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Fiscal and Monetary Policy Adjustment and Economic Freedom for Poverty Alleviation in Nigeria

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ABSTRACT

This study presents an empirical analysis of policy choices for poverty control in Nigeria. Using annual data from 1980 to 2019, we constructed a Vector Error Correction Model (VECM) and simulated Forecast Error Variance Decomposition (FEVD) to explain the role of economic freedom, fiscal policy, and monetary policy in poverty alleviation. The results reveal that expansionary fiscal and monetary policies can mitigate poverty in Nigeria. However, monetary policy is found to be less effective than fiscal policy. Additionally, an expansionary fiscal and monetary policy mix worsens poverty. Moreover, a high degree of economic freedom, by itself, increases poverty. Furthermore, the results suggest that a policy combination of expansionary fiscal policy and a greater degree of economic freedom exacerbates poverty. Finally, concurrent expansionary monetary policy and an improved degree of economic freedom can reduce poverty. These findings are applicable in both the short and long term.

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1. Introduction

In 2010, the United Nations organized the Millennium Summit in New York to improve human socioeconomic conditions. One of the goals set was to reduce by half the fraction of the population of developing countries living on $1 a day or less, typically from around 30 percent in 1990 to 15 percent by 2015 (Besley and Burgess, 2003). However, this goal was not achieved, and high poverty rates persist in many target countries. As a result, in 2015, ending poverty (measured by people living on less than $1.25 per day) became the top priority of the United Nations member states' global Sustainable Development Goals (SDGs) 2030 agenda.

The global goals of the United Nations aim to end poverty and protect the planet by 2030. Sadly, the COVID-19 global pandemic has left substantial evidence of inevitable future poverty growth. For example, the World Bank predicts that global extreme poverty is likely to increase by between 0.3 and 0.7 percentage points to approximately 9 percent, and the proportion of the population living on less than $3.20 a day could increase by 0.3 to 1.7 percentage points to over 23 percent at the end of 2020, because of COVID-19. Additionally, recent estimates by the UN/DESA suggest that global extreme poverty will increase by approximately 60 million by 2030.

The growing trend of poverty is an exceptionally long-standing problem, particularly in the regions of Latin America and the Caribbean, South Asia, sub-Saharan Africa, East Asia, and the Pacific. In 2019, South Asia and sub-Saharan Africa were home to up to 85 percent of the world's extremely poor populations. In sub-Saharan Africa today, the number of extremely poor is much larger than it was two decades ago (World Bank, 2019; UN/DESA, 2019). In Nigeria, poverty affects a significant percentage of the population. For example, in 1980, approximately 18.26 million people lived in poverty, increasing to around 39.2 million in 1992, and 68.7 million in 2004 (NBS, 2005).

Statistics indicate that at least 4 out of 10 individuals across the states (excluding Borno) in Nigeria had real per capita spending of less than 137,430 nairas in 2019. This implies a poverty incidence rate of about 41.10 percent in 2019 (NBS, 2020). Besides, the 2022 Multidimensional Poverty Index suggests that approximately 133 million (63% of) people living in Nigeria are multidimensionally poor.

Because of the high poverty incidence in Nigeria, specific policies aimed at ending poverty are necessary, particularly within the national framework, assuming that poverty stems from a policy mismatch or inadequacy. This often depends primarily on the restructuring of government macroeconomic strategic policy in the context of fiscal and monetary policy adjustments. In general, the existence of a link between poverty and government regulatory fiscal and monetary policy is crucial for evaluating the appropriateness of these policies for reducing poverty. Although ample cross-country and country-specific empirical evidence is validating a link between poverty and fiscal and monetary policy, the inconsistency of the results of studies regarding the relative importance of fiscal or monetary policy over the other has generated an ongoing debate on whether fiscal or monetary, or fiscal-monetary policy mix is the best approach to address poverty.

Unfortunately, fiscal policy in the form of changes in taxes or government expenditure, particularly on social programs, often discourages individuals from taking up employment and acquiring job skills, thereby deepening poverty (Gupta et al., 2002). Similarly, the shallowness of the financial landscape, the large size of the informal sector, administrative bottlenecks, and other factors frequently hinder the effectiveness of monetary policy in reducing poverty. Additionally, the government's fiscal-monetary regulatory policy mix may impede economic agents' freedom and exacerbate poverty.

Therefore, an alternative policy would be to stimulate greater economic freedom to guide the economy out of poverty. Economists who support the preference for economic freedom believe that increasing government spending is not the most effective stimulus for poverty alleviation, but rather an improvement in the degree of economic freedom. The fiscal and monetary regulatory policies of the government would only distort the market, restrict preferences and freedom to supply economic resources, discourage free trade and business competition, and increase poverty.

However, opponents argue that economic freedom is rooted in a market economy that leads to resource misallocation and high poverty incidence. As a result, which of these policy alternatives is suitable for poverty alleviation in Nigeria? Alternatively, if the policy mix were advantageous, what type of policy combination would be appropriate? The centerpiece of the study is identifying the potential direct and indirect long- and short-term impacts of economic freedom and fiscal and monetary policy on poverty alleviation in Nigeria. The study is a holistic attempt at the empirical literature that brings in the analysis of economic freedom and the effect of policy coalescence in evaluating the roles of monetary and fiscal policies in poverty alleviation in Nigeria.

The roadmap for the rest of the paper is as follows: Section 2 is the survey of the literature, Section 3 is the methodology, empirical results in Section 4 and Section 5 is the summary.

2. Literature Survey

Appropriate macroeconomic policy contributing to poverty reduction has been a longstanding topic of discourse among scholars. Crucial to the argument of monetarists is the change in money supply affecting output and, therefore, poverty. From the perspective of monetarists, monetary policy, usually through money stock adjustments, passes through the inflation channel to affect poverty. Monetary policy helps curtail inflation through banks' credit availability and cost control, improves business confidence, and promotes output and income growth. In a regime of expansionary monetary policy, investments result in a decline in poverty because a rise in the money supply reduces the cost of borrowing investment capital and financing consumption expenditures. A cheap monetary policy could be pro-inflationary if there is a sustained rise in the money supply, leading to reduced output and poverty growth. A high rate of inflation increases the incidence of poverty because it is like a regressive tax with a high negative impact on low-income earners (Jhingan, 2010). Growth in inflation erodes real income and limits people to spending mainly on food items for sustenance.

Savings are hurt during a period of expansionary monetary policy when the inflation rate is high. A tight monetary policy also decreases savings owing to low money circulation. This adversely affects investment, output, and income in the long run. Therefore, in the monetarist view, money stock should be controlled to adjust the poverty level. The Keynesians opined that implementing monetary policy, particularly a cheap monetary policy of lowering interest rates is not always helpful in raising private investment and income. Specifically, it is believed that in a period of chronic output contraction, there would be a loss of business confidence and the low marginal efficiency of capital would lead to a loss of willingness to borrow credits to fund investment, even though the interest rate is so low, thereby rendering monetary policy ineffective in raising output, employment, and income and facilitating poverty reduction (McConnell et al., 2009). To Keynesians, an increase in aggregate demand, sub-served by consumption and investment (both determined by government expenditure), works through a multiplier process to produce a cumulative rise in income, employment, and growth. Consequently, Keynesians favor the use of expansionary fiscal policy to promote aggregate output and employment to reduce poverty. In response, Agenor (2004) outlined aggregate demand, employment, economic growth rate, and the like as the channels of impact transmission of macroeconomic policies on poverty reduction. Thus, poverty would decrease as long as public expenditure raised aggregate demand.

The critics of Keynesians pointed to the crowding-out effect of fiscal policy as an exacerbating factor of poverty vis-à-vis a reduction in private investment caused by an increase in public expenditure in the case of deficit budget financing (increased money supply, tax cut, or bond issue). In the same way, Jhingan (2010) outlined the inescapable inflationary impact of adopting deficit budget financing as a fiscal policy tool in developing countries due to a lack of complementary resources. The large size of the government, as indicated by the growth in government expenditure, especially in developing economies, promotes inefficiency and growth volatility. This prompted the Washington Consensus idea of sound fiscal prudence as a pillar of macroeconomic policy. Regrettably, many developing countries cannot nurture the practice of sound fiscal prudence. Nonetheless, fiscal policy would work fine to reduce poverty in developing countries should the policy be shifted to a pro-poor direction by focusing less on a redistributive agenda of money transfer and more on certain policies like public services, property rights, and credits (Besley and Burgess, 2003).

Differently, the structuralists focus on structural transformations or reforms of the economy to boost investment, employment, and output to achieve poverty reduction. This is seen in several of the World Bank/IMF programs and policies, such as the Structural Adjustment Program (SAP), with its emphasis on improving the efficiency of tax administration, cutting down on government size, promoting privatization and trade, and promoting financial liberalization in the developing countries. Yet, many have lamented that such policies have not contributed to poverty reduction in most of the practicing economies. Those countries were rather facing the problem of improving fiscal balances amidst falling revenues following the removal of various tax incentives and trade-related taxes with trade liberalization to attract foreign investors (Heidhues et

al., 2004; Easterly, 2000). Against this, several professionals and scholars place to believe in economic freedom to curb poverty.

The Heritage Foundation explains economic freedom as the nonexistence of government coercion on goods and service production, allocation, and consumption beyond a level required for the citizens to maintain and sustain liberty. The Heritage Foundation lists the elements of economic freedom as the rule of law (property rights and freedom from corruption), the small size of government (fiscal and government spending), regulatory efficiency (business, credit, and labor freedom), and an open market (financial, investment, and trade freedom). Similarly, Frazer Institutes highlight access to sound money, the legal system and property rights, liberty to trade internationally, the size of government and business, credit, and labor regulation as the pillars of economic freedom. Accordingly, economies with high economic freedom tend to have a high per capita income, a high literacy rate, and a low poverty incidence. The major driver of a reduced poverty rate is resilient and dynamic economic growth that comes from improved economic freedom. Better economic freedom is the most effective way to eliminate poverty and positively impacts the living standards of those who choose to be poor (Gwartney, Lawson & Hall, 2011; Miller, Kim & Roberts, 2019). However, regardless of improved economic freedom in society, the poor may still be in the mire of poverty (Ray 2010). Without a doubt, it is, therefore, necessary that the potential impacts of any proposed policy to solve poverty be evaluated.

2.1 Empirical Evidence

Empirically, Nsiah et al. (2021) assessed the determinants of poverty in sub-Saharan Africa using a GMM technique. The study found a negative impact of money supply on poverty. In addition, it suggested that financial inclusion leads to a significant decline in poverty above a threshold of 0.37. Using a panel least squares regression, Cammeraat (2020) found that public social expenditure was negatively related to poverty in 22 Member States of the European Union between 1990 and 2015.

Anderson et al. (2018) adopted a meta-regression analysis and found no serious evidence that higher government expenditure leads to income poverty reduction in developing countries. Further, the study affirmed that the effect of fiscal policy, on average, on poverty in countries in sub-Saharan Africa is less negative but more negative for countries in Central Asia and Eastern Europe. In China, Kuang et al. (2019) modeled the role of financial and fiscal policy on poverty reduction using 382 counties and a panel smooth transition regression approach. The study revealed substantial evidence that fiscal policy, in addition to financial policy, has a positive effect on poverty reduction in the region.

Mengistu (2013) assessed the effect of fiscal policy adjustment on poverty reduction in Ethiopia using a computable general equilibrium micro-simulation method. The research, among others, found that poverty reduction among households is linked to an array of short-term public expenditures. Wang and Zhang (2012) using cross-province data between 1994 and 2004 concluded that social relief expenditures, capital construction expenditures, and public spending on rural development reduce poverty.

Adopting system GMM estimation, Kang et al. (2013) assess the individual welfare response to monetary policy adjustment in Korea. Among others, the study suggested a positive effect of the real interest rate (monetary policy) on poverty. Azis (2008) uses the CFGE simulation method to research the shock of macroeconomic policy on poverty concerning Thailand and Indonesia's economies. In the estimated result, a positive shock in fiscal policy decreases poverty in Thailand, but not in Indonesia. In addition, while the expansionary monetary policy cushions poverty in Indonesia, the same is not true in Thailand. Hence, different countries respond to different policies.

Hasan et al. (2003) empirically analyzed the relationship between economic freedom and poverty in some selected developing countries. On average, the study suggests a negative impact of economic freedom on poverty. Similarly, Norton and Gwartney (2008) found a negative relationship between economic freedom and poverty. Further, Norton (2003) found a positive impact of economic freedom in general on the poor's well-being. The study of Bergh and Bjørnskov (2019) suggests a negative impact of economic freedom on growth and income, particularly among the poorest quintile.

In Nigeria, Obi (2007) considered the role of fiscal policy in poverty reduction in Nigeria. The study identified government expenditure but not tariff management as a tool to reduce poverty. Maku et al. (2020) conducted a comparative analysis of the impact of monetary and fiscal policy on poverty alleviation in Nigeria. Employing the ordinary least square (OLS) and standardized (Beta) coefficient approaches, the study found that monetary policy is more appropriate for poverty reduction than fiscal policy. Contrarily, Farayibi and Owuru's (2016) results suggest a statistically non-significant relationship between government expenditure and poverty. In the foregoing, previous studies lack consensus on the best policy to tackle poverty. Also, largely ignored in past studies, especially in Nigeria, is the effect of economic freedom as a complement to fiscal and monetary policy in poverty alleviation. The impact of a policy mix may have a greater impact on poverty than the individual policy effects. Thus, the present study takes into account the aforementioned gaps in the previous studies.

3. Methodology and Data

Consider a system with a linear VAR model of lag order k, VAR(k), where the included variables are endogenous. A dynamic relationship among poverty, economic freedom, and monetary and fiscal policy using a VAR(k) model as in Equation (1),

$$Z_t = C + \lambda_1 Z_{t-1} + \lambda_2 Z_{t-2} + \ldots + \lambda_k Z_{t-k} + \mu_t \quad (1)$$

Where, Z_t represents a $n \times 1$ column vector of headcount poverty rate (1.25 dollars a day) (PTY), a log of government capital expenditure (fiscal policy) (FP), a 3-month deposit interest rate (monetary policy) (MP) and economic freedom index (EF), all at time t. μ_t stands for an n×1 column vector of white noise disturbance term. The $\mu_t's$ are independently and identically normally distributed with zero-mean and time-invariant variances and covariance. That is, $\mu_t \sim iid\, N(0, \sigma)$ (Lütkepohl, 2004). k equals the number of lag. C is a $n \times 1$ vector of constants. $\lambda_1, \lambda_2 \ldots \lambda_k$ are the $n \times n$ coefficients matrices. Because of co-integrating relations, a reparameterization of Equation (1) is

useful to aid the analysis of the co-integration structure of the model (Johansen and Juselius, 1992; Lütkepohl, 2004). The resulting model is referred to as a Vector Equilibrium Correction Model (VECM) or Vector Error Correction Model, represented in Equation (2).

$$\Delta Z_t = C + \prod Z_{t-k} + \Phi_1 \Delta Z_{t-1} + \Phi_2 \Delta Z_{t-2} + \ldots + \Phi_{k-1} \Delta Z_{t-k} + \mu_t \quad (2)$$

In Equation (2), $\prod$ and Φ are the parameter matrices of the model and Δ symbolizes the first difference operator. The Φ_j ($j = 1, 2, \ldots k-1$) are the short-run parameters. The information about the long-run effect is captured by the $\prod$ matrix. Let ($rk(\prod) = r$. Therefore, the matrix $\prod$ may be expressed in terms of a product order of $k \times r$ matrices β and γ such that $\prod = \beta\gamma'$ where β captures a matrix of equilibrium coefficients including the speed of adjustment to the coefficients of the long run and γ' is a matrix coefficient describing the long run relationship among the variables (Asteriou and Hall, 2011; Lütkepohl, 2004). To test the co-integrating rank of $\prod$, trace and maximum eigenvalue co-integration methods, specify in Equations (3) and (4) as suggested by Johansen (1991, 1995) and Johansen and Juselius (1992) were adopted.

$$\Omega_{Trace}(r) = -T \sum_{j=r+1}^{k} \log(1 - \hat{\Omega}_j) \quad (3)$$

Equation (3) is the trace statistic (based on the likelihood ratio test). In the case of the trace statistic, the null hypothesis is that the co-integrating vectors number is equal to or less than r.

$$\Omega_{Max}(r, r+1) = -T \log(1 - \hat{\Omega}_{r+1}) \quad (4)$$

Equation (4) is based on eigenvalues (characteristic roots). The statistic ascertains the null hypothesis that $rk(\prod) = r$ versus the alternative hypothesis that $rk(\prod) = r + 1$. Note that $\hat{\Omega}$ is the estimated characteristic roots (Lütkepohl, 2004). In a dynamic model, the selection of a suitable optimal lag order is appropriate for achieving a stable and accurate model. As a consequence, the VAR optimum lag selection criteria were adopted. Note that Equation (2) describes the individual policy effect on poverty but does not account for the response of poverty to different policy combinations over time. Therefore, an Equation variant of Equation (4) allowing for an interactive effect is given in Equation (5):

$$\Delta Z_t = C + \prod (Z_{t-k} + (Z * y)_{t-k}) + \Phi_1 \Delta (Z_{t-1} + (Z * y)_{t-1}) + \Phi_2 \Delta (Z_{t-2} + (Z * y)_{t-2}) + \Phi_{k-1} \Delta (Z_{t-k} + (Z * y)_{t-k}) + \mu_t \quad (5)$$

Where y_{t-k} is a subset of Z_{t-k} and $(Z * y)_{t-k}$ refers to interactive terms. The included interactive terms are fiscal policy combined with economic freedom, economic freedom and monetary policy, and fiscal-monetary policy mix. Additionally, a Forecast Error Variance Decomposition is applied to assess the level of variation in poverty attributed to shocks in its various pre-specified determinants. Further, a stationarity test is conducted using the Augmented Dickey-Fuller (ADF) test, specified with intercept only and intercept and trend, as illustrated in Equations (6) and (7).

$$\Delta Z_t = \omega_0 + \theta Z_{t-1} + \sum_{j=1}^{k} \varphi_j \Delta Z_{t-1} + \mu_t \quad (6)$$

$$\Delta Z_t = \beta_0 + \beta_1 t + \theta Z_{t-1} + \sum_{j=1}^{k} \varphi_j \Delta Z_{t-1} + \mu_t \quad (7)$$

In Equations (6) and (7), Z_t represents the individual variable of the study. ω_0 and β_0 are the intercepts and t is the trend term. However, the Philips-Perron method is used as a complement. The data used for the study were sourced from the 2019 Central Bank of Nigeria Annual Statistical Bulletin, Fraser Institutes World economic freedom Index and Index Mundi.

4. Results

From the descriptive statistic reported in Table 1, the poverty rate has a standard deviation value of roughly 7.03 around a mean value of about 53.52 over the sample period. The monetary policy variable averaged up to 11.42 with a standard deviation value of 4.26. The level of deviation of the fiscal policy variable from its mean value of 4.93 is about 2.04. The economic freedom index has the least standard deviation (1.74) among the policy variables and a mean value (4.55). The individual Jarque-Bera statistic indicates a normal distribution of all variables in the study.

Table 1. Descriptive Statistics

Variable	Mean	Std. Dev	Min	Max	Jarque-Bera (Prob.)
PTY	53.5210	7.032	40.090	66.900	0.722 (0.697)
MP	11.415	4.264	5.500	23.600	6.449 (0.039)
FP	4.927	2.035	1.411	7.736	4.356 (0.113)
EF	4.545	1.742	0.000	6.897	1.915 (0.384)

Source: Research findings.

In Table 2, the Augmented Dickey-Fuller (ADF) and the Philips-Perron test reports are presented. All the variables are first-difference stationary series. As such, all are integrated into order one (I(1)).

Table 2. Summary Result of the Stationary Test

Variables	Augmented Dickey-Fuller (ADF)				Philips-Perron (PP)			
	Level		First Difference		Level		First Difference	
	C	C & T	C	C & T	C	C & T	C	C and T
PTY	-1.904 (0.327)	-0.928 (0.942)	-3.815 (0.006)	-4.001 (0.011)	-1.923 (0.319)	-0.715 (0.965)	-3.567 (0.011)	-3.594 (0.044)
MP	-2.588 (0.104)	-3.080 (0.126)	-6.010 (0.000)	-6.085 (0.000)	-2.592 (0.103)	-2.709 (0.239)	-7.194 (0.000)	-7.317 (0.000)
FP	-0.373 (0.904)	-1.683 (0.739)	-6.460 (0.000)	-6.378 (0.000)	-0.422 (0.895)	-2.022 (0.571)	-6.450 (0.000)	-6.372 (0.000)
EF	-1.399 (0.573)	-0.592 (0.974)	-6.040 (0.000)	-6.329 (0.000)	-1.399 (0.573)	-0.592 (0.974)	-6.040 (0.000)	-6.329 (0.000)

Source: Research findings.

Notes: C = constant, C and T = constant and trend.

Table 3 is the optimal lag order selection for the model. Though Schwarz information Criterion (SC) and Hannan-Quinn Information Criterion (HQ) suggested lag 1, Akaike Information Criterion (AIC), sequential modified LR test statistic (LR), and Final Prediction Error (FPE) selected lag 2. Based on the majority, a 2-lag structure model is estimated.

Table 3. VAR lag Selection Order

Lag	LogL	LR	FPE	AIC	SC	HQ
1	-251.224	NA	22.119	14.445	15.141*	14.690*
2	-232.556	29.263*	19.620*	14.300*	15.694	14.792
3	-222.962	12.966	29.733	14.647	16.736	15.383

Source: Research findings.

Table 4 (a and b) contains Johansen's co-integration test results. The result revealed at least one co-integrating equation at a 5 percent level as indicated by the trace and maximum eigenvalue statistic. This suggests the rejection of the no co-integration hypothesis. That is, there is a long-run relationship between poverty, monetary policy, fiscal policy, and economic freedom.

Table 4. Johansen Co-integration Test

a. Trace Statistic				
Hypothesized No. of CE(s)	**Eigenvalue**	**Trace Stat.**	**5% Critical Value**	**P-value**
None *	0.527244	54.12611	47.85613	0.0115
At most 1	0.339648	26.40660	29.79707	0.1170
At most 2	0.189622	11.05227	15.49471	0.2083
At most 3	0.084656	3.272841	3.841466	0.0704
b. Maxi- Eigenvalue				
Hypothesized No. of CE(s)	**Eigenvalue**	**Max-Eigen Stat.**	**5% Critical Value**	**P-value**
None *	0.527244	27.71951	27.58434	0.0480
At most 1	0.339648	15.35433	21.13162	0.2648
At most 2	0.189622	7.779430	14.26460	0.4016
At most 3	0.084656	3.272841	3.841466	0.0704

Source: Research findings.

4.1 Economic Freedom, Monetary and Fiscal Policy, and Poverty

The long-run and short-run estimates of the impact of fiscal and monetary policy and economic freedom on poverty are summarized in Tables 5, 7, and 9. Note that the results presented in Tables 5, 7, and 9 represent the estimated poverty equation in the Vector Error Correction Model (VECM). In Table 5, a period-lagged value of all the variables is statistically significant in the determination of poverty in the long run. The effects of fiscal and monetary policy are negative. Only economic freedom has a positive relationship with poverty in the long run. This suggests that, on average, expansionary fiscal and monetary policy in the previous year had an adverse impact on poverty in the current year, but a greater degree of economic freedom in the past year increased the current rate of poverty. Note that an increase in the 3-month deposit interest rate (monetary policy) increases income levels and makes individuals wealthier. An increase in wealth reduces poverty. Thus, the deposit interest rate (monetary policy) is negatively linked to poverty.

In the short run, two periods of past poverty support positively its current value but are not statistically significant. The coefficients of lagged values of monetary policy and fiscal policy revealed that the instruments have been contributing to poverty reduction in the past. Similar to the long run, the coefficient of a lagged value of economic freedom is positive and significant statistically, suggesting that more economic freedom in the previous year results in a high rate of poverty in the current year. Table 5 equally

shows that fiscal policy is more negative than monetary policy in the short run and long run. For this reason, the former is more effective than the latter in controlling poverty. The estimated error correction mechanism is about 0.57. Therefore, the short-run speed of convergence to the long-run is roughly 57 percent within a year.

Table 5. VECM Poverty Equation

	PTY_{t-1}	PTY_{t-2}	MP_{t-1}	MP_{t-2}	FP_{t-1}	FP_{t-2}	EF_{t-1}	EF_{t-2}	C
LR	1.000		-0.263 (-1.532)		-5.397 (-10.866)		5.394 (7.372)		-50.014
SR	0.152 (0.762)	0.158 (0.939)	-0.224 (-1.506)	-0.024 (-0.147)	-0.469 (-0.263)	-3.365 (-2.133)	5.088 (5.417)	1.303 (0.650)	0.651 (1.158)
ECM	-0.572 (-3.191)				R^2: 0.70			S.E: 2.66	

Source: Research findings.

Notes: LR: Long Run, SR: Short Run. C: intercept. t-statistic values are in the parenthesis

The variance decomposition of the model of the result in Table 5 is presented in Table 6. It shows the percentage variation in poverty attributed to own shock, shock in fiscal policy, economic freedom, and monetary policy, simulated over a ten-period horizon. In the first period, aside from own shocks, shock in monetary policy (about 12.86 percent) is the largest contributing policy shock to variation in poverty. The response of poverty to fiscal policy shock is roughly 8.05 percent. Shock in economic freedom is the least (about 0.78 percent) cause of perturbation in poverty. In the second period through the tenth period, among the policy variables, shock in economic freedom is the dominant source of variation in poverty, followed by fiscal policy and lastly, the monetary policy. On average, the contribution of monetary policy, fiscal policy, and economic freedom to changes in the poverty rate increases over time as shown in Table 6.

Table 6. Variance Decomposition of Poverty

Period	S.E.	PTY	MP	FP	EF
1	2.655237	78.30624	12.86090	8.047948	0.784904
2	3.895949	48.61028	9.644767	7.751180	33.99377
3	4.037148	45.30993	10.00500	7.542143	37.14293
4	6.295724	19.09784	4.142837	29.39720	47.36213
5	11.13188	8.800100	3.933185	27.37401	59.89270
6	14.07561	15.92026	4.938579	30.93148	48.20968
7	15.30798	25.54745	4.904273	28.04414	41.50414
8	15.99278	26.91009	4.900229	25.71417	42.47551
9	16.12699	26.50044	5.779013	25.76914	41.95140
10	16.72091	25.58048	5.563648	25.79269	43.06318
Cholesky Ordering: MP FP EF PTY					

Source: Research findings.

4.2 Poverty Alleviation and Policy Mix

Table 7 is the estimated VECM poverty equation when monetary and fiscal policy, fiscal policy and economic freedom, and economic freedom and monetary policy interact. In the long run, a lagged value of the monetary policy and economic freedom policy mix is statistically significant and negative. This implies that expansionary monetary policy and improved economic freedom in the previous year contributed significantly to poverty alleviation in the current period. The increased economic

freedom in the past year is able to curtail poverty in the current year owing to an increase in income (the income effect of monetary policy), which stems from the increase in commercial banks' deposit interest rate by the Central Bank in the past year. The impact of the interactive effect of fiscal and monetary policy is positive and significant, and it implies that an expansionary fiscal-monetary policy mix in the immediate past year aggravated poverty in the current year.

The long-run impact of contemporaneous economic freedom and fiscal policy in the last year is negative on the current rate of poverty, but statistically not significant. In the short run, the interactive effect of monetary policy and economic freedom is negative, significant, and more effective than in the long run. The short-run interactive coefficient of a lag value of economic freedom and fiscal policy mix is positive but not significant. A two-year lagged value of the coefficient is also not significant but negative. The short-run effect of the fiscal-monetary policy mix is similar to its long-run effect, positive and significant. The capacity of the model's speed of adjustment is roughly 26 percent per annum.

Table 7. VECM Poverty Equation (Interactive Terms Estimates, 1)

	$\boldsymbol{PTY_{t-1}}$		$\boldsymbol{MP_{t-1}}$		$\boldsymbol{FP_{t-1}}$		$\boldsymbol{EF_{t-1}}$		**C**
LR	1.000		1.332 (1.298)		-23.692 (-5.234)		34.805 (2.231)		-85.96
	$(MP*EF)_{t-1}$				$(FP*EF)_{t-1}$				
	-2.598 (-4.744)				-0.521 (-0.314)				
	$(MP*FP)_{t-1}$								
	2.1507 (6.549)								
SR	PTY_{t-1}	PTY_{t-2}	MP_{t-1}	MP_{t-2}	FP_{t-1}	FP_{t-2}	EF_{t-1}	EF_{t-2}	C
	0.133 (0.572)	0.279 (1.343)	-0.367 (-0.543)	-0.856 (-1.273)	-7.613 (-1.260)	-3.839 (-0.742)	9.058 (1.510)	6.762 (0.887)	0.982 (1.33)
	$(MP*EF)_{t-1}$		$(MP*EF)_{t-2}$		$(FP*EF)_{t-1}$		$(FP*EF)_{t-2}$		
	-0.638 (-2.428)		-0.202 (-0.891)		0.068 (0.095)		-0.726 (-0.668)		
	$(MP*FP)_{t-1}$				$(MP*FP)_{t-2}$				
	0.5749 (2.141)				0.3199 (1.618)				
ECM	-0.260 (-2.4062)				R^2: 0.70				S.E: 3.002

Source: Research findings.

Notes: LR: Long Run, SR: Short Run. C: intercept. t-statistic values are in the parenthesis

The result in Table 7 is decomposed into percentage variations in poverty due to shocks in the contributing factors, simulated over a 10-period horizon. Among the interactive terms, in the first period in Table 8, the lion's share of the variation in poverty came from the combined shocks of monetary policy and economic freedom. The monetary and fiscal policy shocks interaction plays the least role in the determination of the variation in poverty. In the second period through the ninth period also, monetary policy and economic freedom shock interaction accounted for the largest variation in poverty with the shocks in the monetary-fiscal policy mix contributing the least.

Table 8. Variance Decomposition of Poverty

Period	S.E.	PTY	MP	FP	EF	MP*FP	MP*EF	FP*EF
1	3.001696	73.00945	2.071571	5.092483	10.24673	0.547736	7.796438	1.235584
2	5.197582	42.89048	15.74683	2.836984	31.78433	0.597494	4.957030	1.186848
3	6.194250	40.20571	21.13760	4.301927	26.01412	0.600968	5.058783	2.680898
4	6.812025	37.78044	17.97752	8.844292	22.76819	0.979566	8.678625	2.971371
5	8.405559	29.56593	11.85295	14.95196	29.81070	0.960151	10.30838	2.549939
6	9.792652	28.58576	8.918724	19.84302	22.03393	3.017980	14.03167	3.568907
7	11.89728	27.20622	6.521648	17.12149	31.40966	2.364768	10.72503	4.651193
8	13.23591	28.34640	5.780678	20.26740	26.43879	2.195591	11.54179	5.429344
9	17.72278	20.11418	3.275941	16.88495	46.88644	1.322272	6.637449	4.878772
10	20.19588	19.12255	2.588341	20.47419	38.69909	1.367760	7.089959	10.65811
Cholesky Ordering: MP FP EF MP*FP MP*EF FP*EF PTY								

Source: Research findings.

Table 9 presents results on the interactive impact of fiscal policy, monetary policy, and economic freedom combined. The estimated coefficient of the interactive term in the short run and long run is positive and significant. Consequently, concurrent implementations of expansionary fiscal and monetary policy and a higher degree of economic freedom in the past significantly contribute to poverty escalation in the current period. The poverty model in Table 9 suggests up to 62 percent long-run convergence per annum.

Table 9. VECM Poverty Equation (Interactive Terms Estimates, 2)

LR	PTY_{t-1}		MP_{t-1}		FP_{t-1}		EF_{t-1}		**C**
	1.000		-1.179(-4.022)		-6.954(-8.203)		1.117(0.870)		-29.45
	$(MP * FP * EF)_{t-1}$								
	0.0661 (3.778)								
SR	PTY_{t-1}	PTY_{t-2}	MP_{t-1}	MP_{t-2}	FP_{t-1}	FP_{t-2}	EF_{t-1}	EF_{t-2}	**C**
	0.029 (0.182)	-0.053 (-0.366)	-0.589 (-2.253)	-0.496 (-2.012)	-1.598 (-0.908)	-3.825 (-2.600)	3.9303 (5.208)	0.8432 (0.524)	0.819 (1.66)
	$(MP * FP * EF)_{t-1}$				$(MP * FP * EF)_{t-2}$				
	0.024 (1.982)				0.0250 (2.321)				
ECM	-0.616 (-5.075)				R^2: 0.80			S.E: 2.23	

Source: Research findings.

Notes: LR: Long Run, SR: Short Run. C: intercept. t-statistic values are in the parenthesis

In Table 10, the percentage variation in poverty caused by the monetary policy, fiscal policy, and economic freedom interactive shocks over 10 years is reported. The results suggest that except in the third period, the contribution of interactive shocks in monetary and fiscal policy and economic freedom over the simulated period is minimal, especially in the aftermath of the fourth period.

Table 10. Variance Decomposition of Poverty

Period	S.E.	PTY	MP	FP	EF	MP*FP*EF
1	2.226483	95.55400	2.148667	1.388600	0.000385	0.908345
2	3.417305	47.46267	2.846885	1.515117	43.03244	5.142888
3	3.787043	40.25002	3.773489	3.909251	35.07497	16.99227
4	6.769287	12.96429	1.474476	27.62596	49.57612	8.359159
5	13.28297	5.463388	0.391736	28.98202	62.60095	2.561910
6	17.61383	9.727459	0.897688	30.27845	57.63627	1.460132
7	19.65240	14.48356	2.028466	27.17654	55.11978	1.191657

Period	S.E.	PTY	MP	FP	EF	MP*FP*EF
8	20.01167	16.71922	2.635575	26.31981	53.17501	1.150385
9	20.14412	16.65298	2.717981	26.01839	53.23555	1.375101
10	20.33789	16.34605	2.673200	26.59309	52.93637	1.451292
Cholesky Ordering: MP FP EF MP*FP*EF PTY						

Source: Research findings.

In the view of Fetail (2017) and Jannsen et al. (2019), economic and financial crises could distort the effectiveness of macroeconomic policy. For instance, in a period of financial crisis, the economy is usually characterized by a high degree of financial market distress and uncertainty. This impairs the impact capacity of macroeconomic policy, particularly fiscal and monetary policy. Therefore, it becomes a question of how well the macroeconomic policy can mitigate poverty if shocks due to financial crisis are accounted for in the estimated model. Table 11 presents the estimated model of poverty with a reference to the 2008/2009 global financial crisis.

Table 11. VECM Poverty Equation

	PTY_{t-1}	PTY_{t-2}	MP_{t-1}	MP_{t-2}	FP_{t-1}	FP_{t-2}	EF_{t-1}	EF_{t-2}	C
LR	1.000		-0.333 (-1.890)		-4.687 (-13.169)		3.716 (6.879)		-40.63
	$FNCS_{t-1}$								
	8.174 (4.864)								
SR	PTY_{t-1}	PTY_{t-2}	MP_{t-1}	MP_{t-2}	FP_{t-1}	FP_{t-2}	EF_{t-1}	EF_{t-2}	C
	0.184 (0.880)	0.260 (1.461)	-0.307 (-1.927)	-0.113 (-0.656)	-0.188 (-0.107)	-3.244 (-1.969)	4.604 (5.440)	0.278 (0.140)	0.598 (1.03)
	$FNCS_{t-1}$				$FNCS_{t-2}$				
	3.604 (1.614)				4.411 (1.968)				
ECM	-0.635 (-3.069)				R^2: 0.71			S.E: 2.71	

Source: Research findings.

Notes: LR: Long Run, SR: Short Run. C: intercept. t-statistic values are in the parenthesis.
FNCS: a dummy variable for a financial crisis

It is evident in Table 11 that the directions of the impact of monetary and fiscal policy and economic freedom are the same when the influence of the 2008/2009 global financial crisis is controlled. However, it is important to note that though the magnitude of the impact of fiscal policy increased, the impact capacity of economic freedom and monetary policy reduced in absolute terms. Note also that the impact of the global financial crisis is positive and significant in the estimated model.

Table 12. Variance Decomposition of Poverty

Period	S.E.	PTY	MP	FP	EF	FNCS
1	2.707338	100.0000	0.000000	0.000000	0.000000	0.000000
2	4.468707	63.16223	1.805794	0.033408	34.59135	0.407214
3	4.619545	59.23838	2.059263	0.418613	36.60598	1.677763
4	6.869135	26.79895	0.972792	25.29541	43.52612	3.406728
5	11.29662	10.03825	1.547440	22.44601	64.59133	1.376974
6	14.34394	8.312691	3.217626	21.77692	65.66740	1.025365
7	15.47584	11.05973	4.379730	19.85458	63.22974	1.476223
8	15.70725	12.82856	4.682946	19.40258	61.47935	1.606565
9	15.80235	12.71702	4.633823	19.68539	61.28074	1.683023
10	17.30558	10.89709	3.880739	21.53946	61.75906	1.923649
Cholesky Ordering: PTY MP FP EF FNCS						

Source: Research findings.

Similar to the variance decomposition earlier simulated, Table 12 suggests that shocks in economic freedom accounted for the highest percentage share of variation in poverty followed by fiscal policy. The lowest came from the shock due to the 2008/2009 global financial crisis.

5. Conclusion

The high poverty rate is a recurrent phenomenon in many developing countries. A crucial step towards its alleviation would be to evaluate the potential and relevance of the available policy options at the disposal of policymakers. However, this is often difficult to do, especially where there are numerous policy alternatives to choose. This study concentrates on fiscal and monetary policy alongside a policy of more economic freedom for the masses to alleviate poverty in Nigeria. In the results, it is not surprising that expansionary fiscal policy and monetary policy, on average, independently reduce poverty across the period, but the inability of the expansionary fiscal-monetary policy mix to alleviate poverty over time.

Thus, the concurrent implementation of expansionary fiscal and monetary policy is likely to worsen poverty in Nigeria. A close evaluation of the individual impact of the policy shows that the fiscal policy is more effective than the monetary policy, valid even under the influence of the 2008/2009 global financial crisis. Poverty noticeably drifts upward with more economic freedom on average. However, poverty will reduce if improvement in economic freedom is complemented with expansionary monetary policy and will rise under a policy juxtaposition of a high degree of economic freedom and expansionary fiscal policy, or if a higher degree of economic freedom and an expansionary fiscal-monetary policy mix, are simultaneously put in place.

In sum, a policy option to fast-track poverty alleviation over time in Nigeria would be to adjust either fiscal policy or monetary policy, or a combination of expansionary monetary policy and scaling up economic freedom.

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Appendix:

Roots of Characteristic Polynomial **Endogenous variables: PTY MP FP EF**	
Root	**Modulus**
0.995848 - 0.037467i	0.996553
0.995848 + 0.037467i	0.996553
0.724442 - 0.195290i	0.750302
0.724442 + 0.195290i	0.750302
0.178149 - 0.550082i	0.578210
0.178149 + 0.550082i	0.578210
-0.353715 - 0.187921i	0.400536
-0.353715 + 0.187921i	0.400536
No root lies outside the unit circle.	
VAR satisfies the stability condition.	

Source: Research findings.

VAR Residual Serial Correlation LM Tests **Variables (PTY MP FP EF)**		
Lags	LM-Stat	Prob
1	11.87968	0.7522
2	22.06360	0.1411
3	18.79726	0.2793
4	11.03680	0.8072
5	15.46415	0.4909
6	11.98403	0.7451

Source: Research findings.

White Heteroskedasticity Test		
Chi-sq	**df**	**Prob.**
177.5999	160	0.1618

Source: Research findings.