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EDITORIAL

Dear Esteemed Readers,

We are pleased to present Volume 13, No. 2, 2025, of the Institute’s Journal of Banking, featuring five carefully selected scholarly papers. We warmly welcome our readers to this edition, which brings together insightful research addressing some of the most pressing economic and financial issues confronting Nigeria and other emerging economies. This volume is thoughtfully designed to provide an engaging and enabling intellectual environment—one that encourages critical reflection, facilitates meaningful connections across themes, and guides readers through the papers with clarity and purpose.

The edition opens with the paper titled “**Government Expenditure, Budget Deficit and Inflation: Are There Shock Responses Intensities and Asymmetrical Magnitudes?**”. This study revisits the long-standing discourse on the fiscal–inflation nexus by examining the nature, intensity, and asymmetry of shock responses arising from government expenditure and budget deficits. By moving beyond conventional linear analyses, the paper offers deeper insights into fiscal policy dynamics and their implications for price stability and macroeconomic management.

The second paper, “**Digital Banking and Youth Empowerment: Pathways to Financial Inclusion and Economic Development in Nigeria,**” draws readers into the transformative role of digital finance in shaping inclusive growth. It explores how digital banking platforms are expanding financial access for young people, supporting entrepreneurship, employment creation, and economic participation. In doing so, the paper situates youth empowerment at the heart of Nigeria’s digital and developmental agenda.

In “**Monetary Policy and Economic Stabilisation,**” the third paper provides a focused examination of the role of monetary policy in

managing economic fluctuations. It assesses policy effectiveness and transmission mechanisms within Nigeria’s structural context, offering timely insights into inflation control, output stabilisation, and financial system stability—issues of continued relevance to policymakers and market participants alike.

The fourth contribution, “**Digital Bookkeeping as a Pathway to SME Creditworthiness in Nigeria**,” turns attention to the real sector, particularly small and medium-sized enterprises. The paper highlights how digital bookkeeping practices enhance financial transparency and reliability, thereby improving SMEs’ access to credit. It presents technology as a practical enabler of enterprise growth and financial inclusion, with clear implications for lenders, fintech innovators, and development institutions. The edition concludes with “**Digital Finance, Balance of Payment and Trade Balance in Nigeria**,” which situates digital financial developments within the broader external sector of the economy. By examining the interactions between digital finance, trade flows, and balance of payments outcomes, the paper contributes to emerging policy discussions on digitalisation, trade competitiveness, and external sector sustainability.

Collectively, the papers in this volume offer a coherent and insightful exploration of macroeconomic policy, digital innovation, and inclusive development. We invite our readers to engage thoughtfully with each contribution, confident that the analyses presented will enrich understanding, stimulate dialogue, and inform policy and practice. I hope you find this edition rewarding and intellectually enriching as you engage with the insights and analyses presented in the papers.

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GOVERNMENT EXPENDITURE, BUDGET DEFICIT AND INFLATION: ARE THERE SHOCK RESPONSES INTENSITIES AND ASYMMETRICAL MAGNITUDES?

**Agbontaen, O.O¹
Ehiedu, Victor C, Ph.D²**

Abstract

The debates that gave rise to this study holds strongly to the fact that government expenditure and budget deficit have significant positive effects on inflation especially on the short-run without valuable insights on the shock emitted by these effects, their responses, intensities and magnitudes. This study established the grounds to test the shock impacts of government expenditure and budget deficit on inflation by putting up a vector auto-regression model that encapsulate monetary authority's desire to curb inflation by enacting various monetary policy measure within her control. Thus, the incidences of various inflation shock response, their observed intensities and magnitudes, to government expenditure and budget deficit where established consequent to their known asymmetries. Government expenditure and budget deficit had positive shock impact on inflation in the short-term but they were not statistically significant. The surprise was that inflation indicated own asymmetries in the short-run that were statistically significant

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with implication for the monetary policy strategies geared towards moderating its shock impacts in the economy. The intensities and magnitudes of these shocks heightened, deepened and stabilized at various stages in the observation with unequal variation in high negative depth that exhibited relative low positive intensities that were three times less in magnitude. These results has implications for monetary authorities, policy makers, academics, researchers at the Africa Development Bank, central bank officials of other developing economies, the World Bank and other international donor agencies.

Key words: budget balance, inflation, deficit, impulse response, VAR, asymmetry

JEL code: C32, E6, O16, P43

1. Introduction

Scholars agree that government expenditure and budget deficit impacts on inflation often yield interrelated shock variations in the intensity and magnitude of their responses through aggregate demand pressure. They obtain this insights from empirical outcomes, connected to the fact that as policy makers seeks to tackle inflation and stabilize economic growth, they generate increases in money supply linked to government spending as they aim at accomplishing the stated policy initiatives (Klein, 2023; Jorgensen, 2022).

The short-run and long-run analysis of government expenditure on inflation, produced evidences that strictly concern the short-run fundamentals of the study, holding in the facts obtained from the long-run and short-run relationships of the variables in the inflation rate model (Okowa & Igbara, 2025). Also, Olufem, Okoh and Irete (2024) analysis considers the

disaggregate values of government expenditure as a principle fiscal policy tool that has no correlation with inflation, besides inflation's weak association with national output. Olurin, Omosebi, Seotan and Akintola (2024) assess government expenditure impact on inflation and economic growth, highlighting the fact that government expenditure and inflation drive economic growth significantly.

The narrations on fiscal deficit and government expenditure's role on inflation calls to mind that price stability is necessary for national output growth. Ngujen (2015) Asian panel data study that captures the role of monetary policy variable in relations to fiscal deficit and government expenditure, obtain results that detail the significance of money supply, fiscal deficit, government expenditure and interest rate as valuable determinants of inflationary pressure. Relatively, Jorgensen and Chen (2013) multivariate Pacific Islands panel data study give details of the strong relationships between budget deficit and inflation as each nations result suggest for the groups' panel estimates. Also, Ozurmba (2012) establish facts that link fiscal policy effect to inflation, while considering economic productive with scanty reference to the role of inflation within the system.

These contending facts left silent the need to look beyond the effect government expenditure and budget deficit have on inflation. Consequently, this study explore these facts through a vector autoregression system that test the hypotheses of the shock effects of monetary policy on inflation in the light of government spending and budget deficit and indicate the shock asymmetry, to understand how inflation shocks response to these fiscal stimulus through the observed impulse responses. In a model that demonstrates monetary authorities attempt to use monetary policy measures to curtail inflation over the observation. It shed light on a perspective of the

argument over the fact that inflation may be structural and ascertain how fiscal policy expansion through these mediums may exacerbate inflation pressures by disclosing the size, intensity and magnitude of their shock response to express their asymmetry.

The other parts of this study consider the review of relevant literature, the methodology, the analysis of empirical results, policy implication, conclusion and recommendation.

2. Literature Review

The arguments that lead the debate on government expenditure, budget deficit and inflation, hold the view that government expenditure breed inflation as expansionary policies may likely increase aggregate demand for goods and services domestically, tentatively generating higher inflation rate (Okowa, & Igbara, 2025; Ngujen, 2015; Olayungbo, 2013). Overtime, fiscal deficit has tactically driven economies with monetary policies that finance budget deficits by increasing money supply that systematically increase inflation pressure (Ngujen, 2015; Jayaraman & Chen, 2013). These strands of facts technical connect policy makers' decision of expansionary fiscal policies through government expenditure and budget deficits basically leads to inflation through aggregate demand pressure or excess money supply channels.

2.1. Government Expenditure and Inflation

Okowa and Igbara (2025) study the short-run and long-run impacts of public expenditure on the inflation rate, using annual datasets that were stationary at first difference. Although their results did not offer a clear co-integrating long-run relation among the variables in their model, the short-run outcomes establish that public capital spending, public recurrent spending, money supply and exchange rate have a positive relationship with inflation in Nigeria. For these reasons they recommend a contractionary monetary policy in the

short-run, while appropriating for expansionary monetary policy, which is purpose driven, to sectorial boost productivity and economic growth in the long-run.

Olufemi, Okoh and Irete (2024) to understand how fiscal policy influence aggregate economic productivity and support the macro economy, they empirically explain the impact of the disentangle aggregate values of government expenditure spending on national output in accordance with their relationship to inflation rate. The outcome of their MANOVA analysis indicates that capital and recurrent expenditure has strong correlation with national output, while inflation has a positive insignificant relationship with national output (Olufemi, Okoh, & Irete, 2024). They emphasize that for the economy to obtain economic progress, fiscal policy tools should guide expenditure components with special attention to impact more on national output. Concluding that productivity alone should not be used as an economic tool to control inflation, since it indicates positive impacts that is not statistically significant (Olufemi, Okoh, & Irete, 2024).

Olurin, Omosebi, Soetan and Akintola (2024) examine the impact of government expenditure on inflation and economic growth using the ordinary least square statistical procedure and disclose that government expenditure and inflation rate have positive and significant impact on economic growth in Nigeria. From this empirical background, they assert that government expenditure arrangements should focus on economic growth intervention strategies to obtain and maintain inflation at single digits, while creating adjustments that will favourably increase productivity in other sectors of the economy.

Further, Olayungbo (2013) examines the central bank of Nigeria dataset from 1970 to 2010 in a vector autoregression model, to

analyze the asymmetry casual influences of government spending on inflation. He obtain a uni-directional asymmetric causality, were contractionary government spending drive positive inflationary changes to lead higher inflation in the economy.

Equally related, Ruge-Murcia (1999) dynamic model of inflation and money supply, which is linked to government creation of new money to finance her expenses that are often in deficits, which is influenced by inflation rates due to reduction in tax revenue. He perceived money supply and budget deficit as endogenous in his model, while government expenditure is assumed to be exogenously determined in a discrete switching regime in an autoregressive process. In the light of Tobin's proposition that inflation 'greases' the wheels of the labour market (Ruge-Murcia, 1999). The simple dynamic stochastic general equilibrium model with asymmetric wage adjustment cost, reveal that optimal inflation is determined by a benevolent government that maximizes the economic welfare gain of citizens in the second order non-linear model. The results indicate that nominal wage that is downwardly rigid at the optimal level greases inflation in the United States economy at approximately 1.2 percent annually with a 95 percent confident interval.

Similarly, Falade (2024) use the smooth transition regression model to analyze the linear and nonlinear impacts of government spending on inflation, using monthly dataset from 2000:1, to 2023:6 from Nigeria. This study asserts that linear approximation fails to adequately explain the non-linear impact of government spending on inflation, particularly in higher growth periods. Contractively, low growth periods where government spending are reduced had financial implication for fiscal policy stimulus and inflation control. Nguyen (2019) study analyses the short-run and long-run impact of government spending on inflation in a co-integration vector auto-

regression model for three Asian countries, India, China and Indonesia. The results reveal a causal co-integration relationship of government spending and inflation in the long-run for these economies, besides their structural stereotypes (Nguye, 2019). The short-run outcomes indicate that the government spending-gross domestic product ratio of China has negative impact on inflation. Relatively, it reveals positive impacts in India and Indonesia, which suggest the need for effective government expenditure prudential guideline to monitor for efficient inflation control.

2.2. Fiscal Deficit and Inflation

Ekomabasi and Ekong (2023), Obi and Ehiedu, (2020) examined the short-run and long-run effect of fiscal deficit on inflation in Nigeria in an auto-regression redistribution lag model, in consideration of the co-integration bound test. The analysis indicates a significant negative long-run impact between fiscal deficit and inflation, besides their uni-directional causality that runs from fiscal deficit to inflation, indicating a that chronic fiscal deficits offers misleading signals in relation to inflation with implication the fiscal policy framework of Nigeria.

Ologbenla (2022) empirical article on inflation and government spending in Nigeria support the view of a positive relationship between government spending and inflation, in a model with inflation, government expenditure, exchange rate and money supply. These results suggest that the seed of adjustment is approximately 5 percent and government spending equilibrium recovers at about 71.28 percent at each interval after a government spending growth shock (Ologbenla, 2022). This author connected this to the results of the exchange rate variable, suggesting its observed negative impact shows that an increase of the local currency by 1 unit over the United State Dollar may reduce government spending by approximately 0.134 percent, while broad

money sensitively drive growth but it's not statistically significant (Ologbenla, 2022).

Nguyen (2015) highlights the sustainability of high economic growth rate through domestic production at low inflation as a major macroeconomic policy objective, to clarify if price stability is essential for effective domestic output growth, despite pressure from fiscal deficits and money supply on inflation in Asian economies. He used a pooled mean group (PMG) estimation-based error correction model and a panel differenced general method of moment (GMM) Arellano-Bond estimator to estimate the model. He observes that money supply indicates significant positive impact on inflation in the PMG output, while fiscal deficit, government expenditure and interest rate are statistically significant determinants of inflation in both empirical estimations (Nguyen, 2015).

Jorgensen and Chen (2013) introduce a multivariate framework to study the relationship of budget deficits and inflation in four Pacific Island states. Their panel data analysis encapsulates a multivariate framework, intentionally to moderate bias that may arise from the omission of relevant variables or estimation errors that may occur from the estimation of the long-run relationship between budget deficits and inflation. Thus, they used the Westerlund Error Correction Based Panel co-integration test procedure (Westerlund, 2007). Their results confirm the existence of a strong, direct relationship between budget deficit and inflation in these economies (Jorgensen & Chen, 2013).

Ozurumba (2012) examine the casual link between inflation and fiscal deficit using the robust Yamamoto Granger non-causality test. The analysis did not obtain a clearly defined impact of the causality of fiscal deficit and inflation in the observation,

suggesting that inflation stabilization may be better moderated with more insights from other macroeconomic variables, since fiscal deficits only conceive inflation from the government financing perspectives (Ozurmba, 2012). Additionally, Medee and Nnebee (2012) set out to investigate inflation and interest rate impact on fiscal deficits in Nigeria in a multiple regression analysis. The results disclose that inflation rate has significant positive impacts on the level of fiscal deficits in Nigeria, while the interest rate did not, suggesting that it may be due to the unstable macroeconomic environment in the economy.

3. Methodology

Generating profound insights from the Neo-Keynesian government expenditure hypothesis that higher government spending may lead higher inflationary trends, this study collected the data sets from 1970 to 2024 of the specified variables in the model from the central bank of Nigeria Bulletin, 2008; 2012, 2018, 2020 and 2025 online database. This period witness consistent high levels of inflation and expansionary fiscal policies that have influenced increases in government expenditure and budget deficit beside other internal and external macroeconomic challenges on which these expansions were justified. This include but not limited to the devaluation of the local currency, the structural adjustment programmes, the global financial crisis, local and international energy price fluctuations etc. The vector auto-regression estimation technique was used considered the shock impact of the lagged values of inflation (INFL -1, INFL -2), money supply (M2), economic growth (ECOGW), exchange rate (EXR), government expenditure (GOVEXP), aggregate bank credit (BCE), interest rate (INTR), and budget deficit (BDFIT) to analyze the observed shock variations and the impulse responses between these variable in the model, which were examined using E-view enterprise edition version 10.

The vector autoregression model estimated for this study is expressed as follows:

$$Y_t = \sum_{k=1}^{\rho} \alpha_k Y_{t-k} + U_t \quad 3.1$$

Where:

Y_t = vector representing K endogenous variables

$t = 1 \dots T$ time period

α_k = it is the dependent cross-sectional for the exogenous variables

Y_{t-k} = the lagged estimate of endogenous variables

$U_t = K \times 1$ vector of random errors which basically represents

$$U_t = [U_{1t}, U_{2t}, \dots \dots U_{Nt}] \text{ iid } (0, \delta) \quad 3.2$$

Tentatively, Y_t is:

$$Y_t = \begin{bmatrix} Y_{11} \\ Y_{12} \\ Y_{13} \end{bmatrix} \quad 3.3$$

Where:

Y_{11} , Y_{12} and Y_{13} represents the Y vector (Kilian & Zhou, 2020; Kilian & Vigfusson, 2011).

Therefore, the empirical model specified for the models are:

Flowing from the equations expressed above, basic vector autoregression model the empirical equation for government expenditure, budget deficit and inflation rate, calibrated for this study will be are model using two lag length as expressed by the results of lag length estimation process (see appendix B1):

$$INFL_t = \varphi_1 + \sum_{j=1}^{\rho} \mu_1 INFL_{t-j} + \sum_{j=1}^{\rho} \mu_2 GOVEXP_{t-j} + \dots + \sum_{j=1}^{\rho} \mu_3 BDFIT_{t-j}$$

3.4

$$GOVEXP_t = \varphi_1 + \sum_{j=1}^{\rho} \mu_1 GOVEXP_{t-j} + \sum_{j=1}^{\rho} \mu_2 INFL_{t-j} + \dots + \sum_{j=1}^{\rho} \mu_3 BDFIT_{t-j}$$

3.5

$$BDFIT_t = \varphi_1 + \sum_{j=1}^{\rho} \mu_1 BDFIT_{t-j} + \sum_{j=1}^{\rho} \mu_2 GOVEXP_{t-j} + \dots + \sum_{j=1}^{\rho} \mu_3 INFL_{t-j}$$

3.6

Where:

$INFL_t$ = inflation rate as observed over time.

$GOVEXP_t$ = government expenditure as observed over time.

$BDFIT_t$ = budget deficit as observed over time.

$INFL_{t-j}$ = lags of inflation rate as observed over time.

$GOVEXP_{t-j}$ = lags of government expenditure as observed over time.

$BDFIT_{t-j}$ = lags of budget deficit as observed over time.

... = Money supply (M2), Economic growth (EcoGw), Exchange rate (EXR), Bank credit (BCE), and Interest rate (INTR).

The vector autoregression estimates were obtained following the traditional empirical view that the estimation of variable at level holds valuable facts that uphold essential clues for policy transformation, which are often lost after difference with the quest for stationarity (Agusti & Costa, 2022; Lenza & Primiceri, 2020; Kilian & Zhou, 2020). This technical stance offers a basic understanding of the intricate short-run shock relationship between the variables in the model and ascertain there asymmetry, and the impulse responses were estimated to express the underlining responses of each of these variable to the shocks express over the observation, outlining the intensity, size and magnitudes of the

established shock responses. To clarify how fiscal policy expansion through government expenditure and fiscal deficits exacerbate inflation in Nigeria.

4. Results and Discussion

4.1 The VAR Results

4.1.2 Inflation and Lagged Inflation Shocks

Previous inflationary circumstances at the first lag, generated a positive shock impact, which is systematically increased the prevailing shocks exhibited by the existing inflation rates. It is important to note that this positive shock impact was statistically significant at the 1 percent level and it should be taken seriously (see Appendix D1 and D5). This is because it establishes a case of short-term own-shock asymmetry, one period before the present monetary policy strategy was introduced to curtail existing inflationary trend. Relatively, the inflationary shock situation at the second lag, revealed a negative shock impact, suggest a decrease in the impact of the existing shocks exhibited by recent inflationary trends. This shock impact was not statistically significant at the 1 percent and 5 percent level (see Appendix D1).

Besides the fact that the significant levels of inflation to lagged inflation shocks where mixed across the observed lag lengths, both results hold valuable clues that matter for inflation expectation and public confidence for trust in monetary policy outcomes to curtail inflation.

4.1.3 Inflation and Government Expenditure VAR Results

Inflation rate at the first lag express the fact that government expenditure emits positive shocks, which is suggested to increase the existing shocks exhibited by inflation rate a period before the prevailing inflation rate was established. It is important to note that although this shock is high, it was statistically significant at the 1

percent levels (see Appendix D1 and D5). This indicated inflation own shock asymmetry a period before the present monetary system was put in place to curb inflation in the economy.

Subsequently, inflation rate at the second lag indicated that government expenditure expressed insignificant negative shocks, suggesting it may likely reflect a decrease in inflation rate two periods before the prevailing inflation rate was established. It is important to note that this shock was not statistically significant at the 1 percent and 5 percent levels.

These imminent shock results may be seem not to have a consistent fit across the stated lags but the model over all summary statistics from which they were obtained indicated that these fact are stable. Thus, these facts expresses an appropriate amount of truth that matter for monetary policy efficiency through government fiscal stimulus adjustments, in the light of monetary authority wiliness to tentatively curb inflation, as expressed by the observed estimates, despite the inherent weaknesses in the results obtained.

4.1.4 Inflation and Budget Deficit VAR Results

Inflation rate at the first lag pointed to the fact that budget balance that was largely in deficits emitted shocks, which is suggested to lead to a decrease in inflation rate a period before the prevailing inflation rate came into existence (see Appendix D1 and D5). The fact remains that this action was not statistically significant at the 1 percent and 5 percent levels. Also, the inflation rate at the second lag showed that budget deficit emits positive shocks, which projects an increase in inflation rate two periods before the prevailing inflation rate was established. It is essential to note that this shock was not statistically significant at the 1 percent and 5 percent levels (seep Appendix D1).

These shock fundamentals between budget deficits and inflation may appear mixed, it is important to note that the observed positive shock impacts emitted by budget deficits in relation to inflation were stronger in impact in comparison to its negative shock impact on inflation rate in the economy. Although these shocks were not statistically significant their summary statistics indicates that the model that expressed these facts is stable. Thus, these facts hold significant level of truth that matter for monetary policy efficiency despite the inherent weakness in the results.

Consequently, from these results states above, when inflation displayed own shock asymmetry, which was statistically significant at 1 percent, government expenditure shocks strongly increase the rates of inflation, besides the roles of the shock influences emitted by the other monetary policy stabilizing measure in the model as the monetary authority make efforts to stabilize inflation. This is a clear indication of a case where government expenditure shocks lead to increase in inflation in the economy, justifying the suggested position that inflation may be structural. Alternatively, from the fiscal financing perspective, it shocks indicates a reasonable decrease, as this scenario places out over the observation. This leads the voice that as inflation shocks displayed own shock asymmetry, budget deficit emitted shocks that reflect a reduction in the inflation rate in the economy. Thus, budget deficit in this wise is not suggest to hold and structural shock influence that may increase inflation as expressed by these shock scenario, besides other effects put in place by the monetary authority to control inflation in the economy within the period studied.

4.2 Impulse Response Results

4.2.1 Inflation Responses to Lagged Inflation Shocks

Inflation response to lag inflation impulses indicated a slightly steep free fall with an initial intensity of +18 and a magnitude of +2 and

+1 that gradually expanded to ± 2 and ± 4.5 respectively, this consistently expanding magnitude lasted for approximately 16 years (see Appendix D2 and D3). After this decline, the shock impulses from the lagged values of inflation stabilized the present inflation significantly, for approximately another 5 years, with an intensity of +2 and -3. Subsequently, present inflation remain stable, waving slightly between it constant state and +0.1 and -0.2 over the subsequent 6 years. Although it reverted to its stable state and maintain consistency for another 5 years. Eventually, it became consistently stable for another 13 years (see Appendix D2 and D3). A clear expression of self-induced stabilizing shock impulses on an extended horizon. In this last 28 years, the level of the size of the expressed intensities was minimally expressed at approximately -1 and +1, over the observation.

4.2.2 Inflation Response to Government Expenditure Shocks

Inflation response to government expenditure, expressed the fact that in the first four years of the observation, inflation response to government expenditure was consistent and stable. At this period, the intensity and magnitude of the shock fizzed out and was consistently stable in accordance to the stable response of inflation to shocks from government expenditure in the observation. After this period, the intensity of the response rose mildly, with a minimal size strength of +0.2 points above the line of stability (see Appendix D2 and D3). The magnitude of this mild shock gradually rose from zero to approximately +5 point and -5 point during this period. This moved along for about ten years, before it became stable for another approximately five years, while the magnitude of the shock remain consistent, reflecting a consistent transmission of what prevailed in the previous period. Subsequently, it dropped below the stability line by approximately +0.2 points and this was for about 4 years (see Appendix D2 and D3). Thus, the magnitude slightly deepens losing + 3 points above while further accumulating approximately

-1 point below the stability line. Immediately after this period, it depressed with -0.1 point below the stability line for over twenty years before it picked up towards the stability line with another +0.1 point, which remain consistent to the end of the observation. The magnitude remain stable only closing up at the end of the observation with -1 point from the lower sphere of the express size of the exhibited magnitude transmitted across the observation.

4.2.3 Inflation Response to Budget Deficit Shocks

The response of inflation to budget deficit indicated that in the first four years of the observation, it had initial extremely low oscillatory and the impulse responses of inflation to budget deficit was very near neutral. The impulse response of inflation to budget deficits emerged at about the fifth year into the observation, with a stable intensity of zero in the first two years. Further, the next three years had an intensity of -1, with a magnitude of +1 and -3 that lasted for over thirteen years, as this size of this response narrows in towards +1 and -1, as the strength of intensity closed in to -1 for another five year, it became neutral and remain on the baseline for approximately fifteen years (Appendix D2 and D3). Subsequently, the intensity of the response of inflation to budget deficit rose to +1, also the magnitude of the response of inflation to budget deficit gradually narrowed in to the baseline and remain stable at -0.5 and +1 towards the end of the observation.

4.3 Policy Implication

4.3.1 Policy Implication of Inflation Response to Lag Inflation

In the first twenty years of the observation, the slightly sloppy free fall witnessed by inflation that bore an initial strength of intensity of +18 point at its peak, with a reasonable weight of magnitude for the first five year after it emerged demonstrated policy makers weak response to expected price changes (Appendix D2 and D3). This initial high intensity may suggest strong price transmission beyond

expectations, such that inflation shocks are led by self-reinforcing price changes that linger longer than expected and fizzles out very slowly over the observation. This may be due largely to the failure of policy makers to quickly counteract inflationary pressure with an effective monetary policy system thought that length of time. Thus, it displaced own shock asymmetry. Also, the observed magnitude of this response suggested that it further weakened the structure of the economy through unfriendly public inflation expectations (see Appendix D2 and D3). Consequently, the intensities and magnitudes of the responses of inflation to shocks of lagged inflation as observed in this analysis are largely asymmetrical with implications for monetary policy practical application reorientation.

4.3.2 Policy Implication of Inflation Response to Government Expenditure

Generally, the results of inflation response to government expenditure exhibited very weak positive intensity that barely lasted for five years, before it gravitated towards stability for another five years. Subsequently, it hovered between the baseline that dictates the stability range for over 8 years before it slightly plunged with approximately -1 point for three years and dipped further to approximately -2 and remained in this state for over sixteen years before it finally reverted back to its formal -1 point position, which it reflected sixteen years earlier, only for about another 3 years (see Appendix D2 and D3). These slight, immutable responses had strong consistent magnitude of approximately +5 and -5 that only expressed slight variations across time. These suggest that government spending emit signals that lead to reduction in private consumption, which dampened aggregate demand, with implication for monetary policy credibility to offset fiscal stimuli that generate inflationary tendencies over the observation. Consequently, these variations in the response of inflation to government expenditure did not demonstrate asymmetrical futures. It is important to note

that despite this assured outlook, it expressed the fact that government expenditure do not exhibit serious inflationary inconsistencies in the domestic economy but it seriously weakens the policy intensity of monetary authorities to curtail inflation.

4.3.3 Policy Implication of Inflation Response to Budget Deficit Shocks

The response of inflation to budget deficit shocks expressed weak levels of intensity of approximately -1 that lasted for first 3 year and stayed equivalently below the stability line with an intensity that is less than -0.5 for another five years before it became consistent for another twenty years (Appendix D2 and D3). The magnitude of this response thought this first fact was relatively steady at +3, but indicated -3 that gradually closed in to become -1 gradually after approximately 15 years. Subsequently, it began to hover about the baseline, while remaining stability with an intensity of approximately +0.5 for approximately 20 years (see Appendix D2 and D3). Although its magnitude remain steady at +2, the level of magnitude closed in to the baseline at approximately -0.1. This suggests how fiscal policy dominants suppress inflation, indirectly constraining monetary policy ability to curtail inflation. This fact shade light on fiscal dominance that undermined monetary authority credibility and independence, as the monetary authorities strategically implement policies to curb inflation. Thus, inflation responses to budget deficit shocks are not asymmetrical but they flow in a sequentially ordered arrangement that is costly for efficient monetary policy inflation control.

4.4 Policy Recommendation

Government spending and deficit should be channeled to sectoral development for value-added innovation that will spur economic growth and productivity. The focus should be on supporting sustainable projects in the real sector to enhance projected

economic growth, and employment as it stabilizes inflation and the macroeconomic without necessarily exacerbating inflationary pressure. On this long-run this will yield sustained high rates of economic growth through domestic production at low inflation that matter for global competitiveness.

5. Conclusion

This research work synthesized facts on government expenditure impact on inflation and budget deficit effect on inflation to put up a system that accounts for the shock impacts and impulse responses of government expenditure and budget deficit in a developing economy, where the authorities uses both fiscal stimulus and monetary policy strategies to curb the effect of inflation on the economy. This was done to technically make allowance for a case that measures the shock impact of government expenditure and budget deficit on inflation as the monetary authority put strategies in place to tentatively minimize its impact, which expresses a unique interplay of insights beyond what was presently suggested in the existing related literatures. Also, the intensities and magnitudes of the shock responses of these variables as depicted by the sizes of the impulse response results were interpreted accordingly.

The lagged values of inflation had mixed shock impact on inflation, expressing interchangeable levels of asymmetries across the lags with diametric contradictions between the established shock impacts. Distinctively, the first lag value of inflation exhibited positive shock impact that expressed short-term own-shock asymmetry that was statistically significant at 1 percent with implications for monetary authority's strategic inflation plan for Nigeria. This shock impacts expressed stable impulses that reverts back and maintains consistency every 5 years, with a further self-induced stabilizing shock impulses on an extended horizon.

Government expenditure VAR results indicated mixed shock impact on inflation, showing dissimilar levels of asymmetries across the lags that were not basically significant. Consequently, inflation responses to government expenditure expressed initial consistently stable impulses that fizzed into a stable response with heightened intensity at high magnitudes. These intensities and magnitudes gradually dipped, losing two-third of its magnitude before it stabilized and became consistent, with less intensity at the lower part of the base line towards the end of the observation.

Equally related, inflation-budget deficit shock relationship expressed a mixed shock impact outcomes, while it was positive at the first lag, it was negative at the second lag, indicating different asymmetrical shock features that were not statistically significant. Inflation response to budget deficit disclosed initial extremely low oscillatory that was close to neutral. Although its intensities were low, its magnitude dipped -3 points to +1, as much as its positive strength could annex but towards the end of the observation the observed magnitude deepened -5 points to +1 on the positive side. These spectacular outcomes have various policy implications for the monetary authority in Nigeria, other economies in Africa and other developing economies in the world economy.

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Appendix D1: VAR Results

Vector Autoregression Estimates

Date: 06/18/25 Time: 04:44

Sample (adjusted): 1972 2024

Included observations: 53 after adjustments

Standard errors in () & t-statistics in []

	INFL	M2	ECOGW	EXR	GOVEXP	BCE	INTR	BDFIT
INFL(-1)	0.434223 (0.16758) [2.59109]	-7603.793 (254122.) [-0.02992]	-0.142744 (0.14012) [- 1.01871]	-3.869207 (24.7423) [- 0.15638]	136.0814 (2911.89) [0.04673]	-1377.019 (1904.01) [- 0.72322]	-0.036932 (0.04009) [-0.92127]	-177.3569 (684.030) [-0.25928]
INFL(-2)	-0.034202 (0.16085) [- 0.21263]	2231.368 (243916.) [0.00915]	0.234600 (0.13449) [1.74431]	0.530605 (23.7486) [0.02234]	-3407.585 (2794.95) [- 1.21920]	-662.8251 (1827.55) [- 0.36269]	0.008753 (0.03848) [0.22748]	751.8734 (656.558) [1.14517]
M2(-1)	1.04E-06 (2.7E-06) [0.38581]	8.595474 (4.09500) [2.09902]	2.11E-06 (2.3E-06) [0.93248]	0.000836 (0.00040) [2.09590]	0.009051 (0.04692) [0.19290]	-0.022691 (0.03068) [- 0.73955]	-1.57E-06 (6.5E-07) [-2.42319]	-0.009601 (0.01102) [-0.87100]
M2(-2)	-1.15E-06 (3.1E-06) [- 0.37102]	-7.888946 (4.70093) [-1.67817]	-1.95E-06 (2.6E-06) [- 0.75151]	-0.000920 (0.00046) [- 2.00898]	-0.015701 (0.05387) [- 0.29148]	0.025268 (0.03522) [0.71739]	1.80E-06 (7.4E-07) [2.42952]	0.009917 (0.01265) [0.78375]
ECOGW(-1)	-0.136438 (0.17881) [- 0.76301]	86175.63 (271153.) [0.31781]	-0.031996 (0.14951) [- 0.21400]	9.904000 (26.4005) [0.37514]	1993.288 (3107.04) [0.64154]	-137.5933 (2031.62) [- 0.06773]	0.014125 (0.04278) [0.33020]	9.048046 (729.873) [0.01240]
ECOGW(-2)	-0.182296 (0.16781) [- 1.08632]	69212.21 (254467.) [0.27199]	-0.115555 (0.14031) [- 0.82356]	8.628615 (24.7759) [0.34827]	-372.8971 (2915.84) [- 0.12789]	821.8506 (1906.60) [0.43106]	0.096917 (0.04014) [2.41430]	-64.69543 (684.959) [-0.09445]
EXR(-1)	-0.011004 (0.02720) [- 0.40449]	-87492.05 (41252.4) [-2.12090]	-0.021051 (0.02275) [- 0.92547]	-8.475461 (4.01650) [- 2.11016]	-92.90171 (472.697) [- 0.19654]	227.7087 (309.085) [0.73672]	0.015787 (0.00651) [2.42587]	96.88202 (111.041) [0.87249]
EXR(-2)	0.011337 (0.03183) [0.35615]	80088.98 (48269.9) [1.65919]	0.019812 (0.02662) [0.74437]	9.374106 (4.69975) [1.99460]	157.8997 (553.108) [0.28548]	-259.9829 (361.663) [- 0.71885]	-0.018414 (0.00761) [-2.41819]	-101.5164 (129.930) [-0.78132]
GOVEXP(-1)	6.31E-06 (8.5E-06)	-1.352191 (12.9054)	1.59E-05 (7.1E-06)	-0.000236 (0.00126)	0.352694 (0.14788)	0.395396 (0.09669)	-5.53E-07 (2.0E-06)	-0.001196 (0.03474)

	[0.74087]	[-0.10478]	[2.23479]	[- 0.18818]	[2.38503]	[4.08915]	[-0.27138]	[-0.03444]
GOVEXP(-2)	5.32E-08 (8.0E-06) [0.00669]	-3.032476 (12.0660) [-0.25132]	7.74E-06 (6.7E-06) [1.16304]	-0.000372 (0.00117) [- 0.31671]	0.617111 (0.13826) [4.46340]	0.321097 (0.09041) [3.55175]	-5.67E-07 (1.9E-06) [-0.29771]	0.112786 (0.03248) [3.47261]
BCE(-1)	-5.30E-06 (1.2E-05) [- 0.45143]	0.958687 (17.7982) [0.05386]	-1.75E-06 (9.8E-06) [- 0.17818]	0.000116 (0.00173) [0.06713]	-0.234968 (0.20394) [- 1.15212]	0.258557 (0.13335) [1.93888]	-2.64E-07 (2.8E-06) [-0.09399]	-0.024511 (0.04791) [-0.51162]
BCE(-2)	7.54E-06 (1.2E-05) [0.64329]	1.790916 (17.7644) [0.10081]	3.91E-06 (9.8E-06) [0.39919]	-1.37E-05 (0.00173) [- 0.00791]	0.486138 (0.20356) [2.38822]	-0.081963 (0.13310) [- 0.61580]	-1.19E-06 (2.8E-06) [-0.42424]	0.396287 (0.04782) [8.28754]
INTR(-1)	0.118639 (0.64726) [0.18329]	508250.9 (981501.) [0.51783]	0.693765 (0.54120) [1.28191]	49.62573 (95.5629) [0.51930]	3657.445 (11246.7) [0.32520]	-1091.177 (7353.92) [- 0.14838]	0.421281 (0.15484) [2.72084]	-443.3367 (2641.95) [-0.16781]
INTR(-2)	0.015986 (0.63187) [0.02530]	-558911.7 (958156.) [-0.58332]	-1.392628 (0.52832) [- 2.63594]	-30.40905 (93.2900) [- 0.32596]	-597.2801 (10979.2) [- 0.05440]	-848.3554 (7179.01) [- 0.11817]	0.226391 (0.15115) [1.49776]	-575.1712 (2579.11) [-0.22301]
BDFIT(-1)	-2.89E-05 (3.0E-05) [- 0.97145]	-17.04067 (45.0667) [-0.37812]	-4.24E-05 (2.5E-05) [- 1.70559]	-0.001962 (0.00439) [- 0.44712]	3.446591 (0.51640) [6.67423]	-0.206847 (0.33766) [- 0.61258]	5.32E-06 (7.1E-06) [0.74892]	0.800301 (0.12131) [6.59728]
BDFIT(-2)	-1.05E-05 (3.8E-05) [- 0.27665]	11.23515 (57.7732) [0.19447]	-3.38E-05 (3.2E-05) [- 1.05957]	0.001726 (0.00563) [0.30689]	-4.212001 (0.66200) [- 6.36251]	-2.233745 (0.43287) [- 5.16035]	2.04E-06 (9.1E-06) [0.22334]	-0.720733 (0.15551) [-4.63462]
C	12.58159 (12.7481) [0.98694]	3148143. (1.9E+07) [0.16285]	19.08497 (10.6591) [1.79049]	-102.1406 (1882.15) [- 0.05427]	71982.06 (221508.) [0.32496]	77828.85 (144838.) [0.53735]	7.885226 (3.04954) [2.58571]	33153.44 (52034.2) [0.63715]
R-squared	0.321804	0.493768	0.355138	0.158833	0.915208	0.697583	0.575218	0.931649
Adj. R-squared	0.020384	0.268777	0.068532	-0.215019	0.877522	0.563175	0.386425	0.901271
Sum sq. resids	9630.810	2.21E+16	6733.042	2.10E+08	2.91E+12	1.24E+12	551.1147	1.60E+11
S.E. equation	16.35612	24802231	13.67585	2414.846	284200.1	185831.4	3.912639	66761.22
F-statistic	1.067625	2.194606	1.239117	0.424856	24.28544	5.190057	3.046829	30.66843
Log likelihood	-213.0682	-967.3558	-203.5827	-477.7920	-730.4983	-707.9818	-137.2575	-653.7248
Akaike	8.681817	37.14550	8.323877	18.67140	28.20748	27.35780	5.821037	25.31037
AIC	9.313798	37.77748	8.955857	19.30338	28.83946	27.98978	6.453018	25.94235
Schwarz	19.37415	12413688	9.231500	445.7197	410821.7	73057.01	23.08564	92934.02
SC								
Mean dependent								

S.D. dependent	16.52541	29004522	14.17002	2190.776	812074.2	281167.8	4.995006	212472.2
Determinant resid covariance (dof adj.)		2.52E+56						
Determinant resid covariance		1.14E+55						
Log likelihood		-3961.120						
Akaike information criterion		154.6083						
Schwarz criterion		159.6641						

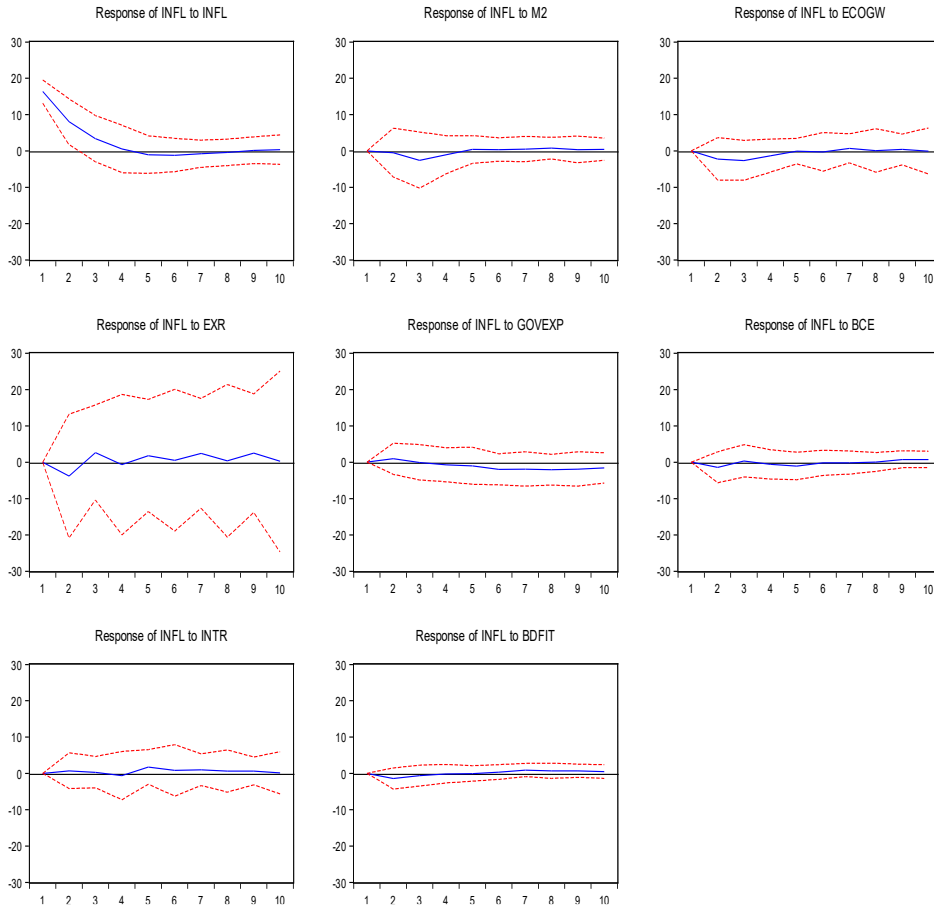
Source: Author's estimation using e-view 10, with data from CBN statistical Bulletin 2022, CBN Report 2024 and Modi online database 2025.

Appendix D2: Impulse Response output of all the variables in the model



Appendix D3: Response of inflation to Impulse of all the variables in the model

Response to Cholesky One S.D. Innovations ± 2 S.E.



Appendix D5: Generalized Impulse of all the variables in the model with response of all the variables in the model

Estimation Proc:

```
=====
LS 1 2 INFL M2 ECOGW EXR GOVEXP BCE INTR BDFIT @ C
```

VAR Model:

```
=====
INFL = C(1,1)*INFL(-1) + C(1,2)*INFL(-2) + C(1,3)*M2(-1) + C(1,4)*M2(-2) +
C(1,5)*ECOGW(-1) + C(1,6)*ECOGW(-2) + C(1,7)*EXR(-1) + C(1,8)*EXR(-2) +
C(1,9)*GOVEXP(-1) + C(1,10)*GOVEXP(-2) + C(1,11)*BCE(-1) + C(1,12)*BCE(-
```

$$2) + C(1,13)*INTR(-1) + C(1,14)*INTR(-2) + C(1,15)*BDFIT(-1) + C(1,16)*BDFIT(-2) + C(1,17)$$

$$M2 = C(2,1)*INFL(-1) + C(2,2)*INFL(-2) + C(2,3)*M2(-1) + C(2,4)*M2(-2) + C(2,5)*ECOGW(-1) + C(2,6)*ECOGW(-2) + C(2,7)*EXR(-1) + C(2,8)*EXR(-2) + C(2,9)*GOVEXP(-1) + C(2,10)*GOVEXP(-2) + C(2,11)*BCE(-1) + C(2,12)*BCE(-2) + C(2,13)*INTR(-1) + C(2,14)*INTR(-2) + C(2,15)*BDFIT(-1) + C(2,16)*BDFIT(-2) + C(2,17)$$

$$ECOGW = C(3,1)*INFL(-1) + C(3,2)*INFL(-2) + C(3,3)*M2(-1) + C(3,4)*M2(-2) + C(3,5)*ECOGW(-1) + C(3,6)*ECOGW(-2) + C(3,7)*EXR(-1) + C(3,8)*EXR(-2) + C(3,9)*GOVEXP(-1) + C(3,10)*GOVEXP(-2) + C(3,11)*BCE(-1) + C(3,12)*BCE(-2) + C(3,13)*INTR(-1) + C(3,14)*INTR(-2) + C(3,15)*BDFIT(-1) + C(3,16)*BDFIT(-2) + C(3,17)$$

$$EXR = C(4,1)*INFL(-1) + C(4,2)*INFL(-2) + C(4,3)*M2(-1) + C(4,4)*M2(-2) + C(4,5)*ECOGW(-1) + C(4,6)*ECOGW(-2) + C(4,7)*EXR(-1) + C(4,8)*EXR(-2) + C(4,9)*GOVEXP(-1) + C(4,10)*GOVEXP(-2) + C(4,11)*BCE(-1) + C(4,12)*BCE(-2) + C(4,13)*INTR(-1) + C(4,14)*INTR(-2) + C(4,15)*BDFIT(-1) + C(4,16)*BDFIT(-2) + C(4,17)$$

$$GOVEXP = C(5,1)*INFL(-1) + C(5,2)*INFL(-2) + C(5,3)*M2(-1) + C(5,4)*M2(-2) + C(5,5)*ECOGW(-1) + C(5,6)*ECOGW(-2) + C(5,7)*EXR(-1) + C(5,8)*EXR(-2) + C(5,9)*GOVEXP(-1) + C(5,10)*GOVEXP(-2) + C(5,11)*BCE(-1) + C(5,12)*BCE(-2) + C(5,13)*INTR(-1) + C(5,14)*INTR(-2) + C(5,15)*BDFIT(-1) + C(5,16)*BDFIT(-2) + C(5,17)$$

$$BCE = C(6,1)*INFL(-1) + C(6,2)*INFL(-2) + C(6,3)*M2(-1) + C(6,4)*M2(-2) + C(6,5)*ECOGW(-1) + C(6,6)*ECOGW(-2) + C(6,7)*EXR(-1) + C(6,8)*EXR(-2) + C(6,9)*GOVEXP(-1) + C(6,10)*GOVEXP(-2) + C(6,11)*BCE(-1) + C(6,12)*BCE(-2) + C(6,13)*INTR(-1) + C(6,14)*INTR(-2) + C(6,15)*BDFIT(-1) + C(6,16)*BDFIT(-2) + C(6,17)$$

$$INTR = C(7,1)*INFL(-1) + C(7,2)*INFL(-2) + C(7,3)*M2(-1) + C(7,4)*M2(-2) + C(7,5)*ECOGW(-1) + C(7,6)*ECOGW(-2) + C(7,7)*EXR(-1) + C(7,8)*EXR(-2) + C(7,9)*GOVEXP(-1) + C(7,10)*GOVEXP(-2) + C(7,11)*BCE(-1) + C(7,12)*BCE(-2) + C(7,13)*INTR(-1) + C(7,14)*INTR(-2) + C(7,15)*BDFIT(-1) + C(7,16)*BDFIT(-2) + C(7,17)$$

$$BDFIT = C(8,1)*INFL(-1) + C(8,2)*INFL(-2) + C(8,3)*M2(-1) + C(8,4)*M2(-2) + C(8,5)*ECOGW(-1) + C(8,6)*ECOGW(-2) + C(8,7)*EXR(-1) + C(8,8)*EXR(-2) + C(8,9)*GOVEXP(-1) + C(8,10)*GOVEXP(-2) + C(8,11)*BCE(-1) + C(8,12)*BCE(-2) + C(8,13)*INTR(-1) + C(8,14)*INTR(-2) + C(8,15)*BDFIT(-1) + C(8,16)*BDFIT(-2) + C(8,17)$$

VAR Model - Substituted Coefficients:

=====

$$\begin{aligned} \text{INFL} = & 0.434223017654 * \text{INFL}(-1) - 0.0342020702899 * \text{INFL}(-2) + \\ & 1.04188614646e-06 * \text{M2}(-1) - 1.15020333553e-06 * \text{M2}(-2) - \\ & 0.136438056512 * \text{ECOGW}(-1) - 0.182296445476 * \text{ECOGW}(-2) - \\ & 0.0110038142587 * \text{EXR}(-1) + 0.0113370430474 * \text{EXR}(-2) + 6.30520988683e- \\ & 06 * \text{GOVEXP}(-1) + 5.32041259453e-08 * \text{GOVEXP}(-2) - 5.29849825408e- \\ & 06 * \text{BCE}(-1) + 7.53607711323e-06 * \text{BCE}(-2) + 0.118639398919 * \text{INTR}(-1) + \\ & 0.0159857264437 * \text{INTR}(-2) - 2.88711813325e-05 * \text{BDFIT}(-1) - 1.053998124e- \\ & 05 * \text{BDFIT}(-2) + 12.5815858458 \end{aligned}$$

$$\begin{aligned} \text{M2} = & -7603.79306338 * \text{INFL}(-1) + 2231.36846338 * \text{INFL}(-2) + \\ & 8.59547424491 * \text{M2}(-1) - 7.88894584915 * \text{M2}(-2) + 86175.6309619 * \text{ECOGW}(-1) \\ & + 69212.2065542 * \text{ECOGW}(-2) - 87492.0515603 * \text{EXR}(-1) + \\ & 80088.977443 * \text{EXR}(-2) - 1.35219076162 * \text{GOVEXP}(-1) - \\ & 3.03247585011 * \text{GOVEXP}(-2) + 0.958686705511 * \text{BCE}(-1) + \\ & 1.79091634584 * \text{BCE}(-2) + 508250.92135 * \text{INTR}(-1) - 558911.71563 * \text{INTR}(-2) - \\ & 17.0406710062 * \text{BDFIT}(-1) + 11.2351513789 * \text{BDFIT}(-2) + 3148142.70755 \end{aligned}$$

$$\begin{aligned} \text{ECOGW} = & -0.142743695714 * \text{INFL}(-1) + 0.234599581391 * \text{INFL}(-2) + \\ & 2.10551312313e-06 * \text{M2}(-1) - 1.9479747057e-06 * \text{M2}(-2) - \\ & 0.0319958734308 * \text{ECOGW}(-1) - 0.115554597562 * \text{ECOGW}(-2) - \\ & 0.0210511691667 * \text{EXR}(-1) + 0.0198119252794 * \text{EXR}(-2) + 1.59027336769e- \\ & 05 * \text{GOVEXP}(-1) + 7.73789684501e-06 * \text{GOVEXP}(-2) - 1.74866500307e- \\ & 06 * \text{BCE}(-1) + 3.91018064534e-06 * \text{BCE}(-2) + 0.693764522644 * \text{INTR}(-1) - \\ & 1.39262841482 * \text{INTR}(-2) - 4.23832041619e-05 * \text{BDFIT}(-1) - 3.37535738973e- \\ & 05 * \text{BDFIT}(-2) + 19.0849672559 \end{aligned}$$

$$\begin{aligned} \text{EXR} = & -3.8692068317 * \text{INFL}(-1) + 0.530605387052 * \text{INFL}(-2) + \\ & 0.000835649384296 * \text{M2}(-1) - 0.000919512830636 * \text{M2}(-2) + \\ & 9.90399988242 * \text{ECOGW}(-1) + 8.62861451578 * \text{ECOGW}(-2) - \\ & 8.47546066116 * \text{EXR}(-1) + 9.37410615306 * \text{EXR}(-2) - \\ & 0.000236453688727 * \text{GOVEXP}(-1) - 0.00037207359281 * \text{GOVEXP}(-2) + \\ & 0.000116333328046 * \text{BCE}(-1) - 1.36822508949e-05 * \text{BCE}(-2) + \\ & 49.625725487 * \text{INTR}(-1) - 30.4090507835 * \text{INTR}(-2) - \\ & 0.00196192667971 * \text{BDFIT}(-1) + 0.00172626530229 * \text{BDFIT}(-2) - \\ & 102.140614438 \end{aligned}$$

$$\begin{aligned} \text{GOVEXP} = & 136.081428128 * \text{INFL}(-1) - 3407.58466227 * \text{INFL}(-2) + \\ & 0.0090514382593 * \text{M2}(-1) - 0.0157008488084 * \text{M2}(-2) + \\ & 1993.28838792 * \text{ECOGW}(-1) - 372.897113039 * \text{ECOGW}(-2) - \\ & 92.901707427 * \text{EXR}(-1) + 157.899712441 * \text{EXR}(-2) + \\ & 0.352694149881 * \text{GOVEXP}(-1) + 0.617111197975 * \text{GOVEXP}(-2) - \end{aligned}$$

0.234968397506*BCE(-1) + 0.486137781791*BCE(-2) + 3657.445003*INTR(-1)
- 597.28012493*INTR(-2) + 3.44659101967*BDFIT(-1) -
4.21200114758*BDFIT(-2) + 71982.0592234

BCE = - 1377.01925609*INFL(-1) - 662.825106196*INFL(-2) -
0.0226909001679*M2(-1) + 0.025267841781*M2(-2) -
137.593327495*ECOGW(-1) + 821.850608651*ECOGW(-2) +
227.708690413*EXR(-1) - 259.982905776*EXR(-2) +
0.395395906486*GOVEXP(-1) + 0.321096674534*GOVEXP(-2) +
0.258556612574*BCE(-1) - 0.0819634279925*BCE(-2) - 1091.1768531*INTR(-
1) - 848.355406802*INTR(-2) - 0.206847172138*BDFIT(-1) -
2.23374483941*BDFIT(-2) + 77828.8455721

INTR = - 0.0369324183295*INFL(-1) + 0.00875304566877*INFL(-2) -
1.56538129426e-06*M2(-1) + 1.80170619447e-06*M2(-2) +
0.0141245923823*ECOGW(-1) + 0.0969171726991*ECOGW(-2) +
0.0157868446616*EXR(-1) - 0.0184138985179*EXR(-2) - 5.52503486934e-
07*GOVEXP(-1) - 5.66669373171e-07*GOVEXP(-2) - 2.63890289677e-
07*BCE(-1) - 1.18889594777e-06*BCE(-2) + 0.421281343012*INTR(-1) +
0.226390833646*INTR(-2) + 5.3243657845e-06*BDFIT(-1) + 2.03554271507e-
06*BDFIT(-2) + 7.88522556087

BDFIT = - 177.35687416*INFL(-1) + 751.873408453*INFL(-2) -
0.00960075411557*M2(-1) + 0.00991727290056*M2(-2) +
9.04804620755*ECOGW(-1) - 64.6954290391*ECOGW(-2) +
96.8820180653*EXR(-1) - 101.516413878*EXR(-2) -
0.0011962995304*GOVEXP(-1) + 0.112785804463*GOVEXP(-2) -
0.0245106027113*BCE(-1) + 0.396287465362*BCE(-2) -
443.336656508*INTR(-1) - 575.171243616*INTR(-2) +
0.800301074254*BDFIT(-1) - 0.720732683503*BDFIT(-2) + 33153.4432675

DIGITAL BANKING AND YOUTH EMPOWERMENT: PATHWAYS TO FINANCIAL INCLUSION AND ECONOMIC DEVELOPMENT IN NIGERIA

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Abstract

This study examines the impact of digital banking on youth empowerment and economic development in Nigeria. Notwithstanding the expansion of mobile and internet banking, disparities persist in usage, awareness, and trust, especially among marginalised populations. The study seeks to assess how digital banking promotes youth empowerment, identify barriers to adoption, and evaluate the alignment between policy commitments and youth experiences. The study utilises a mixed-method approach, combining survey data from Lagos and Osun States with document and policy analysis, encompassing national strategies like the National Financial Inclusion Strategy and international publications from the World Bank and OECD. The theoretical framework is grounded in Empowerment Theory, the Technology Acceptance Model (TAM), and Digital Era Governance (DEG),

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offering insights into the behavioural, outcome-oriented, and institutional aspects of digital finance. The study reveals that digital banking improves financial literacy, entrepreneurship, and inclusion among Nigerian youth; nevertheless, it is hindered by infrastructural deficiencies, gaps in digital literacy, and a lack of trust in financial institutions. The study suggests that overcoming these obstacles via legislative change, enhanced infrastructure, and youth-focused innovation is crucial for attaining equitable and sustainable digital transformation that would translate to economic development.

Keywords: youth empowerment, digital banking, financial inclusion, economic development, digital era governance

1.0. Introduction

The 21st century has experienced a profound digital revolution reshaping economies, governance systems, and societies, with financial services at the forefront of this transformation. Digital banking has emerged as both a facilitator of financial inclusion and a catalyst for economic development, offering innovative solutions for populations historically excluded from formal banking systems. By leveraging technology, financial services can lower transaction costs, expand outreach, and foster economic participation. Young people, known for their digital fluency, are at the centre of this transformation, and their engagement with digital financial services signals both personal empowerment and contributions to wider development goals. Yet, the extent to which digital banking translates into tangible empowerment for youth—particularly in developing countries like Nigeria—remains insufficiently examined.

Global governance frameworks underscore the importance of digital transformation in addressing systemic inefficiencies and

advancing inclusion. The OECD Digital Government Policy Framework (DGPF) outlines six dimensions of digital maturity: digital by design, data-driven, government as a platform, open by default, user-driven, and proactive. These principles emphasize institutional leadership, collaboration, ethical data governance, and citizen-centred approaches (OECD, 2020). While designed for governance systems, they also illuminate pathways for financial inclusion: systems that are responsive, transparent, and user-oriented can enhance trust and public value. Aligning digital financial services with such principles reinforces the need to integrate technology with governance strategies that prioritize equity and inclusiveness, especially for youth who face systemic barriers to full economic participation.

In Nigeria, where nearly 70% of the population is under 30 years of age (Brodowicz, 2024; Ibrahim et al., 2023), youth represent a critical resource for social and economic transformation (Mulikita, 2024). Scholars highlight their role as drivers of national development, contributing labour, creativity, and innovation (Idike & Eme, 2015). However, systemic challenges—unemployment, limited credit access, inadequate education, and exclusion from decision-making—undermine their potential. Outreach International (2023) emphasizes that youth in developing countries face multidimensional poverty, health risks, and structural inequalities, with female youth disproportionately affected. These realities demand interventions that position young people as active participants in development, ensuring their access to inclusive education, technology, and financial systems.

Digital financial services (DFS) are widely recognized as mechanisms to reduce exclusion. By offering accessible and cost-effective products such as savings, loans, and digital payments through mobile and online platforms, DFS enable low-income

groups to engage with formal finance. Haider (2018) shows that DFS facilitate consumption smoothing, savings, and investment among marginalized populations. Yet disparities persist: Huang et al. (2025) note that despite clear benefits, large segments remain excluded due to unequal access and use of digital finance. This gap is particularly acute in sub-Saharan Africa, where financial sector growth has not translated into universal access (Mignamissi & Djijo, 2021). Generation Z, with its digital consumer behaviour and technological affinity, presents promising opportunities for integration into digital finance, but only if services are tailored to their socio-economic realities (Kangwa, Mwale, & Shaikh, 2021). Nigeria exemplifies this paradox of rapid fintech expansion alongside persistent exclusion. Despite fintech firms comprising more than half of service providers, 40% of Nigerian adults remain unbanked, with youth and women disproportionately excluded (Nkechika, 2022). Over half of Nigeria's unbanked population are youth, highlighting both a challenge and an opportunity for inclusive growth. Mobile money platforms, fintech innovations, and Payment Service Banks (PSBs) have sought to bridge this gap, yet economic instability, weak infrastructure, limited digital literacy, and lack of trust hinder adoption. While fintech companies are gradually building credibility among underserved populations, regulatory support, customer-oriented product designs, and infrastructure investments remain essential to sustain progress (Nkechika, 2022).

Comparative perspectives reinforce these dynamics. Hamadou et al. (n.d.) demonstrate that digital penetration—measured through internet use, broadband subscriptions, and mobile adoption—correlates positively with financial inclusion, as reflected in higher deposits and loans. Southeast Asia has progressed significantly due to stronger infrastructure and higher digital literacy, while sub-Saharan Africa continues to lag behind because of poor connectivity

and inadequate mobile penetration in rural areas. This divergence highlights the structural barriers that must be addressed for digital banking to fulfill its transformative potential in Nigeria.

Despite growing research, the specific link between digital banking and youth empowerment in Nigeria is underexplored. Much scholarship emphasizes general benefits of DFS for low-income groups (Haider, 2018; Huang et al., 2025) or examines financial access trends in Africa (Mignamissi & Djijo, 2021; Hamadou et al., n.d.). While these studies identify inclusion patterns, they rarely investigate how digital finance translates into empowerment outcomes for youth—such as entrepreneurship, literacy, job creation, or civic participation. Similarly, analyses of fintech innovation and digital penetration in Nigeria (Nkechika, 2022) provide useful insights but seldom disaggregate data by age or consider youth as a distinct demographic. Consequently, the transformative potential of digital banking for youth remains theoretically asserted but empirically underexamined.

This study addresses this gap by focusing specifically on Nigerian youth and examining how digital banking shapes empowerment outcomes within their socio-economic contexts. The analysis is structured around three objectives: (1) to examine adoption patterns of digital banking among Nigerian youth, highlighting demographic and contextual differences; (2) to analyse how digital banking facilitates empowerment outcomes such as entrepreneurship, financial literacy, and socio-economic participation; and (3) to evaluate the alignments and disconnects between policy frameworks, including the CBN National FinTech Strategy and the National Financial Inclusion Strategy, and youth experiences of digital finance.

These objectives generate the following questions:

- 1) How do Nigerian youth engage with digital banking platforms, and what factors influence their adoption?
- 2) To what extent does digital banking contribute to empowerment outcomes such as entrepreneurship, financial literacy, and economic participation?
- 3) What gaps exist between policy frameworks and youth experiences of digital banking?

The study is grounded in Empowerment Theory, the Technology Acceptance Model (TAM), and Digital Era Governance (DEG). Empowerment Theory frames youth access, agency, and opportunities; TAM explains adoption behaviours through perceived usefulness, ease of use, and trust; and DEG situates digital finance within governance and regulatory structures. Together, these frameworks capture the interplay between adoption, empowerment outcomes, and institutional contexts.

By combining survey data on youth engagement with policy and document analysis, this study provides evidence-based insights into the relationship between digital banking and youth empowerment in Nigeria. It contributes to theory by linking technology-mediated finance to empowerment and governance, while offering practical recommendations for policymakers, financial institutions, and development practitioners. By identifying strategies to strengthen youth participation, reduce systemic barriers, and leverage digital banking as a driver of empowerment, the study advances both scholarly understanding and practical interventions for inclusive growth in Nigeria and beyond.

2.0. Methodology

This study employs a mixed-method design, combining quantitative and qualitative approaches to explore the relationship between digital banking, youth empowerment, and economic development in Nigeria. The quantitative strand captures adoption behaviours and empowerment outcomes through survey data, while the qualitative strand uses document and policy analysis to contextualise findings within institutional, regulatory, and global frameworks. This integration offers a holistic perspective on how digital financial innovations contribute to empowerment.

Surveys were conducted among youth in Lagos and Osun States, targeting indicators such as financial inclusion, digital banking adoption, financial literacy, entrepreneurship, and empowerment outcomes. Document and policy analysis complemented the survey by examining institutional frameworks and implementation mechanisms. Key texts included Nigeria's National Financial Inclusion Strategy, National Digital Economy Policy, the Central Bank's FinTech Strategy and Consumer Protection Regulation 2.0, alongside World Bank and OECD reports. A purposive selection ensured local, national, and global coverage. Triangulating survey and documentary evidence enabled assessment of policy commitments against lived youth realities, situating Nigeria's experience within wider African debates on empowerment and financial inclusion.

3.0. Conceptual Framework and Literature Review

3.1. Empowerment as a Development Concept

Empowerment is central in development discourse, particularly in societies with large youth populations like Nigeria. It refers to the process by which individuals, especially marginalized groups, gain agency—power to make choices—and the ability to access resources and opportunities that allow for social, economic, or political improvement (Kar & Sahu, 2021; Akeju et al, 2024). Youth

empowerment is defined as the process by which young individuals gain the agency, capabilities, and institutional support necessary to shape their lives and contribute meaningfully to their communities and participate actively in national development. (OECD, 2021). In Nigeria, where a majority of people are under 30, youth empowerment is not only desirable but crucial for harnessing demographic potential by deploying initiatives in education, employment, entrepreneurship, and leadership, to ensure that youths are not merely beneficiaries but active contributors to societal progress (Heath & Moreau, 2024).

3.2. Digital Banking and Financial Inclusion

Digital banking or digital financial services (DFS) encompass tools like mobile banking apps, agent banking, POS (point-of-sale) terminals, USSD, digital payments, mobile money, and central bank digital currencies (e.g., eNaira). These tools potentially reduce physical, cost, and geographic barriers associated with traditional banking. Financial inclusion is defined by having affordable, accessible, and useful financial products and services for all, especially underserved groups (Wezel & Ree, 2023). Inclusion is multi-faceted, and the study, *The Impact of Digital Banking on Financial Inclusion in Nigeria (2000-2022)* (Olusanya & Eucharia, 2024) uses co-integration and error correction modelling to show that digital banking adoption, regulatory environment, internet access, financial literacy, and income levels all significantly influence financial inclusion.

3.3. Digital Era and Youth Empowerment

The Digital Era has transformed youth empowerment by broadening access to education, financial inclusion, and entrepreneurship; however, disparities continue to exist where access is restricted. In Namibia, the Digital Era 4.0 has positively impacted youth progress towards Sustainable Development Goals

(SDGs) 4, 8, and 10 by enhancing education and economic participation. However, challenges such as high device costs, inadequate infrastructure, and limited government support persist, marginalising rural and disadvantaged groups (Chata & Nghihepavali, 2024). These dynamics reflect wider African experiences: In Sub-Saharan Africa, insufficient broadband penetration and elevated costs impede digital transformation (International Telecommunication Union [ITU], 2024). Mobile money and fintech platforms in Nigeria and Kenya have enhanced entrepreneurship and financial access for youth; however, limitations in digital literacy and regulatory oversight hinder the realisation of inclusive benefits (Begaz et al., 2023).

Digital Era Governance (DEG) frameworks worldwide prioritise big data, e-governance, and citizen-centric services to enhance transparency, innovation, and engagement (Ravšelj et al., 2022). At the micro level, digital financial services improve youths' empowerment by increasing their participation in financial systems, where user satisfaction promotes continued use and greater inclusion (Ferli et al., 2025). Digitalisation presents significant opportunities; however, its transformative potential is contingent upon addressing systemic barriers related to access, literacy, affordability, and governance to avoid exacerbating inequalities.

3.4. Economic Empowerment and Financial Inclusion

Economic empowerment and financial inclusion mutually reinforce one other, especially via mobile banking, agency banking, and various digital financial services in Nigeria. Mobile banking provides customers with access to savings, credit, and payment options in cost-effective and easy formats—essential components for stabilising household finances, enhancing living standards, and facilitating entrepreneurial endeavours (Jain et al, 2024). The use of decentralised technologies mediates economic empowerment by

enhancing individuals' control over their funds, facilitating investments, and fostering participation in formal systems (Aruwa et al, 2025).

Recent empirical research in Nigeria provides substantial evidence. A case study on agency banking and mobile money operations in South-West Nigeria revealed that digital payment solutions significantly enhanced the financial well-being of previously unbanked individuals by improving payment safety, transfer accessibility, and financial security. Nonetheless, systemic obstacles such as network reliability and literacy continue to constrain their effectiveness (Aruwa et al, 2025). A research conducted in Nigeria's South-South area revealed significant beneficial benefits of financial literacy on the adoption of mobile banking, underscoring the importance of education and digital proficiency (Wosowei & Wosowei, 2023).

Comprehensive data corroborate this trend: the World Bank's Global Findex 2025 indicates a significant rise in formal savings in Nigeria and other developing nations, propelled by mobile money use; these services facilitate formal savings for millions for the first time (World Bank, 2025). Although these mechanisms facilitate economic empowerment through employment, savings, and company development, their distribution is inequitable. Disparities in gender, infrastructure, and digital literacy endure. Consequently, for digital inclusion to result in empowerment, policies must guarantee affordability, dependability of network services, improved digital skills, and regulatory assistance especially aimed at marginalised young demographics.

3.5. Digital Financial Services and Financial Inclusion of Nigerian Youth

Digital financial services (DFS) play a crucial role in promoting financial inclusion in Nigeria, especially for the youth demographic. Mobile phones, internet platforms, and agent networks are utilised to enhance access to savings, credit, and payments, consequently diminishing dependence on conventional banking (Nkechika, 2022). Recent evidence indicates that Nigerian youth are leading this transition. Esendemirli et al. (2024) employed an extended Technology Acceptance Model (TAM) and discovered that 75.5% of university students surveyed actively utilise digital banking. The study identified perceived trust, security, and awareness as significant factors influencing adoption. Social norms significantly influence behavioural intention, while cultural heritage appears to have a negligible impact, highlighting the transformative role of peer influence and digital culture.

The adoption of digital financial services by youth improves financial literacy, fosters independence, and promotes entrepreneurship, providing resources for effective money management and sustained financial stability (Windasari et al, 2022). Nonetheless, challenges remain. Despite increasing adoption, around 40% of Nigerian adults—particularly women, youth, and rural residents—continue to be excluded from formal finance, highlighting structural barriers including infrastructure deficiencies and cybersecurity issues (Nkechika, 2022).

DFS possesses significant potential to transform the lives of Nigerian youth by promoting inclusion, generating economic opportunities, and equipping them for engagement in the digital economy. The success of this initiative relies on the establishment of trust, secure platforms, educational efforts, and policies aimed at mitigating inequalities in access and affordability (Akinola, 2021).

3.6. Barriers to Adoption, Access and Empowerment

While digital banking holds significant potential for enhancing financial inclusion, various obstacles persist that hinder its adoption and empowerment throughout Sub-Saharan Africa. Research indicates that perceived online risks, including concerns about financial loss, identity theft, and reputational harm, substantially diminish user trust and the propensity to engage with e-banking platforms (Jibril et al, 2024). The risks are especially pronounced in contexts characterised by insufficient regulatory oversight and inadequate cybersecurity measures. Socio-economic barriers exacerbate the issue, such as the high cost of smartphones, unreliable internet connectivity, inconsistent electricity supply, and transaction fees that deter adoption among low-income populations (International Telecommunication Union, 2024; World Bank, 2022).

Knowledge gaps intensify exclusion, as individuals without digital literacy or prior ICT experience are reluctant to utilise online banking services. The digital divide frequently reflects socio-economic stratification, resulting in the disproportionate exclusion of marginalised groups (Jibril et al., 2024). In Nigeria, historical bank failures have created trust deficits that discourage youth engagement with digital finance, highlighting the importance of security, confidentiality, and transparent operations for fostering adoption (Esendemirli et al, 2024). To address these challenges, targeted interventions are necessary, including financial literacy programs, affordable access to devices, and strong consumer protection frameworks, to bridge the divide between digital access and true economic empowerment.

3.7. Gap in Existing Literature

Notwithstanding the increasing volume of research on digital banking usage in Nigeria, significant gaps persist in the literature. Current research predominantly centres on urban, university-

educated youth, utilising cross-sectional surveys that restrict generalisability to rural and less-educated demographics, who frequently encounter the most significant obstacles to financial inclusion (Esendemirli et al, 2024). Methodologically, there is a paucity of longitudinal or mixed-method research, limiting understanding of the evolution of digital banking behaviours over time and their interaction with changing socio-economic conditions. Research has predominantly been influenced by the Technology Acceptance Model, which, although effective in elucidating behavioural intentions, fails to adequately encompass broader structural dynamics such as governance quality, institutional trust, regulatory frameworks, and cultural norms that influence adoption in Nigeria. Furthermore, empowerment-oriented frameworks have garnered less focus, resulting in insufficient exploration of how digital banking fosters agency, resilience, and socio-economic mobility among youth (Nkechika, 2022). It is imperative to address these methodological and theoretical shortcomings to enhance nuanced understandings of digital financial inclusion and youth empowerment for economic development in Nigeria.

4.0. Theoretical Framework

This study employs three interconnected theories—Empowerment Theory, the Technology Acceptance Model (TAM), and Digital Era Governance (DEG)—to examine the relationship between digital banking and youth empowerment in Nigeria. Together, they provide a multi-level perspective spanning individual behaviour, empowerment outcomes, and governance dynamics.

Empowerment Theory

Empowerment Theory, advanced by Rappaport (1987) and Zimmerman (1995), emphasises processes through which individuals and groups gain authority, autonomy, and influence over

their lives. It highlights how people build competencies and engage more meaningfully in social, economic, and political domains. In Nigeria, this framework is central for understanding how digital banking can strengthen youth agency, create entrepreneurial pathways, and expand financial inclusion. Recent work by Akeju et al, (2024) confirms its relevance, showing that digital financial access boosts youth entrepreneurial capacity and self-confidence. Despite these strengths, Empowerment Theory is outcome-focused and does not sufficiently explain conditions shaping technology adoption. Challenges such as digital literacy gaps, trust, and perceived risks are underexplored, especially among Nigerian youth with diverse socio-economic profiles. These limitations are better addressed by the Technology Acceptance Model.

Technology Acceptance Model (TAM)

Proposed by Davis (1989) from Ajzen and Fishbein's (1980) Theory of Reasoned Action, TAM explains adoption behaviour through two constructs: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Later developments incorporated trust, risk, and social influence (Venkatesh & Davis, 2000). The model is particularly relevant for explaining Nigerian youth adoption of digital banking. Awoniyi (2022) showed that usefulness and peer influence shaped mobile banking acceptance, while Akinwale and Kyari (2022) found that trust and security concerns influenced eNaira adoption. International studies, such as Olusanya and Eucharia (2024), similarly stress that adoption thrives when perceived ease and benefits outweigh risk concerns.

Nonetheless, TAM's focus on individual perceptions limits its ability to account for structural and institutional influences. Issues like infrastructure deficits, regulatory clarity, and governance capacity—which strongly affect adoption in Nigeria—fall outside

its scope. This necessitates complementing TAM with governance-focused theories such as DEG.

Digital Era Governance (DEG)

Dunleavy, Margetts, Bastow, and Tinkler (2006) introduced DEG to describe how digital technologies reshape governance. Its principles—reintegration of government functions, needs-based holism, and digitalisation—illustrate how technology enhances efficiency and citizen-centred service delivery. Later refinements stress transparency, trust, and institutional capacity (Margetts & Dunleavy, 2013).

In Nigeria, DEG offers a valuable lens for examining how institutions shape digital banking outcomes. Regulatory frameworks, institutional strength, and governance arrangements directly influence the effectiveness of innovations such as the eNaira. Imoisi et al (2025) highlight how weak institutional capacity undermines fintech adoption and limits empowerment potential. DEG thus provides a structural complement to TAM's behavioural insights and Empowerment Theory's outcome orientation.

By integrating these perspectives, the study captures dynamics at multiple levels: Empowerment Theory explains empowerment outcomes, TAM addresses adoption behaviour, and DEG situates these within broader institutional and governance contexts. Together, they form a robust framework for analysing how digital banking can enable youth empowerment in Nigeria while revealing systemic barriers to inclusive digital transformation.

5.0. Discussion of Findings

This study illuminates the prospects, challenges, and policy implications of digital banking and youth empowerment in Nigeria.

The survey data is analysed using Empowerment Theory, the Technology Acceptance Model (TAM), and Digital Era Governance (DEG) to compare global, regional, national, and subnational policy frameworks. This comprehensive methodology evaluates whether digital banking empowers youth beyond access and uptake and how governance structures facilitate or impede this.

5.1. Banking Access and Financial Inclusion

Survey findings reveal that a significant percentage of Nigerian youth have access to banking services; all the respondents indicated that they operate a bank account, and they use digital platform in one form or the other. Nevertheless, the evidence underscores discrepancies, especially between youths in urban and rural locations, corroborating Central Bank of Nigeria's National Financial Inclusion Strategy (FGN NFIS, 2022), which indicates that despite advancements, over 36% of Nigerian adults—predominantly youth, women, and rural inhabitants—continue to be financially excluded as of 2020.

Financial inclusion is achieved when adult Nigerians have easy access to a broad range of financial services (including payments, savings, credit, insurance and investment products) at affordable costs (FGN NFIS, 2022). Nevertheless, the survey reflected that majority use digital platform for money transfer (100%), bill payment (76.9%), and savings (65.4%) while access for other financial services such as loans and investments is relatively low at 7.7% and 30.8%, respectively. This resonates with GSMA 2025 reports that while mobile money penetration is expanding across Sub-Saharan Africa, structural barriers persist in providing universal youth access.

The findings imply that, while numerical gains in financial inclusion are obvious, qualitative barriers limit the potential for

empowerment from such access. This echoes empowerment theory's emphasis on the distinction between formal access and true empowerment (Zimmerman, 2000). Youth may have accounts, but if affordability and usability difficulties persist, financial agency—defined as the ability to save, transact, and borrow meaningfully—is limited, and DEG emphasises the importance of governance in guaranteeing that access is both equitable and effective.

5.2. Digital Banking Adoption and Use

Survey responses indicated that youth actively utilise digital banking channels, including mobile banking applications, USSD codes, and point-of-sale services. Mobile-based services were identified as the most utilised (96.2%), due largely to their convenience and comparatively lower transaction costs. The results correspond with the Technology Acceptance Model (TAM), highlighting perceived usefulness and perceived ease of use as key factors influencing technology adoption (Windasari et al, 2022; Esendemirli et al, 2024) and GSMA, (2025) assertion that mobile-based financial services are increasingly perceived as the primary form of banking for young adults in Sub-Saharan Africa.

Digital platforms are used by a significant number of young people mostly for simple transactions like airtime purchases, peer-to-peer transfers, and small-scale savings; they are less frequently used for borrowing, investing, or starting their own businesses. This indicates a trend of adoption without substantial usage. Comparatively, global examples like Kenya's M-Pesa and India's Paytm illustrate that the adoption of digital banking can be revolutionary when services are effortlessly incorporated into everyday economic activities (GSMA, 2025). TAM elucidates the reasons behind youth adoption of digital banking services; however, empowering outcomes like entrepreneurship, financial literacy, and

enhanced economic security necessitate additional elements, including digital competencies, trust, and supportive regulations.

5.3. Perceptions of Digital Banking

Youth perceptions of digital banking (DB) were generally positive: 92.3% of the respondents agree that it has made financial services more accessible; 96.1% perceive that it reduces the need to visit a physical bank; 84.7% agree that digital banking has enhanced their financial literacy and awareness, 84.6% agree that it has improved their ability to make financial decisions and 84.6% felt that it has boosted their financial independence. However, concerns around fraud, transaction failures, and hidden charges tempered these perceptions. This finding reflects Ozili's (2024) observation that while digital banking enhances access, negative experiences can erode trust and reduce the likelihood of long-term adoption.

The CBN Consumer Protection Framework (2023) lists fraud, inadequate redress mechanisms, and concealed costs as ongoing risks to consumer confidence in digital banking while the World Bank Nigeria Development Update (2023) indicates that the incidence of cyber fraud has increased alongside the expansion of digital finance, posing a regulatory dilemma that directly impacts user trust. TAM posits that trust is an extension of perceived ease of use and perceived utility while Empowerment Theory postulates that empowerment outcomes—such as continuous savings, entrepreneurial initiatives, or autonomous financial decision-making—are significantly contingent upon faith in the system.

The survey results show that inasmuch as the digital platforms provide convenience, the experience has not translated to empowerment due largely to issues around trust, network reliability and security of the cyberspace.

5.4. Challenges, Policy Gaps and Pathways to Improvement

The survey highlighted four key challenges: poor internet connectivity (65.4%), network downtime (73.1%), high transaction charges (38.5%) and cybersecurity concerns (38.5%). Respondents reported that digital services frequently fail during peak hours, and that transaction fees, though minimal, add up to significant costs for frequent users. Many people were also frustrated by the dearth of affordable financial services for young entrepreneurs, with most businesses focussing on transfers and payments.

Policy frameworks like the National Digital Economy Policy and Strategy (2020–2030) underscore digital literacy and infrastructure development as essential components; however, survey data indicates that these objectives are still significantly unfulfilled. The Legal and Institutional Framework for FinTech Regulation in Nigeria (Imoisi et al., 2025) underscores ongoing deficiencies in regulatory clarity, consumer protection, and monitoring. The World Bank Digital Economy Report (2023) emphasises that Sub-Saharan Africa persists in encountering structural obstacles, like inadequate infrastructure and subpar internet access, which undermine the potential benefits of digital finance. In the absence of reliable infrastructure, affordable services, and effective regulation, youth are unlikely to achieve empowerment outcomes from digital banking. The DEG framework highlights the importance of governance capacity and institutional effectiveness in addressing systemic challenges while successful digital financial ecosystems worldwide, exemplified by Kenya’s M-Pesa, have addressed comparable challenges by establishing robust agent networks, creating user-friendly interfaces, and minimising transaction costs via economies of scale (Ndung’u, 2021).

6.0. Conclusion and Recommendations

This study demonstrates that digital banking has significant potential to drive youth empowerment and economic inclusion in Nigeria. The integration of Empowerment Theory, the Technology Acceptance Model, and Digital Era Governance demonstrates how digital financial tools facilitate credit access, improve financial literacy, and promote entrepreneurial opportunities for young individuals. This also highlights ongoing challenges, such as infrastructural deficiencies, digital illiteracy, and a lack of trust in financial institutions, which hinder adoption and restrict the transformative potential of these innovations. The findings underscore the simultaneous existence of promise and precarity within Nigeria's digital banking sector.

Evidence indicates that achieving youth empowerment through digital finance necessitates more than just technological expansion; it also requires intentional policy development, the establishment of institutional trust, and the implementation of targeted youth-centred programs. Addressing infrastructure deficiencies, minimising transaction costs, and enhancing cybersecurity frameworks are essential measures for building trust in digital systems. Investment in digital literacy and financial education initiatives is crucial for bridging socio-economic divides, enabling youth from disadvantaged backgrounds to fully benefit from financial technologies.

Aligning innovation with empowerment strategies, integration of youth perspectives in policymaking, and collaboration among pertinent stakeholders is crucial for realising the inclusive potential of digital banking for transformation into a means for sustainable empowerment and a foundation for youth-led economic development.

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MONETARY POLICY AND ECONOMIC STABILISATION

Ohioimoje Iyemifokhae Abubakar¹

Abstracts

The nexus between monetary policy and economic stabilization has been examined in several studies with different empirics, methodology of analysis hinging on differing theories and variables of interest. Although some studies are of the consensus that monetary policy is fundamental in macroeconomic management; this view does not align with other studies and theories which see monetary policy as having a neutral effect in directing the mechanics of the economic to a desired end. Besides, some of the methods used in examining this relationship exhibit shortcomings that put the findings of such studies in doubt. Given these litany of controversies enmeshed in earlier studies on the role of monetary policy in economic stabilization, this study aims to examine this relationship using the parsimonious VAR model. This approach liberates our modelling from the problem of auto-correlation, multi-collinearity and other related violations of the classical least squares assumptions. The data is time series in nature. The result of the

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study shows that monetary policy is fundamental in causing changes to unemployment growth rate, exchange rate and the gross domestic output. Furthermore, each of the endogenous variable has underlying influence to itself in different lags and to one another.

Keywords: Monetary policy, Inflation, Exchange rate, Unemployment, Gross domestic Product, Vector Auto-Regressive model.

1.0 Introduction

Monetary Policy refers to regulations that control money supply, the cost of credit and the availability of credit in an economy. The policy is usually undertaken by the monetary authority or the central bank, as in the case of Nigeria, to control the activities of other players in the financial industry like commercial banks, savings banks, mortgage banks, merchant banks, bureau-de-change, development banks and discount houses. The objectives of the monetary policy are ensuring price stability, promoting economic growth, exchange rate stability and the attainment of full employment. Monetary policy as a tool of economic stabilization has been a subject of discussions by economists, governments, policy makers and other financial technocrats.

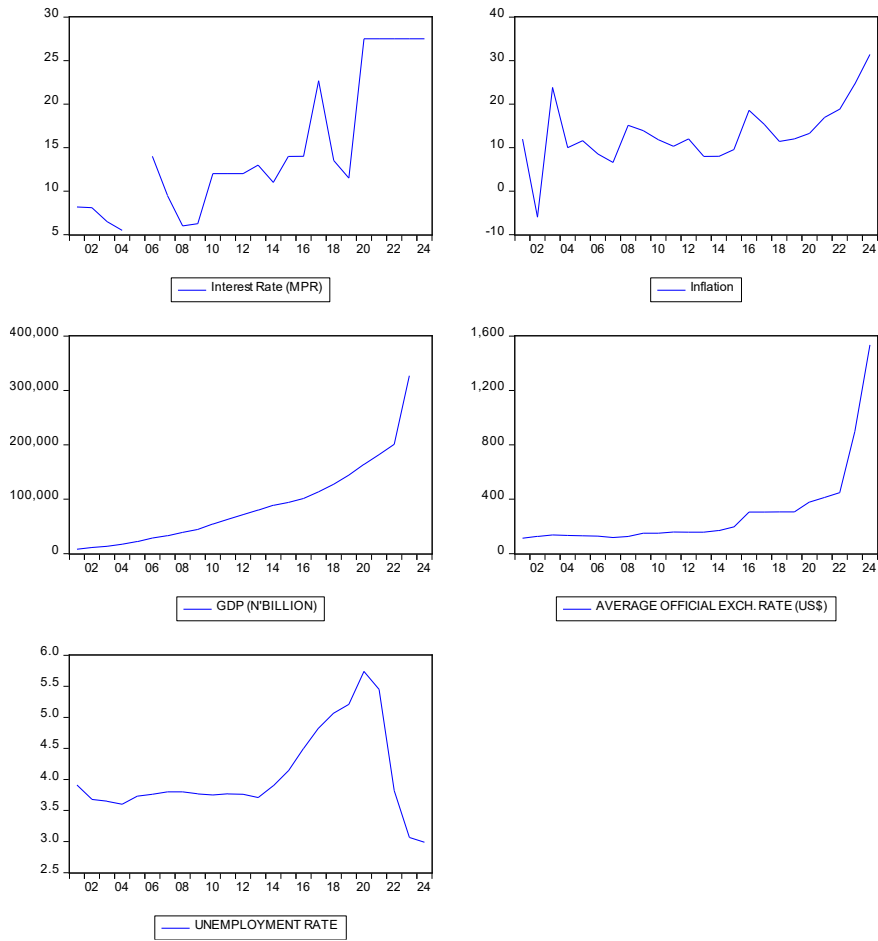
It is important to note that there are different measures of money supply as a unilateral measure of money supply has proven as not only inadequate but misleading. The various measures of money supply are needed for effective forecasting of the probable effect of changes in the different components of money supply on economic stabilization. One of the components of the supply of money, M1 or narrow money, is the most liquid measure of the supply of money. M1 consists of currency

in circulation, demand deposits with commercial banks and cooperative banks as well as other deposits held by the public in the central bank. If M1 is increasing rapidly, this means that there is likely to be an increase in the transactional demand of money. Another measure of money supply is M2. It consists of M1 and savings deposit with post office savings bank. This savings deposit is separated from M1 because it is not as liquid as other components of M1. M3 comprises of the component of M1 and fixed or time deposits with commercial banks. It is necessary to state that fixed deposits are not as liquid as savings deposits in the post office savings bank. M4 consists of the components of M3 and the aggregate deposits with the post office savings banks.

1.1 Background of the Study

The monetary policy was at its lowest rate in Nigeria in 2004 at 5.48%. At this point, the growth rate of unemployment was 3.6% and the official exchange rate per the US dollar was N132.86. The value of the gross domestic output was N17.3 trillion and the rate of inflation was 10%. During the period of the financial shock in 2008, the rate of interest was 6% falling drastically from 9.5% in 2007 to regulate the economy from the spill-over of the global financial crisis. The growth rate of unemployment rose marginally from what it was in 2004 to 3.8%, the official exchange rate against the US dollar was 126.48 while the level of inflation was beyond moderate level at 15.1%. With a surge in the monetary policy rate to 14% between 2014 and 2015, inflation fell to below 10%, the exchange rate rose by more than 50% to N197 to the US dollar while unemployment was on its rise. The value of the domestic production increased gradually from what it was in 2014. For about half a decade (between 2020 and 2024), the monetary policy rate had been placed on 27.5%, given the astronomic increase in the price level within this period. The rise in the monetary policy rate was partly

a response to the depreciating value of the naira which was at an unprecedented exchange of N1,535=US\$1. From 2020, the gross domestic product (gdp) had been rising increasingly and in 2024, the estimated gdp was earmarked to be in the neighborhood of N400trillion. With the growth in domestic output, the growth rate of unemployment came to its lowest level at 2.99% in 2024. Thus, the monetary policy rate is a hub that oil the wheels of progress of other fundamentals in the mechanic of piloting the economy to a desired end.



Source: Author's computation

3.1 Theoretical Review

The theoretical review of the literature on the effectiveness of monetary policy in bringing about the desired changes in macroeconomics has generated varied reactions among economists. The monetarist argued that monetary policy is very important not only in the determination of

the price level but also in influencing the level of economic activity. An excerpt of this could be found in the Irving Fisher's equation of exchange (i.e $MV=PQ$ where M is money supply, V equals to the velocity of circulation of money, P is the price level and Q is the quantity of goods and services). The equation states that holding P and Q constant, changes in the supply of money, M , generates proportional changes in the price level, P . The monetarist argued that only money matters because the quantity of money can be fairly controlled by deliberate policy; changes in the supply of money substantially influence macroeconomic variables and the stable nexus that co-exist among them. This school of economic thought stated that money supply is fundamental in the determination of nominal gross domestic product in the short run and variation in the price level in the long run. The Keynesian economists considered money supply as a passive factor whose economic effects are highly unpredictable especially after the liquidity trap region where the speculative demand for money is perfectly interest elastic such that changes in the supply of money has no effect on output, employment, investment and income. The ideological differences between the monetarists and the Keynesian is that the former argued that if the economy is allowed to operate under the free market forces of demand and supply without government interventions via discretionary monetary and fiscal policies, it will automatically adjust itself to full employment level of output. However, the Keynesians' argument is antithetical to the monetarists' view. They argue that the free market economy is highly unstable. To ensure its stability, the government should play active role through the adoption of appropriate fiscal and monetary policies. The post- Keynesian economists like James Tobin came up with the risk aversion theory of liquidity based on portfolio selection. Tobin presumed that an individual can hold a portfolio of bond and cash unlike the Keynesian

position that people can possess either asset. Cash does not generate interest or incurs risk, however bonds generate interest and the income on bond is uncertain. The higher the investment on this asset, the greater is the risk associated with it. Investors will be willing to shoulder this risk if they are adequately compensated in doing so.

The major debates about the role of monetary policy in economic stabilization are, quite often than not, skewed towards its role with regards to macroeconomics like price stability, the stabilization of aggregate demand, reduction of unemployment and the monetization of government debts. The post-monetarist has been largely dominated by the real business cycle model, the New Keynesian models and the New Consensus model. The demarcation in these theories revolves in the nominal rigidities of wages and prices and their treatments of aggregate demand (Palley, 2007; Goodfriend and King, 1997). The New Keynesian model forecasts neutrality of monetary policy in relation to real economic variables. The integration of sticky prices and monopolistic competition into the real business cycle structure shows the departure in the view of the New Keynesian economics. The New Consensus model is a product of the New Classical model and the New Keynesian model. It agrees with the rational expectation hypothesis of the former and the rigidities of wages and prices in the short run of the latter. These set the foundation for inflation targeting where price stability is the overriding goals and interest rate is considered to be the unilateral tool of monetary policy.

To understand how monetary policy affects economic stabilization, there is the need to consider the various channels through which monetary policy affects the economy. This is embodied in the monetary transmission mechanism. The mechanism includes interest rate channel, exchange rate effects, credit and asset price effects.

In the Keynesian theory of interest rate, interest rate only affects the speculative demand for money with an inverse relationship between the two variables as long as the liquidity preference curve is perfectly inelastic. At a low rate of interest, the curve becomes perfectly elastic because investors prefer to keep all their assets in cash, rather than investing in bonds. Keynes assumed that people can either invest in bond or preserve their assets in cash. They cannot hold both assets simultaneously. Tobin, however, argued that the transactional demand for money is also a function of interest rate in contrast to the Keynesian theory which postulated that it is only a function of the level of income. Additionally, Tobin came up with the portfolio diversification theory. He castigated the Keynesian proposition that people can keep different types of assets at the same time to reduce the riskiness of their investment. These assets are mortgages, cash, equities, bonds, consumer durables, real estate and other related assets. This takes us to the second channel of monetary transmission mechanism- other assets effects.

The other assets effects impact the creation of new investments. The Tobin's q is the market value of firms denominated by the replacement cost of capital. If the Tobin's q is low, investors will be unwilling to purchase new capital since their (investors) market value is low in relation to the cost of capital and vice-versa. Furthermore, Modigliani (1971) stated that the life time resources of consumers determine their spending pattern or consumption level. These resources are human capital, financial capital and real assets. A look at the financial assets, for instance, if the value of stock increases, this leads to rise in financial wealth. Technological progress is a determinant of human capital development while capital appreciation or otherwise affect the value of real assets. The itemized factors affecting the value of these three

resources influence the expenditures or pattern of consumption of the rational consumers as seen in the Life Cycle Hypothesis.

The price level channel of the monetary transmission mechanism affects the overall valuation of firms and industries. If the prices of goods and services soars, this increases the value of businesses engaged in the production of such economic goods because of the high profit potentials involved. This translates to more investments, output, employment and income in such economy. Fall in the prices of goods and services attracts a negative effect on investment, employment, income and growth, drifting this economy into recession.

The credit channel of the monetary transmission mechanism operates in alignment with the monetary policy objectives of the monetary authority. If the apex bank engages in expansionary monetary policy, it reduces the monetary policy rate which is a determinant of all other rates of interest in such economy. With this, businesses and individuals can borrow at lower cost of credit. This influences these economic units to borrow more. This leads to more investments, output, employment and income. The overall productive capacity of such economy is improved. Contractionary monetary policy has opposite effects. There will be decreased investments, output, unemployment and income. The economy drifts towards recession.

3.2 Empirical Review of Literature

Several researches have been carried out in the literature to show the nexus between monetary policy and economic stabilization. Some studies found that monetary policy has limited or no impact on economic stabilisation (Mutuku and Koech, 2014; Montiel et. al, 2012; Kashani, 2011). In the study conducted by Ohiomoje, I. A. (2024), the impact of monetary policy is mixed. On one hand, there is inverse

relationship between income and interest rate. However, the empiric of the study showed that income and interest rate are unresponsive to changes in investment.

Some studies validated that monetary policy is very important in stabilizing economic variables. Vinayagathan (2013) discovered that interest rate shock has significant impact in output in Sri-Lanka. Berg et al (2013) made use of the narrative approach via Romer and Romer (1989) to examine monetary transmission mechanism on four African countries of Uganda, Kenya, Tanzania and Rwanda. The study found vibrant connection between the rise in interest rate and changes in output. Milani and Treadwell (2012) examined the impact of monetary shock on changes in output. The empiric of the study showed that unanticipated monetary shock had smaller influence on output.

Chaudhry et al. (2012) examined the short run and long run relationship of monetary policy, inflation and economic growth in Pakistan. The study discovered that call money which was used to proxy monetary policy had insignificant impact on other economic variables under consideration while its impact was positive and significant in the long run.

Moursi and El Mossalamy (2010) evaluated monetary policy's effect on inflation and growth in Egypt. The empiric showed that monetary policy was more significant in affecting output than price level.

3.3 Methodological Review

Ohiomoje, I., A. (2024) made use of the IS-LM framework to analyse the relationship between monetary policy, fiscal policy and macroeconomic variables. The study made use of the simultaneous equation model in which the two-stage least square was deployed, after

necessary identification checks, to examine the nexus between monetary policy, fiscal policy and macroeconomics in Nigeria.

Milani and Treadwell (2012) utilized the small scale dynamic stochastic general equilibrium (DSGE) model to disentangle unanticipated and anticipated monetary policy shock on output gap and price level. The study made use of the likelihood based Bayesian methods on time series data in the United State of America between 1960 and 2009.

Berg et al. (2013) used narrative approach to examine monetary transmission mechanism on four African countries of Uganda, Kenya, Tanzania and Rwanda.

Chaudhry et al. (2012) made use of the vector error correction model (VECM) to examine the long run relationship between monetary policy instrument, inflation and economic growth.

Mugume (2011) used the vector autoregressive (VAR) model to estimate monetary transmission mechanism in Uganda. The study made use of quarterly data between 1999 and 2009.

Nouri and Samimi (2011) examined the relationship between money supply and economic growth in Iran by utilizing the ordinary least squares technique.

Amarasekara (2009) made use of the recursive VAR and semi-structural VAR to assess the impact of monetary policy on inflation and economic growth in Sri Lanka. Both methodology showed a significant and negative nexus between monetary policy and economic growth. Rafiq and Mallick (2008) examined the effects of shock in monetary policy on output in Germany, Italy and France with the use of VAR.

Suleiman et al (2009) used the Johanssen Cointegration test to examine the long run relationship between money supply (M2), public expenditure and economic growth in Pakistan.

4.1 Methodology of the Study

Sim (1980) stated that if there is simultaneity among several variables, all the variables should be treated in the same way; that is, there is no distinction between the endogenous and exogenous variables. All variables are estimated as endogenous where all equations have the same set of regressors. This leads to the development of the Vector Auto-regressive (VAR) model. In respect to the variables used in this study-monetary policy instrument (interest rate), unemployment, gross domestic product, exchange rate and inflation, the VAR model is shown as follows.

$$\pi_t^{mon.policy} = a_1 + \sum_{k=1}^{k=2} b_{11} \pi_{t-k}^{Mon.policy} + \sum_{m=1}^{m=2} b_{12} \pi_{t-m}^{Infl} + \sum_{c=1}^{c=2} b_{13} \pi_{t-c}^{Exch} + \sum_{p=1}^{p=2} b_{14} \pi_{t-p}^{Unemp} + \sum_{n=1}^{n=2} b_{14} \pi_{t-n}^{Gdp}$$

$$\pi_t^{Infl} = a_2 + \sum_{k=1}^{k=2} b_{21} \pi_{t-k}^{Infl} + \sum_{m=1}^{m=2} b_{22} \pi_{t-m}^{Exch} + \sum_{c=1}^{c=2} b_{23} \pi_{t-c}^{Unemp} + \sum_{p=1}^{p=2} b_{24} \pi_{t-k}^{Mon.policy} + \sum_{n=1}^{n=2} b_{14} \pi_{t-n}^{Gdp}$$

$$\pi_t^{Gdp} = a_3 + \sum_{k=1}^{k=2} b_{31} \pi_{t-k}^{Gdp} + \sum_{m=1}^{m=2} b_{32} \pi_{t-m}^{Exch} + \sum_{c=1}^{c=2} b_{33} \pi_{t-c}^{Unemp} + \sum_{p=1}^{p=2} b_{34} \pi_{t-k}^{Mon.policy} + \sum_{n=1}^{n=2} b_{14} \pi_{t-n}^{Infl}$$

$$\pi_t^{Exch} = a_4 + \sum_{k=1}^{k=2} b_{41} \pi_{t-k}^{Mon.policy} + \sum_{m=1}^{m=2} b_{42} \pi_{t-m}^{Gdp} + \sum_{c=1}^{c=2} b_{43} \pi_{t-c}^{Exch} + \sum_{p=1}^{p=2} b_{44} \pi_{t-p}^{Unemp} + \sum_{n=1}^{n=2} b_{14} \pi_{t-n}^{Infl}$$

$$\pi_t^{Unemp} = a_5 + \sum_{k=1}^{k=2} b_{51} \pi_{t-k}^{Mon.policy} + \sum_{m=1}^{m=2} b_{52} \pi_{t-m}^{Infl} + \sum_{c=1}^{c=2} b_{53} \pi_{t-c}^{Gdp} + \sum_{p=1}^{p=2} b_{54} \pi_{t-p}^{Exch} + \sum_{n=1}^{n=2} b_{14} \pi_{t-n}^{Unemp}$$

Where *Exch* = Exchange rate; *Infl* = Inflationary rate or changes in price level; *Mon. policy* = Interest rate; *Gdp* = Gross domestic product; *Unemp* = Unemployment;

a_i = intercepts; b_i = coefficients; $t-i$ = period lags, π = parameter for variables

The above equations can be put in matrix form as

$$\begin{array}{l} \pi_t^{mon.policy} \\ \pi_{t-k} \\ \pi_t^{Infl} \\ \pi_{t-m} \\ \pi_t^{Gdp} \\ \pi_{t-c} \\ \pi_t^{Exch} \\ \pi_{t-p} \\ \pi_t^{Unemp} \\ \pi_{t-n} \end{array} = \begin{array}{l} a_1 \\ a_2 \\ a_3 \\ a_4 \\ a_5 \end{array} + \begin{array}{cccc} b_{11} & b_{12} & b_{13} & b_{14} \\ b_{21} & b_{22} & b_{23} & b_{24} \\ b_{31} & b_{32} & b_{33} & b_{34} \\ b_{41} & b_{42} & b_{43} & b_{44} \\ b_{51} & b_{52} & b_{53} & b_{54} \end{array}$$

4.2 Result and Discussions

In the lag selection criteria in appendix 1, AIC and HQ prescribed a lag period of 2. Based on this, estimating the vector autoregressive model showed a result where a large number of the variables are insignificant. This is found in appendix 2. To be more precise, only 27 coefficients out of the 55 coefficients in the system of equations in appendix 3 are significant. This falls below 50% of the entire coefficients. This problem arises from the problem of multi-collinearity, auto-correlation and other aberrations that negate the assumptions of the ordinary least squares (OLS). Given these problems, the study devise a method of removing coefficients with insignificant probability in a bid to overcome the itemized violations of the assumptions of the OLS. Appendix 4 shows us the result of this estimation in which all the coefficients in the equations have a probability value of less than 10%. The parsimonious VAR estimates are represented as follows

$$\begin{aligned} \text{INTEREST_RATE_MPR_} &= - \\ &0.548930931773*\text{INTEREST_RATE_MPR_}(-2) + \\ &0.000160676519822*\text{GDP_N_BILLION_}(-2) + \\ &2.31520937417*\text{UNEMPLOYMENT_RATE}(-2) \end{aligned}$$

Equation (1)

$$\begin{aligned} \text{INFLATION} &= -0.349802034638*\text{INFLATION}(-1) + \\ &0.057653700655*\text{AVERAGE_OFFICIAL_EXCH_RATE_US\$}(- \\ &1) - \\ &0.0737233809811*\text{AVERAGE_OFFICIAL_EXCH_RATE_US\$}(- \\ &-2) - 5.40913893553*\text{UNEMPLOYMENT_RATE}(-1) + \\ &10.1505441423*\text{UNEMPLOYMENT_RATE}(-2) \end{aligned}$$

Equation (2)

$$\begin{aligned} \text{GDP_N_BILLION_} &= 3.11304350777 * \text{GDP_N_BILLION_}(-1) - \\ &2.18808507307 * \text{GDP_N_BILLION_}(-2) + \\ &317.180408259 * \text{AVERAGE_OFFICIAL_EXCH_RATE_US\$}(-1) \\ &- 44815.8275533 * \text{UNEMPLOYMENT_RATE}(-1) + 119548.075993 \end{aligned}$$

Equation (3)

$$\begin{aligned} \text{AVERAGE_OFFICIAL_EXCH_RATE_US\$} &= - \\ &5.14071427444 * \text{INTEREST_RATE_MPR}(-2) + \\ &0.00131566010384 * \text{GDP_N_BILLION_}(-2) + \\ &1.47220773228 * \text{AVERAGE_OFFICIAL_EXCH_RATE_US\$}(-1) \\ &- 198.443255587 * \text{UNEMPLOYMENT_RATE}(-1) + \\ &110.743497311 * \text{UNEMPLOYMENT_RATE}(-2) + 270.248219301 \end{aligned}$$

Equation (4)

$$\begin{aligned} \text{UNEMPLOYMENT_RATE} &= - \\ &0.0611153817623 * \text{INTEREST_RATE_MPR}(-1) - \\ &0.0588853317572 * \text{INTEREST_RATE_MPR}(-2) - \\ &0.0301027661866 * \text{INFLATION}(-1) - \\ &0.018144945092 * \text{INFLATION}(-2) - 1.84511205875e- \\ &05 * \text{GDP_N_BILLION_}(-1) + 2.60289857147e- \\ &05 * \text{GDP_N_BILLION_}(-2) + \\ &0.0124953909936 * \text{AVERAGE_OFFICIAL_EXCH_RATE_US\$}(- \\ &-2) + 1.27744501002 * \text{UNEMPLOYMENT_RATE}(-1) - \\ &1.6042636591 * \text{UNEMPLOYMENT_RATE}(-2) + 4.77423939813 \end{aligned}$$

Equation (5)

In equation (1), a unit change in interest rate in lag 2 period results in a decline in the current monetary policy rate by 55%, *ceteris paribus*. A change in the gross domestic product in 2 periods lag leads to an increase in the interest rate by 0.016% in the current year, all other things being equal. Similarly, a shift in the growth rate of unemployment 2 years ago results to a rise in the interest rate by 232% in the present time. The goodness of the fit of the equation (R^2) is 85.6% indicating that the explanatory variables substantially describe the dependent variable. The Durbin Watson statistics is 2.275 which approximates 2. This shows that there is no serial correlation in the model.

In equation (2) of the regression estimates, a change in the price level in lag 1 leads to a decrease in the rate of inflation by 35% in the current period, all other things being equal. A drift in the exchange rate in the previous year causes an increase in the rate of inflation by 5.77% in the current year, *ceteris paribus*. By extension, a change in the exchange rate in lag 2 results to a decline in inflationary rate by 7.4% in the present time. A shift in the growth rate of unemployment in the previous year causes a fall in the price level by 5.41% in the current year. If this shift in unemployment occurs in lag 2, this causes an increase in the price level by 10.15% in the present period. The R^2 is 81.8% which is good while the Durbin Watson (DW) statistics is 1.57, approximating 2. This shows there is no auto-correlation in the model represented in equation 2.

In equation (3), a change in the gross domestic product in lag 1 lead to an increase in the gross domestic product (gdp) by 3.11% in the present year. In the lag 2, a change in the gdp causes a decline in the gross domestic product by 2.19% in the current period. A change in the exchange rate in lag 1 leads to a rise in the gdp by 317.18 in the current

year. If the growth rate of unemployment changes by a unit in lag 1, the gdp declines by 44,816 in the current period, *ceteris paribus*. The R^2 of the model is 99.1% while the DW statistics is 1.8. This indicates a positive result.

In equation (4), a change in the interest rate in lag 2 results to a decline in the exchange rate by 5.41% in the current year. Changes in the gdp in lag 2 cause a rise in the exchange rate by 0.13% in the present time. A drift in the exchange rate in lag 1 causes the exchange rate to soar by 1.47%. A shift in the unemployment growth rate in the previous year generates a decrease in the exchange rate by 198.44% in the present time, all other things being equal. If this shift in unemployment rate is in lag 2, the exchange rate rises by 110.74 in the current period. The R^2 of equation 4 is 98.9% and the DW statistic of 1.8 indicate a good representation of the variables of the model and the absence of serial correlation.

Equation (5) of the estimation shows that changes in the monetary policy rate in lag 1 causes a fall in the unemployment rate by 6.11% in the current year. If this shift in interest rate is in lag 2, this generates a decrease in unemployment rate by 5.89% in the present year, *ceteris paribus*. Changes in the inflationary rate in lag 1 causes a fall in unemployment rate by 3% in the current period. If price level changes in the lag 2, this makes unemployment to fall by 1.8% in the present year. Changes in the gross domestic product in lag 1 makes unemployment to fall by 1.845 in the current year. If this changes in the gdp is in lag 2, the fall in unemployment in the current period is 2.60. Changes in the exchange rate in lag 2 generates a rise in unemployment rate by 1.2%. If the unemployment growth rate changes in a previous period, this causes the current rate of unemployment's growth to rise by 1.28, all other things being equal. If this change in the

unemployment rate is in lag 2, the unemployment rate at the current year declines by 1.604. The R^2 of the model is 96.2 while the DW statistics is 2.33, all showing a good result.

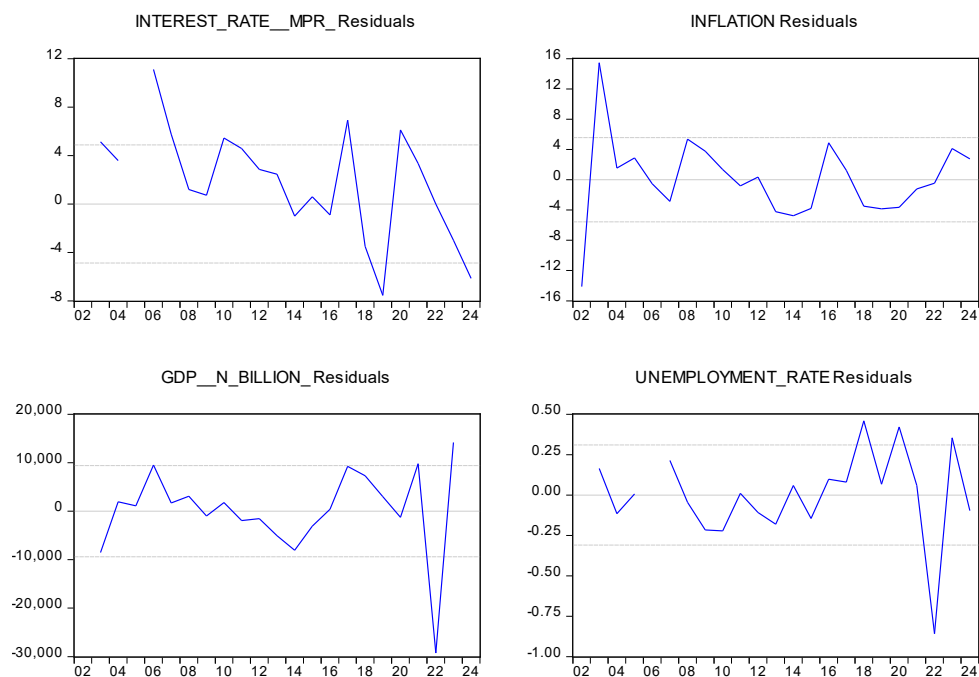
Residuals of the Endogenous Variables

In figure 1, shocks in interest rate decreased between 2002 and 2004. The trend continues between 2006 and 2008 after a rise in the interest rate dynamics. The monetary policy direction took a leap from 2008 to 2010. There was a negative shock in interest rate between 2010 and 2014. However, changes in the monetary policy increased astronomically in 2015 and 2016 as well as 2019 and 2020. Generally, most of the dynamics in monetary policy were more of a decrease rather than an increase in the rate of change during the period under review. The deviation of the predicted value of monetary policy rate from the actual value (residual) is high between 2004 and 2007. The scattered data revolves in-between the regression line between 2008 and 2016. From 2016 to 2024, the deviation of the predicted value from the regression line is at its peak. This suggests that the monetary policy model is a good predictor for mid-term values, rather than when the series is on short term or long term basis.

In figure 2, the disturbance terms or residuals from the scattered plots have sharp deviation from the regression line of changes in the price level between 2002 and 2004. In subsequent years, the residuals of the predicted values of inflationary rates from the actual values are fairly stable. This occurs from 2004 to 2024. This indicates that data on inflation is a good predictor if the series is large than when it is small. Also, it is observed that the scattered plots of inflationary data are at random (in larger part of the sample) and do not contradict the linearity assumption of the ordinary least squares regression.

In figure 3, the predicted data on the gross domestic product is at random and scattered in-between the regression line from 2002 to 2021. However, the shock or disturbance term is high between 2021 and 2024. The data on the gross domestic product is a good predictor of short and medium term series. The residual values does not align with the actual values of the gross domestic product in the long term (2021 and 2024).

The residuals of unemployment revolves around the regression line between 2002 and 2020. The deviations of the scattered plots are high in the subsequent years. This means that data on unemployment are good predictors of small and medium term series.



5.1 SUMMARY AND CONCLUSIONS

All the endogenous variables-interest rate, price level, exchange rate, unemployment and the gross domestic product have the potential of causing changes to themselves (in different lags) and to one another. Monetary policy as a veritable instrument of macroeconomic management is fundamental in initiating changes in the gross domestic product, the rate of growth of unemployment and the exchange rate. Changes in the monetary policy rate in lag 1 causes decline in the current growth rate of unemployment by 6.11%. If such changes occur in lag 2, the decrease in the growth rate of unemployment is marginal (compared to lag 1) at 5.89%. Changes in the rate of interest in lag 2 results to a decline in the exchange rate by 5.41% in the current period. Also dynamism in the rate of interest in lag 2 has the potential of bringing about a fall in the current rate of interest by 55%. Besides, drifts in the gross domestic product in lag 2 causes increase in the rate of interest in the current period by 0.016, *ceteris paribus*. The inverse relationship between monetary policy and the exchange rate stems from the fact that reduction in the interest rate which is a proxy for monetary policy causes liquidity expansion at the credit market and make it seamless for the financial players to expand credit as businesses and others will be willing to borrow at a lower rate of interest. The ability of these economic agents to access credit makes it easier for them to expand the production of goods and services as well as to make more investments. Some of these goods are exported to other countries to earn more foreign exchange. Intuitively, a fall in the rate of interest also leads to decreases in the prices of goods and services in the domestic market since manufacturers can produce at relatively lesser cost of production compared to a reversed case where the rate of interest is

high. The fall in the prices of domestic output attracts traders from other countries to patronize the domestic market which is an addition to the portfolio of foreign exchange reserve of the economy concerned. If exports exceed imports, this leads to increases in the value of such country's currency. This surge in the exchange rate causes further increases in the production of goods and services as can be seen from the result of equation 4. This has the potential of unlocking the employment of more labour, thus making the growth rate of unemployment to decrease when there is increase in the productivity rate. Also, changes in the price level in the previous period causes a 3% rise in the growth rate of unemployment in the current period. The nexus between unemployment, monetary policy and inflation is negative. Increases in the rate of interest is germane to cause increases in the level of prices as producers will not want to bear this burden of high cost of production alone. They pass some of this burden to consumers in the form of price increase. All other things being equal, if supply exceeds demand given the higher prices of goods and services, producers will be forced to down-size which increases the growth rate of the unemployed.

Given the positive relationship between monetary policy and the gross domestic product, there is the need to tailor monetary policy towards warding off inflationary trends that springs up after an economic boom. In other words policy makers have to tighten the credit market by fostering a higher rate of interest. This makes it difficult for banks to lend and places a limit on credit expansion. Such policy may be interwoven by physical measures like wage freeze and the impositions of controls.

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APPENDICES

APPENDIX 1

VAR Lag Order Selection Criteria

Endogenous variables: INTEREST_RATE_MPR_ INFLATION GDP_N_BILLION_
AVERAGE_OFFICIAL_EXCH_RATE_US\$_ UNEMPLOYMENT_RATE

Exogenous variables: C

Sample: 2001 2024

Included observations: 18

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-433.5680	NA	1.00e+15	48.72978	48.97710	48.76388
1	-351.4003	109.5569	1.99e+12	42.37781	43.86176	42.58243
2	-277.5061	57.47326*	2.07e+10*	36.94512*	39.66570*	37.32025*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

APPENDIX 2

Vector Autoregression Estimates

Sample (adjusted): 2003 2023

Included observations: 18 after adjustments

Standard errors in () & t-statistics in []

	INTEREST_R ATE_MPR_	INFLATION	GDP__N_BIL LION_	AVERAGE_OFFI CIAL_EXCH__RA TE_US\$_	UNEMPLOYMENT_RATE
INTEREST_RATE__MPR_(-1)	-0.180538 (0.25115) [-0.71885]	0.167908 (0.20415) [0.82249]	-785.0534 (749.038) [-1.04808]	-2.144571 (3.55699) [-0.60292]	-0.073718 (0.01517) [-4.85848]
INTEREST_RATE__MPR_(-2)	-0.430453 (0.27775) [-1.54977]	-0.206402 (0.22577) [-0.91421]	-881.2712 (828.388) [-1.06384]	-8.041710 (3.93381) [-2.04426]	-0.053951 (0.01678) [-3.21510]
INFLATION(-1)	0.010256 (0.19189) [0.05345]	-0.404524 (0.15597) [-2.59352]	-308.6023 (572.293) [-0.53924]	-3.270579 (2.71768) [-1.20345]	-0.037474 (0.01159) [-3.23256]
INFLATION(-2)	-0.035580 (0.23206) [-0.15332]	-0.070861 (0.18863) [-0.37565]	-303.6654 (692.124) [-0.43874]	-3.976791 (3.28672) [-1.20996]	-0.017687 (0.01402) [-1.26151]
GDP__N_BILLION_(-1)	0.000244 (0.00050) [0.49130]	-0.000846 (0.00040) [-2.09189]	2.109126 (1.48314) [1.42207]	-0.004979 (0.00704) [-0.70699]	-8.53E-08 (3.0E-05) [-0.00284]
GDP__N_BILLION_(-2)	-8.27E-05 (0.00054) [-0.15311]	0.000848 (0.00044) [1.93131]	-1.071987 (1.61106) [-0.66539]	0.006906 (0.00765) [0.90273]	3.01E-06 (3.3E-05) [0.09232]
AVERAGE_OFFICIAL_EXCH__ RATE_US\$_(-1)	0.056618 (0.04353) [1.30070]	0.058882 (0.03538) [1.66415]	248.3961 (129.824) [1.91333]	1.316769 (0.61650) [2.13587]	0.005034 (0.00263) [1.91426]
AVERAGE_OFFICIAL_EXCH__ RATE_US\$_(-2)	-0.092120	-0.053543	128.8206	0.658657	0.011123

	(0.04841)	(0.03935)	(144.375)	(0.68560)	(0.00292)
	[-1.90299]	[-1.36073]	[0.89226]	[0.96070]	[3.80322]
UNEMPLOYMENT_RATE(-1)	-2.086935	-5.370191	-49424.66	-203.4721	1.246789
	(2.07911)	(1.69001)	(6200.90)	(29.4465)	(0.12561)
	[-1.00376]	[-3.17761]	[-7.97057]	[-6.90989]	[9.92591]
UNEMPLOYMENT_RATE(-2)	7.463502	13.63298	12526.18	105.9806	-1.882336
	(5.73669)	(4.66308)	(17109.5)	(81.2487)	(0.34658)
	[1.30101]	[2.92360]	[0.73212]	[1.30440]	[-5.43115]
C	-8.352346	-9.108255	105417.5	361.6476	5.617894
	(16.8017)	(13.6573)	(50110.5)	(237.962)	(1.01507)
	[-0.49711]	[-0.66692]	[2.10370]	[1.51977]	[5.53448]
<hr/>					
R-squared	0.932597	0.883156	0.993631	0.976110	0.972459
Adj. R-squared	0.836307	0.716235	0.984534	0.941981	0.933115
Sum sq. resids	71.99295	47.56781	6.40E+08	14441.12	0.262772
S.E. equation	3.206978	2.606799	9564.722	45.42045	0.193749
F-statistic	9.685273	5.290876	109.2155	28.60083	24.71690
Log likelihood	-38.01666	-34.28695	-182.0258	-85.72807	12.50068
Akaike AIC	5.446296	5.031884	21.44731	10.74756	-0.166742
Schwarz SC	5.990412	5.576000	21.99143	11.29168	0.377374
Mean dependent	14.99444	14.08333	107115.8	272.3450	4.196667
S.D. dependent	7.926481	4.893597	76909.03	188.5676	0.749164
<hr/>					
Determinant resid covariance (dof adj.)	1.90E+09				
Determinant resid covariance	16930451				
Log likelihood	-277.5061				
Akaike information criterion	36.94512				
Schwarz criterion	39.66570				
Number of coefficients	55				
<hr/>					

APPENDIX 3

System: UNTITLED

Estimation Method: Least Squares

Sample: 2003 2024

Included observations: 20

Total system (unbalanced) observations 98

Estimation settings: tol=0.00010, derivs=analytic (linear)

Initial Values: C(1)=0.00000, C(2)=0.00000, C(3)=0.00000, C(4)=0.00000,

C(5)=0.00000, C(6)=0.00000, C(7)=0.00000, C(8)=0.00000,

C(9)=0.00000, C(10)=0.00000, C(11)=0.00000, C(12)=0.00000,

C(13)=0.00000, C(14)=0.00000, C(15)=0.00000, C(16)=0.00000,

C(17)=0.00000, C(18)=0.00000, C(19)=0.00000, C(20)=0.00000,

C(21)=0.00000, C(22)=0.00000, C(23)=0.00000, C(24)=0.00000,

C(25)=0.00000, C(26)=0.00000, C(27)=0.00000, C(28)=0.00000,

C(29)=0.00000, C(30)=0.00000, C(31)=0.00000, C(32)=0.00000,

C(33)=0.00000, C(34)=0.00000, C(35)=0.00000, C(36)=0.00000,

C(37)=0.00000, C(38)=0.00000, C(39)=0.00000, C(40)=0.00000,

C(41)=0.00000, C(42)=0.00000, C(43)=0.00000, C(44)=0.00000,

C(45)=0.00000, C(46)=0.00000, C(47)=0.00000, C(48)=0.00000,

C(49)=0.00000, C(50)=0.00000, C(51)=0.00000, C(52)=0.00000,

C(53)=0.00000, C(54)=0.00000, C(55)=0.00000

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.132025	0.228435	-0.577957	0.5663
C(2)	-0.495038	0.246134	-2.011250	0.0506
C(3)	0.047031	0.174687	0.269232	0.7890
C(4)	0.011840	0.209651	0.056476	0.9552
C(5)	-4.14E-05	0.000151	-0.273434	0.7858
C(6)	0.000230	0.000152	1.515514	0.1370
C(7)	0.037942	0.029497	1.286293	0.2052
C(8)	-0.087107	0.045770	-1.903120	0.0637
C(9)	-1.929385	1.979522	-0.974672	0.3352
C(10)	9.476462	4.488136	2.111447	0.0406
C(11)	-14.52611	12.82059	-1.133029	0.2635
C(12)	0.054041	0.198864	0.271751	0.7871
C(13)	-0.061375	0.217970	-0.281576	0.7796
C(14)	-0.483292	0.149812	-3.225991	0.0024
C(15)	-0.165421	0.147275	-1.123212	0.2676
C(16)	-0.000202	0.000133	-1.511720	0.1379

C(17)	0.000141	0.000135	1.048643	0.3002
C(18)	0.101506	0.025876	3.922826	0.0003
C(19)	-0.064889	0.040563	-1.599704	0.1170
C(20)	-5.729605	1.754072	-3.266460	0.0021
C(21)	9.101664	3.974201	2.290187	0.0270
C(22)	4.709224	11.29639	0.416879	0.6788
C(23)	-763.0999	698.3769	-1.092676	0.2806
C(24)	-861.2884	774.2202	-1.112459	0.2721
C(25)	-348.5602	514.6139	-0.677324	0.5018
C(26)	-407.7505	508.7672	-0.801448	0.4273
C(27)	2.179555	1.365935	1.595651	0.1179
C(28)	-1.137731	1.491532	-0.762793	0.4498
C(29)	249.0280	121.9198	2.042557	0.0473
C(30)	127.9377	135.5691	0.943709	0.3506
C(31)	-49431.21	5824.478	-8.486804	0.0000
C(32)	11986.82	15933.61	0.752298	0.4560
C(33)	107672.3	46245.28	2.328287	0.0247
C(34)	-3.211798	3.069539	-1.046345	0.3012
C(35)	-7.215712	3.364444	-2.144697	0.0377
C(36)	-3.395475	2.312402	-1.468375	0.1493
C(37)	-3.502542	2.273243	-1.540769	0.1307
C(38)	-0.001108	0.002058	-0.538212	0.5932
C(39)	0.002528	0.002077	1.217026	0.2302
C(40)	1.617828	0.399400	4.050643	0.0002
C(41)	0.586463	0.626108	0.936681	0.3542
C(42)	-205.9971	27.07474	-7.608460	0.0000
C(43)	79.22701	61.34325	1.291536	0.2034
C(44)	436.4418	174.3640	2.503050	0.0162
C(45)	-0.066151	0.014052	-4.707514	0.0000
C(46)	-0.060536	0.015402	-3.930369	0.0003
C(47)	-0.035750	0.010586	-3.377093	0.0016
C(48)	-0.019189	0.010407	-1.843888	0.0721
C(49)	-3.05E-05	9.42E-06	-3.237179	0.0023
C(50)	3.71E-05	9.51E-06	3.903935	0.0003
C(51)	0.002765	0.001828	1.512204	0.1378
C(52)	0.011681	0.002866	4.075430	0.0002
C(53)	1.265845	0.123947	10.21283	0.0000
C(54)	-1.671156	0.280826	-5.950865	0.0000
C(55)	5.012775	0.798228	6.279881	0.0000

Determinant residual covariance

1.89E+08

APPENDIX 4

System: UNTITLED

Estimation Method: Least Squares

Sample: 2003 2024

Included observations: 22

Total system (unbalanced) observations 104

Estimation settings: tol=0.00010, derivs=analytic (linear)

Initial Values: C(2)=-0.54893, C(6)=0.00016, C(10)=2.31521, C(14)=-0.34980, C(18)=0.05765, C(19)=-0.07372, C(20)=-5.40914, C(21)=10.1505, C(27)=3.11304, C(28)=-2.18809, C(29)=317.180, C(31)=-44815.8, C(33)=119548., C(35)=-5.14071, C(39)=0.00132, C(40)=1.47221, C(42)=-198.443, C(43)=110.743, C(44)=270.248, C(45)=-0.06615, C(46)=-0.06054, C(47)=-0.03575, C(48)=-0.01919, C(49)=-3.0e-05, C(50)=3.7e-05, C(52)=0.01168, C(53)=1.26585, C(54)=-1.67116, C(55)=5.01278

	Coefficient	Std. Error	t-Statistic	Prob.
C(2)	-0.548931	0.198746	-2.761965	0.0072
C(6)	0.000161	2.40E-05	6.703023	0.0000
C(10)	2.315209	0.456493	5.071729	0.0000
C(14)	-0.349802	0.121035	-2.890091	0.0050
C(18)	0.057654	0.009673	5.960254	0.0000
C(19)	-0.073723	0.018614	-3.960604	0.0002
C(20)	-5.409139	1.659887	-3.258740	0.0017
C(21)	10.15054	1.954738	5.192790	0.0000
C(27)	3.113044	0.894329	3.480870	0.0008
C(28)	-2.188085	0.968991	-2.258107	0.0268
C(29)	317.1804	59.06584	5.369947	0.0000
C(31)	-44815.83	4501.973	-9.954708	0.0000
C(33)	119548.1	14639.93	8.165891	0.0000
C(35)	-5.140714	2.801388	-1.835060	0.0705
C(39)	0.001316	0.000522	2.520491	0.0138
C(40)	1.472208	0.123300	11.94005	0.0000
C(42)	-198.4433	24.48968	-8.103139	0.0000
C(43)	110.7435	34.12967	3.244786	0.0018
C(44)	270.2482	85.76034	3.151203	0.0023
C(45)	-0.061115	0.014504	-4.213776	0.0001
C(46)	-0.058885	0.016322	-3.607722	0.0006
C(47)	-0.030103	0.010523	-2.860536	0.0055

C(48)	-0.018145	0.011032	-1.644799	0.1042
C(49)	-1.85E-05	5.34E-06	-3.452907	0.0009
C(50)	2.60E-05	6.43E-06	4.050855	0.0001
C(52)	0.012495	0.002991	4.177767	0.0001
C(53)	1.277445	0.131427	9.719783	0.0000
C(54)	-1.604264	0.294622	-5.445152	0.0000
C(55)	4.774239	0.831307	5.743050	0.0000

Determinant residual covariance 1.08E+10

Equation: INTEREST_RATE_MPR_ = C(2)*INTEREST_RATE_MPR_(-2)
+ C(6)*GDP_N_BILLION_(-2) + C(10)*UNEMPLOYMENT_RATE(-2)

Observations: 20

R-squared	0.856003	Mean dependent var	15.57000
Adjusted R-squared	0.839062	S.D. dependent var	8.009361
S.E. of regression	3.213119	Sum squared resid	175.5103
Durbin-Watson stat	2.275138		

Equation: INFLATION = C(14)*INFLATION(-1) + C(18)*AVERAGE_OFFICIAL_EXCH_RATE_US\$(-1) + C(19)*AVERAGE_OFFICIAL_EXCH_RATE_US\$(-2) + C(20)*UNEMPLOYMENT_RATE(-1) + C(21)*UNEMPLOYMENT_RATE(-2)

Observations: 22

R-squared	0.818351	Mean dependent var	14.16364
Adjusted R-squared	0.775610	S.D. dependent var	6.172790
S.E. of regression	2.924041	Sum squared resid	145.3503
Durbin-Watson stat	1.579499		

Equation: GDP_N_BILLION_ = C(27)*GDP_N_BILLION_(-1) + C(28)*GDP_N_BILLION_(-2) + C(29)*AVERAGE_OFFICIAL_EXCH_RATE_US\$(-1) + C(31)*UNEMPLOYMENT_RATE(-1) + C(33)

Observations: 21

R-squared	0.990801	Mean dependent var	95810.13
Adjusted R-squared	0.988501	S.D. dependent var	76393.18
S.E. of regression	8191.778	Sum squared resid	1.07E+09
Durbin-Watson stat	1.800972		

Equation: AVERAGE_OFFICIAL_EXCH_RATE_US\$ = C(35)*INTEREST_RATE_MPR_(-2) + C(39)*GDP_N_BILLION_(-2) + C(40)*AVERAGE_OFFICIAL_EXCH_RATE_US\$(-1) + C(42)*UNEMPLOYMENT_RATE(-1) + C(43)*UNEMPLOYMENT_RATE(-2) +

C(44)

Observations: 21

R-squared	0.989613	Mean dependent var	318.8471
Adjusted R-squared	0.986150	S.D. dependent var	331.2325
S.E. of regression	38.98103	Sum squared resid	22792.81
Durbin-Watson stat	1.780122		

Equation: UNEMPLOYMENT_RATE = C(45)*INTEREST_RATE__MPR_(-1)
+ C(46)*INTEREST_RATE__MPR_(-2) + C(47)*INFLATION(-1) + C(48)
*INFLATION(-2) + C(49)*GDP__N_BILLION_(-1) + C(50)
*GDP__N_BILLION_(-2) + C(52)*AVERAGE_OFFICIAL_EXCH__RATE_
US\$(-2) + C(53)*UNEMPLOYMENT_RATE(-1) + C(54)
*UNEMPLOYMENT_RATE(-2) + C(55)

Observations: 20

R-squared	0.962147	Mean dependent var	4.113000
Adjusted R-squared	0.928079	S.D. dependent var	0.763476
S.E. of regression	0.204750	Sum squared resid	0.419224
Durbin-Watson stat	2.327344		

DIGITAL BOOKKEEPING AS A PATHWAY TO SME CREDITWORTHINESS IN NIGERIA

Emeka Cletus Okemadu¹

Abstract

Over 80% of Nigeria's workforce is employed by small and medium-sized businesses (SMEs), which account for nearly half of the country's GDP. However, SMEs continue to face financial limitations, primarily as a result of incomplete financial records that increase lenders' perception of risk and produce information asymmetry. In this article, the relationship between digital bookkeeping and SME creditworthiness in Nigeria is examined. Utilizing secondary data from the World Bank, National Bureau of Statistics, Central Bank of Nigeria, and fintech case studies, the study employs financial inclusion frameworks, alternative credit scoring models, and information asymmetry theory to examine how digital bookkeeping enhances SME credit availability. Results indicate that digital bookkeeping facilitates alternative data credit scoring, improves SME integration into payment ecosystems, and lessens adverse selection by producing structured transaction histories. Bookkeeping-enabled fintech solutions have increased SME financing and enhanced repayment performance, according to comparative data from South Africa, Ghana, and Kenya. However, there are obstacles to adoption in Nigeria, such as fragmented platforms, low digital literacy, and privacy and trust issues. The study comes to the conclusion that in order to mainstream digital bookkeeping, banks, regulators, fintechs, and SME associations must work together. Stronger data governance

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frameworks, capacity-building, cost-effective fintech solutions, and regulatory standardization are some of the policy recommendations.

Keywords: SMEs, Creditworthiness, Digital Bookkeeping, Financial Inclusion, Nigeria

JEL Classification: G21, O16, M41

1. Introduction

Nigeria's economy still depends heavily on small and medium-sized businesses (SMEs), which create jobs, spur innovation, and aid in diversification away from reliance on oil. SMEs employ over 80% of the workforce, make up over 96% of businesses, and contribute close to half of the country's GDP, according to the National Bureau of Statistics (NBS, 2022). Even with this crucial role, SMEs still have ongoing financial difficulties. Nigeria has one of the biggest SME financing gaps in Sub-Saharan Africa, with an estimated ₦600 billion (IFC, 2022).

Inadequate financial record-keeping is a major obstacle to SME financing. Without consistent record-keeping of sales, expenses, or cash flows, a large number of SMEs function informally. Credit rationing results from this lack of trustworthy records, which also increases lenders' perception of risk and produces information asymmetry (Adegbite & Machethe, 2020; CBN, 2023). As a result, the majority of SMEs either cannot obtain bank loans or must pay exorbitant borrowing fees.

Nigeria's financial technology (fintech) industry is expanding quickly, opening up new avenues for closing this gap. SMEs can record transactions, create financial statements, and create

verifiable financial histories with the help of digital bookkeeping applications, which are frequently integrated with e-commerce platforms and mobile payments. Digital bookkeeping creates alternative credit information, lowers uncertainty, and increases SMEs' appeal to lenders by converting unstructured practices into structured data (Nguyen & Canh, 2021; GSMA, 2022).

Globally, SMEs' access to financing is changing due to digital financial tools. Pezesha extends SME loans in Kenya using transaction data from bookkeeping apps, which improves repayment performance by more than 30% (McKinsey, 2022). Oze helps SMEs in Ghana and Nigeria get bank and fintech loans by combining digital bookkeeping with credit scoring models. QuickBooks integration with banks in South Africa aggregates data for SMEs thus making it easier for banks to make credit decisions. These encounters demonstrate that digital bookkeeping is a means of achieving financial inclusion rather than just a tool for keeping records.

According to recent research from Nigeria, financial inclusion outcomes are greatly enhanced when fintech innovations are paired with financial literacy (Sam-Abugu, Luo, & Wong, 2025). This implies that digital bookkeeping could be a key component in closing Nigeria's SME financing gap if it is backed by suitable regulatory frameworks and capacity-building.

This study investigates how digital bookkeeping can improve Nigerian SMEs' creditworthiness. The goals are to:

1. Analyze how information asymmetry in SME lending is reduced by digital bookkeeping.
2. Examine evidence of digital bookkeeping adoption in Nigeria and around the world.
3. Determine the obstacles to adoption in Nigeria.

4. Make policy suggestions for banks, SME associations, fintechs, and regulators.

The remainder of the paper is structured as follows: Section 2 reviews theoretical and empirical literature; Section 3 outlines the methodology; Section 4 presents findings and discussion; Section 5 discusses policy implications; Section 6 concludes.

2. Literature Review

2.1 Theoretical Framework

2.1.1 Information Asymmetry and Credit Rationing

The theory of credit rationing (Stiglitz & Weiss, 1981) remains foundational in explaining SME financing challenges. Incomplete financial information frequently prevents lenders from differentiating between borrowers who pose a high and low risk. They consequently impose strict collateral requirements or restrict credit. The issue is particularly severe in emerging markets, where SMEs usually do not have audited statements (Nguyen & Canh, 2021).

By producing organized, verifiable records of income, expenses, and cash flows, digital bookkeeping lessens adverse selection. Lenders can better understand SME performance and repayment capacity thanks to these records. Fintech-driven record-keeping tools lower loan default risks by increasing transparency, according to recent African data (Osei-Assibey, 2020).

2.1.2 Credit Scoring and Alternative Data

Traditional credit scoring relies on collateral and repayment histories, both of which are hard to come by among Nigerian SMEs. Digital bookkeeping records, e-commerce activity, and mobile money transactions are now all included in alternative data credit

scoring models (IFC, 2022; McKinsey, 2022). By using these strategies, lenders can increase the size of their SME loan portfolios while controlling risk.

The CBN (2023) in Nigeria has urged banks to look into fintech collaborations that allow for different uses of data. According to Okoronkwo and Uchegbulam (2025), fintech lending platforms are a good substitute for traditional bank financing for SMEs when paired with bookkeeping records.

2.1.3 Financial Inclusion and Development Theory

According to research on financial inclusion, entrepreneurship, productivity, and the fight against poverty are all fueled by financial access (Beck, Demirgüç-Kunt, & Levine, 2007). Digital financial services promote inclusion in Africa, according to more recent studies (GSMA, 2022; World Bank, 2021). These tools are enhanced by digital bookkeeping, which helps SMEs maintain their borrowing relationships and strengthen their financial discipline. Fintech adoption in Southern Nigeria has already resulted in quantifiable gains in business growth, credit uptake, and savings (Iroakazi & Ade, 2025).

2.2 Empirical Review

2.2.1 SME Financing Challenges in Nigeria

Nigerian SMEs continue to face significant credit constraints. Less than 15% of SMEs obtain bank loans, according to Adegbite and Machethe (2020), with the majority relying on informal credit or personal savings. One of the main obstacles, according to the CBN (2023), is insufficient records. Furthermore, according to Abubakar (2021), SMEs that followed organized record-keeping procedures had a much higher chance of gaining from intervention programs

like the Agri-Business/Small and Medium Enterprise Investment Scheme (AGSMEIS).

2.2.2 Record-Keeping and SME Credit Access

Reliable records enhance SME credit availability, according to evidence. According to Onugu (2020), commercial banks were more interested in Nigerian SMEs with organized bookkeeping procedures. SMEs with standardized digital records or audited accounts are less likely to be denied loans globally (Beck & Demirgüç-Kunt, 2006). According to recent reports, banks are taking fintech-generated financial records into account more and more when evaluating the creditworthiness of SMEs (IFC, 2022; Deloitte, 2021).

2.2.3 Digital Bookkeeping and Fintech Innovations

Throughout Africa, fintech bookkeeping solutions are being implemented. Higher repayment rates are reported by Pezesha in Kenya, which incorporates bookkeeping data into credit scoring (McKinsey, 2022). Oze makes it possible for SMEs in Ghana and Nigeria to keep track of their daily transactions and apply for partner loans. According to Olatunji et al. (2025), SMEs in Lagos that embraced digital financial services, such as bookkeeping, saw an improvement in their ability to obtain financing and their overall business performance.

2.2.4 Gaps in the Literature

Digital bookkeeping is still not well studied in Nigeria, despite its increasing use. The majority of research places more emphasis on digital lending and mobile payments than on structured bookkeeping as a means of establishing creditworthiness. While highlighting the potential of alternative data in Africa, Osei-Assibey (2020) urges a more thorough examination of bookkeeping as a data source. Although empirical evidence is still scarce, recent research

(Sam-Abugu, Luo, & Wong, 2025; Okoronkwo & Uchebulam, 2025) indicates that integrating fintech lending with digital record-keeping could open up SME financing in Nigeria. Therefore, this paper makes a contribution by highlighting policy implications, putting forward a conceptual framework, and synthesizing evidence from Nigeria and around the world.

3. Methodology

3.1 Research Design

The research design used in this study is conceptual and analytical. The conceptual approach synthesizes existing evidence from academic literature, institutional reports, and fintech case studies, in contrast to purely empirical studies that depend on econometric modeling or large survey datasets. Given that digital bookkeeping is still a relatively new field in Nigeria with little extensive empirical data, this design is appropriate (Okoronkwo & Uchebulam, 2025). According to Jaakkola (2020), conceptual studies are especially helpful for expanding theoretical knowledge, integrating insights from various contexts, and identifying research gaps.

3.2 Data Sources

Secondary data came from a number of reliable sources, such as:

- **National and institutional reports:** World Bank (2021), International Finance Corporation (IFC, 2022), National Bureau of Statistics (NBS, 2022), and Central Bank of Nigeria (CBN, 2023).
- Industry studies include Deloitte (2021), McKinsey & Company (2022), and GSMA (2022).
- **Scholarly literature:** Peer-reviewed research on financial inclusion, fintech adoption, and SMEs in Africa (e.g., Abubakar, 2021; Osei-Assibey, 2020; Iroakazi & Ade, 2025).

- **Case studies:** Fintech products like QuickBooks (South Africa), Tyms (Nigeria), Pezesha (Kenya), and Oze (Nigeria/Ghana).

3.3 Analytical Framework

A three-pronged analytical framework is used in the study:

1. According to the Information Asymmetry Theory (Stiglitz & Weiss, 1981; Nguyen & Canh, 2021), digital bookkeeping lowers moral hazard and adverse selection in SME lending.
2. To assess how bookkeeping records can supplement or replace collateral and repayment histories, alternative credit scoring models were developed (IFC, 2022; Okoronkwo & Uchebulam, 2025).
3. To evaluate how digital bookkeeping enhances SMEs' involvement in the formal financial system, apply the Financial Inclusion Theory (Beck et al., 2007; Sam-Abugu, Luo, & Wong, 2025).

3.4 Scope and Limitations

This study's scope is restricted to Nigerian SMEs in industries like services, retail, trade, and agriculture. Lessons are drawn for Nigeria based on comparative analysis from South Africa, Ghana, and Kenya. The primary drawback is the dependence on secondary sources; however, this is countered by cross-referencing data from several reliable sources to increase validity.

4. Discussion

4.1 Digital Bookkeeping and the Mitigation of Information Asymmetry

The inability of lenders to confirm income sources and repayment capacity is one of the main barriers to SME financing in Nigeria. Due to their cash-based operations and frequent lack of audited accounts, SMEs frequently have opaque financial flows. This issue is directly addressed by digital bookkeeping, which generates organized, time-stamped records of sales, costs, and earnings.

SMEs can automatically create income statements, keep track of daily transactions, and see cash flow patterns thanks to platforms like Oze. By lowering information asymmetry and facilitating more precise risk assessments, these digital records give lenders reliable data (Osei-Assibey, 2020).

This pathway is supported by evidence from other African markets. According to Nguyen and Canh (2021), SMEs in Vietnam that used digital financial tools had a much higher loan approval rate than those that relied on manual records. According to McKinsey (2022), SMEs in Kenya that used platforms with bookkeeping integration experienced reduced default rates as a result of increased transparency. These results imply that if adoption rises in Nigeria, comparable outcomes may be achieved.

4.2 Digital Bookkeeping and Alternative Credit Scoring

In Nigeria, traditional credit evaluation models rely on repayment history and collateral, both of which exclude the majority of SMEs. Digital data sources, including bookkeeping records, e-commerce activity, and mobile money transactions, are now incorporated into alternative credit scoring methods (IFC, 2022).

Structured datasets produced by bookkeeping software can be used as stand-ins for collateral. Even in the absence of tangible assets, a two-year history of steady sales records can show repayment capacity. In order to speed up loan processing and increase approvals, Oze, for example, collaborates with banks in Ghana and Nigeria to feed SME records into automated credit scoring.

CBN (2023) has urged banks in Nigeria to investigate these kinds of alternative data partnerships. According to Okoronkwo and Uchegbulam (2025), fintech lending platforms that make use of bookkeeping data are a good substitute for traditional bank financing, especially for micro and small businesses.

4.3 Integration of Digital Bookkeeping with Payment Ecosystems

The value of bookkeeping is further increased by its integration with e-commerce platforms and digital payments. SMEs can use bookkeeping software to automatically record sales that are connected through digital stores, bank transfers, or mobile money. As a result, a closed-loop ecosystem of financial records, payments, and commerce is created.

For instance, Oze offers SMEs online stores where every transaction is tracked, updating financial and inventory records at the same time. Lenders benefit from richer datasets and fewer errors in manual entry. Pezesha has enhanced loan repayment performance in Kenya by more than 30% through the integration of digital ledgers and mobile payments (McKinsey, 2022).

Olatunji et al. (2025) found that SMEs in Lagos who used integrated digital services, such as bookkeeping and payments, reported increased profitability, increased lender trust, and higher financial literacy. This integration may offer a scalable remedy for SME

credit exclusion in Nigeria, where the use of mobile money is growing (GSMA, 2022).

4.4 Benefits for Stakeholders

Adoption of digital bookkeeping has several advantages for various stakeholders.

- **For SMEs:** Better financial planning, easier access to loans, improved record-keeping, and more credibility with official institutions.
- **For banks:** increased SME portfolios, better risk modeling, lower default rates, and access to richer datasets.
- **For Regulators:** Better oversight of SMEs, increased connections between SMEs and the formal economy, and advancements toward financial inclusion goals.
- **For Fintechs:** Possibilities for product innovation, market expansion, and collaborations with financial institutions.

This ecosystem-wide set of advantages demonstrates that digital bookkeeping is a catalyst for systemic change in SME financing as well as a technological tool.

4.5 Barriers to Adoption in Nigeria

Digital bookkeeping adoption is hampered by a number of factors, despite its potential:

1. **Low Digital Literacy:** Many small business owners lack the technical know-how necessary to implement and maintain digital bookkeeping. User-friendly designs and training are essential (Sam-Abugu, Luo, & Wong, 2025).
2. **Trust and Data Privacy Issues:** SMEs might worry about banks or fintechs abusing their data. Consumer protection frameworks need to be strengthened (Gabor & Brooks, 2021).

3. **Cost of Adoption:** Even small subscription fees have the potential to deter microenterprises from adopting them. Models that are inexpensive or subsidized might be required.
4. **Platform fragmentation:** Data portability is restricted by fintech systems' incompatibilities. Apps that banks are not yet aware of may be adopted by SMEs.

4.6 Comparative Lessons from Peer Economies

Nigeria can learn from other African economies that have made strides in digital bookkeeping adoption:

- **Kenya:** Pezesh demonstrates how integrating bookkeeping with credit scoring can expand access to SME finance.
- **Ghana:** Oze shows how partnerships between fintechs and financial institutions make SME data more acceptable to banks.
- **South Africa:** QuickBooks illustrates how mainstream bookkeeping platforms can facilitate SME access to partner bank loans.

These experiences highlight the importance of regulatory support, industry collaboration, and fintech innovation. For Nigeria, the lesson is clear: digital bookkeeping adoption must be embedded in a broader financial inclusion strategy that balances innovation with consumer protection.

5. Policy Implications

The data shows that digital bookkeeping is a structural enabler of SME creditworthiness in Nigeria, not just a tool for keeping records. Coordination between banks, regulators, fintech companies, and SME support groups is necessary to realize its full potential.

5.1 For Banks

Banks must recognize digital bookkeeping records as credible sources of credit information. Rather than relying exclusively on collateral and audited accounts, banks can integrate bookkeeping data into their risk assessment frameworks. Doing so would allow them to expand SME lending portfolios without compromising prudential standards. Partnerships with fintechs are critical: banks could integrate APIs that allow seamless access to SME transaction histories, reducing loan processing costs and timelines.

5.2 For Regulators

Clear guidelines for digital bookkeeping data should be established by the Nigeria Inter-Bank Settlement System (NIBSS) and the Central Bank of Nigeria (CBN). Standardization would guarantee record comparability among lenders and interoperability across fintech platforms. To gain the trust of SMEs, regulators must also bolster consumer protections and data protection laws. Additionally, by lowering collateral requirements or giving them priority in intervention programs, CBN could provide incentives to SMEs that embrace digital record-keeping.

5.3 For Fintech Firms

Fintechs need to put trust, affordability, and usability first. Reaching micro and small businesses requires user-friendly interfaces, multilingual support, and affordable pricing structures. SME confidence would be further increased by adherence to Nigeria's data privacy regulations and open data-sharing arrangements with banks. Beyond facilitating credit access, fintechs must also show value by assisting SMEs with supplier management, inventory tracking, and digital store expansion, for instance.

5.4 For SME Associations and Development Agencies

Digital bookkeeping should be included in the capacity-building initiatives of organizations like the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN) and SME trade associations. Peer-learning networks, demonstration projects, and training sessions can raise awareness and encourage adoption. Grants or subsidies from development partners like the World Bank and the IFC can be used to expand digital bookkeeping programs among vulnerable SME segments.

6. Conclusion

SMEs continue to play a crucial role in Nigeria's economic development, but they continue to face financial obstacles, mostly as a result of poor financial documentation. By generating structured, verifiable transaction histories that lessen information asymmetry, enhance creditworthiness, and allow lenders to grow their portfolios of SME loans, digital bookkeeping offers a practical way to close this gap.

The talk shows how digital bookkeeping, when combined with payment ecosystems and alternative credit scoring models, helps a number of parties: banks lower default risks, regulators promote financial inclusion objectives, fintechs expand their markets, and SMEs obtain loans. With the correct ecosystem support, adoption is possible, as demonstrated by comparative lessons learned from South Africa, Ghana, and Kenya.

But there are still obstacles, especially low digital literacy, issues with trust, and platform fragmentation. Coordinated efforts are needed to overcome these: banks must incorporate digital records; regulators must standardize data practices; fintechs must create inclusive solutions; and SME associations must raise awareness.

In the end, digital bookkeeping is more than just a new technology. With the ability to open up Nigeria's SME credit market, encourage entrepreneurship, and support sustainable economic growth, it is a policy-relevant enabler of inclusive finance.

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DIGITAL FINANCE, BALANCE OF PAYMENT AND TRADE BALANCE IN NIGERIA

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Abstract

Digital financing has become an important means of payment in modern economies, facilitating transactions both domestically and across borders. Increasing digital financial activities may influence external sector performance by addressing balance of trade (BOT) and balance of payments (BOP) deficits. This study examines the impact of digital financing on Nigeria's balance of payments and balance of trade from 2009 to 2022. An ex-post facto research design was adopted, and data were analyzed using descriptive statistics and the autoregressive distributed lag (ARDL) model. The results reveal a strong persistence in the BOP, as indicated by the significant lagged BOP coefficient. Current Automated Teller Machine (ATM) transactions exert a negative effect on BOP, whereas lagged ATM transactions show a positive significant impact. Current web payments (WEB) significantly influence BOP, while mobile payments (MOB) exhibit mixed effects,

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positive in the current period but negative in the lagged period. Fixed telephone subscriptions (FTS) also positively affect BOP. Regarding BOT, results show that the lagged BOT is mean-reverting. Point of Sales (POS) transactions have a negative significant effect on BOT, while WEB payments negatively affect BOT in the current period but positively in the lagged period. The study concludes that while web-based and point-of-sale transactions tend to reduce BOP and BOT balances, mobile payments enhance both in the short run. ATM transactions improve BOP over time, although their influence on BOT varies. Overall, digital finance contributes to external sector stability, even though BOT remains volatile but adjusts more rapidly.

Keywords: Digital finance; balance of payment; balance of trade; web payment; mobile payment

Introduction

Digital finance has been the norm in developed economies especially western world but not so popular in the pre-covid 19 era in developing countries because of the socio-cultural habit of the people to hold onto traditional method of payment despite several government policies aimed at enhancing financial inclusion (OECD, 2020). In addition, there are several attempts by the United Nations in their social development goals (SDG) and Millenium Development Goals (MDG) aimed at increasing the level of financial inclusion among the young and the aged people especially, the rural dwellers. The unexpected lockdown restrictions that came as a result of the covid-19 where most employees were working from home and business transactions were virtually enabled was a turning point in the use of digital currencies in developing countries as most transactions were settled using financial technologies.

The impact of the social media and multimedia also increase the use of digital currencies such as binance and bitcoin. This is necessitated as there is an increase in globalization as a result of access to smart phones, computers, and the internet. These modern payment structure made possible by digital payment system and the attendance social media networking which enables strangers over a long distance to acquaint and socialize with strangers, resulted into investment in foreign currencies, digital currencies, foreign goods, foreign customs, and practices.

These may not be unconnected with digital advertisement, online sales promotion, globalization, and cross-border migration which perhaps increase the gross national products of modern national economies. Thus, regionalization, bilateral trade, cartels, colonial affiliation, and globalization of developing nations may increase individual earnings (OECD, 2020). However, President Shavkat Mirziyoyev of Uzbekistan emphasized that the year 2020 would be the year of the development of digital economy, science, and education and also reiterated the necessity to acquire knowledge on digitalization and information technologies (Shavkat, 2020). Therefore, there is expectation that enhancing digital financing may lead to higher balance of payment and balance of trade.

Balance of payment (BOP) is a systematic record of all economic transactions between the residents of a country and the rest of the world over a period of time usually a year. BOP consist of trade in goods and services, cross-border investments, and transfers (remittances and aid). BOP therefore, consists of the current account, the capital account, and the financial account. Higher inflows than outflow in the balance of payment is a balance of payment surplus while it is deficit if otherwise. Balance of trade (BOT) is the difference between a country's exports

and imports of goods over a specific period of time usually a year. Trade surplus is recorded when the value of export is greater than that of import while it is trade deficit if otherwise. BOT includes only the services of tangible goods excluding services which are recorded in the current account of BOP.

Digital finance is the payment for goods and services through digital platform including the internet, computer, and phones as characterized with low use of cash and bank notes. The use of digital finance is a more secure form of holding money than at home or at hand when traveling (UNCTAD, 2020). Digital finance involves the participation of banks, mobile network operators, financial technologies (fintech), governments, firms, and individuals in the use of electronic payment system. Digital finance however, requires investment in financial infrastructure and technology for smooth, secure, and cost-effective service delivery.

Digital financing is a way to overcome payment problem due to lack of nearness to banks and payment centers. Hence, electronic platforms which contributed to higher international trade, payment system, economic growth, and financial inclusion (OECD, 2020). This digital finance may be the expected vehicle that can drive digitalization of the financial system in Nigeria with its associated advantages of financial inclusion, ease of payment, and security of funds that may contribute to economic growth and development. Perhaps, digitalization of finance may have been responsible for the rapid technological development of developed and emerging economies as it may have helped to facilitate the rise of services in international cross-border trade.

Thus, information and communication technology services form the backbone of digital trade while providing the necessary network infrastructure that underpin the digitalization of other types of services. Also, acquisition of new technologies may have also facilitated the rise of digitally enabled services that are supported by data-driven innovative solutions such as cloud computing.

Therefore, there are several changes in the modern way of doing businesses locally and internationally. These changes are at unprecedented speed with increasing interconnectedness, greater demand for just-in-time delivery, faster trade execution with greater reliability made possible with the use of digital solutions in facilitating movement of goods faster across borders (UNCTAD, 2021).

Hence, the need to update existing international trade rules by establishing a clear distinction between goods and services which enables firms to flexibly operate in different location even while mixing goods and services together. This makes it difficult to identify the particular rules to be applied to each specific transaction (OECD, 2020). Therefore, digital finance increases systematic risk by negatively impacting financial stability (Asep *et al.*, 2020; Risman *et al.*, 2021).

This might have culminated in the signing by President Biden of the United States, an executive order for the regulation of cryptocurrencies and for research into implementing a digital dollar in order to have a potential change in international trade, cross-border transactions, an alternative credit for finance, a regulated digital currency environment, and to also preserve the world currency reserve status in recognition of the importance of digital currency (Biden, 2021). It is therefore unexpected that despite the huge benefit from digitalization, most

developing countries record balance of trade and balance of payment deficit which has culminated into high foreign and local borrowing with its antecedent effect on the local economy (UNCTAD, 2020).

To this end, the need to embrace digital financing is necessitated by high poverty rate among Nigerians. According to Eze and Alugbuo (2021), the multidimensional poverty index of Nigeria is 0.34 at 0.64. This implies that 64 per cent of Nigerians are poor. Also, the 2019 Poverty and Inequality Report in Nigeria shows that 40 per cent of Nigerians live below the nation's poverty line of ₦137 or ₦430 (\$381.75) per year. Embracing digital financing may help to achieve the goals of financial inclusion, enhance digital financing culture among Nigerians, open additional sources of income through foreign exchange trading, and increase digital currency investment. This is necessitated by the World bank (2021) survey that about 50 per cent of Nigerians are willing to leave the country. Making the country to rank third after Liberia (70 per cent) and Sierra Leone (60 per cent) among nations with high emigration. The reasons for this mass exodus of Nigerians were linked to the need to find greener pasture in countries with better economic indices with the view to earning more money to be repatriated into their home country. Perhaps having higher digitalized financing structure where Nigerians can invest through the digital platform and earn higher income may reduce the crave for foreign migration as digital finance positively impacts money supply (Obinne, *et al.*, 2020).

Engaging in digital financing may be a double-edged sword for Nigeria as a predominantly import dependent nation because modern financial system with financial innovation is situation-specific (Błach, 2011). Innovations in the financial system may help bring about industrial revolution (Dosi, 1990). These may arise as a result of more people

having greater access to international market with superior technology at possibly cheaper rate. Additionally, the use of financial innovation may help record favourable balance of payment and balance of trade. Financial innovation is driven by modern globalization, investors, and government. Hence exposure to new and wider international risk, and promotion of economic growth through improved allocation and reduction of financial service costs (Sekhar & Gudimetla, 2013). Lule *et al.* (2012) posit that the perceived ease of usefulness, self-efficacy, credibility, and usage influence mobile banking habits in Kenya. Nevertheless, e-shoppers request comprehensive web interfaces and online shopping technologies (Lim & Ting, 2012) as they show the willingness to use digital platform (Ramli, 2020).

Contrarily, the country may become a dumping ground for obsolete items and inferior technology. This may lead to balance of payment deficit and consequently foreign exchange constraint. This view was held when Ionescu (2012) posits that failure to properly integrate financial innovation may lead to financial instability. Therefore, there is need for security infrastructure for mobile banking (Kanobe, *et al.*, 2017). Nevertheless, SWIFT facility increases profitability especially for smaller banks with significant network effects on performance (Scott *et al.*, 2017). Hence, there is greater customer personal finance, and accelerated financial decision making which include the ability to deploy digital finance in the payment system (Durai & Stella, 2019).

The purpose of this paper is to examine the impact of digital finance on the balance of payment and balance of trade in Nigeria. Apart from the fact that the study makes use of Nigerian data, the study is different from other international studies on digital finance by concentrating on the balance of payment. To the best knowledge of this author, this will be the first time this will be explored in literature.

This paper is segmented into five sections. Section two contains literature review, section three treats the methodology, section four presents the results and summary while section five consists of the conclusion of the study.

2. Literature Review

The theory of comparative advantage by David Ricardo argues that countries will be better off when they concentrate in producing goods or services that are of comparative advantage to each of them. This simply means that a country may be at higher advantage when it engages in products or services with lower opportunity cost. However, the new trade theory as propounded by Paul Krugman with the argument that availability of technology especially digital operations may pave way for higher sales through user friendly application that people around the globe may join and increase sales with lower cost, thus, achieving economies of scale. Also, the technology gap theory expatiates on the importance of technological innovation as countries endowed in technology may export it to other countries with competitive advantage. The theory of financial innovation was propounded by Sekhar and Gudimetla (2013) and pertain to the process of finding new features and products for existing financial products and therefore reduce financial risk. The underpinning theory of financial innovation is the work of Joseph Schumpeter on innovation. Financial innovation consists of historical changes and development of financial products through innovations of technology, tools, and system.

The technology acceptance model is a generally accepted model propounded by Davis (1989) that posits that people tend to use a certain technology if it is easy to use or if it is believed that using it may aid in getting work done easily. This theory is underpinned by the theory of

reasoned action. The model argues about perceived usefulness (PU) which explains the acceptance of certain technology once users believe it will get the task done better. Furthermore, the model also identifies the perceived ease-of-use (PEOU), which is the believe of users about the ease of using a system (Davis, 1989). The model identifies with the behavioural human approach to the study of information system. This model is designed to encourage users on how best to use certain technology. Thus, the key highlights of the model are social influence, satisfaction, pleasure, usefulness and the ease of using new e-services or new e-technology.

3. Methodology

The study used an *ex-post* facto research design as a result of historical and quantitative nature of data. Secondary data from 2009 to 2022 were analysed using autoregressive distributed lag

3.1 Model Specification

The models of the study are specified as follow:

$$BOP = \beta_0 + \beta_1 ATM_1 + \beta_2 WEB_2 + \beta_3 MOB_3 + \beta_4 POS_4 + \beta_5 CHQ_5 + \lambda Z_t + \varepsilon_1$$

equation 1

$$BOT = \beta_0 + \beta_1 ATM_1 + \beta_2 WEB_2 + \beta_3 MOB_3 + \beta_4 POS_4 + \beta_5 CHQ_5 + \lambda Z_t + \varepsilon_1$$

equation 2

The dependent variables are BOP and BOT, the experimental variables are automated teller machines (ATMs); webpay (WEB); mobile payment (MOB); and point of sales (POS).

Table 3.1 Variable Description

S/N	Parameter Measured	Variables	Symbols	Measurement of Variables	Variable Descriptions
a	Annual balance of payment	Balance of payment growth rate	BOP	New BOP less previous year BOP and divide by previous year BOP	This measures changes in balance of payment as a result of changes in digital financing
b	Annual balance of trade	Balance of trade growth rate	BOT	New BOT less previous year BOT and divide by previous year BOT	This measures changes in balance of trade due to changes in digital financing
1	Annual automatic teller machine	Automatic teller machine growth rate	ATM	Natural logarithm of ATM	This captures transaction done by ATM and the trend of changes in this transaction in the sampled period
2	Annual webpay	Web payment	WEB	Natural logarithm of webpay	These are transactions done using computer and computer-related

					software system.
3	Annual mobile payment	Mobile payment	MOB	Natural logarithm of mobile payment	These are the transactions done using the mobile phone
4	Annual point of sales	Point of sales	POS	Natural logarithm of point of sales	These are transactions done on point of sales devices
5	Fixed telephone subscription	Annual fixed telephone subscription	FTS	Natural logarithm of fixed telephone subscription	This shows the amount spent by institution in order to have access to global satellite.

Author's Compilation (2025)

4.0 Results and Discussion

4.1 Descriptive Analysis of Balance of Payment and Digital Finance

Table 4.1 discussed the mean, standard deviation, coefficient of variation, minimum, maximum, skewness, and kurtosis. The mean value of BOP is -0.3370, implying that on the average the country record balance of payment deficit. The standard deviation of 1.8999 signifies that the BOP value on the average by about 1.8999. The minimum value of -3.5579 show the lowest BOP value while the maximum value is 4.3422. The skewness of 0.6845 and the kurtosis of 4.0531 shows a right skewed and a moderately high leptokurtic distribution respectively. The mean value of -3.3123 reveals that on the

average, the country record trade deficit. The standard deviation of 8.1356 shows high deviation from the mean value in the BOT. The minimum value of -30.6328 shows the lowest BOT while the maximum value of 0.5581 shows the highest growth rate. The skewness of -2.9905 and the kurtosis of 10.5606 reveals a left skewed and a high leptokurtic distribution respectively.

The mean value of ATM is 8.3355 as the average of ATM value. The standard deviation of 1.2699 reveals the deviation from the mean which is moderate. The minimum and maximum of 5.9907 and 10.3935 is the lowest and highest of ATM respectively. The skewness and kurtosis of -0.2402 and 2.4904 shows a left tailed and platykurtic distribution respectively. The mean value of 6.2928 shows the average POS value, with a standard deviation of 2.6227, which represents the deviation from the mean value. The minimum and maximum value of 2.4006 and 10.6222 represent the lowest and highest POS value respectively. The skewness and kurtosis of 0.0236 and 1.9798 signify a right tailed and platykurtic distribution. The mean WEB value of 6.4514 shows the average WEB value with a high deviation from the mean value of 3.7816. The minimum and maximum value of 3.2208 and 13.5717 are the lowest and the highest WEB value respectively. The kurtosis and skewness of 1.1994 and 2.7092 show a right tailed and platykurtic distribution.

The mean value of MOB is 6.2356 with a deviation from the mean value of 3.3401. The minimum and maximum value of 0.2390 and 11.6183 reveal the lowest and the highest value respectively. The skewness and kurtosis of -0.1004 and 2.1937 show a left tailed and platykurtic distribution respectively. The mean value of FTS is -2.8892, representing the average FTS value with a standard deviation of 0.6247, signifying a mild deviation. The minimum and maximum value of -

3.5348 and -1.4473 show the lowest and the highest FTS value respectively. The skewness and kurtosis of 1.2486 and 3.2980 reveal a right tailed and leptokurtic distribution.

Table 4.1 Descriptive Analysis of Balance of Payment and Digital Finance

Variables	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Number of Observation
BOP	-0.3370	1.89997	-3.5579	4.3422	0.6845	4.0531	14
BOT	-3.3123	8.1356	-30.6328	0.5581	-2.9905	10.5606	14
ATM	8.3355	1.2699	5.9907	10.3935	-0.2402	2.4904	14
POS	6.2928	2.6227	2.4006	10.6222	0.0236	1.9798	14
WEB	6.4515	3.7816	3.2208	13.5717	1.1994	2.7092	14
MOB	6.2356	3.3401	0.2390	11.6183	-0.1004	2.1937	14
FTS	-2.8892	0.6247	-3.5348	-1.4473	1.2486	3.2980	14

Author's Compilation (2025)

4.2 Correlation Analysis

This section presents the explanation for the correlation between variables in order to present an organized explanation for the strength of the relationship between the dependent variables and the independent variables. Table 4.2 shows that BOP is negatively correlated with BOT at a value of -0.0089. The table further shows that BOP is negatively correlated with ATM, POS, WEB, and MOB at -0.1771, -0.1560, -0.2233 and -0.1828 respectively, signifying low negative correlation. Table 4.2 also shows that BOP is positively correlated with FTS at 0.2156, implying a low positive correlation. Table 4.2 also reveals that BOT is negatively correlated with ATM, POS, WEB, and MOB at -0.1966, -0.1845, -0.0608, and -0.1511 respectively, representing a low and negative correlation. The table

further shows that BOT is positively correlated with FTS at 0.1513, representing a low positive correlation.

Table 4.2 Correlation Analysis

Variables	BOP	BOT	ATM	POS	WEB	MOB	FTS
BOP	1.0000						
BOT	-0.0089	1.0000					
ATM	-0.1771	-0.1966	1.0000				
POS	-0.1560	-0.1845	0.9717	1.0000			
WEB	-0.2233	-0.0608	0.8297	0.8305	1.0000		
MOB	-0.1828	-0.1511	0.9763	0.9911	0.8283	1.0000	
FTS	0.2156	0.1513	-0.7917	-0.7621	-0.3737	-0.7941	1.0000

Author's Compilation (2025)

4.3 Pre-Estimation Test: Unit Root Test

Table 4.3 shows that BOP, BOT, and FTS are of zero order, that is, they are stationary at I(0) and requires no differencing. The same table reveals that ATM, POS, and MOB are stationary at I(1).

Table 4.3 Dickey-Fuller Unit Root Test

Variables	Level			First Difference			Order of Integration
	None	Constant	Constant Trend	None	Constant	Constant Trend	
BOP	0.0342	-0.3769	0.5852	0.012	-0.9339	0.3104	I (0)
BOT	0.0026	-3.8593	2.6284	0.003	-1.1439	0.2984	I (0)
ATM	0.8717	0.8583	0.9197	0.563	-0.0665	0.1114	I (1)
POS	0.9758	0.5512	0.3251	0.794	0.0136	0.0508	I (1)
WEB	0.9685	0.5617	1.1681	0.893	0.0239	0.1742	I (1)
MOB	0.7292	1.1251	0.2634	0.310	-0.04291	0.0403	I (1)
FTS	0.0130	-1.0273	0.2734	0.007	-0.3118	0.0932	I (0)

Author's Compilation (2025)

4.4 Regression Results

The Autoregressive Distributed Lag (ARDL) is used to estimate the impact of the dependent variables on the independent variables. Model one and model two are the effect of balance of payment and balance of trade respectively on digital finance. Furthermore, lagged BOP is positively significant at 5 per cent (coefficient 0.681; $p = 0.025$). Thus, a one unit rise in previous year BOP results in 0.681 unit rise in the current year while holding other independent and control variables constant.

The same table shows contemporaneous ATM to be negatively significant at 1 per cent level (coefficient = -8.38; $p = 0.006$), implying that a current increase in ATM usage reduces BOP. The previous ATM is positively significant at 5 per cent level (coefficient = 4.04; $p = 0.036$), signifying a longer-term benefit of digital infrastructure to BOP. Additionally, contemporaneous WEB is negatively significant at 1 per cent level (coefficient = -2.51; $p = 0.006$), implying that web payment reduces BOP.

Contemporaneous MOB is positively significant at 5 per cent (coefficient = 6.66; $p = 0.022$) and lagged MOB is negatively significant at 5 per cent (coefficient = -3.43; $p = 0.021$), implying that in the short term, mobile payments improve BOP while decreasing BOP in the longer period. FTS is positively significant at 5 per cent (coefficient = 12.14; $p = 0.014$), indicating that efficient digital infrastructure improves BOP. POS is negatively marginally significant at 10 per cent (coefficient = -4.54; $p = 0.083$), implying that the use of POS may lead to lower BOP.

Furthermore, the lagged value of BOT is negatively significant at 5 per cent (-1.60; p = 0.005), implying a mean-reverting process, that is, a high BOT in previous year will lead to a significant decrease this year. This shows that BOT is not stable in the short run but correct itself after some time. Also, POS is negatively significant at 1 per cent (coefficient = -78.60; p = 0.006); implying that POS leads to deterioration in the BOT. Contemporaneous WEB is negatively significant at 5 per cent (coefficient = -10.27; p = 0.014) while being positively significant at 1 per cent at lagged period (coefficient = 8.24; p = 0.008). These suggest that immediate use of web payments can increase international spending while the lagged effect is reflected in the increase in BOT. Contemporaneous ATM is marginally positively significant at 10 per cent level (coefficient = 15.65; p = 0.059), suggesting a short run effect of ATM on promoting trade surplus. Additionally, lagged FTS is marginally negatively significant at 10 per cent level (coefficient = -14.16; p = 0.080), implying a diminishing effect of FTS on trade resources.

Table 4.4 ARDL Result of Balance of Payment

bop	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
bop						
L1.	.6806988	.1632883	4.17	0.025	.1610424	1.200355
atm						
-.	8.384656	1.164209	7.20	0.006	4.679622	12.08969
L1.	4.040515	1.112916	3.63	0.036	.4987206	7.58231
pos						
	-4.543862	1.775432	-2.56	0.083	-10.19408	1.106355

web

-. -2.513712 .3680643 -6.83 0.006 -3.685056 -1.342367
L1. .2680711 .1829632 1.47 0.239 -3.141994 .8503416

mob

-. 6.655105 1.525222 4.36 0.022 1.801168 11.50904
L1. -3.428174 .7656831 -4.48 0.021 -5.86492 -9.914287

fts 12.13575 2.36723 5.13 0.014 4.602165 19.66933
_cons -47.54483 8.402536 -5.66 0.011 -74.28545 -20.80421

Table 4.5 ARDL Result of Balance of Trade

bot Coef. Std. Err. t P>t [95% Conf. Interval]

bot

L1. -1.596589 .2068873 -7.72 0.005 -2.254997 -.9381816

atm

-. 15.6456 5.282802 2.96 0.059 -1.166633 32.45784
L1. -10.40609 5.212887 -2.00 0.140 -26.99583 6.18364

pos -78.59675 11.48889 -6.84 0.006 -115.1595 -42.03397

web

-. -10.27435 1.999131 -5.14 0.014 -16.63648 -3.912225
L1. 8.235451 1.283512 6.42 0.008 4.150744 12.32016

mob 65.23051 10.00416 6.52 0.007 33.39282 97.06821

fts

-.	14.57474	9.20668	1.58	0.212	-14.72503	43.8745
L1.	-14.16018	5.435459	-2.61	0.080	-31.45824	3.137874
_cons	47.14107	30.28506	1.56	0.217	-49.23951	143.5216

4.5 Discussion of Findings

The study concluded that across both the models, digital finance tools significantly influence BOP and BOT but in opposite direction and timeframes. Web payments and point of sale manifest a short-run negative effect on both balance of payment and balance of trade. Point of sales may have led to decrease in BOP and BOT as a result of imported consumption. Web payments also decrease BOP and BOT in the short-term as a result of cross-border spending, aligning with Obinne *et al* (2020).

Mobile payments reflect positive short-run impact on both BOT and BOP. The result is strong for BOT, implying that mobile finance boosts local trade and improves external balances. ATM usage has a dynamic influence, as for the BOP model, both current and lagged ATM effects are positive and significant suggesting financial access supports BOP. On the other hand, BOT model show that the effect of ATM changes from time to time due to positive effect in the short run and negative effect in the subsequent period which is a sign of short-lived gains or long-term capital outflow. This result is consistent with Risman *et al.* (2021).

The reversion in the long-term equilibrium shows that BOT model has a strong and significant negative lag on BOT, which indicate a quick correction toward long-term equilibrium possibly due to trade policy, consistent with & Błach (2011) and Ionescu (2012). The BOP model

shows positive persistence, indicating momentum or slow adjustment, implying shocks to BOP may persist longer, this is consistent with the findings of Scott *et al.* (2017). The study shows that digital finance generally supports trade and balance of payment. However, mobile payments are the most beneficial by enhancing both BOP and BOT. In addition, POS and WEB platforms need policy control to prevent trade deficits through rising imports. Finally, BOT is more volatile than BOP but adjust faster. The theoretical framework of this work is consistent with Dosi (1990).

5. Conclusion

In conclusion, the study establishes that digital finance significantly influences Nigeria's balance of trade (BOT) and balance of payments (BOP), though the effects vary across instruments and timeframes. Mobile payments enhance both BOT and BOP, promoting local trade and external stability, while web payments and POS transactions negatively affect them in the short run due to import-led spending. ATMs show mixed effects, offering short-term gains but possible long-term outflows. Overall, digital finance supports external sector performance when properly regulated, confirming that technology-driven financial tools play a vital role in shaping trade and payment balances in Nigeria.

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