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External shocks, Economic Resilience and Economic Growth in Sub-Saharan Africa Countries: A case study of Nigeria

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Abstract

The study examined external shocks, economic resilience, and economic growth in Sub-Saharan Africa (SSA) countries, using Nigeria as a case study for the period between 1990 and 2022. To achieve this objective, the study employed Fully Modified Ordinary Least Squares (FMOLS) to estimate the relationship after subjecting the series to preliminary testing. The findings revealed that external shocks had a significant impact on Nigeria's economic growth during the observation period. Specifically, it was found that oil price shocks had a significantly negative impact on Nigeria's economic growth, while global demand shocks had a significantly positive impact. However, the study did not find sufficient evidence to conclude that financial shocks had a significant impact on Nigeria's economic growth. Regarding the interactive terms, it was discovered that when economic resilience was interacted with all three measures of external shocks (oil price, global demand, and financial shock), there was a significant impact on economic growth. This implies that economic resilience alters the effect of external shocks on economic growth in Nigeria, both in sign and size. The implication is that policymakers in Nigeria should make efforts to develop and measure Nigeria's economic resilience to external shocks, subsequently making efforts to improve areas of weakness to strengthen Nigeria's level of resilience to external shocks, ensuring stable economic growth.

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1. Introduction

Economic growth in Sub-Saharan African (SSA) countries including Nigeria has been sluggish over the years despite the abundance of natural and human capital available in the region. Stable economic growth facilitates and ensure economic development, reduces poverty, and improves living standards. In Nigeria, where many individuals rely on agriculture and informal sectors for livelihoods, stable economic growth provides employment opportunities and income stability (**Joseph & Obikaonu, 2021**).

Moreover, stability in economic growth is one essential parameter that investors look at when making investment decision, both domestic and foreign direct investment,

which drives infrastructure development and technological advancement, further stimulating economic expansion (**Adeniyi, Oyinlola & Omisakin, 2011; Hallam, 2022**). Additionally, stable economic growth enables the government to invest in essential social services like healthcare and education, contributing to human capital development and long-term sustainable development goals of the nation (**Fadiran, 2021; Kingsley & Tonuchi, 2021**). One of the major factors attributed to the poor and sluggish performance of economic growth in most SSA countries including Nigeria is the region exposure to external shocks such as oil price shock, global demand shock, and financial shocks among others (**Joseph, Awolaja, & Ajibola, 2024**). External shocks, particularly oil price shocks, have been identified in empirical studies to have significant negative impact on economic growth in Nigeria due to the country's heavy dependence on oil revenue. During negative oil price shocks, Nigeria's government revenue decreases, leading to budget deficits, reduced public spending, and constraints on infrastructure development and social programs (**Odhiambo, 2020**). The negative oil price shock does not only impact the government revenue but also leads to exchange rate depreciation which has detrimental impact on the country level of inflation or what is known as imported inflation.

In fact, several empirical studies linked the 2016 economic recession in Nigeria to the negative oil price shock which impacted the country exchange rate and through the pas-through effect resulted in high inflation cum stagflation (**Odhiambo, 2020**; **Raifu, 2021; Ikechi & Anthony, 2021**). This dependence also makes Nigeria vulnerable to fluctuations in global oil prices, exposing the economy to volatility and uncertainty. Mitigating the impacts of oil price shocks presents challenges as the country's limited economic diversification hinders its ability to withstand external shocks. Additionally, policy responses such as monetary measures may be less effective in addressing supply-driven inflation caused by oil price shocks, exacerbating economic challenges.

Empirical studies identified at least three channels by which oil price shocks for instance impact economic growth. First, for an oil exporting country like Nigeria, a negative oil price shock reduces government revenues leading to reduced public spending on infrastructure, social programs, and investments, which can hinder economic growth and development (**Hallam, 2022; Hatmanu et al., 2020**). Secondly, higher oil prices can lead to increased production costs for businesses, reducing their profitability and investment capacity, thereby slowing down overall economic growth especially if the higher crude oil bye-products are not adequately mitigated (**Oladunni, 2019**). Thirdly, oil price shocks can influence consumer spending patterns due to changes in fuel prices, affecting demand for goods and services and consequently impacting economic activity (**Oladunni, 2019; Hallam, 2022; Hatmanu et al., 2020**).

Given the inadequacy of monetary policy in a supply driven inflation such as that of oil price shock and the tendencies of fiscal policy measure to become even inflationary, it becomes evidential that building economic resilience becomes a crucial moderating factor on the pass-through effect of external shocks, such as oil price fluctuations, on economic growth in Nigeria. By measuring and improving its economic resilience, Nigeria can better withstand the adverse effects of external shocks, thereby minimizing their impact on economic growth. This involves strengthening key economic fundamentals, diversifying the economy, and improving institutional capacity to absorb and adapt to these shocks (**Joseph et al., 2024**). Additionally, economic resilience can help mitigate the negative effects of external shocks on key sectors, such as agriculture and manufacturing, which are vital contributors to economic growth.

Moreover, a resilient economy is better equipped to attract investment and foster innovation, further bolstering its ability to maintain stable economic growth amidst external uncertainties. Economic resilience in this sense is the ability of economy to mitigate the adverse effect of external shocks on its macroeconomic indicators such as economic growth and the speed at which the economy can recover from the effect of these shocks (**Joseph et al., 2024; Jolles et al., 2023**). Several studies have been dedicated to estimating and measuring a nation economic resilience particularly in Europe, most of these studies have concluded that more economic resilient countries are able to dampened the effect of external shocks on their economy (**Jolles et al., 2023**; **Briguglio, 2016**). The challenge in literature is that despite most empirical studies reaching the conclusion that countries that are more resilient to external shocks are able to dampened the effect of these shocks on their economy without validating this conclusion based on empirical study.

Thus, the present study aims to address this gap by empirically assessing the role of economic resilience as a moderating factor on the pass-through effect of external shocks on economic growth in Nigeria, providing valuable insights for policymakers and stakeholders.

2. Literature Review

2.1 Theoretical Framework

The Post Keynesian theory of macroeconomic performance serves as the study theoretical framework that emphasizes the interplay of effective demand, uncertainty, power relations, and non-equilibrium dynamics in shaping economic outcomes (**Marshall & Rochon, 2019; Murakami, 2022**). Unlike neoclassical approaches, Post Keynesian theory rejects the assumption of rationality and advocates for government intervention to stabilize the economy (**Marshall & Rochon, 2019**; **Murakami, 2022**). Central to this theory is the notion that fluctuations in effective demand can lead to instability in output, inflation, and unemployment, necessitating policy responses to mitigate these fluctuations (**Sergio et al., 2022**). One of the key equations used in Post Keynesian theory is the aggregate demand equation, which illustrates how changes in consumption, investment, government spending, and net exports influence overall demand in the economy (**Marshall & Rochon, 2019**). This equation underscores the importance of fiscal policy in stabilizing output, inflation, and unemployment during economic shocks.

Countercyclical fiscal policy, which involves adjusting government spending and taxation to stimulate or cool down demand, is recommended to counteract fluctuations in effective demand (**Sergio et al., 2022**). Similarly, monetary policy plays a crucial role in stabilizing the economy by influencing interest rates and the demand for money (**Marshall & Rochon, 2019**). The IS-LM model is often employed to illustrate how changes in monetary policy can shift the LM and/or IS curves to stimulate or restrain output and inflation.

By adjusting interest rates, policymakers can affect investment and consumption levels, thereby promoting economic stability (**Prates, 2020**). Post Keynesian economists also introduced the Augmented Phillips Curve, which incorporates additional variables such as inflation expectations, income distribution, and supply-side factors to explain the relationship between unemployment and inflation (**Prates, 2020**). This augmented framework provides a more nuanced understanding of how various factors interact to shape macroeconomic outcomes.

Furthermore, investment, income distribution, and institutional arrangements are highlighted as key determinants of effective demand and economic stability (**Oladunni, 2019**). Policies aimed at promoting full employment and reducing income inequality are deemed essential for fostering sustainable economic growth (**Oladunni, 2019**).

Despite criticisms of its lack of clear modelling approaches and microfoundations, the Post Keynesian theory remains influential in guiding macroeconomic policies due to its focus on real-world complexities and societal issues (**Prates, 2020**). By challenging traditional economic theories and emphasizing real-life complexities, the Post Keynesian framework has contributed to a more nuanced understanding of macroeconomic dynamics and policy implications.

2.2 Empirical Review

Several empirical studies have examined the impact of oil price shocks on economic growth in Nigeria. For instance, **Adeniyi, Oyinlola & Omisakin (2011)** introduced threshold effects into their analysis, revealing that despite these adjustments, Nigeria's oil sector remains somewhat isolated, with limited linkages to the broader economy. **Aliyu (2009)** emphasized the positive impact of oil price shocks and exchange rate appreciation on real economic growth, highlighting the importance of economic diversification to reduce vulnerability to oil price fluctuations. **Oyeyemi (2013)** underscored the long-term repercussions of crude oil price shocks on Nigeria's economic growth trajectory, emphasizing the imperative of diversifying the country's revenue sources beyond the oil sector. **Omitogun, Longe, & Muhammad (2018)** shed light on the mismanagement of oil revenues, suggesting that more effective allocation of these resources is necessary to spur economic growth. **Raifu (2021)** emphasized the critical role of institutional quality in shaping the relationship between oil revenue and economic growth, suggesting that improvements in governance structures could enhance the effectiveness of oil revenues in driving economic development. **Fadiran (2021)** highlighted the nuanced impact of oil price shocks on the monetary transmission mechanism, underscoring the need for policymakers to consider the differential effects of external shocks on various channels of the economy.

Ikechi & Anthony (2020) highlight the significant effect of oil price changes on short-term economic growth, emphasizing the need for economic diversification away from primary production to mitigate the vulnerability to oil price fluctuations. Their findings suggest that Nigeria's over-reliance on oil exports makes its economy susceptible to external shocks, underscoring the urgency for policy reforms aimed at promoting diversification and resilience.

Akinsola & Odhiambo (2020) extend the analysis to low-income oil-importing sub-Saharan African countries, revealing a mixed but generally negative impact of oil price changes on long-term economic growth. They suggest that policymakers should implement efficient energy policies and technological advancements to mitigate the risks associated with oil price volatility, emphasizing the importance of enhancing energy security and reducing dependency on oil imports.

Odhiambo (2020) provides a comprehensive review of existing literature on the relationship between oil price and economic growth, emphasizing the diversity of findings across different countries and methodologies. This study highlights the need for further research to better understand the underlying mechanisms driving the relationship between oil prices and economic growth, suggesting that contextual factors and policy responses play a crucial role in shaping outcomes.

Omotosho (2020) employs a New-Keynesian DSGE model to assess the macroeconomic implications of oil price shocks and fuel subsidy regimes in Nigeria. Their results underscore the importance of well-targeted safety nets and sustainable adjustment mechanisms in fuel subsidy reforms to mitigate the adverse effects of oil price shocks on economic stability. This study emphasizes the complex interplay between oil prices, fiscal policies, and macroeconomic outcomes, highlighting the importance of policy coordination and institutional capacity in managing external shocks effectively.

Overall, these studies provide the importance of economic diversification and policy reforms to mitigate the adverse effects of oil price fluctuations on economic growth in Nigeria. They emphasize the need for proactive measures to reduce dependency on oil exports, enhance energy security, and promote sustainable development through investments in alternative sectors. Additionally, institutional improvements, efficient energy policies, and technological advancements are highlighted as key strategies to enhance resilience and mitigate the risks associated with oil price volatility, ultimately fostering long-term economic stability and inclusive growth.

3. Research Methodology

3.1 Data and Data source

All data used for the study were sourced from Central Bank of Nigeria Statistical Bulletin and Bloomberg. The analysis covers the period between 1990 to 2022. Data on Nigeria economic growth, oil price, global output, US federal fund rate, and exchange rate. The data on economic resilient index (ERI) is computed using the Augmented Min-Max normalization approach as clearly discussed in **Joseph et al. (2024)**.

3.2 Model Specification

Following the New Keynesian approach discussed in the previous section and previous empirical studies, the functional form of the model can therefore be modelled as in equation (1).

GDPg = f (Oilp, GDS, USR, EXR) (1)

Where, GDPg represent the GDP growth rate, Oilp, represent brent crude oil price, GDS represent global demand shock (captured with global GDP), USR represent US federal fund rate (used to measure financial shock), and EXR represent Nigeria exchange rate. The econometric form of the model can therefore be modelled as in equation (2);

$$lnGDPg_t = \alpha_0 + \alpha_1 lnOilp_t + \alpha_2 lnGDS_t + \alpha_3 lnUSR_t + \alpha_4 lnEXR_t + \varepsilon_t \quad (2)$$

Where ln represent the natural log of the variable. Equation (2) can be modified to account for economic resilience which help determine the moderating effect of economic resilience on the nexus between external shock and economic growth in Nigeria as given in equation (3).

$$lnGDPg_t = \alpha_0 + \alpha_1 lnOilp_t + \alpha_2 lnGDS_t + \alpha_3 lnUSR_t + \alpha_4 lnEXR_t + \alpha_5 lnERI_t + \alpha_6 lnERI * OIlp_t + \alpha_7 lnERI * GDS_t + \alpha_8 lnERI * USR_t + \varepsilon_t \quad (2)$$

Table 1

Apriori Expectations

	$(GDPg_t)$	$GDPg_t)$
$Oilp$	-	-
gds	+	+
usr	-	-
exr	+/-	+/-
ERI		+/-
$Oilp * ERI$		+/-
$gds * ERI$		+/-
$USR * ERI$		+/-

3.3 Modelling Strategy

To address our study objective, we employ the Fully Modified Ordinary Least Squares (FMOLS) method.

Originating from **Philips and Hansen (1990)**, FMOLS is tailored for estimating cointegrated relationships with a mix of I(1) variables, offering distinct advantages over simple OLS and other common estimation techniques.

This choice is substantiated by FMOLS's capacity to mitigate issues like endogeneity, serial correlation, and heteroscedasticity prevalent in time series data analysis. Particularly in macroeconomic research, where variables often exhibit long-run co-movement, FMOLS proves adept at handling cointegrated variables (**Rukhsana & Shahbaz, 2008**). By leveraging FMOLS, we aim for precise and consistent parameter estimates while accommodating potential unit roots and cointegrating relationships among the variables under scrutiny (**Rukhsana & Shahbaz, 2008**). Moreover, FMOLS facilitates the inclusion of lagged variables and error correction terms, enriching the model's capacity to capture dynamic relationships and long-term equilibrium adjustments in the data. Overall, FMOLS furnishes a robust econometric framework that aligns seamlessly with our study's aim of probing the enduring impacts of external shocks on economic growth in Nigeria.

In our analytical process, we initially subject the variables to stationarity tests using the Augmented Dickey-Fuller (ADF) unit root test. Upon establishing the stationarity order, we further examine for cointegration among the variables employing Johansen's cointegration method. Subsequently, we proceed to estimate the model using FMOLS. Additionally, an ancillary analysis investigates the impact of monetary policy, specifically the monetary lending rate, on lending and inflation rates, serving as proxies for assessing monetary policy effectiveness. While these results are not reported here, they are available upon request.

4. Result and Analysis

This section presents and discuss the result of the empirical analysis. First, the time series data were first subjected to a unit root test, detailed in Table 2, utilizing both the Augmented Dickey Fuller and Phillip Perron (PP) tests to determine the presence or absence of a unit root within the series. The findings revealed that none of the series used for the analysis are stationary at level, however, at first difference all the series became stationary.

Table 2: Unit Root Test results: Trends and Intercept

Variable	ADF		I(d)	Philip Perron			
	At Level	1st Difference		At Level	1st difference	I(d)	REMARKS
GDPg	-2.068748*	-7.438364***	I(1)	-1.068748*	-6.528933***	I(1)	Stationary
OilP	-3.196615*	-8.388052***	I(1)	-2.468392*	-9.883622***	I(1)	Stationary
GDS	-2.37534*	-9.289334***	I(1)	-2.45224*	-9.452034***	I(1)	Stationary
USR	-3.425966*	-5.815166***	I(1)	-3.425966*	-7.388232***	I(1)	Stationary
EXR	-1.751079*	-10.58354***	I(1)	-1.63483*	-9.384533***	I(1)	Stationary
ERI	-2.921619	-6.607517***	I(1)	-1.67829 *	-7.679933***	I(1)	Stationary
OilP_ERI	-1.48860	-6.712966***	I(1)	-1.38892	-8.692142***	I(1)	Stationary
GDS_ERI	-1.834692*	-8.284465***	I(1)	-1.914692*	-7.478922***	I(1)	Stationary
USR_ERI	-2.293077*	-8.934895***	I(1)	-2.419303*	-9.479345***	I(1)	Stationary

Significance is indicated as follows: ***, ** and * for 1%, 5% and 10% respectively, all variables are logged
Source: **Researcher's Computation**

Table 3: Cointegrating Equation (Johannsson)

Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.906550	220.6364	125.6154	0.0000
At most 1 *	0.881619	147.1564	95.75366	0.0000
At most 2 *	0.711689	81.00721	69.81889	0.0049
At most 3	0.532236	42.45204	47.85613	0.1465
At most 4	0.462783	35.26389	29.79707	0.4356
At most 5	0.315924	18.89850	22.6278	0.5003

The trace test indicates 3 cointegrating eqn(s) at the 0.05 level.

* denotes rejection of the hypothesis at the 0.05 level; **MacKinnon-Haug-Michelis (1999) p-values

Table 4: FMOLS results

Variable	**GDPg**	**GDPg**
GDPg(-1)	0.639 (0.000)***	0.642 (0.000)***
OilP	-0.257 (0.003)***	-0.135 (0.000)**
GDS	0.387 (0.002)***	0.325 (0.003)***
USR	-0.221 (0.091)*	-0.311 (0.008)*
EXR	0.342 (0.001)***	0.344 (0.005)***
ERI	-	0.453 (0.000)***
OilP_ERI		0.052 (0.000)***
GDS_ERI		0.641 (0.000)***
USR_ERI		0.024 (0.000)***
C	4.525 (0.293)	21.88 (0.043)**
R2	0.8693	0.9138

Significance is indicated as follows: ***, ** and * for 1%, 5% and 10% respectively, p-value in parenthesis.

The Johanson co-integration test presented in Table 4 revealed the existence of three cointegrating series validating a long-run relationship among the variables under estimation since the trace statistics is greater than the 5% critical values in three equations. Having validated the existence of a long-run relationship, the study proceeds to estimate the models using FMOLS. Since the variables are all differenced before being stationary, the researchers used the difference version of FMOLS to estimate each of the models.

The FMOLS analysis revealed that a one percent increase in the lagged value of GDP growth rate from the previous year leads to a corresponding increase of 0.639 percent in the current GDP growth rate. This finding suggests a positive and significant relationship between the lagged GDP growth rate and the current GDP growth rate, indicating a degree of persistence in economic growth over time. Such results imply that past economic performance can have a notable impact on present economic conditions, emphasizing the importance of considering historical trends and patterns in forecasting future economic outcomes.

The analysis also indicated that a one percent increase in oil price results in a decrease of 0.257 percent in economic growth. This finding suggests a negative and statistically significant relationship between oil prices and economic growth in the context of the study. The finding is theoretically and empirically consistent. Positive oil price shock can cause economic growth to slow down given that its increases the cost of production forcing firms to cut down on production which can slow down economic activities The result further revealed that a one percent increase in global demand shock results in an increase of 0.387 percent in economic growth. This finding suggests a positive and statistically significant relationship between global demand shocks and economic growth in the context of the study. The positive impact of global demand shocks on economic growth

underscores the importance of external demand dynamics in driving economic activity, particularly in an open economy like Nigeria. The finding is consistent with previous empirical studies in Nigeria such as **Ikechi & Anthony (2020)**, **Akinsola & Odhiambo (2020)**, **Odhiambo (2020)** and **Omitogun et al. (2021)**.

The result also indicated that the US federal funds rate does not exert a significant impact on Nigeria's economic growth at the 5% level of significance. However, the expected negative relationship between the US federal funds rate and Nigeria's economic growth was observed. This finding suggests that changes in the US federal funds rate may not significantly influence economic growth in Nigeria, highlighting the relative independence of Nigeria's monetary policy from US monetary policy decisions. Additionally, the model revealed that a one percent increase in the exchange rate (appreciation of the naira relative to the dollar) leads to an increase in economic growth by 0.342 percent. This result implies that a stronger domestic currency may positively contribute to economic growth by enhancing purchasing power and promoting investment, although further analysis may be needed to explore the underlying mechanisms driving this relationship.

In the second model, economic resilience was introduced as a factor influencing Nigeria's economic growth. The results indicated that economic resilience has a significant impact on Nigeria's economic growth, with a one percent increase in the economic resilience index corresponding to a 0.453 percent increase in economic growth, aligning with theoretical expectations. Furthermore, when economic resilience was interacted with oil prices, a one percent rise in the interactive term led to a 0.052 percent increase in economic growth. The implication is that economic resilient index influence on economic growth outweigh the influence of oil price on Nigeria economic growth which explains why the original negative relationship turns positive. Similarly, when economic resilience was interacted with global demand, a one percent rise in the interactive term resulted in a 0.641 percent increase in economic growth, consistent with theoretical expectations. Lastly, the interaction between economic resilience and the US federal funds rate revealed that a one percent rise in the interactive term led to a 0.024 percent increase in economic growth. These findings underscore the importance of economic resilience in buffering against external shocks and promoting sustainable economic growth in Nigeria.

5. Conclusion and Policy Implication

The study examined the moderating effect of economic resilience on the nexus between external shock and Nigeria economic growth. Specifically, our study provides valuable insights into the determinants of economic growth in Nigeria and sheds light on the role of economic resilience in mitigating the impacts of external shocks. The results highlight the significant influence of lagged GDP growth rate, oil prices, global demand shocks, exchange rates, and economic resilience on Nigeria's economic growth dynamics. Particularly noteworthy is the positive impact of economic resilience on economic growth, emphasizing the importance of fostering resilience-building measures to enhance Nigeria's capacity to withstand external shocks and promote sustainable development.

Policy implications arising from these findings suggest the need for proactive measures to bolster economic resilience through targeted policies aimed at diversifying the economy, enhancing productivity, and strengthening institutional frameworks. Additionally, policymakers should pay close attention to global economic conditions, particularly oil prices and global demand dynamics, and implement strategies to mitigate their adverse effects on Nigeria's economy. Moreover, efforts to maintain exchange rate stability and improve monetary policy effectiveness should be pursued to support sustained economic growth. Overall, the findings underscore the importance of adopting a comprehensive approach to economic management that integrates resilience-building strategies with sound macroeconomic policies to foster inclusive and resilient economic growth in Nigeria.

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