative long run coefficients of oil price (OP) and exchange rate (EX) can be calculated as: $\beta^+ OP^+ = \frac{\varphi_2}{-\varphi_1}$, $\beta^- OP^- = \frac{\varphi_3}{-\varphi_1}$ and $\beta^+ EX^+ = \frac{\varphi_4}{-\varphi_1}$, $\beta^- EX^- = \frac{\varphi_5}{-\varphi_1}$. The short run adjustment to a positive and a negative shock in the oil price and exchange rate are taken by the parameters are ∂_i, σ_i and π_i, θ_i respectively. The short-run symmetry can equally be tested by using a standard Wald test for the null hypothesis: $\sum_{i=0}^{q} \partial_i = \sum_{i=0}^{r} \sigma_i$ for oil price and $\sum_{i=0}^{s} \pi_i = \sum_{i=0}^{t} \theta_i$ for exchange rate, respectively.

The F-statistic for the bound test is used to determine the existence of a long-run relationship in the model (Pesaran et al., 2001; Shin et al., 2014). The null hypothesis is that there is no cointegration in the model. There are three possible outcomes to be derived from equation 2. First, is to reject the null hypothesis if the value of the F-statistic exceeds the upper critical bounds. Second, is to reject the null hypothesis if the value of the F-statistic is below the respective lower critical bounds. Third, if the value of the F-statistic is between the upper critical bound and the lower critical bound, the result is inconclusive.

The time period considered for this work dates from first quarter of 1995 to the fourth quarter of 2021. Data for real effective exchange rate is obtained from International Financial Statistics (*IFS*) database, M2, CPI, EX, IR and OP are obtained from Central Bank of Nigeria Statistical bulletin. The data sets M2 is quarterly while IR is annual both were interpolated to monthly using the Chow and Lin (1971) method.

4.0 Empirical Analysis

Table 1, presents a summary of unit root test for each variable in our model. The two important points worth noting here are that: the ARDL approach does not strictly require the classification of I(0) or I(1) (Pesaran et al., 2001). We employed the Augmented Dickey-Fuller (ADF) and Philip Perron test to examine the existence of unit root in our variables. From the result, the null hypothesis of a unit root in each of the series cannot be rejected against the alternative hypothesis of stationarity around a deterministic linear trend and constants in both Augmented Dickey Fuller test (ADF) and the Philip Perron test (PP) with the exception of M2. Given that our variables are mixture of I(1) or I(0), validates the use of F-test or bound test for cointegration.

Table 1: Unit Root Test Result

	ADF				PHILIP PERRON				
	Levels		1st Diff		Levels		1st Diff		OOI
	C	C&T	C	C&T	C	C&T	C	C&T	
CPI	9.17	6.38	1.34	-6.60	15.6	8.25	-5.81	-9.65	I(1)
EX	1.80	-0.03	-3.68	-4.28	2.41	0.03	-12.98	-13.53	I(1)
IR	-1.45	-1.64	-3.52	-5.51	-2.17	-2.36	-14.64	-14.43	I(1)
M2	3.77	2.59	-2.34	-3.98	7.04	-3.26	-6.58	-7.88	I(0)
OP	-2.30	-2.64	12.56	-12.54	-1.70	-2.14	-12.36	-12.34	I(1)

To further investigate the characteristics of our variables of interest, we explore the descriptive statistics of our variables of interest. Specifically, by considering the measures of central tendencies, variation and symmetric distribution of the series as presented in Table 2. The kurtosis that measures the peakedness or flatness of the series distribution is greater than 3 in CPI, EX, IR and $M2$ among the series, which is suggestive that four out of the series peaked to the surface or leptokurtic relative to the normal distribution. The fact that majority of our variables exhibit and heavy tail phenomenon indicate that

linear approach for our model might be biased. The Jarque-Bera normality test statistic for all the variables are statistically significant indicating non-normality of the distribution. The correlation statistics shows high positive correlation between CPI, EX and OP, suggesting that both exchange rate (EX) and oil price (OP) are important determinants of inflation (CPI). Also, the high negative correlation between CPI and interest rate (IR), and high positive correlation between CPI and M2 suggest that M2 and IR are crucial to inflation dynamics.

Table 2: Descriptive Statistics and Correlation Matrix

	CPI	EX	IR	M2	OP
Mean	121.83	174.47	12.88	3730.13	56.23
Median	86.65	137.58	13.44	2870.87	52.54
Maximum	411.52	453.89	21.01	15090.13	138.74
Minimum	14.36	73.84	5.23	79.29	10.22
Std. Dev.	100.67	96.19	3.03	3761.71	32.75
Skewness	1.10	1.30	-0.11	0.94	0.52
Kurtosis	3.26	3.59	4.07	3.01	2.23
Jarque-Bera	66.16	95.66	16.19	47.81	22.90
Probability	0.00	0.00	0.00	0.00	0.00
Observations	324	324	324	324	324

Correlation Matrix

	CPI	EX	IR	M2	OP
CPI	1.00				
EX	0.97	1.00			
IR	-0.46	-0.06	1.00		
M2	0.99	0.95	-0.21	1.00	
OP	0.67	0.22	-0.51	0.42	1.00

Table 3 shows the results of NARDL between inflation and other determinants with the asymmetric effects on exchange rate and oil price in Nigeria. To achieve this, we first estimate equation 2. The optimal lag length is selected by the use of Akaike information criteria (AIC). We also test for both short and long run asymmetries are applied to select the best specification. Our findings in Table 3 report the asymmetric evidence in both short and long runs, in which Panel A, B, and C present the short-term estimates, long-term estimates, and diagnosed effects, respectively. Estimates in Panel A indicate the short-term effects of inflation determinants such as exchange rate, oil prices, money supply and interest rate. The result shows that past inflation negatively affect the current inflation. With regards to our main variable of interest exchange rate and oil price (EX and OP), it shows that positive exchange rate shock or appreciation of exchange rate positively correlates with inflation. However, negative exchange rate

shock (depreciation) has opposite effect. Our result showed a clear asymmetric effect in terms of considering the impact of oil price on inflation. In other words, the short term and long term effect of positive oil price shock contribute positively to inflation in Nigeria. Our findings are consistent with the previous literature for instance by Nasir, Al-Emadi, Shahbaz, & Hammoudeh, 2019; Nasir, Lorente et al., 2020 and Pham et al. 2020. On our control variables, both money supply and interest rate shock do not have short term impact on inflation. Other diagnostic statistics show the model is correctly specified as indicated by the Ramsey RESET statistics, the result show no evidence of misspecification. CUSUM test is relied upon to check the stability of our coefficients, and the results show that our coefficients are stable as presented in figure 1. The LM statistics show no evidence of serial correlation as indicated by its insignificant statistics at 5% critical value. The result of the bound test

revealed that our calculated F statistics of 13.06 is higher than the upper bound critical value at 1, 5 and 10 percent respectively which shows evidence of cointegration. Similarly, the error correction term also shows evidence of long run relationship.

Table 3. Short run and Long run Result (Non-linear ARDL)

Panel A: Short run Result				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.34	0.34	-1.00	0.32
CPI_{t-1}	1.28	0.06	22.19	0.00
ΔEX_{t-1}^{+}	-0.23	0.09	-2.47	0.01
ΔEX_{t-2}^{+}	-0.01	0.00	-2.64	0.01
ΔEX_{t-1}^{-}	0.10	0.09	1.03	0.31
ΔEX_{t-2}^{-}	0.01	0.01	1.62	0.10
ΔEX_{t-3}^{-}	0.12	0.06	2.03	0.04
ΔOP_{t-1}^{+}	0.01	0.00	4.09	0.00
ΔOP_{t-2}^{-}	0.31	0.05	5.79	0.00
ΔMS_{t-1}	0.01	0.02	0.66	0.51
ΔIR_{t-1}	0.00	0.00	2.77	0.01
Panel B: Long run Result				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EX_{t}^{+}	-1.30	0.05	-23.96	0.00
EX_{t}^{-}	0.31	0.05	5.79	0.00
OP_{t}^{+}	0.01	0.00	3.75	0.00
OP_{t}^{-}	-0.01	0.02	-0.59	0.56
MS_{t}	0.00	0.00	2.96	0.00
IR_{t}	0.01	0.01	1.67	0.10
C	-0.23	0.33	-0.67	0.50

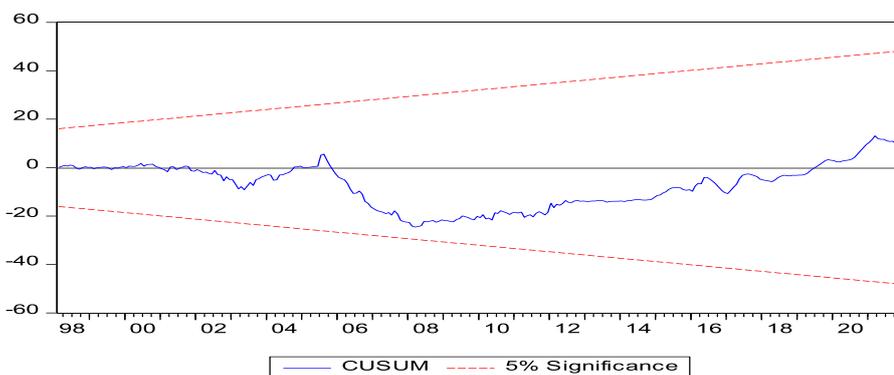| Panel C: Post estimation diagnostic results				
ECM_{t-1}	LM	ARCH	RESET	DW
-0.09	0.59(0.91)	1.71(0.32)	1.23(0.25)	2.01
CUSUM(CUSUMSQ)	Bound Test (F)	Wald Short run	Wald Long run	
Stable (Stable)	13.06	29.49(0.102)	17.66(0.006)	

Figure 1. Stability Test (CUSUM)

5.0 Conclusion and Policy Recommendation

This paper investigates the asymmetric impact of oil price and exchange rate respectively, on price inflation in Nigeria. We employ the NARDL approach to capture the magnitude of the change of both the increase and the decrease in the oil price and exchange rate on inflation. First, our result indicates that an increase in the oil price has a greater impact on CPI than a decrease in the oil price. The evidence that the impact of OP+ is greater than OP- on price inflation, implies that the government needs to implement various energy policies to offset the inflationary impact of positive oil price shock. The result of asymmetric effect of exchange rate on price level shows that an appreciation (depreciation) of the naira in relation to US dollar or a positive (negative) shock to the exchange rate leads to a positive (negative) response from inflation. However, what the results have shown suggest that the exchange rate appreciation leads to a reduction in inflation while the negative shocks showed a positive impact suggesting that exchange rate depreciation can be inflationary. In terms of policy context, our result showed that exchange rate pass-through (ERPT) has significant implication for monetary policy and that currency depreciation can be a challenge to the effort of achieving the objective of price stability.

Given the observed differences in the impact of oil prices and exchange rate on inflation, this study recommends that the monetary policy actions of the apex bank should be focused on addressing core inflation in periods of excessive oil price increase while strengthening local refining efforts to stop the economy from its dependence on imported petroleum products. This is in line with the fact that demand for foreign currencies by importers of refined petroleum products constitutes additional pressure and tendency for local currency to depreciate. This has far reaching implication on domestic price level as evident in the pass-through of exchange rate to inflation and consequently, the macro economy in general

Also, to mitigate the impact of rising oil prices and currency depreciation on inflation, the central bank of Nigeria may consider implementing a combination of monetary and fiscal measures. This could include adjusting interest rates to stabilize the currency and employing targeted fiscal policies to support domestic industries affected by higher input costs.

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Strategic Management in The Central Bank of Nigeria (CBN):The Journey So Far.

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Abstract

Strategic Management is very crucial for organizations to thrive in today's dynamic and complex environment. From enabling increased efficiency, improved decision-making, better collaboration & coordination and effective alignment with organizational goals, strategic management has positioned organizations to foresee trends and rapidly respond to changing market conditions. This paper used a qualitative approach in providing understanding of strategic management concepts covering strategy formulation, implementation, evaluation, and the benefits of its application for public organizations like the Central Bank of Nigeria (CBN). It also offered insights into the CBN's strategic journey. The paper noted that the Bank employed strategic management to ensure the clear articulation of its strategic direction and goals, and the alignment with the activities, functions, and resources that will ensure the realization of the Bank's mandate of ensuring monetary, price, and financial system stability in the Nigerian economy. The CBN transitioned from ad-hoc strategic functions and activities to a structured strategic management approach in 2012, while subsequent strategy cycles (2015-2019 and 2021-2024) witnessed an increased focus on inclusive economic growth, a transformative shift in the financial system, better adaptability to emerging challenges, and a people-centric vision that resulted in significant achievements in the Nigerian economy. The paper recommended that Central Banks should leverage Strategic Management in driving their goals of maintaining monetary and price stability, as well as fostering sustainable economic growth.

Key Words: strategic management, CBN, Balanced Scorecard, strategy cycle, thematic area, sustainable economic growth.

JEL: E58, E59

1.0   Introduction

Throughout the course of history, the concept of strategy has maintained its significance, influenced by key military conflicts and events that have shaped its understanding. Bracker (1980) explained that the term "strategy" originated from the Greek word "Strategos," which refers to a General. Additionally, the concept of "Stratego" embodies the notion of effectively utilizing resources to defeat an enemy. Strategic management has drawn inspiration from historical applications of strategy. In his renowned book, The Art of War, Ancient Chinese strategist and philosopher Sun Tzu (2010), presented strategic insights that continue to be studied by present-day business and military leaders. His emphasis on the imaginative and deceptive elements of strategy underscored the notion that strategic management is both an art and a science.

Strategic management is concerned with strengthening the long-term viability and effectiveness of organizations, integrating other management processes to provide a systematic, coherent, and effective approach for establishing, monitoring, and updating an organization's strategic objectives. It comprises decisions and actions that guide the formulation and implementation of plans aimed at achieving an organisation's objectives. (Pearce & Robinson 2005: Maroa & Muturi 2015). Parnell (2014) opined that strategic management deals with the continuous process of defining an organization's mission and goals within the context of its external environment and internal capabilities, formulating and executing strategies, and exercising strategic control to ensure the strategies are successful in attaining the organizational goals.

Furthermore, Strategic management helps align an organization's activities with its overarching goals and objectives, as it provides a structured framework for decision-making, allowing organizations to make informed decisions based on analysis and evaluation. In a dynamic political and institutional environment within which many public organizations operate, an effective strategic management capability is essential for maintaining and strengthening the fit between the organization and its external stakeholders and managing results within a clearly defined context of mission, mandates, values, and vision.

A strategically managed public organisation should have its budgeting, performance measurement, human resource, program management, and other management processes guided by a strategic

agenda, developed with buy-in from key stakeholders and communicated widely within the organisation. Over the years, the Central Bank of Nigeria (CBN), as a public organization, has implemented programs aimed at actualising its purpose as aligned with its mandate. To ensure a unified focus in driving a strategic direction that effectively fulfils its mandate, the Bank has gone through various strategy management cycles. This has brought to the fore the need to create awareness on how the Bank has been applying strategic management to achieve its mandate and to create positive impact on the Nigerian economy.

1.1. Aims and Objectives

This paper is aimed at providing an overview of the strategic journey of the CBN, and provide an understanding of the strategic management. The paper has been divided into five (5) sections; following this introduction is section two, which discusses the conceptual/theoretical framework for Strategic management. Section three provides insights on strategic management in the Bank, section four highlights the challenges and way forward, while section five is the summary and conclusion.

2.0. Conceptual/theoretical Framework

The concept of strategy can be seen as a means of establishing an organization's purpose, in terms of its long-term objectives, action programs, and resource allocation priorities. Various scholars have provided definitions for strategic management. According to Wheelen and Hunger (2002), strategic management is a set of managerial decisions and actions that determines the long-run performance of an organization.

Porter (1996) stated that strategic management is the comprehensive collection of ongoing activities and processes that organizations use to systematically coordinate and align resources and actions with mission, vision, and strategy throughout an organization.

Dess, Lumpkin & McNamara (2018) opined that strategic management is the process by which an organization formulates and implements strategies to achieve its objectives.

These definitions highlight the importance of the strategic management process in achieving the long-term objectives of organisations, through the efficient utilization of resources.

2.1 Evolution of Strategic Management

Strategic management as a discipline has evolved over the past century to address the complexities and challenges of managing organizations in an ever-changing and increasingly competitive environment. It has undergone significant evolution that can be traced back to the early 20th century with the pioneering work of Frederick W. Taylor and Henri Fayol, who laid the groundwork for systematic management practices (Taylor, 1911; Fayol, 1916). However, it was in the mid-20th century that modern strategic management began to take shape.

Following World War II, a recognition of the necessity for long-term planning led to the emergence of management theories like Management by Objectives (MBO) and Corporate Planning. The 1960s and 1970s saw a surge in interest, with scholars like Igor Ansoff, Kenneth Andrews, and Michael Porter contributing to foundational concepts such as strategic planning, portfolio analysis, and SWOT analysis. The 1980s emphasized competitive advantage, notably through Michael Porter's work on industry positioning.

In the 1990s and beyond, the field embraced the dynamic and global nature of business, focusing on core competencies, the resource-based view, and dynamic capabilities. In the 21st century, strategic management expanded to encompass strategy implementation, organizational culture, and sustainability, effectively adapting to the fast-paced changes in technology, globalization, and environmental concerns.

To implement their strategies, organisations use a strategic management framework that provides a detailed overview of the strategy management process. This process typically comprises several components, each playing a critical role in ensuring the success of the strategy. Understanding the components of strategic management is crucial for organizations, as they enable a structured approach to strategic planning and execution. The components include the organization's vision and mission; internal and external environment analysis; strategy formulation, implementation; and performance evaluation. The proper articulation and synchronization of these components play a significant role in the achievement of the overall strategy. These components are examined below, highlighting their purpose and significance.

2.2 Vision and Mission

Clear and compelling vision and mission statements are fundamental components of strategic management. They provide an organization with direction, purpose, and focus, helping it to identify its values and long-term goals. According to Hitt, Ireland and Hoskisson (2014), a vision statement "outlines the organization's aspirations and what it wants to become in the future," while a mission statement "describes the organization's business and identifies its customers and products or services." A well-crafted vision and mission statement can inspire employees, customers, and stakeholders, creating a shared sense of purpose and a commitment to achieving the organization's goals.

2.3 External and Internal Analysis

External and internal analysis is another critical component of strategic management. It involves analysing the organization's external environment and its internal resources and capabilities to identify opportunities and threats.

External analysis encompasses market and competitor analysis, which involves the process of gathering, evaluating and interpreting data and information about a specific market or industry. It entails environmental scanning on factors such as the industry structure, competitive landscape, market trends and regulatory environment. This can be conducted using tools such as:

I.   **PESTLE Analysis:** This analyses the Political, Economic, Social, Technological, Legal, and Environmental factors that may impact the organization.

II. **Porter's Five Forces Analysis:** This evaluates the competitive forces in an industry and identifies an organization's competitive position. The five forces include the threat of new entrants, the bargaining power of suppliers, the bargaining power of buyers, the threat of substitutes, and the intensity of competitive rivalry.

Internal analysis on the other hand, is focussed on assessing an organization's internal resources, capabilities and strengths, to identify its competitive advantages and areas for improvement, which will inform its strategic decisions. (Pearce and Robinson, 2017).

Types of internal analysis tools:

I.   **SWOT Analysis:** SWOT stands for Strengths, Weaknesses, Opportunities, and Threats. According to Grant (2021), "SWOT analysis is a simple but powerful tool for identifying the strategic options that a firm can pursue". Insights gained from the external and internal analysis help organizations to formulate a clear understanding of their position in an industry and develop strategies that leverage their strengths, mitigate their weaknesses, and take advantage of opportunities.

II. **Value Chain Analysis:** This evaluates the organisation's activities and processes that create value for customers. The analysis helps the organisation in identifying areas where it can improve efficiency and reduce costs.

III. **Resource Analysis:** It involves evaluating the organisation's tangible and intangible resources including financial resources, physical assets, intellectual property, technology, brand reputation, and human capital. It assesses the availability, uniqueness and strategic value of these resources.

IV. **Organisational Culture and Structure:** This helps to assess the organisation's culture, values, norms, and structure to gain an understanding of its internal operations, decision-making processes, and interactions. It identifies the alignment between culture and strategic objectives, determining whether the culture facilitates or obstructs the attainment of organizational goals.

2.4 Strategy Formulation

Strategy formulation is the process of developing a long-term plan that outlines the actions required to achieve an organisation's desired outcomes. It entails selecting the best course of action based on the insights gained from the external and internal analysis. According to Hitt, Ireland and Hoskisson (2014), strategy formulation comprises identifying strategic options, evaluating & selecting the best option, and developing an action plan. A strategic plan typically includes specific goals and objectives, and key performance indicators (KPIs) that help organizations to measure progress and evaluate the success of the strategy.

2.5 Strategy Implementation

Strategy implementation is the process of executing the strategic plan effectively. It involves translating the plan into specific actions, allocating resources,

and aligning organizational structures and systems to support its execution. According to Hunger and Wheelen (2001), successful strategy implementation requires a clear understanding of the organization's culture, effective communication, and leadership commitment. It also requires focusing on continuous improvement and the ability to adapt to changing circumstances.

2.6 Evaluation and Control

Evaluation and Control entails tracking progress, comparing actual results to desired outcomes, identifying areas of improvement, and taking corrective actions to ensure that the organisation stays on track to achieve its desired results. According to Pearce and Robinson (2017), evaluation and control is essential for ensuring that strategies are executed effectively and that they continue to be relevant in changing conditions.

Evaluation involves measuring the performance of the organization against the objectives and goals set in the strategic plan. It helps to determine if the strategies are working effectively and if there are areas that require improvement. To evaluate the progress of the organization, it is important to assess performance metrics and KPIs in relation to desired results and targets.

Control involves identifying deviations from the planned course of implementation and taking corrective action where necessary, so the organization remains on course to achieve its goals. This may involve making changes to the strategic plan, reallocating resources, or adjusting processes to improve performance. Control also involves monitoring external factors that may impact the organization's performance.

In implementing its strategic Management, the CBN adopted the Balanced Scorecard (BSC) methodology developed by David Norton and Robert Kaplan in 1992. The BSC is a strategic management framework that provides a balanced view of an organization's performance by considering various perspectives beyond just financial measures to include factors related to customers, internal processes, as well as learning and growth.

The financial perspective evaluates monetary metrics such as revenue and Return On Investment (ROI). From the customer's perspective, performance is gauged based on factors like satisfaction and market share. The internal business process perspective analyses how efficiently the organization operates, focusing on quality and innovation. Lastly, the learning and growth perspective delves into the organization's adaptability and growth potential, considering elements like employee satisfaction and investments in research and development.

To address its unique operating model, the CBN adapted the BSC to focus on three (3) perspectives namely: i. Outcome, focused on the results and measurable impact the Bank intends to achieve, ii. Internal process which deals with the effectiveness and efficiency of the Bank's operations and iii. Enabler, targeted at the internal capabilities needed to deliver the desired results.

3.0 Strategic Management In Central Bank Of Nigeria: The Journey So Far

According to the CBN Act (2007), the principal objects of the CBN mandate are to:

a. Ensure monetary and price stability;
b. Issue legal tender currency in Nigeria;
c. Maintain external reserves to safeguard the international value of the legal tender currency;
d. Promote a sound financial system in Nigeria; and
e. Act as Banker and provide economic and financial advice to the Federal Government.

The Central Bank of Nigeria (CBN) has over the years, implemented programs aimed at actualizing its purpose as aligned to its mandate. Prior to 2012, the formulation of strategy was primarily based on policy or regulatory requirements, without any emphasis on a comprehensive and integrated approach for the Bank. Adamu (2020) outlined that the non-formal strategy era was characterized by ad-hoc response to strategy issues; a contingency-driven approach to policy; regulation and stakeholder management; reactive & compliance-based supervision; a largely analog-driven & ageing infrastructure, systems, tools & techniques; and human resources not driven by strategic priorities of the Bank amongst others. He noted, "*From 1999 to 2012, the institution stepped up efforts toward laying the foundation for a comprehensive corporate strategy.*"

Hence, the CBN adopted a structured approach for its strategy management to ensure a unified focus in driving a strategic direction that effectively fulfils its mandate. Since 2012, the Bank has gone through

three (3) different strategy cycles as follows:

    I.   **2012 – 2015**

    II. **2015 – 2019**

    III. **2021 – 2024**

3.1   2012 – 2015 Strategy Cycle

For its first strategy cycle, the CBN made a deliberate effort to develop, define and document its Corporate Strategy by adapting the Balanced Scorecard framework and methodology. By adopting this approach, the Bank demonstrated its commitment to align its strategic objectives with its overall vision and mission supported by its core values. This cycle ran from 2012 – 2015, with the Vision:

"By 2015: Be the Model Central Bank delivering Price and Financial System Stability and Promoting Sustainable Economic Development".

The strategy was built on four (4) strategic themes and 21 strategic objectives that were designed to achieve the overarching vision of driving growth and development of the Nigerian economy. The strategic themes were - *Price Stability Conducive to Economic Growth* (PSCEG); *Safe, Stable, and Sound Financial System* (SSSFS); *Credible, Reliable, and Efficient Payments System* (CREPS); and *Become the Model Central Bank* (BMCB).

3.2.1   Key Achievements of the 2012 – 2015 Strategy

This strategy was a transformative endeavour that significantly improved the stability and resilience of the Nigerian economy. During the period, the Bank achieved remarkable milestones in the various thematic areas as follows:

    A. **Thematic Area: Price Stability Conducive to Economic Growth (PSCEG)**

    I.   **Achievement of Single Digit Inflation:** One of the key achievements of the Bank was the effective management of inflation. Through effective monetary policies, CBN successfully maintained a single-digit inflation rate within the required benchmark of 6% - 9% from Q1 of 2013 to end of Q2 in 2015.

    II. **Establishment of a World-class Dealing Room:** The CBN established the Dealing Room to serve as a central hub for managing financial markets, providing real-time access to market data, facilitating quick and informed decision-making. This has enhanced the CBN's ability to monitor and respond to market developments.

    III. **Trade Monitoring System:** The Bank facilitated the deployment of e-Form "M" to enhance trade monitoring and promote transparency in the country's financial sector. The e-Form "M" was used to process import and export transactions, capturing details such as the type of goods, their value, and country of origin. The platform enabled real-time tracking and verification of all trade transactions, ensuring compliance with international trade regulations and preventing money-laundering activities. The implementation of this system significantly reduced the manual processing of trade transactions thereby improving efficiency and reducing the risk of fraudulent activities. The e-Form "M" reduced the cumbersome processing time from a minimum of "one week" to "on-the-spot". It also grants applicants access to complete the form from any location, at any time and to effect amendments.

    B. **Thematic Area: Safe, Stable, and Sound Financial System (SSSFS)**

    I.   **National Financial Inclusion Strategy (NFIS):** The global pursuit of financial inclusion as a vehicle for economic development, had a positive effect in Nigeria, as the exclusion rate reduced from 53.0 % in 2008 to 46.3 % in 2010. Encouraged by the positive development, the CBN in collaboration with stakeholders launched the National Financial Inclusion Strategy in 2012 which led to a reduction in the percentage of adult Nigerians that were excluded from financial services from 46.3% in 2010 to 39.5% in 2014.

    II. **Consumer Protection Framework (CPF):** The Bank developed the framework to safeguard the rights and interests of consumers in the Nigerian financial sector thereby enhancing financial inclusion and ultimately, a stable financial system. It included nine (9) principles namely: Responsible Business Conduct, Disclosure and Transparency, Consumer Financial Education, Fair Treatment, Protection of Consumer Assets and Privacy, Complaints Handling and Redress, Competition, and Enforcement. The development and release

of the CPF led to an enhancement of the existing redress mechanism, making it more effective. It also significantly improved market conduct and discipline and heralded the launch of the financial literacy initiative.

III. **Deployment of *FinA*:** The CBN deployed a Management Information System (MIS) Dashboard known as *FinA*. The Application was a web-based platform that provided real-time financial data and analysis for the CBN and DMBs. Its primary objective was to enhance the efficiency and effectiveness of the financial system in Nigeria. With the application, CBN was able to monitor the financial system more closely and take necessary actions where required.

IV. **Deployment of Risk Management Framework and International Financial Reporting Standards (IFRS) template for OFIs:** The CBN collaborated with stakeholders to create a Risk Management Framework and IFRS template for Other Financial Institutions (OFIs). The framework guided OFI risk identification, assessment, and management given the significance of risk management in financial stability and depositor protection. Similarly, the IFRS template promoted openness and accountability in financial reporting by ensuring uniformity and comparability.

V. **Good Ranking from the FATF on AML:** The CBN earned a good ranking on the Anti-Money Laundering (AML) measures specified by the Financial Action Task Force (FATF) during the period of 2012-2015. This ranking provided assurance to stakeholders that Nigeria's financial system was secure and protected against money laundering and terrorist financing activities.

VI. **Tiered Know-Your-Customer (KYC) Guidelines:** The introduction of the Guidelines was aimed at establishing a risk-based approach to customer identification and verification. This helped financial institutions better understand their customers and minimize the risk of financial crimes.

C. **Thematic Area: Credible, Reliable, and Efficient Payments System (CREPS)**

I. **Cheque Truncation and Reduction in Clearing Cycle Time:** The cheque truncation process significantly reduced the clearing cycle time to T+1, resulting in faster and more efficient payments as well as improved cash flow for businesses and individuals. Additionally, the electronic processing of cheques greatly reduced the risk of fraud and errors associated with physical cheque processing, thereby improving the overall efficiency of the payment system in Nigeria.

II. **Licensing of 21 Mobile Money Operators:** To promote financial inclusion and improve access to financial services for the unbanked population, the CBN licensed 21 mobile money firms to offer mobile financial services. This action was aimed at providing affordable, secure financial services to underserved populations, particularly in rural areas. The licensed operators were required to meet certain regulatory standards and guidelines set by the CBN to ensure the safety and soundness of the mobile money industry.

III. **Biometric Verification Number (BVN):** The CBN implemented the BVN as a means of enhancing the security of customers' bank accounts. It was designed to reduce fraud and money laundering by making it easier to track transactions through a unique identification number that linked all bank accounts of an individual or corporate entity. Implementation of BVN helped to improve the security of customers' funds and led to a reduction in fraudulent activities in the banking sector.

IV. **Implementation of Cashless Policy:** With the aim of reducing the volume of physical cash in circulation and promoting electronic payment systems, the cashless policy was designed to encourage the use of electronic payment channels such as cards, mobile banking, and internet banking, thereby reducing the cost of cash handling for banks and enhancing financial inclusion. CBN implemented the policy in phases, starting with Lagos State in 2012 and gradually extending to FCT and other states in the country within that period.

V. **Issuance of Agent Banking Regulations and Licensing for Super Agents:** The aim of this

initiative was to encourage financial institutions to use agents to provide basic financial services in underserved areas, reduce the cost of banking, enhance financial inclusion and promote economic growth. To this end, the CBN developed regulations that govern the activities of agent banking, including the licensing and supervision of super agents.

VI. Compliance Monitoring with Payment Card Industry Data and Security Standards (PCI-DSS): The PCI-DSS Standards were adopted to ensure that payment card data was protected from theft or fraud. The Bank ensured compliance with the requirements of the Standard by engaging in regular audits and assessments of financial institutions to identify and promptly address any vulnerabilities.

VII. Nigerian Sustainable Banking Principles (NSBP): The CBN introduced the NSBP to align with global standards and promote responsible banking practices. The principles were implemented to encourage banks to incorporate social, environmental, and governance factors into their operations.

VIII. Nigerian Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL): CBN established the initiative aimed at de-risking agricultural lending, thus encouraging commercial banks to increase their lending to the agricultural sector. NIRSAL enabled access to credit for farmers and agribusinesses, thereby enhancing agricultural productivity.

D. Thematic Area: Become the Model Central Bank (BMCB)

I. Reorganization and Automation of Processes to Ensure Efficiency: In recognition of the need to improve the efficiency and effectiveness of the Bank's operations, the CBN restructured selected Departments, streamlining and automating their processes to support their functions. This aimed to ensure that they were adequately equipped to deliver on the Bank's strategic objectives.

II. Establishment of the International Training Institute (ITI): The ITI was established as a world-class institute to provide high-quality training and capacity building programs. The institute has continued to provide a conducive learning environment for the upskilling of CBN staff and other external stakeholders.

3.3 2015-2019 Strategy Cycle

In 2014, a change in leadership at the Central Bank of Nigeria (CBN) prompted the formulation of a new strategy and the commencement of the second strategy cycle, which spanned from 2015 to 2019. Approved by the Board on October 13, 2015, the Bank's vision in this strategy cycle was to **"Be the Model Central Bank delivering Price and Financial System Stability and Promoting Sustainable Economic Development."**

To actualize the vision, the four (4) strategic themes from the previous strategy cycle were retained, and a new theme, *Sustainable Finance and Inclusive Growth* (SFIG) was added. This addition was informed by the Bank's desire to leverage its developmental function to drive inclusive growth and economic development.

The new thematic area increased the number of strategic themes to five (5), with twenty-five strategic objectives. The objectives addressed various areas, such as improving the regulatory and supervisory framework, advancing financial inclusion, enhancing the payments system, and strengthening the Bank's preparedness for enhanced performance. To ensure the achievement of the focus areas, the Bank implemented various strategic initiatives (programs and projects) to close performance gaps.

3.3.1 Key Achievements of the 2015 – 2019 Strategy

During the 2015-2019 strategy cycle, the CBN made significant progress in its strategy execution, which resulted in some key accomplishments in the various thematic areas.

A. Thematic Area: Price Stability Conducive to Economic Growth (PSCEG)

I. Stabilization of the Foreign Exchange Market: The CBN achieved the stabilization of the market through the adoption of flexible exchange rate regime, which allowed market forces to determine the value of the Nigerian currency. The flexible exchange rate regime had a significant

; impact in reducing the gap between the official and parallel market rates, as the premium between the two rates remained relatively stable ranging from 14% to 19% percent within the strategy cycle.

II. **Automation of the Dealing Room Processes:** The automation improved the Dealing Room's efficiency, accuracy, and transparency in enabling real-time tracking and monitoring of interbank transactions; and information transmission among market participants.

III. **Deployment of Scripless Securities Settlement System (S4):** The CBN deployed the Scripless Securities Settlement System (S4), which was an electronic replacement for the paper-based securities transactions system. This was a major step forward in its efforts to modernize and improve Nigeria's financial infrastructure.

IV. **Automation of Form "A", "NXP" and "NCX":** CBN facilitated the automation of the forms which streamlined the trade process reducing manual intervention, and errors as well as enhancing the trade monitoring process.

V. **The Investors & Exporters Window:** The I&E window was introduced to boost foreign exchange liquidity and attract foreign investments into the country. The window provided a platform for investors to freely trade foreign exchange at market-determined rates and was instrumental in improving the availability of foreign exchange in Nigeria.

B. 7 **Thematic Area: Safe, Stable, and Sound Financial System (SSSFS)**

I. **Consumer Complaint Management System:** To engender public confidence in the financial system, the CBN implemented an industry-wide Consumer Complaint Management System, which has provided a platform for consumers to report any issues they encounter with financial institutions, thereby safeguarding their rights and interests. The deployment of the system has played a crucial role in ensuring that consumers' complaints are effectively addressed and resolved.

II. **Inclusion of Other Financial Institutions (OFIs) in the FATF/AML:** To further strengthen its commitment to the country's anti-money laundering (AML) and counter-terrorism financing (CTF) regime, the Bank included Other Financial Institutions (OFIs) in the Financial Action Task Force (FATF) and AML/CFT compliance framework. This was done in recognition of the important role that OFIs play in the financial system and the need to mitigate the risks associated with their operations. The action aimed to ensure that OFIs were held to the same high standards as Deposit Money Banks.

III. **Financial Literacy Curriculum for Primary & Secondary Schools (Phase 1):** The curriculum was designed to equip young Nigerians with the necessary skills and knowledge to make informed decisions about their finances. It covered a range of topics related to personal finance, such as budgeting, saving, investing, and managing debt.

C. **Thematic Area: Credible, Reliable, and Efficient Payments System (CREPS)**

I. **Unstructured Supplementary Service Data (USSD) Telecom Protocol:** CBN implemented the USSD to facilitate financial transactions and services, particularly in areas with limited access to banking infrastructure. The USSD, which is a communication protocol, enabled users to perform basic banking functions such as checking account balances, transferring funds, and paying bills via their mobile phones, without requiring internet connectivity. This was instrumental in driving financial inclusion in Nigeria.

II. **Interchange Fee Regime:** The introduction of the Interchange fee regime in consultation with the industry stakeholders replaced Merchant Service Charge (MSC). This enhanced the issuance and utilization of card transactions in the country and brought structure to the compensatory mechanism for parties involved in financial transactions such as merchant acquirers, card schemes, card issuers, mobile money operators, payment terminal service providers, and payment terminal service

aggregators.

III. **Electronic Payment Incentive Scheme (EPI):** CBN introduced the Electronic Payment Incentive Scheme (EPI) to promote the use of electronic payment channels among individuals and businesses. The primary goal of the scheme was to decrease reliance on cash transactions and enhance financial inclusion in Nigeria. Under the EPI, merchants and consumers were incentivized to adopt electronic payments through rewards, discounts, and other benefits.

D. Thematic Area: Sustainable Finance and Inclusive Growth (SFIG)

I. **Youth Entrepreneurship Development Programme (YEDP):** CBN launched the programme to address the challenges faced by young entrepreneurs in accessing finance and obtaining support for their businesses. The YEDP offered eligible applicants, loans of up to N10 million at a single-digit interest rate, as well as business development and mentoring services. The program focused on providing training and capacity building programs to equip young entrepreneurs with the necessary skills for business success.

II. **Anchor Borrowers Programme (ABP):** The programme was launched to boost the production and processing of key agricultural commodities by creating economic linkages between anchor companies and smallholder farmers. The ABP was successful in increasing agricultural productivity, improving rural livelihoods, and reducing food imports in Nigeria.

III. **Establishment of the National Collateral Registry (NCR):** The NCR was created to enhance financial inclusion and access to credit for Micro, Small and Medium Enterprises (MSMEs) in Nigeria. It provided a platform that allowed lenders to register security interests in movable assets, such as vehicles and equipment, used as collateral for loans granted to MSMEs. The NCR also provided a comprehensive database of movable assets that were pledged as collateral, which helped lenders to reduce the risk of non-performing loans.

IV. **Shared Agent Network Expansion Facility (SANEF):** SANEF was established by CBN to deepen financial inclusion and promote availability of financial services to underserved and unserved Nigerians through a network of shared agents. It increased the number of financial points & agents and contributed to financial literacy and inclusion in the country.

V. **Agribusiness Small and Medium Enterprise Investment Scheme (AGSMEIS):** The scheme was targeted at promoting agricultural and agro-allied businesses in Nigeria by providing low-interest loans to Small and Medium Enterprises (SMEs). AGSMEIS provided finance to SMEs in the agricultural sector and facilitated growth in the Nigerian economy.

VI. **NIRSAL Microfinance Bank (NMFB):** CBN facilitated the establishment of the NMFB in 2019 to provide access to finance for smallholder farmers, agricultural value chain players, and Micro, Small and Medium-sized Enterprises (MSMEs). In line with the CBN's commitment, NMFB enhanced access to credit for underserved populations thereby promoting financial inclusion and stimulating economic growth.

VII. **Non-oil Export Stimulation Facility (NESF):** The NESF was designed as a low interest loan intervention programme to encourage and support non-oil export-oriented businesses. The facility was aimed at diversifying the Nigerian economy, reducing the country's dependence on oil and addressing some of the challenges faced by Nigerian exporters, including inadequate infrastructure, high transportation costs, and limited access to finance. The NESF played a significant role in promoting non-oil exports and economic growth in Nigeria.

E. Thematic Area: Become the Model Central Bank (BMCB)

I. **Enterprise Risk Management (ERM) Framework:** As part of its strategy, CBN implemented an ERM framework to enhance its risk management capabilities

and practices. Implementation of the framework provided a holistic approach to identifying and managing risks, and the integration of risk management in the organization's decision-making process.

II. **Enterprise Programme Management Framework:** The EPM framework provided a standardized approach to programme and project management that enabled effective decision-making, risk management, and stakeholder engagement. It helped rationalize the proliferation of projects and initiatives in the organization, thereby leading to significant cost savings.

III. **Organizational Alignment and Workforce Optimization:** The CBN implemented programmes that focused on aligning the organizational structure with its strategic goals and optimizing its workforce. A new department, Payments System Management (PSM) was created to improve efficiency, safety, and accessibility of the payments system. Additionally, a comprehensive assessment of the workforce was conducted to ensure that the right skill sets and competencies were in place, in line with the organization's needs.

3.4   2021 – 2024 Strategy

Following the expiration of the 2015-2019 strategy, it became imperative to adopt a more agile approach to strategy management to address emerging complexities in the financial system, the resulting effects of the Covid-19 pandemic, the disruptive impact of technology and innovation, and the changing roles of central banks globally. The 2021-2024 Strategy was approved by the Board on October 25, 2021, and officially launched on February 22, 2022.

It was formulated to create a transformative shift in the financial system, which underscored the CBN's commitment to actively contribute to solving the fundamental challenges faced by the country, as it relates to its mandate of ensuring monetary, price, and financial system stability.

A key element of the strategy is the adoption of a new Mission Statement: *"To ensure monetary, price and financial system stability as a catalyst for inclusive growth and sustainable economic development"* which defines and translates the Bank's purpose as anchored in its Mandate.

In addition to the Mission, a new Vision Statement was crafted for the Bank *"To be a people-focused Central Bank promoting confidence in the economy and enabling an improved standard of living".* The vision, which is centred on a people-focused approach, highlights the Bank's commitment to create a higher standard of living for the citizens and to inspire active participation from all stakeholders. Through collaboration, the Bank intends to implement policies and interventions that will generate tangible and measurable impact. This informed the proposition of *"Partnering for Success"* which identified six (6) key stakeholders — Citizens, Businesses, Diaspora, Investors, Operators, and Government.

The strategy aims to address five value gaps identified in achieving our Mandate, namely: *High Inflation, Unstable Exchange Rates, High Cost of Borrowing, Financing Import Dependency,* and *High Dependency on the Central Bank.* It is expected that at the end of 2024, the desired outcomes of *low inflation, stable exchange rates, low cost of borrowing, a more productive, export-focused economy,* and *a deeper and broader financial system* would be achieved.

Furthermore, it is centred around seven (7) Strategic Themes comprising 24 Strategic Objectives that will enable the Bank to achieve its strategic goals. The Strategic Themes include five (5) Value-creating themes namely: *Price Stability, Integrity & Soundness,Future-Forward & Inclusive, Catalyst for Productivity, and Resilience Against Shocks* and two (2) Enabling themes: *Operational Excellence and Empowered for Impact,* which serve as the bedrock for achieving the desired outcomes.

To foster a culture that supports the realization of the new strategy, the Bank adopted new core values. These values encapsulated in I-PACT - Integrity, Partnership, Accountability, Courage, and Tenacity - embody the beliefs that unify the organization internally, and externally with its stakeholders and communities. The core values serve as guiding principles that define and shape the Bank's work practices and culture.

3.4.1   Key Initiatives of the 2021 – 2024 Strategy

The implementation of the 2021-2024 Strategy has resulted in significant strides towards

accomplishing the Bank's desired outcomes to close the value gaps. Some key initiatives are highlighted below:

I.   **Regulatory Sandbox for the Nigerian Payments System:** The CBN Regulatory Sandbox was launched to enable fintech firms conduct live tests of new, innovative products, services, delivery channels and business models in a controlled environment, subject to appropriate conditions and safeguards. The Sandbox is expected to foster collaboration, knowledge sharing, and partnerships among fintech firms, traditional financial institutions, and regulators to drive further innovation in the payments' ecosystem. Through the Sandbox, the CBN will facilitate the emergence of numerous innovative payment solutions to expand access to financial services, drive financial inclusion and promote economic development. Valuable insights gained from the operationalization of the Sandbox will enable the development of regulatory frameworks that balance innovation, consumer protection, and financial system stability.

II. **RT200 FX Programme:** The CBN introduced the programme to generate more stable and sustainable Foreign Exchange (FX) inflows through increased contribution of non-oil exports, thereby safeguarding the Nigerian economy against FX shortages and shocks. Specifically, the programme aimed to raise $200 billion in foreign exchange (FX) earnings from non-oil sources within the next 3-5 years. One of the key pillars of the programme is the Non-oil Export Proceeds Repatriation Rebate Scheme, designed to incentivize exporters in the non-oil sector to repatriate and sell their export earnings in the FX market. Within a period of 14 months from the launch of the programme, a total of $1.7 billion was repatriated. 46.5 per cent of the value ($790 million) was sold at the Investors' & Exporters' Window and the balance retained in the exporters' domiciliary accounts.

III. **National Financial Inclusion Strategy:** In 2022, the CBN and the National Financial Inclusion Governance Committees launched new policy documents to accelerate financial inclusion in Nigeria, with a target of 95% inclusion by 2024. The implementation of these policy documents was to serve as tools for economic development particularly in the areas of poverty reduction, employment generation, wealth creation, and improved standard of living. The documents which were unveiled included: The *National Financial Inclusion Strategy (NFIS 3.0)*, *National FinTech Strategy, Strategy for Leveraging Agent Networks to Drive Women's Financial Inclusion,* and *Payment System Vision 2025.*

IV. **CBN Digital Currency:** The Central Bank Digital Currency (CBDC) ***"eNaira"*** is aimed at facilitating diaspora remittances; improving efficiency of cross-border payments; enabling direct welfare disbursements to citizens; and encouraging financial inclusion amongst others. The CBN through the eNaira initiative launched *Programmable Money*, a solution that has transformed the traditional disbursement process of the Federal Government and enhanced the efficiency of disbursing targeted or in-kind fiscal support of various schemes. The CBN also introduced the eNaira USSD code *997# that has enabled seamless access to financial services thereby increasing participation in the digital economy and promoting financial inclusion.

V.   **Naira Redesign Policy:** This was aimed at enabling the CBN to effectively manage currency circulation, combat counterfeiting, promote the expansion of a cashless economy, manage inflation, and strengthen the implementation of monetary policy. The implementation of the policy resulted in reduced currency in circulation which impacted the implementation of monetary policy. It also led to an uptick in the utilization of alternative channels of payment, which facilitated the adoption of the cashless policy and enhanced financial inclusion.

4.0   Successes, Challenges and Way Forward

Through its strategic execution over the years, the

CBN achieved significant successes as enumerated in the different strategy cycles discussed previously. The Bank also encountered challenges that underscored the complexities and evolving nature of Nigeria's economic landscape. These challenges bordered on access to accurate and comprehensive macroeconomic data, poor coordination between fiscal and monetary authorities, managing disruptive tendencies arising from the growth of Fintech companies, enabling an attractive business environment, and overcoming limitations in the export structure to support foreign exchange (FX) inflows, amongst others.

These challenges impacted on the Bank's ability to achieve some of its strategic goals. The CBN was unable to achieve its inflation target in the 2015–2019 strategy cycle stemming from the challenges experienced during the recession in 2016. However, the Bank through the implementation of various policies was able to moderate inflationary pressures within the cycle.

However, the CBN is actively investing in strengthening data collection mechanisms through the implementation of data management initiatives and leveraging technology that would ensure timely access to accurate macroeconomic data and enable informed decision-making. Furthermore, the Bank is fostering collaboration between traditional banks and Fintech companies by implementing regulatory frameworks that promote partnerships and knowledge-sharing platforms.

The CBN is also strengthening effective coordination between the monetary and fiscal authorities to align policies and maximize their impact on economic stability and growth. Recognizing the significance of an attractive business environment, the CBN is enhancing collaboration with relevant stakeholders to address regulatory bottlenecks, facilitate infrastructural development, and provide financial incentives to attract domestic and foreign investors.

Furthermore, the Bank is actively supporting export diversification and growth through the facilitation of export promotion strategies and trade facilitation measures. It has also adopted an agile regulatory approach, to ensure a balance between innovation and stability in the financial sector.

The continued adaptation of the Bank's strategies and policies is enabling it to navigate the complexities of the financial landscape, foster innovation, address regulatory gaps, and establish an enabling environment conducive to sustainable economic growth and development in Nigeria.

5.0 Summary, Conclusion and Recommendations

Understanding the key building blocks of successful strategy management is crucial for organizations aiming to thrive in a competitive global business environment. These building blocks include having a clear vision and mission statement, conducting external and internal analysis, formulating strategies based on insights gained, implementing those strategies effectively, and continuously evaluating and adjusting them as needed.

For central banks, strategy management is of utmost importance as it ensures alignment between organizational goals and broader macroeconomic and financial stability objectives. By developing and executing well-defined strategies, central banks can effectively manage risks, respond to crises, and fulfil their mandates in an efficient manner. To develop successful strategies, central banks need to analyse the economic and financial landscape, identify risks and challenges, and establish clear objectives consistent with their mandates. Effective communication, regular monitoring of progress and adaptation to environmental changes are also essential.

The Central Bank of Nigeria has embraced strategic management, implementing three strategy cycles from 2012 to 2015, 2015 to 2019, and an ongoing cycle from 2021 to 2024. During the initial strategy cycle, the Bank focused on enhancing financial stability and refining regulatory frameworks, which resulted in improved financial systems and increased investor confidence. The second cycle prioritized economic growth and development by supporting small and medium-sized enterprises, enhancing credit accessibility, and fostering financial inclusion, enabling increased productivity and job creation. The current strategy cycle aims to build upon previous successes, to maintain resilience in the financial system, achieve sustainable economic growth and improve the standard of living standard of living of Nigerians.

The application of strategy management within the CBN has aligned its operations with the Bank's strategic objectives, shaping its strategic direction. Through strategic management, the CBN is working towards achieving its goals of maintaining monetary and price stability, promoting a stable financial system, and fostering sustainable economic growth. Looking ahead, the Bank will continue to leverage strategy management to respond effectively to evolving economic conditions and emerging trends, thereby playing a vital role in promoting sustainable economic growth and development in Nigeria.
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An Inflationary Implication of Politically Motivated Expansionary Fiscal Policy

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Abstract

Despite the efforts of the Central Bank of Nigeria in controlling inflation in the country, the fiscal arm of the government has been unfrugal in spending and that is what informed this work looking at the inflationary implication of an expansionary fiscal policy that is politically motivated in Nigeria using a time series data between 1981 and 2021. The methodology of the Autoregressive Distributed Lag model was employed and the findings showed that fiscal deficit, public debt and debt financing positively and significantly affect inflation both in the short and long run. The speed of adjustment of any disequilibrium was estimated to be 20 per cent per annum. It was therefore recommended that government spending should be restrained to whatever could help improve productivity. Similarly, there is a need for a strong alignment between the fiscal and monetary arms in fighting inflation.

Key Words: Inflation, Fiscal policy, Public Debt, Tax

JEL Classifications: H5, H6, E3, E5, E6

1.0   Background to the study

One of the traditional views on the management of economic activities is the manipulation of either fiscal or monetary policies. These duos are referred to as demand management policies because they aim at controlling the aggregate demand to achieve any of the macroeconomic goals. Monetary policy has been at the forefront of combating inflation and that is in the purview of the Central Bank of the country. However, the macroeconomic challenges that accompany the monetary policy are, to a large extent hurting some other macroeconomic goals. For instance, when the interest rate is raised to control inflation, it has an attendant effect on investment and consequently on the output and growth of the economy.

In light of the supply chain disruption resulting from the impact of COVID-19, the Russian-Ukraine war, and the domestic insecurities in Nigeria, demand has greatly outstripped the supply of many products (consumer goods especially). This, no doubt has led to excess demand which has resulted in inflationary pressures in the country.

Despite all attempts by the Central Bank of Nigeria (CBN) to moderate inflation for many years now, it has refused to be tamed and that is a signal of the fact that monetary policy alone may not be able to effectively control inflation in Nigeria if the fiscal dimensions are not controlled. A contractionary monetary policy with an expansionary fiscal policy will produce frustrating outcomes for the monetary authorities. In an event when the CBN is increasing the monetary policy rate and the fiscal arm of the government is deliberately embarking on expansionary measures to deliver on campaign promises, it may result in undesirable outcomes.

Monetary policy has the potential to put a check on the price level variability through the interest rate channel, while the fiscal policy is potentially equipped to set the economy on the long-run path through investment in infrastructure, healthcare, education, equitable distribution of income through effective tax administration and transfer payments mechanisms in addition to the provision of public goods and services. It is therefore important to note that most of the inflationary tendencies in developing economies are due to fiscal imbalance (Ljungqvist and Sargent, 2000). The balancing capacity of fiscal policy can be demonstrated only through fiscal responsibility.

Fiscal responsibility or discipline is demonstrated through some fiscal policy channels, such as: (1) cutting down on unnecessary government expenditure to reduce the fiscal deficit which will further reduce borrowing and reduce debt service charges, (2) embarking on appropriate tax policies that will affect all the components of aggregate demand downwards. It is this fiscal responsibility, which could be referred to as fiscal restraint that this work intends to examine how much it could affect inflationary tendency in Nigeria. Fiscal discipline or responsibility shows that the policymakers are willing to align with the inflation control measures by the CBN.

1.1 Fiscal Deficit and Inflation

When a country approves a budget deficit, it has invariably signed into two critical issues. The first one is that the budget deficit could be financed through fiscal policy by borrowing (domestic or/and external) and it could also be financed through printing more currency (Sargent, et al, 1981; Muhammed, et al,

2016). Printing more currency may be subject to seigniorage, especially when it is positive, but most of the time it is negative. It is the seigniorage that is used to finance the budget and not have to resort to taxes. These two channels of financing budget deficit have their negative consequences. When money is borrowed especially from domestic sources, this leads to the crowding-out effect of private investment in the country, through the instrumentality of high-interest rates, and that stifles productivity and growth (Keynes, 1923, Fisher, et al, 2000, Lin and Chu (2013). Some researchers have established a positive relationship between budget deficit financing and inflation (de Hann and Zelhorst 1990, Edwards and Tabellini 1991, Fischer, et al. 2002). On the other end of the spectrum, some other authors have found no significant relationship between fiscal deficit and inflation (Niskanen,1978, McMillin and Beard,1982, Ahking and Miller,1985). Both domestic and external borrowing leads to debt burdens that are passed on to the next generations. It also affects debt servicing burdens and eventually could lead to debt overhang.

Figure 1.1 Inflation and Budget Deficit
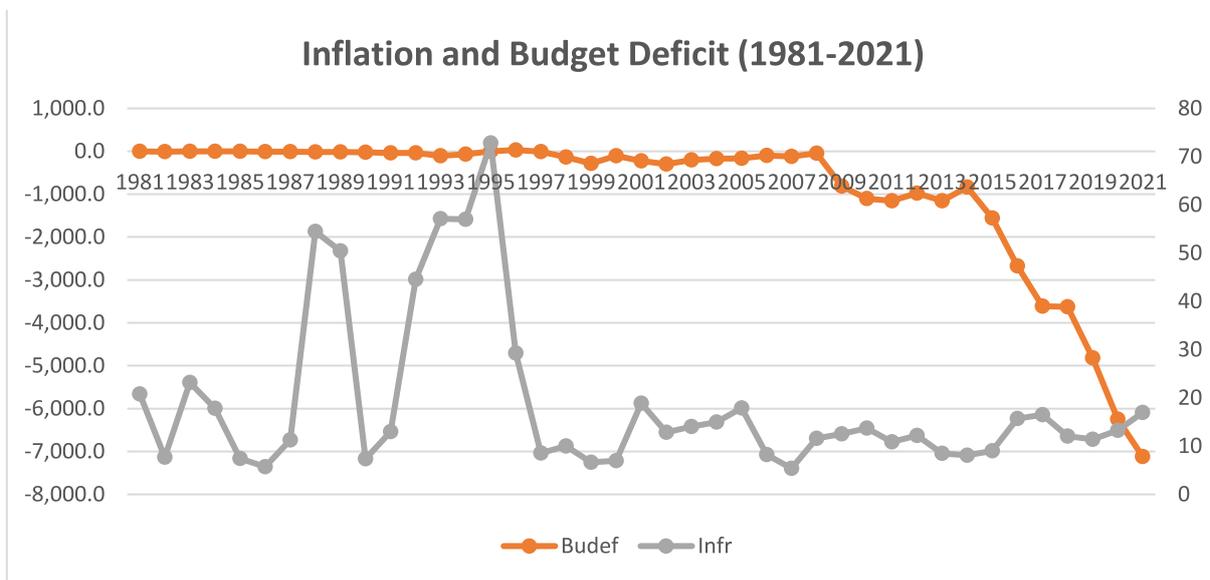
Source: Generated by the author using Excel 2019.

Figure 1.1 shows the trend analysis of inflation and budget deficit in the country for the period 1981 to 2021. For the period between 1981 and 2008, the budget deficit was near zero but thereafter plunged into the negative region till date. Inflation was able to attain single digits in only a few years. It jumped to over 72 per cent in 1995 and thereafter dropped sharply and remained in the region of 5 to 20 per

cent.

The two positions on the relationship between fiscal deficit and inflation, are confirmed theoretically, notwithstanding, there is yet another position led by Buffie (1999), that the established weak link between fiscal deficit and inflation is caused by the wage cycle effect of the public sector. This position has not received much attention in the literature

(Ekanayake, 2012).

## 1.2   Public Debts and inflation

A major source of fiscal deficit financing is through public debts, domestic and external. Although it has been conceived by the monetary authorities that inflation is largely a monetary phenomenon, it has come to the fore both in policy and academia that public debts have become very critical in influencing inflation in most economies. According to Aimola and Odhiambo (2018), the efforts of monetary policy will be rendered impotent if the fiscal policy is not adequately aligned with its objectives.

Most economies, especially Nigeria have not been able to muster enough revenue from their tax and other sources of revenue and have to resort to borrowing to finance their budgets. This continuous and persistent borrowing ultimately becomes inflationary irrespective of the contractionary monetary policies by the monetary authority (Sims (2012, 2013, 2014). Public debts have over time been a subject of concern in many circles because of their effect on macroeconomic destabilization

(Wijnbergen, Budina, 2001). Most of the money borrowed is meant to finance the fiscal deficit, but quite a lot of the money is meant for certain urgent needs that are probably not provided for in the budget but need attention. For instance, borrowed money to purchase arms for the military fighting the insurgents. IMF (2022) raised an alarm that the debt level of Nigeria will require 100 per cent of its revenue to be able to pay back the debts given the current trend of borrowing by 2026. This continuous borrowing is a result of a low level of revenue which is causing economic destabilization.

The current state of public debt in Nigeria is gradually becoming unsustainable in light of the current macroeconomic challenges (World Bank, 2022). The absolute value of debt stock nearly doubled between 2016 and 2020. However, due to the high cost of borrowing, the federal government has resulted in ways and means advances from the CBN to the tune of N13.1 trillion or 8.5 per cent of the GDP (World Bank, 2022), which they are working on how to convert to long-term loans just to reduce the cost of debt servicing that has crippled the infrastructural budgets

Figure 1.2 Inflation and External Debts

Inflation and External Debts (1981-2021)
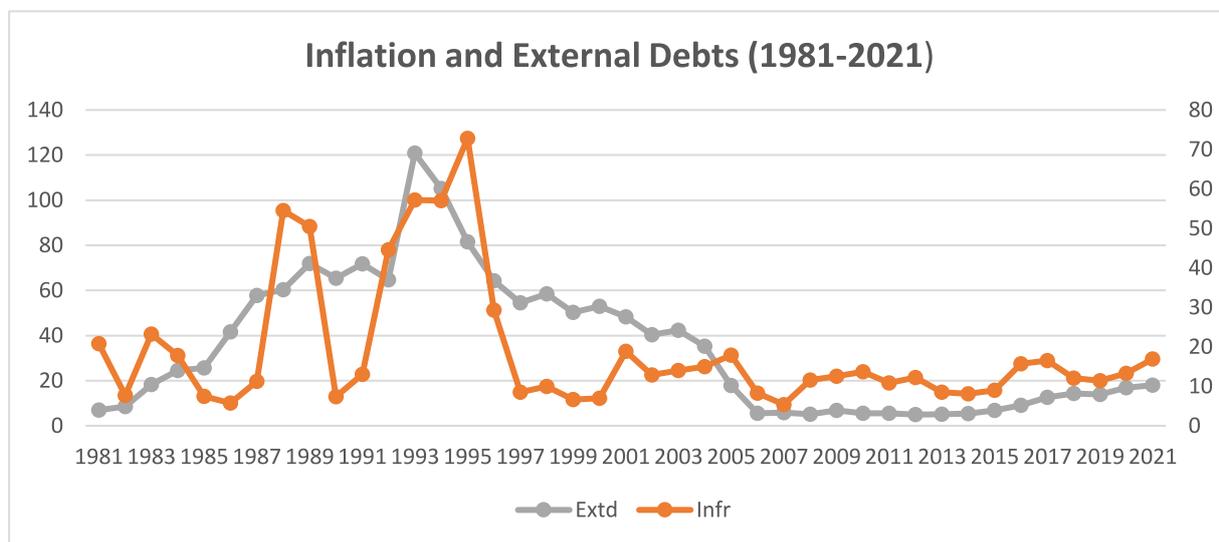
Source: Generated by the author using Excel 2019.

and means advances are not productive, it simply produces inflation which cannot be controlled by any monetary policy. Reports showed that both local and foreign debts between 1999 and 2021 grew from N3.55 trillion to N26.91 trillion, representing an increase of 658 per cent (Obadare, 2021).

Figure 1.2 showed the trend analysis of inflation and external debts. The correlation between the two is

high and that shows that as external debt increases, inflation is generated. The left vertical axis presents the external debts in billion of naira and the right vertical axis shows the inflation rate in percentage.

1.3 Taxes and Inflation

Manipulation of taxes in the country has great implications for the general price level. The effect of

tax on the economy can be viewed from both the demand management and supply management perspectives. A cut in taxes, to the demand siders, can boost aggregate demand and fuel inflation, whether personal income or corporate income taxes. Disposable incomes of workers will rise and enhances their purchasing power. On the firms' side, a cut in company income tax generates more after-tax profit and higher retained profit for investment demand purposes. From the demand management policy perspective, inflation can be reduced by increasing taxes. Anichebe (2015) indicated that both personal income tax, company tax and consumption tax all affect inflation significantly.

The view of the supply siders is centred on how productivity can be increased when tax is reduced. Theoretically, a cut in taxes produces two forces that help to determine how the labour supply will behave. Substitution and income effects of an increase in real wage due to a tax cut. It has been found that the substitution effect is stronger and that is why when taxes are cut, workers supply more labour and work harder to earn more and thereby raising the output level that dampens the price increase (Niskanen and Moore, 1996). The summary of tax cuts on inflation could be either negative or positive depending on the perspective we want to emphasize. However, for a tax cut to be meaningful, it must be accompanied by spending cuts, otherwise, a fiscal deficit will result.

To the best knowledge of the author, no serious work that encompasses the various fiscal policy measures have been investigated in Nigeria. Most of the works are on fiscal deficit and inflation (Eita, Manuel, Naimhwaka and Nakusera, 2019), public debts and inflation (Aimola and Odhiambo, 2021), and taxes and inflation. This work aggregates all the various fiscal policy measures and examined their impact on inflation. In addition, most of the work done is in different countries. This work, therefore, domesticates the research work at an aggregate level to the Nigerian economy.

The remaining part of this work is divided into six sections. Section two presents the available recent empirical literature, while section three shows the theoretical framework on which the whole research work rests. Section four presents the methodology and model specification. Section five deals with the presentation and analysis of results and finally, section six provides a summary and policy recommendations for the study.

2.0 Literature Review

Not too many works have been carried out on the linkage between fiscal policy and inflation in Nigeria. A number of works were on one fiscal policy tool and inflation or the other. A few of them are highlighted here.

2.1 Empirical Review

The effect of fiscal deficit on inflation especially when there is fiscal dominance compared to monetary dominance is what Banerjee, Boctor, Mehrotra and Zampolli (2022) investigated in some 21 advanced economies beginning from 1975 when the Central Bank independence began. The finding showed that for a regime of fiscal dominance, fiscal deficit exerts up to five times the effect on inflation than on monetary policy dominance. It was also found that under fiscal dominance, a higher fiscal deficit tends to be more inflationary in the future.

Aimola and Odhiambo (2021) investigated how public debt affected inflation in Ghana between 1983 and 2018. The authors engaged ARDL methodology to estimate the parameters. It was revealed from the findings that there existed a long-run relationship from the Bounds testing results. The findings also revealed that public debt exerts a positive effect on inflation in the country, whether in the short or long run. The authors, therefore, suggested a prudent debt acquisition to minimize the instigation of price increases.

Eita, Manuel, Naimhwaka and Nakusera (2019) examined the effect of fiscal deficit on inflation in Namibia between 2002 and 2017. The Authors employed the Autoregressive Distributed Lag model and the findings showed that there is a positive and significant effect of fiscal deficit on inflation in the country. It was also found that causality runs from fiscal deficit to inflation and that means that once fiscal deficit can be addressed, inflation will be contained.

The work of Romero and Marin (2017) on the effect of the accumulation of debts on inflation in 52 countries between 1965 and 2014 engaged panel analysis and the findings showed that the estimated parameters for the developed nations were not significant but that of the developing nations were significant. This showed that highly indebted nations suffer from inflationary pressures. This work is supported by that of Bon (2015) carried out in 60 countries from different economic regions of the world between 1990 to 2014. The author employed a panel analysis using the GMM method of estimation and the findings showed that

public debt has a positive significant effect on inflation in all the countries.

With the background knowledge that fiscal imbalance could offset the economic stability of an economy, Muhammad, Zafar, Noman and Arfeen (2016) investigated the relationship between fiscal imbalance, the mode of financing the imbalance (such as borrowing and printing new notes) and inflation in Pakistan between 1973 and 2014. The authors employed the Autoregressive Distributed Lag model for the estimation of the parameters and their findings revealed that both the fiscal imbalance and the mode of financing it has a strong positive and significant effect on inflation in the country. This outcome is supported by Catao and Terrones (2001) in their study on 23 emerging economies between 1970 and 2000. Using a panel cross-country analysis, it was established by their findings that when the fiscal deficit to GDP ratio is reduced by one per cent, inflation is also reduced by 1.5 to 6 per cent. Catao and Terrones (2003) went further to investigate if fiscal deficit actually could cause inflation using 107 countries between 1960 and 2001 and modelled the relationship non-linearly from the angle of the inflation tax. The findings, using a panel analysis showed that fiscal deficit is positive and significant on inflation especially in low-income countries experiencing high inflation.

Against the backdrop of the role of inflation in the economic development of a nation, Fakher (2016) examined the effect of fiscal deficits on inflation in some Asian countries between 1993 and 2013. Using a panel Pooled Mean Group and GMM methods of estimation, the findings showed that, with the two methods, fiscal deficits have a positive and statistically significant relationship with inflation.

This positive relationship between fiscal deficit and inflation was further investigated by Ekanayake (2012) on the Sri Lanka economy both in the presence of public sector wages and in the absence of public sector wages. The author employed ARDL for the period 1959 to 2008 and the findings still support the positive relationship between fiscal deficit and inflation in their country. Although the effect on inflation was lower when public sector wages is played down.

Faraglia, Marcet, Oikonomou and Scott (2012) similarly examined the effect of public debt on inflation by using the Dynamic Stochastic General Equilibrium (DSGE) model. It was discovered that inflationary tendency depends on the maturity, size

and sign of the public debt. On the whole, it was found that higher public debt triggers higher inflationary pressures. This finding was also in consonance with that of Ahmad, Sheikh and Tariq (2012) who investigated the effect of domestic debt on inflation in Pakistan between 1972 and 2009, using the Ordinary Least Square estimation method, it was found from their estimation that domestic debt has a positive and significant effect on inflation in the country.

3.0 Theoretical Framework

The theoretical spine of this work is hinged on the work of the Classical economists on their view on the effect of government deficit financing, through borrowing on private investment in the country. The original philosophy was shared by Adam Smith in his work 1776, and he stood for the fact that government has no business in interfering in the allocation of resources and that it results in philosophical and crowding out problems for the economy. The first argument of Smith is that the government's labour is unproductive and therefore rejected the idea of moving resources from the private sector to the government, either through taxes or borrowing. The argument further states that when funds are borrowed from the public to finance government spending, it simply destroys capital which has been made available for the private sector to utilize in the production process.

This position of Adam Smith was later supported by some other Classical economists like J. S. Smith and J. B. Say. The philosophy of these economists is simply that government has no business in stabilization policy and that the funds made available through saving should be left alone for the private sector to utilize. The advocacy of Keynes on the role of the multiplier in his General Theory has brought about the role of government in stabilization.

The transmission mechanism from government deficit to macroeconomic variables like interest and price is explained thus. When the government borrows money to finance its deficit, especially from the domestic funds market, it engages in competition with the private sector investors for the available funds. Given the limited funds, especially in a developing economy like Nigeria, and the structural rigidities in the financial market, the interest rate is pushed up and that discourages private investors from borrowing to engage in productive activities. The implications are: (1) national output is reduced, (2) due to the combination of aggregated demand resulting from government spending, and shortage of

output, prices of goods will rise. This theory was critiqued on the ground that crowding out will only happen in an economy at or near full employment. However, Nigeria is not near full employment, so why should this theory be applied amid the excess capacity prevalent in the country? The reason why this applies is that we are confronted with limited funds in the funds market and the government can borrow at any rate of interest to the detriment of the private sector. Secondly, the economy is confronted with so many rigidities in the funds market and other markets that will inhibit the production of the private sector.

4.0 Methodology and Model Specification

The methodology used in this work is econometric analysis and as a result of the unit root test carried out, where the stationary tests showed a mixture of different orders of integration, I(0) and I(1), the Autoregressive Distributed Lag (ARDL) model was employed with the use of Bounds testing for cointegration (Pesaran, et al, 2001). This method is chosen for the estimation because of its ability to robustly check both the short and long-run effects of the relationships in small samples (Pesaran, et al, 2001). Following the work of Aimola and Odhiambo (2021) in their work on Inflation and Public debts, where they employed public debts, money supply, interest rate, GDP per capita, and Gross Fixed Capital Formation as dependent variables while inflation was the dependent variable; this work will adopt their model and drop some of the variables and concentrate on the variables of interest in this study such as public debt, budget deficit, debt service and taxes as independent variables. The functional relationship is therefore presented in equation (4.1).

$$Infr = f(pubd, budef, debtser, taxes) \qquad (4.1)$$

The econometric format is as:

$$Infr_t = \alpha_0 + \beta_1 pubd_t + \beta_2 budef_t + \beta_3 debtser_t + \beta_4 taxes_t + e_t \qquad (4.2)$$

Where Inf = Inflation rate, pubd = public debt, budef = budget deficit, debtser = debt service, taxes = the sum of revenues from personal income taxes and petroleum profit taxes as proxies for taxes, e = error term.

4.1 ARDL Model Specification

The generalized ARDL (p, q) model is specified below:

$$C_t = \alpha_{0j} + \sum_{i=1}^{p} \rho_j\, C_{t-1} + \sum_{i=0}^{q} \tau_j^{\cdot}\, D_{t-1} + \varepsilon_{jt} \qquad (4.3)$$

If cointegration is found among the variables, the Error Correction Model will be obtained

by parameterizing the model (4.3)

The long-run relationship can be expressed as follows:

$$Infr_t = b_{01} + b_2 Infr_{t-1} + b_3 LnPubd_{t-1} + b_4 Budef_{t-1} + b_5 LnDebtser_{t-1} + b_6 LnTaxes_{t-1} +$$

$$e_{1t} \qquad (4.4)$$

And the reparameterized ARDL of four variables (p. q1, q2, q3) generates the ECM as shown in model (4.5):

$$\Delta Infr = \quad a_0 \quad + \sum_{i=1}^{p} a_{1j} \Delta Infr_{t-1} + \sum_{i=1}^{q1} a_{2j} \Delta LnPubd_{t-1} + \quad \sum_{i=1}^{q2} a_{3j} \Delta Budef_{t-1} +$$

$$\sum_{i=1}^{q3} a_{4j} \Delta LnDebtser_{t-1} + \sum_{i=1}^{q4} a_{5j} \Delta LnTaxes_{t-1} + ect\,(-1) + e_t \qquad (4.5)$$

If there exists no cointegration, equation 4.4 will be estimated.

4.2 Nature and Sources of Data

This work employed annual time series data between 1981 and 2021. The variables in the data are inflation rate, public debts (a combination of domestic and external debts), budget deficit, debt service and taxes. Inflation, public debts, budget deficit and debt service were sourced from the Statistical Bulletin of the Central Bank of Nigeria. Personal and petroleum profit taxes were obtained from the Federal Inland Revenue, Nigeria. All the variables are logged except the inflation rate which is already in a rating format.

5.0 Analysis of Results

Models 4.4 and 4.5 are estimated in this section and results are analyzed.

5.1 Unit Root results

The unit root showed that there exists a mixture of integration at different orders I(0) and I(1), but there is no I(2). Based on this result, Autoregressive Distributed Lag (ARDL) model was employed with Bounds testing for cointegration.

Table 5.1 Unit Root test result

Variable	At Level			At First Difference			Order of Integration
	ADF Stat	5 % Level	Prob. Value	ADF Stat	5 % Level	Prob. Value	
Infr	-3.00911	-2.93694	0.0426				I(0)
Lnbudef	5.157590	2.960411	0.0000				I(0)
Lnpubd	-1.11182	-2.93694	0.7018	-6.26497	-2.93899	0.0000	I(1)
LnDebtser	-3.31455	-2.93694	0.0208				I(0)
LnTaxes	-1.09365	-2.93694	0.7090	-6.48101	-2.93899	0.0000	I(1)

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5.2 Optimal Lag selection

Before the estimation of the model, the optimal lag length was selected and the criterion that was automatically selected was AIC, which chose the following 1, 1, 4, 3, 3 for inflation, budget deficit, public debt, debt service and taxes respectively.

5.3 Cointegration result

Based on the estimation technique, the Bounds testing for cointegration was employed as prescribed by Pesaran, et al, (2001). The result is shown in the table

5.2 Cointegration test result using bonds testing

Null Hypothesis: No cointegration				
F-statistic	4.325023			
		Level of Significance	I(0)	I(1)
		0.1	2.2	3.09
		0.05	2.56	3.49
		0.025	2.88	3.87
		0.01	3.29	4.37

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Table 5.2 showed the cointegration results using Bounds testing for cointegration. The Null hypothesis is that there is no cointegration. Decision rule: i) If the F-statistic value is less than the lower bounds value, I(0), there is no cointegration, ii) if it falls in between the lower and upper bound values, no decision, but iii) if it is higher than the upper bound values, I(1), at the chosen level of significance, then there is cointegration. The table showed that F-statistic is higher than the 5 per cent level of significance and so it was decided that there is cointegration among the variables.

5.4 Long-run model

The long-run model (4.4) was estimated and displayed in table 5.3. The model showed that the long-run relationships between the dependent variable and the independent variables are statistically significant. Current inflation is influenced by the previous year's inflation significantly. A unit change in the previous generates about a 53 per cent increase in the current year's inflation. Similarly, public debts showed that a unit increase in public debts leads to about a 734 per cent increase in inflation in the long run and the coefficient is positive and significant. This positive relationship can be explained by the impact of borrowing, both domestically and externally. This result supports the findings by Romero and Marin (2017) and Bon (2015) on the impact of public debt on inflation in an economy. This becomes more pronounced when the borrowed funds are not spent on productive activities. A budget deficit also affects inflation positively and significantly. A unit change in the budget deficit will lead to an increase in inflation of about 2.4 per cent. This is because a budget deficit causes the monetary authority to release more money into the system thereby fueling inflation. This result supports the finding of Banerjee, Boctor, Mehrotra and Zampolli (2022) on the impact of fiscal deficit on inflation during a fiscal dominance.

Table 5.3 Long run model

Dependent Variable: Inflation rate				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	39.50488	83.1239	0.475253	0.6376
INFR(-1)	0.534744	0.138088	3.872501	0.0005
LNPUBD(-1)	7.347985	3.398084	2.162391	0.0148
BUDEF(-1)	0.02462	0.002922	8.426310	0.0203
LNDEBTSER(-1)	4.87222	1.688405	2.885607	0.0015
LNTAXES(-1)	-3.2048	1.719739	-1.86354	0.071
R-squared	0.444509			
/Adjusted R-squared	0.36282			
F-statistic	5.441431			
Prob(F-statistic)	0.000879			
Durbin-Watson stat	1.695051			

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Debt servicing similarly exerts a positive and significant effect on inflation. A unit change in debt service generates about a 487 per cent increase in inflation. This is very peculiar in Nigeria where a large chunk of the budget is allocated to service debts. This spending has no productive benefit on the economy and so triggers prices and causes more damage to the economy. The result of the Durbin-Watson statistic (1.69) showed that the long-run model is free from serial correlation and the model is well specified and estimated by the probability value of F-statistic (0.000879).

5.5 Error Correction Model

From the long-run model, the error correction term was generated from the residuals of the long-run

model. This residual was regressed with the difference of the variables lagged one period from the model (4.5) and the result is presented in table 5.4. All the short-run variables are shown in differenced forms and it was revealed that inflation in the previous period is statistically significant in affecting the current inflation rate. Public debts budget deficit and debt servicing are all positively related and statistically significant in affecting the current inflation in the short run. A percentage increase in public debt increased inflation by about 355 per cent, while a budget deficit changed by a unit will increase inflation by about 2 per cent. If debt servicing increases by a percentage point, inflation will rise by 47.6 per cent. Changes in taxes do not significantly affect inflation. The ECT is the long-run component in the ECM and the conditions for long relationships are satisfied. The coefficient is negative and it is significant at a probability value of 0.0004. That shows that in the long run, any disequilibrium will be restored at the speed of 20.1 per cent.

Table 5.4 Error Correction Model (ECM)

Dependent Variable: D(INFR)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.09759	2.656417	0.03674	0.9709
D(INFR(-1))	0.91995	0.282188	3.26006	0.0026
D(LNPUBD(-1))	3.55394	1.084525	3.27696	0.0017
D(BUDEF(-1))	0.02249	0.005857	3.83985	0.0035
D(LNDEBTSER(-1))	4.76537	2.033844	2.34304	0.0021
D(LNTAXES(-1))	0.28837	6.660351	0.04329	0.9657
ECT(-1)	-0.20147	0.035262	-5.71352	0.0004
R-squared	0.361792			
Adjusted R-squared	0.242128			
F-statistic	3.023393			
Prob(F-statistic)	0.018628			
Durbin-Watson stat	1.895066			

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The model is well fitted as indicated by the probability value of F-statistic and the model is free from serial correlation from the Durbin-Watson statistic of 1.90.

The above results imply that if inflation is to be contained, public debts must be constrained to the barest minimum. Since budget deficit expansion is the reason for the high level of borrowing, the more the fiscal deficit, the more the borrowing and the more it fuels inflationary pressures. An increase in debt service as a percentage of GDP is manifested in a high inflation rate.

5.6 Residual Diagnostic tests

The residuals were tested to confirm if the assumptions of Ordinary Least Squares are satisfied. Using the Breusch-Godfrey test, it was found that there is no serial correlation at a probability value of 18 per cent. This result supports the Durbin-Watson statistic earlier obtained. It was also revealed that the residuals exhibit constant variance irrespective of the size of the sample and they were also normally distributed as shown by the Jarque-Bera test.

Table 5.5 Residual Diagnostic test results

| Test Method			Prob. Chi-Square
Breusch-Godfrey Serial Correlation LM Test			0.1835
Heteroskedasticity Test: Breusch-Pagan-Godfrey			0.3056
Jarque-Bera normality test			0.122819

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5.7 Parameter Stability test

The stability test is meant to reveal how the parameters will respond to a shock in the variables. The CUSUM test shows that when the variables are subject to any shock, the parameters will remain stable over time.

Figure 5.1 Parameter stability test
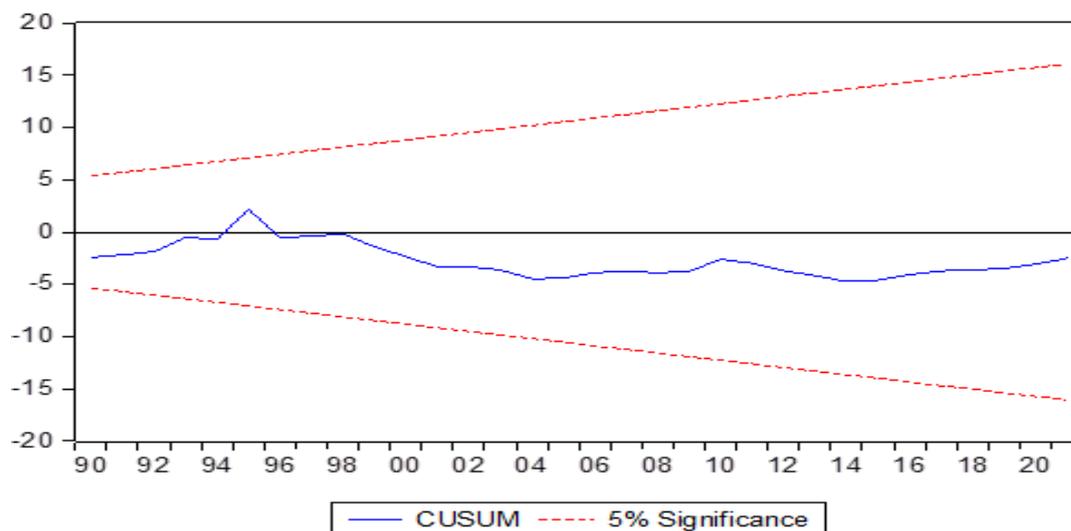
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6.0 Summary and Policy Recommendations

This study has examined the effect of politically motivated expansionary fiscal policy manifested in indiscriminate spending by the government through fiscal deficit and borrowing. The findings of this work confirmed the theoretical postulation of how public debts and fiscal deficits affect the general price level in the economy. Any fiscal policy expansion mechanism that is not aligned with the contractionary monetary policy will be inflationary. The Autoregressive Distributed Lag model was employed in the estimation and the findings showed that fiscal deficit exerts both positive and significant impacts on inflation in Nigeria. Similarly, public debts and debt servicing indicate a positive and significant impact on inflation.

Based on the results of the empirical investigation, the following policy recommendations are put forward:

i.   The government should to control the unnecessary expenditure that creates a fiscal deficit.

ii. There is a need for the government to be creative in revenue generation through revenue diversification and expenditure rationalization and promotion of Fiscal – Monetary policy coordination.

iii. The fiscal arm of government should endeavour to be more discipline in consonance with the monetary authority in moderating inflation in Nigeria.

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Impact of Crude Oil Price, Exchange Rate and Bank Financing on Inflation in Nigeria using the Autoregressive Distributive Lag (ARDL) Approach

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Abstract

The study investigates the impact of crude oil price, exchange rate and bank financing on inflation in Nigeria using an autoregressive distributive lag (ARDL) model. Annual time series data from 1987-2022 was employed. The results indicate that stationarity in all the variables was obtained at first difference except for bank financing, and no long-run relationship exists. More so, crude oil prices and bank financing have an inverse relationship with inflation except for exchange rate under the reviewed period. The study recommended that Bank financing should be skewed towards the real sector as it will facilitate diversification of the Nigerian economy

1.0   Background to the study

Inflation is considered an important macroeconomic indicator employed among the tools in ascertaining the financial health of any economy, and it is most feared by stakeholders (Yolanda. 2017). Globally, most economies are faced with a rising trend of inflation largely attributed to the COVID-19 pandemic with its restrictions and the war between Russia and Ukraine, which affected energy and food supplies, among others. This has spurred global inflation to 9 per cent at the end of 2022 (International Monetary Fund, 2022). However, Nigeria is not immune to the spillover effect of this economic phenomenon. But it is also pertinent to consider the remote issues that succeeded in making the Nigerian economy more volatile.

In Nigeria, before the unearthing of crude oil, agriculture was the cash cow which served as the mainstay of the economy. This is rooted in the country being blessed with large fertile agricultural land, rivers, forests, grassland and a large population (Mordi et al., 2010). The agricultural sector significantly contributed to employment generation, food security, growth of local industries, and increased export and foreign exchange earnings, among others. The sector has made remarkable records, including the world's major exporter of groundnut, cocoa and palm, and occupies a significant position among rubber, cotton, hides and skin exporters (CBN, 2010; Ismail et al., 2013). It further accounted for an average of 57 per cent of the Nigeria's Gross Domestic Product, generates about 64.5 per cent of export earnings and employed 72 per cent of the labour force between 1960 and 1969 (Central Bank of Nigeria, 2000; Ismail et al., 2013; Price water house, 2017).

However, with the emergence of crude oil into the landscape of the economy, the narrative became the contrary because instead of complementing the existing agricultural sector, it resulted in its relegation, and this caused the sector to lose its position as the main export earner to crude oil (Mordi et al., 2010). As a result, the oil sector became the new bride of the economy as it contributes about 90 per cent to the country's export earnings (CBN, 2000). This was further triggered by the increased export quota and quadrupled crude oil per barrel price increase due to the instability in the Persian Gulf. This resulted in the boom experienced in the Nigerian economy in the 70s (Ismail et al., 2013).

Consequently, with the boom recorded, the agricultural sector contribution witnessed a steady decline over time, especially from the 1970s to the late 2000s because in 2016, for instance, the sector had an average of 23.5 and 5.1 per cent contribution to Gross Domestic Products and export earnings respectively (National Bureau of Statistics, 2016). Therefore, the availability of more earnings from the oil proceeds changed Nigerians' consumption pattern from locally made goods and services to imported ones. As such, the economy became the largest importer of goods and services to feed the growing population, which

further led to the shutdown of local industries, thereby creating unemployment, poverty and food insecurity.

With this development and coupled with the spillover effect of the implementation of the Structural Adjustment Program (SAP) menu in the 1980s, which includes external debt management strategies, removal of fertilizer and petroleum subsidy, privatization and commercialization, second-tier foreign exchange market operations, trade liberalization and interest rate deregulations and among others (Ojameruaye, 1988; Anyanwu, 1990) triggers the country's inflation which was apart from the ones recorded in the 1970s during the Udoji salary awards that resulted to increased money supply without a corresponding increase in output and by extension result to an inflationary rate of 33.7 per cent (Anyanwu, 1990).

Amidst this scenario, the Nigerian economy gradually became skewed to the oil sector, and its prices are externally determined by the demand and supply forces at the international market. Despite being a major player in the oil market, Nigeria still imports refined petroleum products, which has an impact on the proceeds of export of crude oil or foreign exchange. This is because the available refining infrastructural facilities are in their poor state; hence, the importation of refined oil became a necessity to meet local demands. Therefore, this raises a question as to whether the fluctuation in crude oil prices spur inflation in the economy because its derivative constitutes a high cost in production and distribution. Subsequently, the proceeds from crude oil export form a cogent proportion of the country's foreign exchange (FXs) earnings and couple with the structural imbalances in the economy, which further allows economic agents (i.e., households and firms) to source for FXs locally either at the official or parallel or black market to carry out their importation activities. This has an implication on imported goods and services because the prices will largely depend on the cost and availability at which these economic agents obtained these Fxs.

Therefore, amidst these dynamics, the role of banks, especially the Deposit Money Banks (DMBs), cannot be relegated to the background because they are important players in the FXs market and international business and because economic agents are involved, these banks do offer financial accommodation which is term as a credit to the private sector to facilitate or augment their businesses at a cost benchmarked on the prime lending rate set by the Central Bank of Nigeria. This credit to the private sector resulting from bank financing goes a long way to complement the volume of money supply in the economy, which invariably impacts the price level.

Currently, bank financing proxied as a credit to the private sector has increased to NGN38 trillion, while crude oil prices have risen to USD100.08 as of 2022. However, the economy still records an increase in the exchange rate to NGN423.71/USD1 and that

inflationary rate to 18.77 per cent (Central Bank of Nigeria, 2023). However, this significant fluctuation of these indicators is largely due to the supply-side effect, which is attributed to certain global factors earlier captured and internal factors like insecurity challenges which include Boko haram insurgency, armed banditry, farmers herders, increased money supply through bank financing without corresponding output, increased exchange rate, low manufacturing output, the rising cost of petroleum products (Anyanwu, 2010) among others. Against this background, this study specifically seeks to assess the impact of fluctuation in crude oil prices, exchange rate and bank financing on inflation in Nigeria from 1987 to 2022.

This paper is structured into five (5) sections. Section one covers introduction, while section two encapsulates review of relevant literature where key concepts, theories and empirical reviews were made. Section three and four captures the methodology employed by the study. Section four is the results and discussions of findings while section five concludes the paper.

2.0 Literature Review

2.1 Conceptual Review: This sub-section focuses on the definition of variables which include inflation, crude oil prices, exchange rate and bank financing.

Inflation and Bank Financing: According to Ishola (2010), inflation is 'an increase in the volume of money and credit relative to the available goods and services, resulting in a substantial and persistent rise in the general price level'. Johnson (1972) see it as a sustained rising trend in the general price level. It can be defined as an economic situation where there is a general rise in the prices of goods and services continuously (Central Bank of Nigeria, n.d.). However, inflation as measured by the consumer price index, whole sale price index and GDP deflator. Consequently, to operationalize this concept, the study adopted the definition by Central Bank of Nigeria (n.d) and the consumer price index measures was used as a proxy to Inflation which captures the fluctuations in the price of goods that are directly consumed by individuals (Ishola, 2010). Subsequently, bank financing refer to as the total credit or loan made available to economic agents (Households, firms and Government) by Deposit Money Banks. Though, for the purpose of this study, credit to private sector was considered but it was measured in percentages (%).

Exchange Rate and Crude Oil Prices: According to the Central Bank of Nigeria (2016), exchange rate is the 'price of one currency in terms of another currency'. It is usually expressed as the number of units of a domestic currency that will purchase one unit of a foreign currency and vice versa. The foreign currency can be Dollars, Euro, Pound sterling, Yuen among others. However, the study adopted the definition presented by the Central Bank of Nigeria and further considers the US Dollars at the official rate to suffice as

the exchange rate by this official exchange rate captures exchange rate determined by monetary authorities. On the other hand, crude oil price measures the spot price of various barrels of oil. Though, crude oil has its own benchmark which include west Texas Intermediate (WTI), rent and OPEC. The study is delimited to the OPEC benchmarking which captures seven different crude oil from different countries which Nigeria is not exempted. However, the prices of this crude is largely determined by the forces of demand and supply of crude oil. This was measured in USD dollars.

2.2   Theoretical Review

Purchasing Power Parity (PPP) Theory: Gustav Cassels developed this theory in 1920, popularly called the Inflation Theory of Exchange Rates. The theory focuses on determining the exchange rate between countries on a convertible paper note. It further asserts that the PPP between two (2) countries is significantly measured by their general price level. In other words, the theory stresses that a currency tends to have the same purchasing power when spent in its home and in a foreign country when converted. Although, the peculiarities among countries gave rise to the issue of over and undervalued currency.

When a country's currency has a lower purchasing power in its own country, then it is said to be undervalued and vice versa. Therefore, the theory is relevant to the study because it shows the nexus between the exchange rate and inflation. Although, the theory was criticized because it only applies to countries whose balance of payment (BOP) is determined by the merchandise trade account and not the capital account (Ishola, 2010). According to Keynes, the theory fails to consider the elasticity of reciprocal demand because the exchange rate is not only determined by changes in price levels.

Theory of Demand and Supply: The nexus between crude oil price fluctuation and inflation can be elucidated through the theory of demand and supply, where the theory of consumer demand and production is both proxied to analyze the demand and supply sides (Adesete and Bankole, 2020). Consequently, if the demand for crude oil increases without a corresponding increase in output, the crude price will increase, increasing the oil-exporting country's oil revenue. By implication, all things have been equal; they will have more funds to execute programs, especially by supporting the real sector, which will invariably reduce the certain cost of production of firms and hence reduce the price of goods and services and vice versa.

Quantity Theory of Money: The advocators of this theory are Fisher, Pigou and Marshal in the classical tradition. Irving Fisher, one of this theory's developers, stresses that money supply and price level are directly proportional. This relationship can be presented algebraically as thus MV = PT
where: M: Total money supply,
         V: Rate or velocity of money in circulation
         T: Volume of transactions or total output

P: Price Level

Therefore, if V and T are assumed to be constant, a change in the money supply (M) will result in a proportional change in the price level. However, M is the policy variable, which is exogenously determined by the Central Banks. Although, the Fisher view faced a lot of criticism as there exists a disconnect between its assumption the reality.

The Cambridge version of the Quantity theory diverted from the views of the fisher as the version stressed that doubling the money supply will not lead to doubling prices (Ishola, 2010). Also, the Keynesian version of the theory stresses that the nexus between the quantity of money supply and the price level is indirect and non-proportional (Ishola, 2010). Therefore, in whichever direction of the nexus between money supply and price level, the theory is of relevance because it exposes the relationship between Bank financing, which complements money supply and inflation.

2.3   Empirical Review

Musa (2021) assessed the impact of the exchange rate on inflation in Nigeria for 33 years in which time series data were employed, and the study was purely quantitative. The study adopted econometric models such as GARCH and VECM to analyze key variables' relationships. These variables include nominal exchange rate (NER), import (IMP), money supply (MS), inflation and export (EPT). As a result, it shows a long-run relationship between the variables and that money supply and exchange rate have a positive and significant effect on inflation.

Uwamariya and Gasana (2018) undertook a multivariate analysis of Rwanda's Economic Indicators using the VAR model alongside a time series of quarterly data from 1994 to 2014, which was obtained from the National Bank of Rwanda. Key variables employed for the study include CPI, exchange rate and NGDP. By implication, the findings revealed that inflation is not directly related to inflation but to Gross Domestic Product and vice versa. More so, the IRF shows that the variable under consideration significantly impacts each other.

Another study by Nkoro and Uko (2016) in Nigeria examined exchange rate and inflation volatility on stock price volatility in Nigeria for 26 years (i.e., from 1986 to 2012). However, quarterly data was employed, which was obtained on key variables, including exchange rate, inflation and stock prices, which GARCH models analyzed. As a result, the findings show an inverse relationship between exchange rate and inflation volatility and stock prices under the period considered. In a similar study, Obiekwe and Osabunhien (2016) investigated the effect of exchange rate instability on inflation in Nigeria using annual time series data from 2006 to 2015. Again, the GARCH technique was employed, and the findings depict that the parallel and official exchange rate passes through to inflation in the short and long run, respectively. And therefore, on the whole, exchange rate volatility has a significant positive effect on inflation in the long run.

Albuquerque and Portugal (2005) examined the relationship between exchange rate and inflation in Brazil using time series data and the GARCH model. Results indicate that the nexus between exchange rate volatility and inflation is semi-concave during the period reviewed. More so, the results depict that when volatility is high, the elasticity of inflation response tends to be low, thus impacting less and as a result, in the short run, firms employ a "wait and see" strategy when volatility is high. Also, Adeniyi (2013) investigated exchange rate volatility and inflation upturn in Nigeria. So doing, time series data was employed from 1986 to 2012, which was analyzed using the Vector Error Correction Mechanism (VECM) model. By so doing, the study revealed that the relationship between exchange rate volatility and inflation in Nigeria during the period considered is positive and highly significant.

Additionally, using monthly data and the VAR model, Sarmah and Prasad (2021) examined whether or not crude oil prices affected inflation and economic growth in India from 1997 to 2016. Findings revealed that crude oil prices have a positive relationship with inflation. The same result was obtained when the crude oil price was split into a positive and negative partial sum of oil price while employing a nonlinear and asymmetric autoregressive distribution model.

Sek et al. (2015) undertook a comparative study between high and low-dependency countries on the effects of oil price changes on inflation. The findings show that increasing oil prices does not necessarily affect inflation directly. Still, it indirectly increases the exporters' production costs in high-dependency countries. Furthermore, oil prices directly affect inflation among the low-dependency group because they are only oil producers and exporters. As a result, higher oil prices will result in higher income/output and purchasing power, increasing the price level. Also, Adeete and Bankole (2020) investigated the nexus between oil price shock and macroeconomic aggregates while employing the SVAR model and impulse Response Function (IRF). Monthly data set from 1981 and 2019 were further employed. The finding shows that the oil price shock negatively impacts economic growth, import, investment, inflation, and the exchange rate.

Another related study was carried out by Nuhu (2017), which assessed the impact of oil price instability on Nigerian economic growth from 1981 to 2015 using the VAR model. Findings from the study reveal that oil price Granger caused economic growth and exchange rate, whereas exchange rate Granger caused inflation in a nutshell; the study stressed that oil price instability largely influences exchange rate and economic growth but indirectly affects inflation, thus making the relationship to be negative.

Olomola (2006) applied VAR models and quarterly data for 33 years to investigate the impact of oil price shocks on macroeconomic indicators, which includes output, inflation, real exchange rate and money supply in Nigeria, and the study revealed that oil price shocks have no significant influence output and inflation. Still, money supply and exchange rates were significantly affected by oil price shocks. Additionally, Olusegun (2008) examined the implications of shocks in oil prices on macroeconomic performance in Nigeria using the VAR technique. As a result, it shows that oil price shock is a key source of variation in oil revenue and output. Also, oil price shock does not impact real money supply, government expenditure and consumer price index. Umar and Abdulhakeem (2010) studied the effect of oil price fluctuations on Nigerian macroeconomics using the VAR technique. They revealed that GDP, unemployment and money supply are significantly affected by oil prices except for the consumer price index.

Orimogunje (2019) investigated the impact of banking credit on economic growth and inflation in Nigeria from 1996 to 2014 using the descriptive and Granger causality test. By so doing, the findings show that domestic and net domestic credit has a significant impact on GDP but no existence of a relationship with inflation. Korkmaz (2015) also conducted similar studies on ten randomly-selected European countries (Spain, Finland, France, Germany, Greece, Hungary, Italy, Poland, Turkey and the United Kingdom) from 2006-2012. Findings further revealed that domestic credit disbursed by the banking industry had no effect on inflation but on economic growth.

Batayneh, Salamat and Mmani (2021) investigate the impact of inflation on the financial sector development with emphasis on Jordan from 1993 – 2018 while using the ARDL model. Findings reveal a negative effect of inflation on financial sector development in the short and long run. Also, Akinkoye, Sanusi and Moses (2015) use time series data from 1970 to 2011 and the ARDL model in examining the dynamic interaction between inflation and credit. By so doing, it reveals that there is a long-run relationship between the variables, and there is no evidence of causality in either direction between inflation and credit rationing during the period considered. Furthermore, Kaluslime (2018) examined private sector credit on inflation volatility in Uganda while employing OLS and monthly data from 1995 to 2017.

By so doing, the findings reveal that private-sector credit growth is positively linked to one-period lag inflation volatility. Finally, Boyd, Levine and Smith (2000) investigated the impact of financial sector performance from 1960 to 1995, revealing a negative relationship between inflation and banking development and equity market activity.

This implies that inflation's impacts on banking lending activity and stock market development diminish rapidly as inflation rises. However, from the reviewed studies, vast literature exists on the theme. Still, little or none has tried to establish the nexus between crude oil prices, exchange rate, bank financing and inflation in Nigeria from 1987 to 2022. Thus, necessitating the need to carry out this study.

3.0 Materials and Methods

Time series data for 35years (i.e., 1987-2022) was employed for the study which was obtained from database of World Bank, Central Bank of Nigeria, National Bureau of Statistics. Other sources of data or information was gotten from related textbooks, journals, Magazines and other relevant websites. The study adopted a Quantitative method and key variables employed include, inflation rate, crude oil prices, exchange rate, and credit to private sector which were measured in percentages (%) and monetary units (Naira and USD) respectively. Additionally, in analyzing the data, descriptive statistics and econometric tools such as the unit root, Autoregressive Distributive Lag (ARDL) Model, and granger causality technique were employed at 0.05 level of significance. However, the model was adopted and modified from the works of Fadli et al (2011) and Musa (2021).

Consequently, the generalized ARDL model can be specified as thus;

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{n} \beta i \Delta Y_{t-1} + \sum_{i=0}^{n} \lambda i \, \Delta X_{t-1} + \theta_1 Y_{t-1} + \theta_2 X_{t-1} + \theta_3 X_{t-1} + \mu_t \ldots\ldots\ldots 1$$

This can be re-written as thus

$$\Delta INFL_t = \beta_0 + \sum_{i=1}^{n} \beta i \Delta INFL_{t-1} + \sum_{i=0}^{n} \lambda_1 \Delta CRPR_{t-1} + \lambda_2 \Delta EXCH_{t-1} + \lambda_3 \Delta CPSG_{t-1} + \theta_1 CRPR_{t-1} + \theta_2 EXCHR_{t\ 1} + \theta_3 CPSG_{t\ 1} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

Where: βi, λi: Short-run coefficients, θ_1, θ_2, θ_3: ARDL long-run Coefficients; μ_t: Disturbance term. INFL: Inflation. CRPR: Crude oil prices. EXCH: Exchange rate. CPSG: Credit to private sector. Having specifying the ARDL model, pre-testing was conducted in order to ascertain the optimal lag length and the appropriate model.

4.0 Results and Discussion

Table 4.1: Optimal Lag Length Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-634.905	NA	2.47e+11	37.58263	37.76221	37.64387
1	-535.549	169.4898*	1.85e+09	32.67933	33.57719*	32.98553*
2	-518.356	25.28381	1.80e+09*	32.60916*	34.22531	33.16031

Source: *Eviews 10*   * depicts the lag selection

Table 4.1 shows the various optimal lag selection criterion. However, there are contradictory results arising from the criterion. But this study opted for optimal lag 2 because its corresponding lag selection criterion (AIC) has the lowest minimum value, as supported by Asteriou and Hall (2011).

Table 4.2: Descriptive Statistics

STATISTIC	INFL	CRPR	EXCH	CPSG
Mean	19.80528	46.8292	134.786	81.6325
Median	12.945	38.405	127.23	83.93
Maximum	72.84	109.45	423.71	98.09
Minimum	5.39	12.28	4.02	52.63
Std. Dev.	17.41753	31.6864	118.343	10.9336
Skewness	1.736349	0.68167	0.89073	-1.078
Kurtosis	4.712291	2.12556	3.00033	3.85852
Jarque-Bera	22.48735	3.93497	4.76045	8.07831
Probability	0.000013	0.13981	0.09253	0.01761
Observations	36	36	36	36

Source: *Eviews 10*

Table 4.2 reveals that the mean values and deviations from the mean scores for INFL, CRPR, EXCH, and CPSG within the period are approximately 19.80(17.41), 46.82 (31.68), 134.78(118.34), and 81.63(10.93) respectively. The EXCH recorded the highest deviation. Similarly, the Skewness for INFL, CRPR, and EXCH are positive, except for CPSG, which present are negative. The positive skewness depicts that the data spread from the right-hand side of the normal curve and is contrary in the case of negative skewness. On the kurtosis, INFL and CPSG are leptokurtic because it has Kurtosis value of 4.71 and 3.85, which is greater than 3. At the same time, CRPR and EXCH are platykurtic and mesokurtic because their kurtosis values are less than 3 and equal to 3, respectively. In addition, the Jarque-Bera test for normality reveals that INFL and CPSG are normally distributed because their p-values are less than 5 per cent, while CRPR and EXCH are not normally distributed (Asteriou and Hall, 2011).

Unit Root Test

Table 4.3: Unit Root Test Result

Variable	ADF		PP		Order of Integration	Decision
	Level	First Diff	Level	First Diff		
INFL	-	-6.492 0.0000**	-	-8.074 0.0003**	I(1)	Stationary
CRPR	-	-4.837 0.0004**	-	-4.686 0.0006**	I(1)	Stationary
CPSG	-3.627 0.0101**	-	-3.536 0.012**	-	I(0)	Stationary
EXCH	-	-4.057 0.003**	-	-3.975 0.004**	I(1)	Stationary

Source: *Eviews 10*

Table 4.3 depicts the unit root test results for ADF, and PP conducted at 5% significance level. It reveals that all the series (i.e., INFL, CRPR, EXCHR) are stationary at first difference 1(1), which in other words, implies that they are stationary at the same level and are integrated of order one I (1). In contrast, CPSG is stationary at levels (I(0). This outcome, depicts a mixture of an order of integration, i.e., I(0) and I(1), thus, satisfies the condition for the adoption of the Autoregressive Distributive Lag (ARDL) model as supported in the works of Pesaran, Shin and Smith (2001). Furthermore, having established that the variables are stationary at different levels [1(0) and 1(I)], it is cogent to ascertain if a long-run relationship among the variables. Hence, the ARDL bound test for integration was conducted, as shown in Table 4.4.

ARDL Bound Test for Cointegration
Table 4.4: ARDL Bound Test for Cointegration Test Results

Test Statistic	Value	K
F-statistic	4.06	3
Critical Value Bounds		
Significance	**I(0) Bound**	**I(1) Bound**
10%	2.618	3.532
5%	3.164	4.194
1%	4.428	5.816

Source: *Eviews 10*

Table 4.4 shows the ARDL cointegration test of whether a long-run relationship exists among the series. However, the result depicts that it is inconclusive to establish if there is a long-run relationship between crude oil prices, exchange rate, credit to private sector growth and inflation in Nigeria during the period under review. This is because F-statistic (4.06) is greater than the lower critical bounds values of I (0) but less than the critical bound values I (1) at a 5 per cent level of significance, which in other words, it is in between the critical bound values (Pesaran, Shin and Smith, 2001). Consequently, before inferences can be made on the inconclusiveness of the cointegration, it is cogent to ascertain the order of the integration of the variable as buttressed by Pesaran, Shin and Smith (2001). Therefore, this lends way for the conduct of the Johansen Cointegration Test, as shown in Table 4.5

Table 4.5: Johansen Cointegration Results

No of CE(s)	λ trace	5%	λ Maxi	5%
None	45.66025	47.85613	23.43605	27.58434
At most 1	22.22420	29.79707	14.90403	21.13162
At most 2	7.320177	15.49471	5.037413	14.26460
At most 3	2.282763	3.841466	2.282763	3.841466

Source: *Eviews 10*

Table 4.5 reveals that the trace and max-eigen value test depicts no cointegration among the variables. This is because the trace test and max-eigen value are less than their respective critical values, necessitating the need to accept the null hypothesis of no cointegration among series. Therefore, the outcome of the Johansen cointegration test paved way to adjudge the inconclusiveness of the variables as obtained in the ARDL bound test in table 4.5. It can be concluded that there exists no cointegration among the variables, which in other words, implies that there are no long-run relationships between the variables. By this outcome, only the ARDL(Short-run) Model specification is required.

Table 4.6: ARDL (Short-run) Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
INFL(-1)	0.780357	0.147382	5.294795	0.004
INFL(-2)	-0.320116	0.151391	-2.114494	0.0442
CRPR	-0.120076	0.07827	-1.534136	0.1371
EXCH	0.018919	0.02624	0.721003	0.4773
CPSG	-0.379306	0.211731	-1.791452	0.0849
CPSG(-1)	0.188155	0.220717	0.852468	0.4017
CPSG(-2)	-0.402786	0.210407	-1.914321	0.0666
C	61.21163	23.55066	2.599147	0.0152
R-squared	0.650653	Akaike info criterion		7.870426
Adjusted R-squared	0.556598	Schwarz criterion		8.22957
F-statistic	6.917793	Hannan-Quinn criterion		7.992905
Prob(F-statistic)	0.000109	Durbin-Watson stat		1.801487

Source: *Eviews, 10*

Table 4.6 depicts the short-run coefficient of the series. Crude oil prices (CRPR) have a negative relationship with inflation (INFL) and it is not statistically significant because its p-value is greater than 5 per cent which is supported by the fact that it has t-value of less than 2. This implies that a dollar increase in CRPR will result in a 12 per cent decrease in INFL and vice versa. Technically, this means that an increase in the price of crude oil implies more revenue to the government's coffers for budget implementation, which is invariably used to support or develop the critical sectors of the economy. This, by extension, would create employment and increased output to compete with the demand side and, by implication, would reduce the general prices of goods and services. More so, the negative relationship established during the period under review is valid because the households and the firms, especially the local types, are not direct beneficiaries of the crude oil price fluctuations as compared to its derivatives like Premium Motor Spirit, kerosene, Diesel but rather the government because it directly serves as goods or products that is traded or exported across borders. This is further strengthened in the works of Olusegun (2008), that relationship is not shocking owing to the fact that inflation in Nigeria is measured based on consumer price index (CPI) which by extension do not capture crude oil prices in its computations. This outcome is in tandem in the works of Umar and Abdulhakeem (2010), Olomola (2006), Nuhu (2017) and Adeete and Bankole (2020).

The exchange rate (EXCH) has a positive relationship with inflation (INFL), which means that an increase in EXCH by a dollar will increase the inflation rate by 1 per cent. Although, it is not statistically significant because its t-value and p-value are less than 2 and 5 per cent, respectively. This revealed the implication of an import-dependent economy like Nigeria because there tend to be a significant degree of elasticity of changes in the exchange rate to the level

of general prices. Since Nigeria relies heavily on imported items to complement its supply deficits, an increase in the exchange rate will directly result in an increase in the prices of these imported goods and services and spurring inflation. This outcome is in tandem with the works of Nuhu (2017), Musa (2021), Adeniji (2013), Obiekwe and Osabunhien (2016), which the stressed exchange rate has a positive relationship to inflation which implies that the exchange rate is a contributory factor to the level of inflation rate in Nigeria.

More so, the coefficient of Credit to the private sector (CPSG) has a negative relationship with the level of inflation (INFL). However, it is not statistically significant because its p-value is less than 5 per cent. This negative relationship implies that a one per cent increase in CPSG will result in a 37 per cent reduction in inflation. This is in order because if deposit money banks lend or grant credits to the private sector, especially for real sector development. This will boost their businesses and, by implication, will result in more output to meet up demand side, create employment, increase revenue to the government through tax, and overall, result in a reduction in the level of the prices. This outcome agrees with the works of Korkmaz (2015), Boyd, Levine and Smith (2000),

and Batayneh, Salamat and Mmani (2021). Also, the lags of INFL are statistically significant owing to its p-value of less than 5 per cent. This implies that the previous year's inflation has a positive and negative implication on the current year's inflation, but the lags of CPSG are not statistically significant, though they have a positive and negative relationship with inflation for the preceding years.

However, the adjusted R-squared is 0.55, which implies that 55 per cent variation in INFL is accounted for by the explanatory variables. F-ratio is significant and implies that the model adequately explains variation in INFL during the period under review. It is further confirmed by a p-value of less than 5 per cent. Also, the DW-statistic is 1.8, which implies that there is absence of autocorrelation. This is based on the fact that if DW statistic ranges between 1.5 to 2.5, it is relatively normal, but outside this range i.e., less than 1 or more than 3, according to field (2019) then it could definitely cause for concern.

Diagnostic Testing
The following Diagnostic test was conducted to check for the model's normality, heteroscedasticity and serial correlation.

Table 4.7: ARDL Diagnostic Results

Test Statistic	Result
Serial Correlation $\chi^2(2)$:	0.762 [0.477]
Normality (Jarque-Bera)	0.644 [0.724]

Source: EViews 10

White heteroskedasticity test had already been checked when running the ARDL model, so other diagnostic tests such as normality and serial correlation test was conducted. The result revealed that the ARDL model is free from serial correlation and misspecification because all these tests conducted have their p-value(s) greater than 0.05,

which implies the acceptance of the null hypothesis that there is no serial correlation and its normality. Furthermore, to check the stability of the model, the cumulative sum of recursive residuals (CUSUM) and CUSUM sum of Squares test were conducted as displayed in figure 4.1 and 4.2
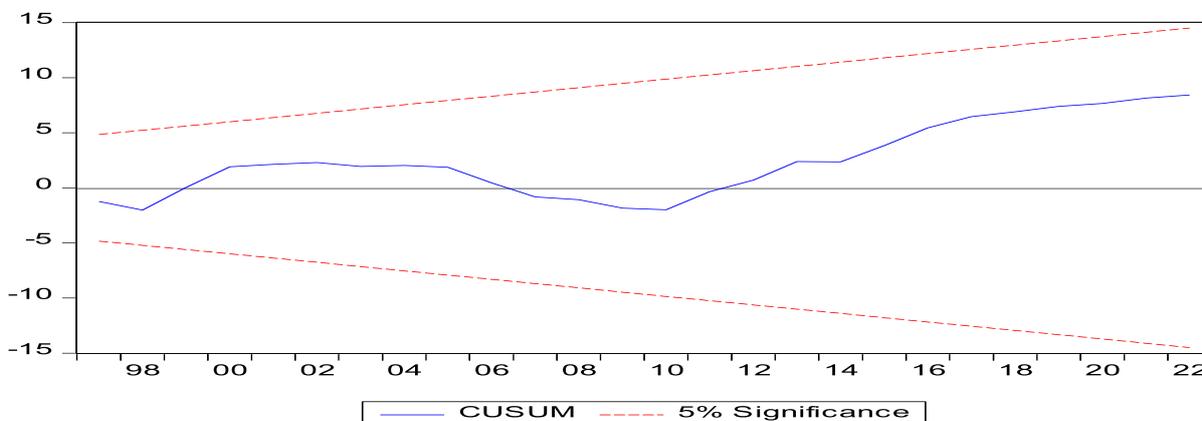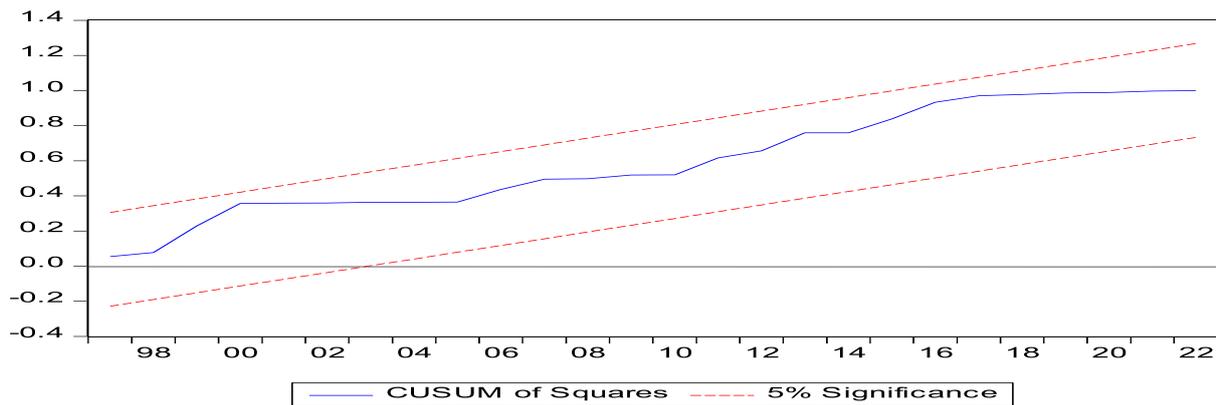
Figure 4.1: CUSUM Test

Figure 4.2: CUSUM of Square Test

Source: *EViews 10*

Figure 4.1 and 4.2 clearly shows that the model is stable since the CONSUM and CUSUM of Squares plots are within the lower and upper bounds as against a scenario if the plots of the CUSUM break in the lower or upper bounds, then such a parameter is said to be unstable (Tang and Lean, 2007).

5. Conclusion and Recommendations

Based on the findings, the study concluded that crude oil prices and credit to private sector growth has an inverse relationship whereas exchange rate has a positive relationship with inflation under the period considered which further justifies an import dependent and petrodollar system operated by Nigeria. Consequently, the following recommendations were suggested for implementation.

Firstly, there is need for the Nigerian Government to aggressively diversify the economy towards the non-oil sector with emphasis on mechanized agriculture, industrial or manufacturing sector and the ICT sector as this would go a long way in reducing the over reliance on the oil sector and become resilient to any shock, be it internal or external. Secondly, the bank financing should be skewed towards supporting the real sector of the economy as this will go a long way in boosting output, creating jobs, revenue etc. As a result, it will result to less import, thus reducing the pressure on the exchange rate and by extension, strengthen the naira against the dollar.

Declaration of Interest Statement
I hereby certify that the content of this paper denotes an original and unpublished work and is not under consideration elsewhere for publication.

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