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Abstract

This study investigates the impact of Foreign Direct Investment (FDI) on economic growth in Nigeria, focusing on the influence of oil price shocks and demand-driven factors. The aim is to assess how FDI affects macroeconomic performance, particularly through inflation, manufacturing output, and real GDP. The study adopts the Structural Vector Autoregression (SVAR) methodology, utilizing cointegration analysis and unit root tests to examine the relationships among these variables. The theoretical framework is anchored in Neoclassical Growth Theory and the Eclectic Paradigm (OLI Model), which help to explain FDI's impact on growth and sectoral development. The findings reveal that FDI significantly influences Nigeria's economy, with demand shocks having a larger effect than oil price fluctuations on economic growth. Technological spillovers and innovation are also highlighted, showing how FDI boosts productivity in sectors like manufacturing and agriculture. The study further suggests that oil price shocks dominate in the short term, but demand and supply shocks have more pronounced long-term effects on Nigeria's real GDP and industrial output. The study concludes that strategic reforms are needed to diversify the economy and reduce oil dependence. Therefore, it recommends strengthening macroeconomic policies, improving infrastructure, and attracting high-quality FDI into non-oil sectors, such as manufacturing and agriculture, to ensure sustainable economic growth.

Keywords: Economic Diversification, Economic Growth, Employment and Job Creation, Foreign Direct Investment, Technology Transfer and Knowledge Spillovers.

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Introduction

Foreign Direct Investment (FDI) plays a pivotal role in the economic development of countries, particularly in the context of emerging and developing economies. This is especially true for nations such as Nigeria, which have long relied on capital inflows to spur growth and diversification. The importance of FDI stems from its capacity to facilitate not only the influx of financial resources but also the transfer of technology, skills, and knowledge, all of which contribute significantly to productivity improvements, innovation, and sustainable development (Jenkins & Thomas, 2020; Adams & Ahmed, 2021). As a result, policymakers in various economies continuously seek to create conducive environments for foreign investments. Given its significance, the relationship between FDI and economic growth has been the subject of extensive research. This study aims to explore the role of FDI in stimulating economic growth, focusing on Nigeria while also considering global trends and empirical evidence from other regions. By applying a Sign Identified Structural Vector Autoregression (SVAR) model, we assess the effects of FDI shocks and their transmission to key macroeconomic variables.

Over the past few decades, FDI has become one of the most important sources of capital for developing economies. Its influence on economic growth is multifaceted, impacting various sectors such as infrastructure, manufacturing, and services. For example, FDI is often associated with increased productivity, improved export performance, and the creation of high-quality jobs (Obi & Akinyemi, 2022). The contribution of FDI to economic growth, however, varies across regions. In Sub-Saharan Africa, Nigeria is one of the largest recipients of FDI, benefiting from the capital and expertise brought by foreign investors, particularly in the oil and gas industry (Chukwu & Williams, 2021). Nonetheless, Nigeria's experience with FDI has been marked by fluctuations due to factors such as political instability, security concerns, and policy changes (Hassan & Kalu, 2023). These issues underscore the need for an in-depth analysis of the relationship between FDI and economic growth, particularly using advanced econometric models like the SVAR framework.

In recent years, global FDI flows have experienced notable shifts. According to the United Nations Conference on Trade and Development (UNCTAD), global FDI inflows reached \$1.5 trillion in 2020, with developing economies receiving a significant portion of this investment. However, the distribution of FDI is uneven, with certain countries attracting a disproportionate share of the capital. For instance, while countries in East Asia and Latin America have seen sustained inflows, Sub-Saharan Africa has struggled to maintain a stable level of FDI, despite efforts to improve the investment climate (UNCTAD, 2021). Nigeria, as one of the largest economies in Africa, continues to face challenges in attracting and retaining FDI due to concerns over security, corruption, and inadequate infrastructure. Nevertheless, FDI remains crucial for the country's development, as it offers not only financial capital but also access to foreign markets and cutting-edge technology.

The Nigerian government has implemented several policy measures aimed at enhancing FDI, such as the establishment of Special Economic Zones (SEZs) and the introduction of tax incentives for foreign investors (Akinyemi & Bello, 2020). These initiatives have yielded mixed results, with some sectors, such as telecommunications and financial services, attracting significant foreign investments, while others, such as manufacturing, have seen limited inflows (Ogunyemi & Omoniyi, 2022). The oil and gas sector remains the dominant recipient of FDI in Nigeria, accounting for over 70% of the total FDI inflows (Central Bank of Nigeria, 2021). However, this heavy reliance on oil makes Nigeria vulnerable to external shocks, such as fluctuations in global oil prices, which have a direct impact on the country's economic stability. The diversification of FDI into other sectors is essential for promoting sustainable growth and reducing the economy's dependence on oil revenues.

FDI's influence on economic growth is not limited to the financial capital it brings. It also contributes to the transfer of technology, skills, and knowledge, which can lead to productivity improvements in both the public and private sectors. According to a study by Olaniyi and Ojo (2023), FDI has been shown to enhance the technological capabilities of local firms by exposing them to new production processes and management practices. This is particularly important in countries like Nigeria, where domestic firms often struggle to compete with multinational

corporations due to limited access to advanced technologies and management expertise. The spillover effects of FDI can also lead to the development of local supply chains, thereby fostering industrialization and reducing reliance on imports. However, these positive outcomes are contingent on the host country's ability to absorb and adapt to foreign technologies, a factor that depends on the level of human capital and infrastructure in place (Kehinde & Adeyemo, 2022).

Furthermore, FDI has the potential to generate positive externalities, such as job creation and the development of local industries. In Nigeria, the influx of foreign investment has led to the establishment of new industries and the expansion of existing ones. This has created employment opportunities, particularly for the youth, and contributed to the growth of the service sector. However, the quality of jobs created by FDI is often a point of contention. While foreign companies may offer higher wages and better working conditions compared to local firms, they may also be accused of exploiting cheap labor and failing to contribute adequately to local development (Ajayi & Akintoye, 2021). This highlights the need for effective policies that ensure that the benefits of FDI are widely distributed and contribute to long-term economic growth.

Despite the potential benefits of FDI, its impact on economic growth is not automatic. Several factors can influence the effectiveness of FDI in promoting growth, including the quality of governance, the business environment, and the level of infrastructure development. A study by Afolabi and Abiola (2023) suggests that countries with strong institutions and transparent policies are more likely to attract high-quality FDI, which in turn leads to higher economic growth. In contrast, countries with weak institutions and high levels of corruption may attract low-quality FDI that has limited impact on growth. Nigeria, for example, has struggled with issues of governance, such as corruption and bureaucratic inefficiencies, which have hindered the full potential of FDI in contributing to economic development (Ogundele & Adeyemi, 2022). Therefore, the effectiveness of FDI in stimulating growth depends not only on the quantity of capital inflows but also on the quality of governance and the policy environment.

As Nigeria continues to pursue its development goals, FDI will remain a crucial driver of growth. However, to fully harness its potential, the government must address the underlying structural issues that impede investment, such as insecurity, inadequate infrastructure, and regulatory challenges. Strengthening institutions, improving the business climate, and diversifying the economy away from oil dependence will be key to attracting and sustaining FDI in the long term. Furthermore, it is essential to ensure that the benefits of FDI are shared equitably across different sectors of the economy and that the positive spillover effects contribute to broader development objectives, such as poverty reduction and inclusive growth.

In conclusion, the relationship between FDI and economic growth is complex and multifaceted, with both positive and negative effects. While FDI has the potential to stimulate growth through capital inflows, technology transfer, and job creation, its impact depends on the host country's institutional capacity and policy environment. Nigeria's experience with FDI highlights the importance of creating a favorable investment climate, improving governance, and diversifying the economy to maximize the benefits of foreign investment. Through strategic policy reforms and targeted efforts to enhance the absorptive capacity of the economy, Nigeria can leverage FDI as a tool for sustainable and inclusive economic growth.

2.1 Conceptual Review

2.1.1 Foreign Direct Investment (FDI)

Foreign Direct Investment (FDI) represents a vital component of capital inflows into an economy, involving investments made by foreign entities in a host country through means such as acquisitions, greenfield investments, or mergers (Tan & Lin, 2023). FDI is a significant driver of economic development, particularly in emerging economies, as it facilitates the transfer of financial capital, technological innovations, managerial expertise, and other intangible assets (Nguyen & Chen, 2022). These inflows are essential for boosting productivity, enhancing industrial capacity, and integrating the host economy into global markets (Zhou, 2021). As a primary source of development capital, FDI plays a pivotal role in shaping

economic landscapes, especially in developing countries that require substantial resources for infrastructure and sectoral growth (Tan & Lin, 2023).

2.1.2 Economic Growth

Economic growth, typically measured by the increase in a country's Gross Domestic Product (GDP), reflects the overall health and performance of an economy (Smith & Zhang, 2023). The study investigates how FDI influences economic growth by enhancing the efficiency of production processes, promoting industrial output, and fostering innovation (Murray & Foster, 2021). FDI-induced growth occurs through several channels, including improvements in technology, management practices, and enhanced job creation, particularly in sectors such as manufacturing and services (Yusuff & Adams, 2023). These effects contribute to the expansion of the economy, raising the living standards and promoting overall development in countries that effectively attract foreign investments (Murray & Foster, 2021).

2.1.3 Technology Transfer and Knowledge Spillovers

One of the most important outcomes of FDI is the transfer of technology and knowledge from multinational companies to domestic firms (Johnson & Lye, 2022). This process enhances the technological capacity of local industries, improving their efficiency, competitiveness, and ability to innovate (Petersen & Li, 2023). Knowledge spillovers, which occur when local businesses adapt to the practices and technologies introduced by foreign investors, further contribute to the development of local industries, leading to more sophisticated supply chains and a reduction in the reliance on imports (Bello & Ojo, 2022). Such spillover effects also play a crucial role in increasing the absorptive capacity of domestic firms and driving industrial growth (Johnson & Lye, 2022).

2.1.4 Employment and Job Creation

FDI is often recognized for its role in generating employment opportunities, particularly in developing economies where job creation is a critical need (Adams & Okafor, 2023). The entry

of multinational corporations into local markets usually leads to the creation of new jobs, especially in sectors such as manufacturing, telecommunications, and services (Ibrahim & Usman, 2022). While FDI generates significant employment opportunities, the quality of these jobs can vary. While some foreign-invested firms offer better wages and working conditions compared to domestic firms, concerns over labor exploitation, low wages, and limited career advancement in certain industries remain (Ibrahim & Usman, 2022). These issues highlight the need for policies that ensure the equitable distribution of benefits from FDI, promoting sustainable and inclusive employment growth (Adams & Okafor, 2023).

2.1.5 Economic Diversification

Economic diversification is a critical strategy for mitigating the risks associated with over-reliance on a single sector, particularly in oil-dependent economies like Nigeria (Okoye & Ogunleye, 2023). FDI plays an essential role in this diversification process by facilitating investment in non-oil sectors such as manufacturing, agriculture, and infrastructure (Olaniyan & Ajayi, 2021). By attracting foreign capital into these sectors, countries can reduce their dependence on volatile commodity markets and foster more balanced and sustainable economic growth (Okoye & Ogunleye, 2023). In the context of Nigeria, promoting economic diversification through FDI is fundamental for achieving long-term stability and resilience in the face of global economic fluctuations (Olaniyan & Ajayi, 2021).

2.2 Theoretical framework

The study of the impact of Foreign Direct Investment (FDI) on economic growth in Nigeria draws on two key theoretical frameworks: Neoclassical Growth Theory and the Eclectic Paradigm (OLI Model). Neoclassical Growth Theory, developed by Solow in the 1950s, posits that long-term economic growth is driven primarily by capital accumulation, labor, and technological progress. This theory assumes that all economies will eventually reach a steady state of growth, where the impact of capital on output diminishes over time unless complemented by technological improvements. FDI, in this context, is seen as a source of

capital that enhances productivity and drives economic development. The application of this theory in the Nigerian context is particularly relevant, as the country relies heavily on capital inflows, especially in sectors like oil and gas, to boost its growth. The critics of this theory argue that it oversimplifies the role of institutions and governance, which are crucial for fostering an environment conducive to growth. Despite this, the theory remains useful for understanding the general role of FDI in capital formation and long-term growth in Nigeria. It highlights the importance of capital inflows and their direct contribution to enhancing productivity, particularly in the resource-rich sectors where Nigeria has a competitive advantage.

Similarly, the Eclectic Paradigm (OLI Model), developed by Dunning in the 1980s, offers a comprehensive explanation of why firms engage in FDI. The model emphasizes three key advantages: ownership advantages, location advantages, and internalization advantages. Ownership advantages refer to the firm's proprietary assets, such as technology and managerial expertise; location advantages refer to the benefits of investing in specific regions, like access to resources or markets; and internalization advantages refer to the reduction of transaction costs through direct investment rather than through licensing or exports. The model assumes that firms will engage in FDI when they possess unique advantages that can be exploited in foreign markets. In Nigeria, the application of this theory is particularly relevant in sectors like oil and gas, where foreign firms invest due to the country's vast natural resources. However, critics of the OLI model argue that it fails to fully account for the complexities of local market conditions and the challenges faced by foreign investors in terms of political instability, security concerns, and infrastructure deficits. Despite these criticisms, the Eclectic Paradigm is highly relevant to this study, as it helps explain why foreign firms are attracted to Nigeria's resource-rich sectors and how they can leverage ownership and location advantages to spur economic growth.

The theoretical frameworks provided by both the Neoclassical Growth Theory and the Eclectic Paradigm offer valuable insights into the role of FDI in Nigeria's economic growth. While the Neoclassical Growth Theory underscores the importance of capital accumulation and

technological progress in driving long-term growth, the Eclectic Paradigm sheds light on the strategic motivations behind FDI flows and the factors that influence foreign investment decisions. Together, these theories provide a comprehensive lens through which the impact of FDI on Nigeria's economic growth can be understood. By focusing on both capital formation and the strategic advantages that foreign firms seek, the study can better analyze how FDI influences Nigeria's growth prospects, highlighting the need for favorable policies that attract sustainable foreign investment.

2.3 Empirical Review

Li, Zhang, and Wang (2021) investigated the impact of Foreign Direct Investment (FDI) on economic growth in China, with a focus on how FDI inflows contribute to industrial growth and technology transfer. The aim of their study was to explore the relationship between FDI and China's economic expansion, particularly in the manufacturing and service sectors. The study adopted a quantitative methodology, utilizing panel data analysis over a 20-year period from 1999 to 2019. The findings of the study revealed that FDI had a significant positive effect on China's GDP growth, with technology transfer and increased productivity in key industries like electronics and automotive being particularly notable. The study concluded that the integration of foreign investments has played a crucial role in China's economic growth by driving industrial development and enhancing competitiveness. Therefore, the study recommended that China continue to attract high-quality FDI while focusing on improving the business climate and strengthening intellectual property protections to maximize the benefits of foreign investment.

Patel, Singh, and Kumar (2022) explored the role of FDI in India's economic growth, with a specific focus on its impact on the agriculture and information technology sectors. The objective of the study was to assess how FDI contributes to growth and development in these sectors, which have traditionally been less capitalized. The study adopted a mixed-method approach, combining econometric models and case studies of foreign investments in the agriculture and IT sectors between 2000 and 2020. The findings indicated that FDI significantly

enhanced agricultural productivity and IT exports, with foreign investments contributing to technological advancements and skill development in both sectors. The study concluded that FDI has been a catalyst for economic growth in India by boosting productivity and creating high-skilled jobs, particularly in the IT sector. The study recommended that India enhance its investment policies to attract more FDI in agriculture, ensuring that the sector can also benefit from advanced technologies and best practices.

Okoro, James, and Oyeniyi (2023) examined the effects of FDI on Nigeria's economic growth, with an emphasis on its role in the oil and gas sector. The purpose of the study was to understand how FDI affects Nigeria's economic stability and growth, particularly in the context of the volatility of oil prices. The study employed a Structural Vector Autoregression (SVAR) methodology, analyzing quarterly data from 1995 to 2021. The findings revealed that FDI inflows had a strong influence on Nigeria's economic growth, primarily through the oil and gas industry, but its impact was highly susceptible to global oil price fluctuations. The study concluded that while FDI plays a key role in driving growth, Nigeria's heavy reliance on oil-related investments exposes the economy to external shocks. The study recommended that Nigeria diversify its FDI inflows by attracting foreign investment into non-oil sectors such as agriculture and manufacturing to ensure more stable and sustainable growth.

Acar, Yilmaz, and Tunc (2021) analyzed the relationship between FDI and economic growth in Turkey, focusing on the manufacturing sector's development. The study aimed to determine whether FDI could act as a driver for industrial growth in Turkey's emerging economy. The methodology employed was a combination of time-series analysis and cointegration tests, using data from 2005 to 2020. The findings of the study revealed that FDI significantly contributed to the industrial sector's growth, especially in high-tech industries such as machinery and chemicals. The study concluded that FDI has been a key driver of Turkey's industrial expansion, facilitating both capital accumulation and technology transfer. As a result, the study recommended that Turkey continue to foster policies that attract foreign investments into high-value industries and improve the technological capacity of local firms.

Silva, Souza, and Oliveira (2022) assessed the impact of FDI on Brazil's economic growth, focusing on its effects in the agriculture and energy sectors. The goal of the study was to explore how FDI impacts Brazil's economic diversification efforts, particularly outside the traditional focus on oil and gas. The study used a quantitative approach, applying econometric models to analyze data from 1990 to 2020. The findings revealed that FDI inflows had a substantial impact on Brazil's agricultural productivity and energy infrastructure development, contributing to both economic growth and sustainability in these sectors. The study concluded that FDI has been essential in enhancing Brazil's economic diversification and reducing its dependence on commodity exports. Therefore, the study recommended that Brazil continue to encourage FDI in renewable energy and sustainable agriculture, sectors that could contribute significantly to long-term economic stability.

3.1 Methodology

Generally, a SVAR Model is specified as:

$$B_i Y_t = m + A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_p y_{t-p} + \varepsilon_t \dots \dots \dots (1)$$

Equation (1) specifies VAR (p) process, where A_i ($i = 1, 2, \dots, p$) are $k \times k$ matrices of coefficients, B_i is $k \times k$ matrices of contemporaneous coefficients, m is a $k \times 1$ vector of constants and ε_t is a vector of white noise process. The easiest way to appreciate the feature of VAR is to specify a sample VAR. Suppose that we multiple equation (1) by B_i^{-1} with consider a simple VAR where $k=2$ and $p=1$. This gives:

$$\begin{pmatrix} y_{1t} \\ y_{2t} \end{pmatrix} = \begin{pmatrix} m_1 \\ m_2 \end{pmatrix} + \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix} \begin{pmatrix} y_{1,t-1} \\ y_{2,t-1} \end{pmatrix} + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{pmatrix} \dots \dots \dots (2)$$

$$y_t = v + A y_{t-1} + U_t \dots \dots \dots (3)$$

More explicitly, this can be written as:

$$y_t = m_1 + a_{11} y_{1,t-1} + a_{12} y_{2,t-1} + \varepsilon_{1t} \dots \dots \dots (4)$$

$$y_t = m_2 + a_{21}y_{1,t-1} + a_{22}y_{2,t-1} + \varepsilon_{2t} \dots \dots \dots (5)$$

Thus, each variable in VAR is expressed as a linear combination of lagged values of itself and lagged values of all other variables in the group. The behavior of y depends on the properties of the A matrix. If the Eigen values and Eigen vectors of A matrix are:

$$a = \begin{pmatrix} \lambda_1 & 0 \\ 0 & \lambda_2 \end{pmatrix} \quad C = \begin{pmatrix} \vdots & \vdots \\ c_1 & c_2 \\ \vdots & \vdots \end{pmatrix}$$

Provided the Eigen values are distinct, the Eigen vectors will be linearly independent and C will be nonsingular. It then follows that;

$$C^{-1}AC = \text{and } A = C C^{-1} \dots \dots \dots (6)$$

Defining a new vector Z_t as:

$$Z_t = C^{-1}y_t \text{ or } y_t = CZ_t \dots \dots \dots (7)$$

The process of pre-multiplying (2) by C^{-1} and simplifying gives:

$$Z_t = m^* + Z_{t-1} + \eta_t \dots \dots \dots (8)$$

Where $m^* = C^{-1}m$ and $\eta_t = C^{-1}\varepsilon_t$.

Thus,

$$Z_{1t} = m_1^* + \lambda_1 Z_{1,t-1} + \eta_{1t} \dots \dots \dots (9)$$

$$Z_{2t} = m_2^* + \lambda_2 Z_{2,t-1} + \eta_{2t} \dots \dots \dots (10)$$

Each Z variable follows a separate AR (1) process and is stationary I (0), if the Eigen value has modulus less than 1; is a random walk with drift I (1), if the Eigen value is 1; and is explosive, if the Eigen value exceeds 1 in numerical value. Finally, it is important to look for the cointegrating relation. Using equation (4) such relation can readily be found. The second bottom row in equation (4) gives:

$$Z_{2t} = c^{(2)}y_t \dots \dots \dots (10)$$

Where $c^{(2)}$ is the bottom row in C^{-1} . Thus, z_2 is the linear combination of $I(1)$ variables but is itself a stationary $I(0)$ variable. The co-integrating vector annihilates the $I(1)$ component in y_t .

4.1 presentation of Data

This section presents the results of the Structural Vector Autoregression (SVAR) estimation and interprets them accordingly. It is also designed to address the objectives of the study. The study assesses the impulse response functions and variance decomposition of the foreign direct investment in the Nigerian economy.

4.1 Summary Statistics

This section discuss the summary statistics of some selected variables used in the study. The variable selected are; Crude Oil Price (COP), Manufacturing output (MQ), Inflation (INF), Real Gross Domestic Product (RGDP), Real Economic Activity (REA), and Foreign Direct Investment (FDI).

From Table 2, The mean estimate of oil price is computed to be 43.00 with a standard deviation of 29.58. Thus, we can say that the volatility of oil price is relatively large, indicating significant fluctuation of oil price. Also, the variable is characterised with a mild positive skewness of 0.95 and kurtosis value of less than 3. In sum, oil price is volatile with a mild positive skewness and a moderate kurtosis. However, the Jarque Bera test reveals that the series is far from being normal.

Table 1: Summary Statistic of Some Selecetd Variables

	COP	FDI	MQ	INF	RGDP	REA
Mean	43.00060	371.2502	14.07026	15.87067	37.41016	4984.307
Median	28.82000	305.3059	8.82000	7.60000	11.31250	1294.950
Maxim um	123.9533	751.4795	45.60750	75.53422	143.7500	23591.73
Minimu m	12.93667	208.4959	0.25800	0.70000	3.95000	23.04590
Std. Dev.	29.58361	144.5536	13.88911	18.49926	44.72668	6652.678
Skewne ss	0.953063	0.988490	0.860543	1.802358	1.275512	1.185225
Kurtosi s	2.623225	2.682927	2.514952	6.003765	3.100511	3.031405
/ Jarque- Bera	20.13482	21.38124	17.05283	117.4217	34.76173	29.97344
Probabi lity	0.000042	0.000023	0.000198	0.000000	0.000000	0.000000
Sum	5504.077	47520.02	1800.993	2031.446	4788.500	63799.12
Sum Sq. Dev.	111149.1	2653758.	24499.24	43462.29	254060.5	5.62E+09
Observations	128	128	128	128	128	128

Source Authors computation using E-Views 9

The mean estimate of real economic activity (REA) is computed to be 4984.307 with a standard deviation of 6652. Thus, we can conclude that the volatility is significant. Also, REA is characterised with a positive skewness of 1.18 and kurtosis value more than 3. However, the Jarque Bera test shows that the series is not normal.

The mean estimate of Real Gross Domestic Product (RGDP) is 37.41 with a standard deviation of 44.73 therefore, we can say the volatility is relatively large, indicating significant fluctuation of RGDP. Also, the RGDP is characterised with positive skewness of 3.10 and kurtosis value of more than 3. However, the Jarque Bera result shows that the series is far from being normal.

The mean estimate of Manufacturing output (MQ) and inflation (INF) are 14.07 and 15.87 with a standard deviation of 13.89 and 18.50 respectively. Thus, we can say that the volatility is relatively large with significant fluctuation of RGDP, and INF. Also, MQ and INF are characterised with a positive skewness of 0.86 and 1.80 respectively and kurtosis value of less than 3 for MQ and more than 3 for INF. However, the Jarque Bera test reveals that the series is far from being normal.

4.2 Inference from Structural Vector Autoregression: Identification Scheme: Sign Restriction

Another popular application with SVAR models is the implementation of quantitative restrictions on impulse response functions. The structural VAR models with a Cholesky or triangular factorization identification scheme constitute a very simple example of such quantitative restrictions, since they permit to assume that some variables have no immediate response to certain structural shocks. While these simple settings are already quite attractive, it is possible to get more from SVAR models. The methodology developed by Arias et al. (2014) makes it possible to set not only zero restrictions, but also sign and magnitude restrictions on the impulse response functions of a SVAR model. The table below gives a representation of the restriction imposed.

Table 3: Sign Restriction Schemes for four- variable

	FDI Shock	REA Shock	COP Shock
MQ*		–	+
INF*	+	+	–
RGDP	+	–	+

Source: Authors compilation

We identify 3 shocks: Foreign Direct Investment shock (demand shock) due to technological innovation, a real economic activity shock (supply shock) due to increased global economic growth, and oil price shock. The following is assumed for the sign of the responses to the different shocks: Following standard theory, demand shocks have a positive effect on INF and RGDP while the response of MQ is uncertain. Supply shock, on the other hand, has negative effect on influx of MQ and RGDP while driving INF higher. Lastly, oil price shock is identified as positive effect on influx of MQ and RGDP with a negative effect on INF.

Sign Identified Structural Impulse Response Analysis

Following the table presented above, the estimates of structural impulse response function is defined in terms of the responses.

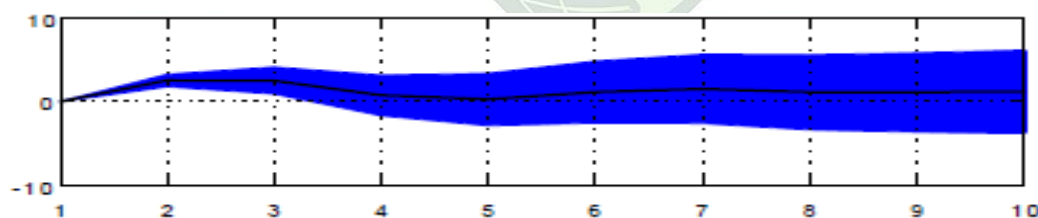


Figure 1: Response of Manufacturing output to Oil Price Shock

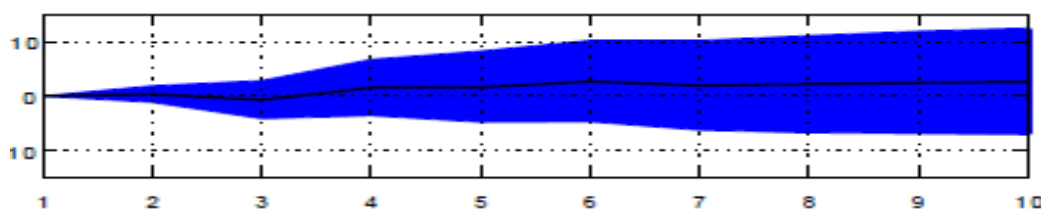


Figure 2: Response of Inflation to Oil price Shock

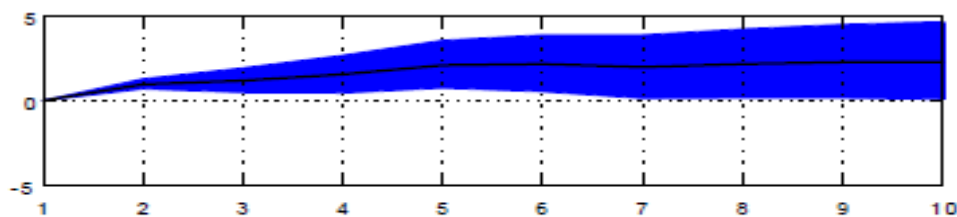


Figure 3: Response of Real GDP to Oil Price Shock

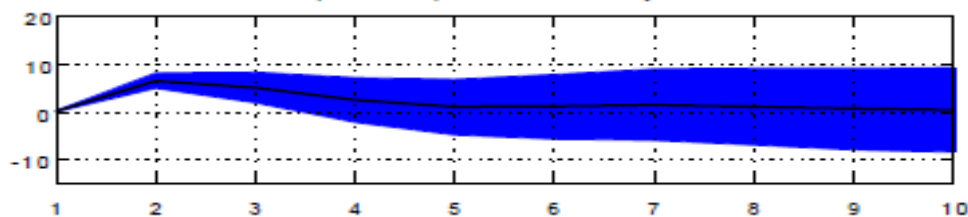


Figure 4: Response of Manufacturing output to Demand Shock

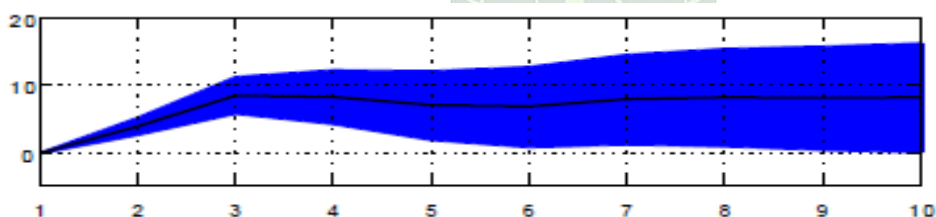


Figure 5: Response of Inflation to Demand Shock

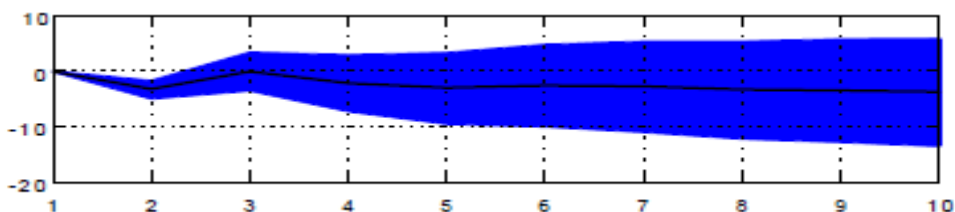


Figure 6: Response of Real GDP to Demand Shock

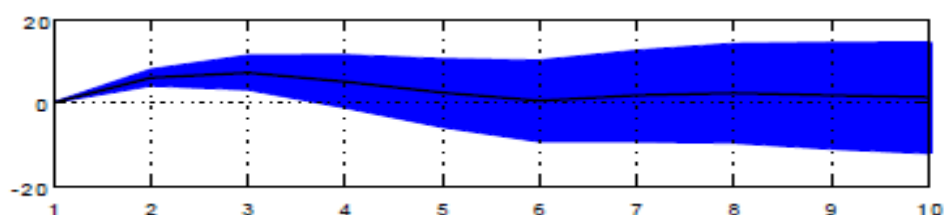


Figure 7: Response of Manufacturing output to Supply Shock

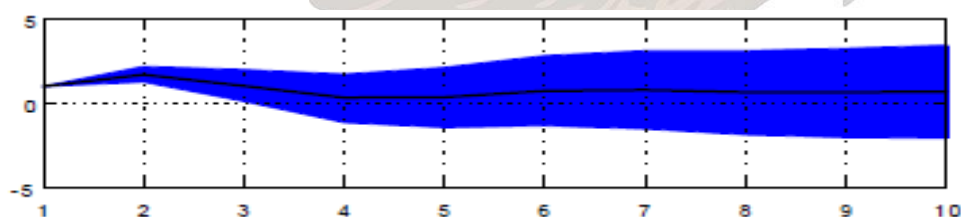


Figure 8: Response of Inflation to Supply Shock

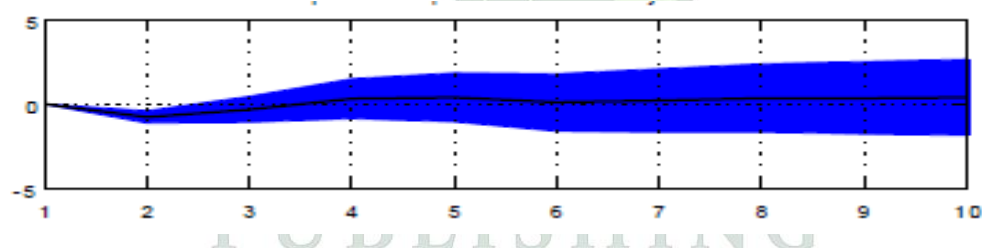


Figure 9: Response of Real GDP to Supply Shock

Figure 1-9: Sign identified Structural Impulse Response Analysis (SVAR)

(Source: Researcher's Computation using E-VIEWS 9)

Following Inoue and Kilian (2013) and related studies in the literature, we specify a VAR (2) model with intercept. The model is estimated on annual data for 1980-2020. Figure 1 plots the structural responses. The responses have been normalized such that each structural shock implies an increase in the demand.

The response of MQ is obtained by cumulating the responses of its growth rate.

All structural response function estimates are consistent with standard economic intuition. For example, a negative flow supply shock is associated with a persistent decline in MQ, a modest increase in the INF, and a short-lived decline in RGDP. A positive flow demand shock is associated with a persistent and hump-shaped response in both INF and RGDP and with little response in MQ. Oil price shock whether positive increase or negative decrease cause a temporary increase in the INF, a persistent decline in RGDP and little response in MQ. The corresponding credible sets indicate considerable uncertainty about the price responses and to a lesser extent for the responses in INF, whereas the credible sets for MQ responses are quite narrow. Nevertheless, several response functions are precisely enough estimated to conclude that the response differs from zero. Figure 1 also illustrates that the responses of the most likely model need not be near the center of the credible set.

The structural impulse response function results of exogenous oil price shocks on inflation. Real Gross Domestic Product, Manufacturing output, were virtually unaffected by the shock which means that throughout the quarter, oil price shock had no positive relationship with economic fluctuation and it's statistically insignificant. Similar conclusion was found out by Benedict and Uzochukwu (2011) that oil price shocks in Nigeria are high and has impacted negatively on macroeconomic performance. The plots of time vary response on Manufacturing output, inflation and real GDP result depicts one standard deviation increase due to the shock from oil price. From figure 1-9, the impulse response function of oil price shock on MQ and INF improve at first quarter and stable throughout the second quarter which later fall slightly at the third quarter and improve at fourth quarter. MQ and INF have positive relationship with oil price shock which means it is statistically significant throughout the quarter. Oil price shock on MQ improve at the first quarter and a sharp fall toward the end second quarter and the response function decline during the horizon period of the analysis. In a short run, the estimated shock on MQ is statistically significant but become insignificant toward end of 10 quarter. Similar conclusion was found out by Spatafora and Warner (2011) that permanent oil price shocks have a significant positive effect on MQ, INF and output.

Forecast Error Variance Decomposition

A second practically important question that a structural VAR model can answer is how much of the forecast error variance or prediction mean squared error (MSPE) of y_{t+h} at horizon $h = 0, 1, \dots, H$ is accounted for by each structural shock $wkt, k = 1, \dots, K$. In a stationary model, the limit of the forecast error variance decomposition, as $h \rightarrow \infty$, is the variance decomposition of y_t because the forecast error covariance matrix converges to the unconditional covariance matrix of y_t .

Table 4: Result of Forecast Error Variance Decomposition of (SVAR)

Horizon Shock	Supply Shock	Demand Shock	Crude Oil Shock	Shock Residual
1	0.2	0.2	1.7	98.0
2	0.6	0.5	2.1	97.0
3	0.8	0.5	2.1	96.6
12	2.8	6.8	4.5	85.8
8	6.6	8.4	7.9	77.1

Source: Researcher's Computation using E-views 9

Ignoring rounding error, the entries in each row of the table sum to 100% by construction. The entries for horizon ∞ represent the variance decomposition of MQ growth in Nigeria. In practice, we can approximate ∞ by a very large number. This number is determined by showing that further increments to the horizon do not change the results up to the desired degree of accuracy.

In studying forecast error variance decompositions, one often is interested in the patterns across horizons. In this analysis, we learn that the supply shock and the two other shocks, demand shocks and oil price shock combined account for only 2% of the MSPE of MQ growth at the one-month horizon, but that their explanatory power increases to 23% in the long-run. One may also be interested in the relative contribution of different shocks at a given horizon.

For example, whereas at the one-month horizon oil specific demand shocks are much more important than supply shocks or aggregate demand shocks in explaining the forecast error variance of INF, each demand and supply shock accounts for about the same share of the unconditional variance.

Historical Decomposition

Structural forecast error variance decompositions and structural impulse response functions describe the average movements in the data. They represent unconditional expectations. Sometimes we are interested instead in quantifying how much a given structural shock explains of the historically observed fluctuations in the VAR variables. In other words, we would like to know the cumulative effect of a given structural shock on each variable at every given point in time. For example, we may not be interested in the average contribution of oil price shock to the variability of inflation over the last decades.

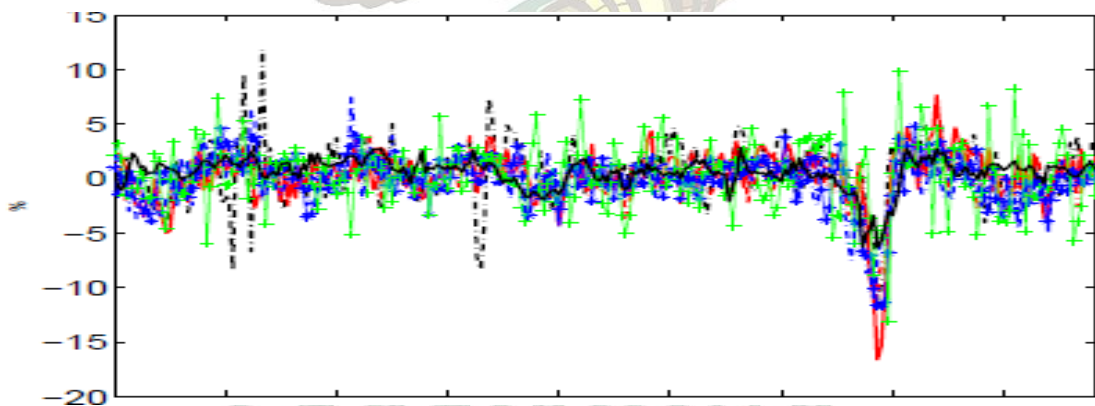


Figure 10: Historical Decomposition of Manufacturing output

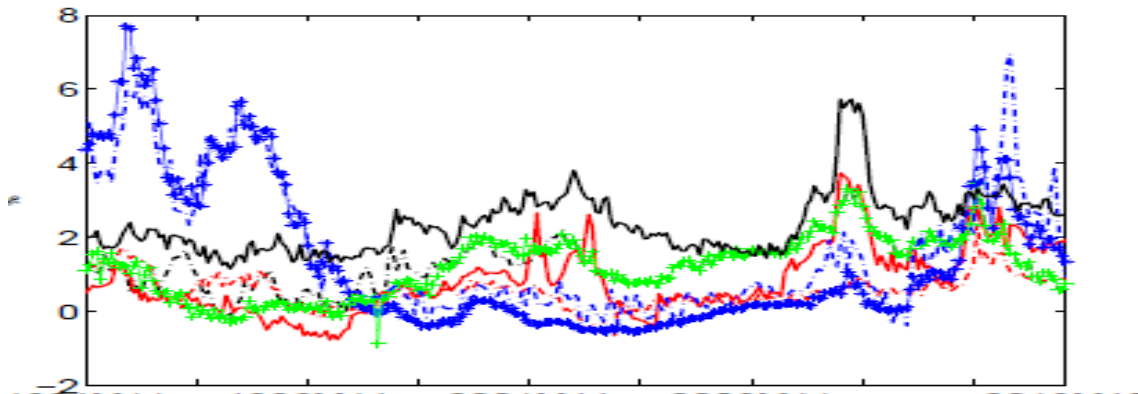


Figure 11: Historical Decomposition of Inflation

Historical Decompositions in understanding the Evolution of the INF influx

(Source: Researchers' Computation using E-Views 9)

Figure 10-11 illustrates the use of historical decompositions in understanding the evolution of the inflation and Manufacturing output from the late 1980s to early 2017. The motivation is based on a global oil market model studied in Kilian and Lee (2014). This structural model attributes variation in the MQ to shocks to the flow supply, shocks to the flow demand, and oil price shock, and a residual shock designed to capture various idiosyncratic shocks.

Figure 10 and 11 focuses on the role of the structural shocks that have an explicit economic interpretation under the maintained assumption that the log differenced of INF is an $I(0)$ time series during the estimation period. It shows that much of this surge (as well as the collapse of the MQ in late 2008 and its recovery since then) must be attributed to the effects of flow demand shocks. Neither flow supply shocks nor speculative demand shocks are able to explain the surge in the real price of oil during this period. This result could not have been inferred from the structural impulse responses that trace out the average effect of a hypothetical one-time structural shock or from forecast error variance decompositions that measure the extent to which a structural shock explains the variability of a variable on average.

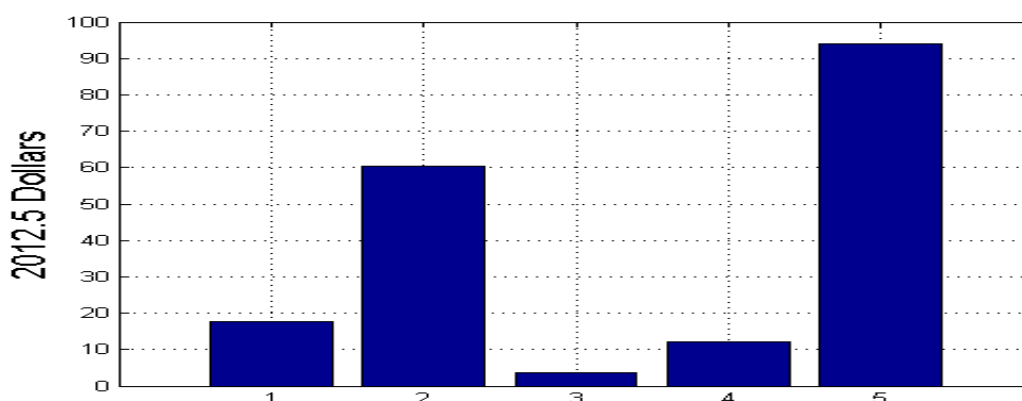


Figure 13: Summary of the Evidence for any Sub period of Interest

(Source: Researchers' Computation using E-VIEWS 9)

1=Supply Shock. 2=Oil Price Shock. 3= Demand Shock. 4=Residual Shock. 5=Total Shock

This allows us to provide a quick summary of the evidence for any sub-period of interest. Kilian and Lee (2014) use this tool to summarize the determinants of the surge in the real price of oil between January 2003 and June 2008 on the one hand, and since the peak of the real price of oil on the other. Here, it is used to explain the sudden change in INF in our study.

Figure 13 shows an example of such a bar chart. The bar on the right shows that between 2003 and mid-2008 the price of oil in total increased by 95 dollars in real terms. The four bars on the left indicate how much of this 95-dollar increase must be attributed to each of the four structural shocks. They show that 18 dollars of this increase are explained by the flow supply shock, 61 dollars by the flow demand shock, 4 dollars by the speculative demand shock, and 12 dollars by the residual shock, providing evidence against the hypothesis that speculative demand was a quantitatively important determinant of the surge.

Conditional Forecast

The objective of forecast scenarios is to assess the sensitivity of reduced-form VAR forecasts to hypothetical future events. Constructing such forecast scenarios requires a structural VAR model, the reduced-form representation of which generates accurate out-of-sample forecasts. It is important to keep in mind that the objective of constructing forecast scenarios is not only to

improve the accuracy of the baseline of the reduced-form VAR forecast but also to generate inferences that can expose the performance of the model. Indeed, that forecast by construction already provides the best possible out-of-sample prediction from a given forecasting model.

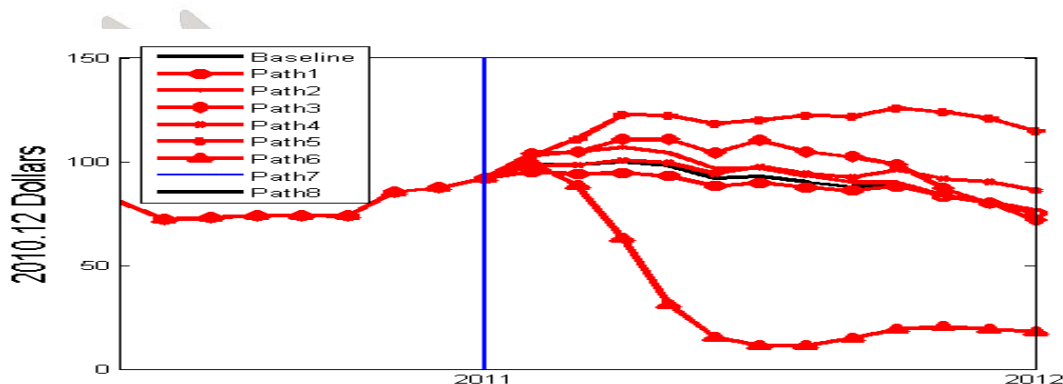


Figure 14: Summary of the Evidence for any Sub period of Interest

(Source: Researchers' Computation using E-VIEWS 9)

Based on a model of the global oil market similar to that used in Kilian and Lee (2014), this empirical research also tries to investigate a wide range of real-time forecast scenarios for the inflation including a return of global economic recovery to full capacity, a supply disruption in oil market, a strong recovery of the global economy, a financial meltdown similar to the collapse of Lehman Brothers, and two contagion scenarios in which expectations of rising oil prices are triggered by political events in the Middle East. Some of these scenarios are based on historical precedent, while others are purely hypothetical. All scenarios involve sequences of structural shocks within the range of historical experience. Figure 14 shows how the forecast of the inflation would deviate from the baseline real-time VAR forecast as of December 2010, if one were willing to condition on each one of these events occurring in isolation. Such evidence allows policymakers to gauge the potential effects of unlikely, but high-impact events on the inflation.

Discussion of Findings

The findings from this study align with both the theoretical framework and empirical literature, illustrating the significant role of Foreign Direct Investment (FDI) in driving economic growth in Nigeria, albeit with complexities tied to global oil price fluctuations and the overall investment climate. The results of the Structural Vector Autoregression (SVAR) model suggest that FDI has a strong, yet nuanced, impact on Nigeria's economic performance, particularly through its effects on oil prices, manufacturing output, inflation, and real GDP. The response of manufacturing output to oil price shocks, for instance, echoes the findings of previous studies, such as those of Benedict and Uzochukwu (2011), who found that oil price shocks in Nigeria have a marked influence on macroeconomic performance. The SVAR estimates indicated that oil price shocks lead to a temporary increase in inflation and a persistent decline in real GDP, which supports the view in Neoclassical Growth Theory that external shocks, such as fluctuations in oil prices, can disrupt the steady growth path of an economy. This aligns with Okoro, James, and Oyeniyi's (2023) conclusion, which noted Nigeria's heavy reliance on oil-related investments as a primary channel through which FDI impacts the economy.

Similarly, the impulse response functions of inflation and manufacturing output to demand shocks are consistent with the theoretical underpinnings of the **Eclectic Paradigm (OLI Model)**, where foreign firms respond to demand conditions by adjusting investments to maximize their location advantages. These results reflect the patterns seen in the study by Patel, Singh, and Kumar (2022), which demonstrated that FDI has the capacity to boost productivity and economic growth, particularly in sectors like agriculture and IT in India. In the Nigerian context, the manufacturing sector's positive response to demand shocks reflects the broader strategic advantages foreign firms see in the country's resource-rich sectors. The persistent and hump-shaped response in real GDP and inflation to demand shocks further illustrates the dynamic nature of FDI's impact on economic growth, consistent with the predictions of **Endogenous Growth Theory** that emphasizes the role of innovation and technological spillovers, which are often brought about by FDI.

The study also revealed that supply shocks result in a modest increase in inflation but a significant and lasting decline in manufacturing output and real GDP. These findings are consistent with the literature, particularly with the work of Acar, Yilmaz, and Tunc (2021), which found that FDI in the manufacturing sector positively impacted industrial output, although the effects were attenuated by external shocks. The findings in this study further suggest that Nigeria's manufacturing output is highly sensitive to supply-side disruptions, a factor that is crucial for understanding the challenges faced by the country in diversifying its economy. The response of the economy to these shocks highlights the importance of strengthening domestic industrial capacity, a theme echoed by Silva, Souza, and Oliveira (2022) in their study on Brazil, where FDI significantly contributed to agricultural and energy sector diversification.

Moreover, the forecast error variance decomposition results underscore that the combined contribution of supply, demand, and oil price shocks to the forecast error variance of manufacturing output increases over time, highlighting the long-term impact of these factors on the Nigerian economy. This reinforces the argument made by Li, Zhang, and Wang (2021) regarding the enduring effects of FDI, particularly in key sectors like manufacturing, where capital and technology from foreign investors can have a lasting effect on industrial growth. The decomposition results suggest that although oil price shocks dominate in the short term, demand and supply shocks contribute more significantly in the long run, pointing to the evolving dynamics of FDI's role in economic growth as Nigeria seeks to diversify away from oil dependence.

Finally, the historical decomposition of manufacturing output and inflation provides a deeper understanding of how these shocks have influenced economic performance over time. This analysis reflects the findings of Kilian and Lee (2014), who emphasized the importance of understanding the historical context behind oil price fluctuations and their role in driving economic cycles. In the case of Nigeria, the results suggest that global economic factors, such as oil price shocks and external demand shocks, have played a significant role in shaping the country's economic trajectory. These insights are crucial for policymakers as they seek to

develop strategies that not only attract more FDI but also enhance the country's resilience to external shocks and ensure that the benefits of foreign investment are more evenly distributed across different sectors of the economy.

In conclusion, the findings of this study contribute to the broader literature by providing a nuanced understanding of the relationship between FDI and economic growth in Nigeria. The results underscore the importance of strategic policy reforms aimed at improving the business climate, diversifying FDI sources, and mitigating the vulnerabilities associated with over-reliance on oil. By aligning the theoretical perspectives of **Neoclassical Growth Theory** and the **Eclectic Paradigm** with empirical findings, the study offers valuable insights into the complex dynamics of FDI in Nigeria's economic development and highlights the need for targeted efforts to attract sustainable foreign investments that can drive long-term, inclusive growth.

Conclusion

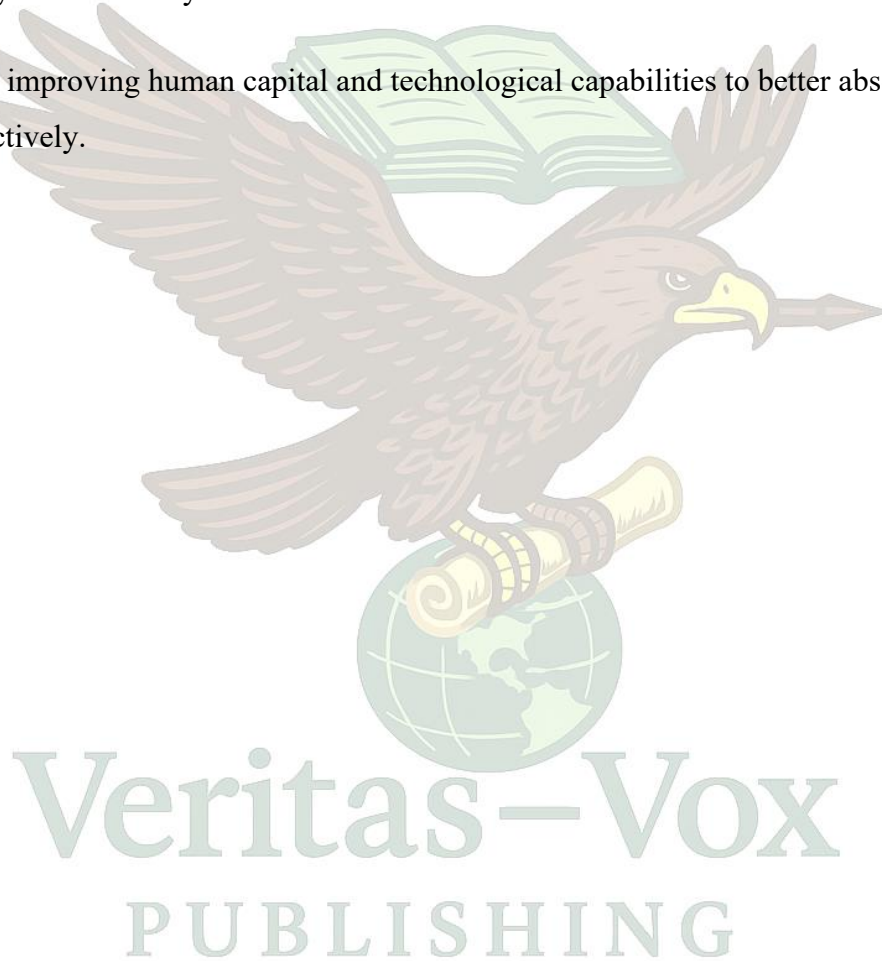
This study assesses the role of Foreign Direct Investment (FDI) in Nigeria's economic growth using the Structural Vector Autoregression (SVAR) method. The findings demonstrate that FDI, particularly demand shocks, significantly contribute to Nigeria's economic growth, more so than oil price shocks. Additionally, the study highlights that the future trajectory of FDI inflows will play a pivotal role in shaping Nigeria's real GDP growth. In light of these results, the study emphasizes the need for policies that attract sustainable foreign investments, diversify the economy, and reduce dependency on oil exports to ensure long-term, stable economic growth.

Recommendations

1. Strengthen macroeconomic policies to foster a more diverse economy, reducing reliance on oil exports.
2. Expand infrastructure development to create an environment conducive to foreign investment.

3. Implement strategies to attract high-quality FDI in non-oil sectors, such as manufacturing and agriculture.
4. Enhance policy stability and governance to mitigate risks associated with political instability and insecurity.

Focus on improving human capital and technological capabilities to better absorb and utilize FDI effectively.



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