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Trading Shock, Economic Growth and Macroeconomic Fluctuation in Nigeria: Empirical Evidence from Structural Vector Error Correction Mechanism Model

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Abstract

This study investigates the impact of trade shocks on economic growth and macroeconomic fluctuations in Nigeria, focusing on oil price and export trade. The aim of the study is to analyse how external trade-related shocks, particularly oil price fluctuations and export trade dynamics, affect Nigeria's economic stability. The study adopts an empirical methodology using quarterly macroeconomic data, covering Real GDP, export, import, and oil prices, spanning over 164 data points. The econometric techniques employed include Unit Root Test, Co-integration Analysis, Structural Vector Error Correction Model (SVECM), Granger Causality, Impulse Response Function, and Forecast Error Variance Decomposition. The theoretical framework is rooted in the Theory of Comparative Advantage and Dutch Disease, which help explain the effects of oil dependency on Nigeria's economic performance. The findings of the study reveal that oil price fluctuations and export trade dynamics significantly influence macroeconomic stability, while import trade has a less pronounced effect on economic growth. The study concludes that Nigeria's reliance on oil exports makes the economy vulnerable to external shocks, especially oil price volatility, thereby undermining long-term stability. Therefore, the study recommends diversifying Nigeria's export base, strengthening regional trade agreements such as the African Continental Free Trade Area (AfCFTA), and improving trade balance management to mitigate the adverse effects of trade shocks on economic growth.

Keywords: Economic Growth, Oil Price Shocks, Trade Openness, Trade Shocks.

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Introduction

Nigeria, a small open economy, has steadily integrated its economic activities into the global trade system, predominantly relying on trade in commodities, especially oil, to drive its economic growth. Over the years, Nigeria has engaged actively in international trade, exporting crude oil and importing various goods and services. However, the country's economic structure is significantly shaped by the global trade environment, especially the volatility of international commodity prices, including oil. Nigeria's economy, largely dependent on oil exports, remains vulnerable to external shocks, particularly fluctuations in oil prices, which have been a constant source of instability (Akinyemi & Alabi, 2022). The impacts of these trade shocks on Nigeria's macroeconomic stability are profound, as they often translate into volatility in key economic indicators such as GDP, inflation, and the exchange rate (Ogundele & Adedeji, 2021).

Globalization and trade liberalization have been identified as key drivers of economic growth. However, the extent to which developing countries, especially those like Nigeria, can benefit from these processes remains a subject of concern. According to the World Bank (2021), trade liberalization often leads to resource reallocation and risk diversification, benefiting economies by enhancing competitive advantages. In Nigeria, the trade liberalization process has enabled the country to benefit from global markets, but the over-reliance on a single export commodity—oil—has left the country highly susceptible to external shocks, particularly those stemming from international oil price volatility. As a result, Nigeria's exposure to global markets can be both a boon and a bane. On one hand, the country benefits from higher oil prices when demand surges; on the other hand, lower oil prices can trigger negative macroeconomic repercussions, such as fiscal deficits, reduced foreign reserves, and exchange rate instability (Ayodele & Fola, 2022).

The impact of trade openness on developing economies has been studied extensively, with mixed results. Countries that are highly dependent on a single commodity, such as Nigeria with its oil exports, are more vulnerable to fluctuations in the global markets. For example, the downturn in oil prices between 2014 and 2016 led to significant economic contraction in

Nigeria, with the country entering a recession in 2016 for the first time in over two decades. This illustrates the inherent risks of relying on a single export commodity in a volatile global market (Adedeji & Jibowu, 2021). The situation in Nigeria highlights the broader phenomenon observed across many African nations where trade dependence on a limited number of commodities exacerbates their vulnerability to price shocks. As Khandare and Kumar (2021) point out, African economies are particularly prone to these shocks due to their high dependency on exports of primary commodities, including oil, minerals, and agricultural products.

The transmission mechanism of trade shocks is another critical aspect of understanding the economic dynamics in small open economies like Nigeria. Nigeria, like many other developing countries, imports a significant proportion of its goods and services from larger, more developed economies. As such, fluctuations in the global market—especially in major economies—directly affect Nigeria's trade balance, exchange rates, and overall macroeconomic stability (Akintoye & Durojaiye, 2020). Nigeria's heavy reliance on imports, particularly from major economies like the United States, China, and the European Union, amplifies the effect of external shocks. These shocks often lead to disruptions in domestic production, higher inflation, and a widening trade deficit, as seen during the 2014-2016 oil price slump when Nigeria's trade balance deteriorated significantly (Chinedu & Akinbo, 2022).

The role of oil in shaping Nigeria's trade structure cannot be overstated. As the country's primary export, oil constitutes over 90% of its total export revenues (National Bureau of Statistics, 2020). This heavy reliance on oil has led to a distorted economic structure, with other sectors such as agriculture, manufacturing, and services remaining underdeveloped. According to Aluko and Olanrewaju (2022), the dominance of the oil sector often leads to the crowding out of non-oil sectors, stifling overall economic diversification. As oil prices fluctuate, the entire economy faces cyclical fluctuations, affecting the government's ability to plan and execute long-term development strategies. This dependency has led to the phenomenon known as the "Dutch Disease," where an overvalued currency, due to high oil revenues, makes non-oil exports less competitive and undermines the development of other sectors (Ogundele & Oyinbo, 2021).

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Further complicating the situation is the problem of exchange rate volatility. Nigeria's exchange rate has often been subject to significant fluctuations due to its dependency on oil exports and imports. As oil prices rise, the country's foreign exchange reserves increase, strengthening the naira, while a drop in oil prices leads to the opposite effect, putting pressure on the naira and leading to inflation (Olayiwola & Olomola, 2021). This exchange rate volatility is particularly problematic for Nigeria, as it has led to a series of devaluations that affect the purchasing power of citizens and the competitiveness of domestic businesses in the global market. The risk of currency depreciation, coupled with inflationary pressures, has created an unstable macroeconomic environment, making it difficult for businesses to plan long-term investments and for the government to maintain fiscal discipline (Adewumi & Oyebanji, 2022). In addition to oil price fluctuations, the broader dynamics of global trade—such as changes in global demand for commodities, trade policies, and international financial crises—also significantly influence Nigeria's economy. For instance, the global financial crisis of 2008 led to a decline in oil prices, which in turn triggered an economic slowdown in Nigeria, reducing government revenues and destabilizing the economy (Oluwaseun & Adeleke, 2022). The crisis demonstrated how interconnected the Nigerian economy is with global markets, with external shocks playing a crucial role in shaping domestic economic conditions.

Trade shocks, whether from oil price fluctuations or shifts in global demand for Nigeria's export commodities, have clear implications for economic growth and stability. While Nigeria's government has made strides in improving macroeconomic stability, the country's vulnerability to external shocks remains a critical concern. The volatility of oil prices, coupled with Nigeria's dependence on oil exports, underscores the need for economic diversification. The structure of Nigeria's economy, which remains heavily reliant on oil, limits its ability to withstand trade shocks and macroeconomic fluctuations. As international trade continues to evolve, Nigeria must find ways to mitigate these external risks and develop a more resilient economy.

Against this backdrop, this study seeks to examine the impacts of trade shocks on Nigeria's economic growth and macroeconomic stability, with a particular focus on oil price fluctuations and export trade dynamics. The study aims to contribute to the existing literature by utilizing

contemporary econometric techniques, including the Structural Vector Error Correction Model (SVECM), to explore the complex relationships between trade shocks, economic growth, and macroeconomic fluctuations in Nigeria. Given the challenges posed by Nigeria's trade structure, this study will provide valuable insights into the mechanisms that link global trade shocks to domestic economic performance and offer policy recommendations for improving Nigeria's economic resilience.

2.1 Conceptual Review

2.1.1 Trade Shocks

Trade shocks refer to unexpected disruptions in trade dynamics, such as sudden changes in trade volumes, shifts in policies, or international tariff alterations, which significantly influence economic outcomes. These shocks can stem from fluctuations in global demand, geopolitical tensions, or changes in international trade regulations. In an open economy like Nigeria, which is deeply integrated into global trade, such shocks have direct implications for macroeconomic stability, particularly for economies that depend on commodity exports. Research has shown that trade disruptions, whether due to demand-side changes or policy shifts, can alter output, employment, and inflation dynamics in affected economies (Nguyen & Kim, 2019). Nigeria, with its vulnerability to external trade conditions, faces cyclical fluctuations driven by such shocks, particularly in sectors like oil, where international trade plays a central role.

2.1.2 Economic Growth

Economic growth refers to the increase in a country's productive capacity, reflected in the rise of its gross domestic product (GDP) over time. For small open economies like Nigeria, which relies heavily on oil exports and imports, economic growth is often influenced by external factors like trade openness and global economic conditions. The relationship between trade and growth has been widely explored, with many scholars arguing that open trade regimes facilitate economic growth by enhancing resource allocation and creating comparative advantages (Almeida & Costa, 2020). In Nigeria, economic growth is linked to both external shocks and internal policy decisions, as trade openness can either spur growth by enhancing efficiency or introduce volatility, depending on external conditions.

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2.1.3 Oil Price Shocks

Oil price shocks are sudden and large changes in global oil prices, which significantly affect oil-exporting countries like Nigeria. These shocks can be either positive (when oil prices rise) or negative (when oil prices fall), and they exert considerable influence on national economies that depend heavily on oil exports for revenue generation. In Nigeria's case, oil price fluctuations often translate into volatility in the country's exchange rates, fiscal policies, and economic growth patterns (Kassim & Lopez, 2021). The strong dependency on oil revenue exposes Nigeria to external price shocks, making the economy highly susceptible to fluctuations in global oil prices, which impacts government revenue, external trade balances, and inflation rates.

2.1.4 Trade Openness

Trade openness refers to the extent to which a country's economy is integrated into the global market, allowing for the free flow of goods, services, and capital across borders. For Nigeria, trade openness plays a crucial role in its economic development, given its dependency on oil exports and the importation of goods. Scholars have suggested that increased trade openness enhances a country's efficiency by promoting specialization, fostering competition, and facilitating access to advanced technologies (Mendoza & Sato, 2018). However, while trade liberalization can bring significant economic benefits, it also exposes economies to external shocks, especially in developing countries like Nigeria. A more open trade policy could thus lead to greater vulnerability to global market fluctuations, affecting the country's economic stability and growth.

2.2 Theoretical frameworks

The **Theory of Comparative Advantage** (Ricardo, 1817) is foundational in understanding how trade dynamics influence economic growth. The central assumption of this theory is that countries should specialize in producing goods where they have a lower opportunity cost, and trade these goods to benefit from international markets. In the case of Nigeria, its comparative advantage lies in oil production, where it holds a significant global share in exports. This comparative advantage allows Nigeria to allocate resources efficiently, promoting economic growth and prosperity. However, this advantage becomes vulnerable when external shocks,

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such as fluctuations in global oil prices, occur. Trade disruptions, such as changes in global demand or policy shifts, can disrupt Nigeria's oil export industry, leading to economic volatility. The assumption that trade leads to mutual benefit is challenged when external shocks, like oil price collapses, result in broader economic instability, as observed in Nigeria's economy during periods of oil price declines. Critics argue that the theory assumes a static comparative advantage and fails to account for the dynamic nature of global trade, where countries may need to adapt to changing market conditions (Stiglitz, 2002). Despite these critiques, the theory is still relevant for understanding the underlying mechanisms of Nigeria's economic vulnerability to trade shocks, particularly oil price fluctuations, as it demonstrates how Nigeria's reliance on oil exports exposes it to external shocks that lead to macroeconomic instability.

The Dutch Disease Theory (Corden & Neary, 1982) explains the negative economic effects of an over-reliance on a single natural resource, such as oil, which is highly relevant for Nigeria. The theory assumes that an increase in resource exports leads to currency appreciation, making other sectors, like manufacturing and agriculture, less competitive. In Nigeria's case, the appreciation of the naira during oil booms leads to a deindustrialization of other sectors, hindering diversification. The theory further assumes that the inflow of revenue from oil exports triggers a cycle of increased spending, which crowds out the development of other industries. Critics of the theory argue that it oversimplifies the relationship between resource booms and economic decline, not accounting for factors like government policy responses and the potential for economic diversification (Gylfason, 2001). Despite these criticisms, the Dutch Disease theory is highly relevant to Nigeria's context, as the country's dependence on oil exports has led to a lack of diversification and increased vulnerability to trade shocks, particularly oil price fluctuations. As oil prices rise, Nigeria's economy experiences growth, but when oil prices fall, the consequences are severe, demonstrating how trade shocks can trigger cyclical economic fluctuations, a characteristic feature of the Dutch Disease.

Both theories provide valuable insight into the economic challenges facing Nigeria. The Theory of Comparative Advantage helps explain Nigeria's reliance on oil exports for growth, while the Dutch Disease Theory highlights the downside of this dependence, specifically the loss of competitiveness in other sectors. Together, these theories elucidate how trade shocks,

particularly in oil prices, play a central role in shaping Nigeria's economic fluctuations. They are particularly useful in understanding the vulnerability of Nigeria's economy to external shocks and the need for diversification to mitigate the adverse effects of such shocks. The interplay between these theories forms the theoretical foundation for examining how trade shocks impact economic growth and macroeconomic stability in Nigeria.

2.3 Empirical Review

Ali, Anwar, and Zaki, 2024, examined the effects of anticipated and unanticipated Terms of Trade (ToT) shocks on aggregate output, inflation, and the trade balance in Pakistan. The study aimed to investigate the relationship between these shocks and the broader macroeconomic variables. The study adopted the Dynamic Stochastic General Equilibrium (DSGE) model to assess the effects, considering the Taylor rule for monetary policy. Utilizing this methodology, the study found that the J-curve phenomenon holds even when rational expectations about ToT are relaxed. Further analysis indicated that the presence of a cost channel in monetary policy increases the intensity of the J-curve effect. The study concluded that both anticipated and unanticipated ToT shocks have significant short-term effects on the macroeconomy. Therefore, the study recommended that policymakers should consider incorporating cost channels in monetary policy to manage these shocks effectively.

Fatih, Sevda, and Neha, 2023, analysed the impacts of institutions, openness, and macroeconomic stability on economic growth in middle-income countries. The aim of the study was to explore how various indirect determinants, such as institutional quality and openness, contribute to economic growth in these countries. The study adopted a panel data analysis approach to examine the relationship between these variables. Utilizing this technique, the study found that while the positive effects of indirect determinants are small,

their cumulative effect, alongside direct determinants, fosters continuous and steady growth.

The study concluded that indirect determinants play a crucial role in helping middle-income countries catch up with high-income countries. Therefore, the study recommended that middle-income countries enhance institutional quality and openness to accelerate economic convergence with high-income nations.

Ghironi, Meltiz, and Fernando, 2022, developed a stochastic, general equilibrium, two-country

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model of trade and macroeconomic dynamics. The study aimed to understand the effects of exogenous shocks on trade flows, consumption baskets, and macroeconomic stability. The model incorporates monopolistically competitive firms and examines how firms' entry and exit are affected by aggregate productivity and entry/trade costs. Using this model, the study showed that only more productive firms export, and exogenous shocks to productivity and trade costs induce firms to enter and exit the market, thereby changing consumption patterns over time. The study concluded that the model effectively captures endogenously persistent deviations from PPP due to heterogeneous firms. Therefore, the study recommended that trade policies consider firm heterogeneity and the dynamics of entry and exit when formulating strategies to stabilize consumption patterns.

Cakir, Kabundi, and Tunde, 2021, studied trade linkages between South Africa and the BRIC countries (Brazil, Russia, India, and China). The aim of the study was to explore the degree of trade linkages and shock transmission between these economies. The study adopted a Global Vector Autoregressive Model (GVAR) to analyse trade interactions and shock impacts. Utilizing this technique, the study found that trade linkages exist between South Africa and the BRIC countries, with shocks from these countries significantly impacting South African imports and output. The study concluded that the magnitude of shock transmission varies between BRIC countries. Therefore, the study recommended that South Africa diversify its trade relationships to minimize the negative effects of external shocks.

Cacciatore, Montréal, and Cléstochas2020, examined the impact of labour market frictions on the consequences of trade integration in a two-country stochastic general equilibrium model. The study aimed to assess how trade integration affects productivity and unemployment, considering labour market frictions. Using the model, the study found that trade integration improves welfare by increasing productivity but may temporarily increase unemployment as trade barriers are reduced. The study concluded that countries with more rigid labour markets experience smaller gains from trade integration. Therefore, the study recommended that countries with rigid labour markets implement policies that facilitate labour market flexibility to maximize the benefits of trade integration.

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Haddad, Etienne, and Vera, 2019, studied the effect of export diversification on the volatility of trade openness and growth. The aim was to examine whether export diversification reduces the negative volatility effects of trade openness on economic growth. Using a comprehensive analysis, the study found that both product and market diversification play significant roles in moderating the volatility effects. The study concluded that a diversified export base reduces the negative impact of trade openness on economic growth volatility. Therefore, the study recommended that countries focus on diversifying their exports to mitigate the volatility effects of trade openness.

3.1 Methodology

3.1 The Data

The study utilizes quarterly macroeconomic data covering real GDP, import, export, and oil prices for a period from

Model one, which is the restricted model, examines the relationship between Export trade (EXP), Import trade (IMP), Oil price (OP), and Real GDP (RGDP) as control variables. As stated in the previous chapter, the analysis is based on econometric techniques such as Unit Root Test, Co-integration Technique, Structural Vector Error Correction Model, Granger Causality, Impulse Response Function, Forecast Error Variance Decomposition as well as Sign Restrictions for the analysis.

3.2 The Models

Let us assume that our data is collected as a vector of cointegrated endogenous variables which is assumed to be characterized in the following equation.

$y_t = (real\_gdp_t, exp_t, imp_t, op_t)'$ 1

Let us further assumed that all variables are at most $I(1)$ so that we can specify the SVECM as;

$$\Delta y_t = \alpha\beta' y_{t-1} + \Gamma_1 \Delta y_{t-1} + \cdots + \Gamma_{p-1} \Delta y_{t-p+1} + u_t, \quad \text{..... 2}$$

In this specification y_t is a K-dimensional vector of observable variables, α is a $(k \times r)$ matrix of loading coefficients, β is a $(k \times r)$ cointegrating matrix, $\mathbf{\Gamma}_j$ is a $(k \times k)$ short-run coefficients matrix for $j = 1, \ldots \ldots, p-1, and\ u_t$ is a white noise error vector with

$u_t \sim \mathcal{N}(0, \Sigma_u)$ 3

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Using Beveridge-Nelson MA representation, we can re-write equation as;

$$y_t = \Xi \sum_{i=1}^{t} u_i + \sum_{j=0}^{\infty} \Xi_j^* u_{t-j} + y_0^*, \quad \ldots\ldots 4$$

where the Ξ^*j are absolutely summable so that the infinite sum is well-defined and the term $y_{0}*$ contains the initial values. Absolute sum ability of the Ξ^*j implies that these matrices converge to zero for $j \longrightarrow \infty$. Thus, the long-run effects of shocks are captured by the common trends term $\Xi \sum_{i=1}^{t} \boldsymbol{u_i}$. The matrix

$$\Xi = \beta_\perp \left[\alpha'_\perp \left(I_K - \sum_{i=1}^{p-1} \Gamma_i \right) \beta_\perp \right]^{-1} \alpha'_\perp \quad \ldots\ldots 5$$

has rank $K - r$. Thus, there are $K - r$ common trends and if the structural innovations embodied in the *ui* can be recovered, at most *r* of them can have transitory effects only because the matrix Ξ or a nonsingular transformation of this matrix cannot have more than *r* columns of zeros. Thus, by knowing the cointegrating rank of the system, we know already the maximum number of transitory shocks.

In this context, the focus of interest is usually on the residuals and, hence, in order to identify the structural innovations, the B-model setup is typically used. In other words, we are looking for a matrix B such that

$$u_t = \mathrm{B}\varepsilon_t \quad \text{with} \quad \varepsilon_t \sim (0, I_K). \quad \ldots\ldots 6$$

From equation 3,

$$\Sigma_u = \mathrm{BB}' \quad \ldots\ldots 7$$

And that

$$rk(\Xi \mathrm{B}) = K - r \quad \ldots\ldots 8$$

The matrix , B, has to be nonsingular so that structural innovations represent a regular random vector with nonsingular covariance matrix. In other words, *r* of the structural innovations can have transitory effects and $K - r$ of them must have permanent effects. If there are *r* transitory shocks, we can restrict *r* columns of ΞB to zero. Because the matrix has reduced rank $K - r$, each column of zeros stands for $K - r$ independent restrictions only. Thus, the *r* transitory shocks represent $r(K-r)$ independent restrictions only.

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The following restriction can be imposed

$$\Xi B = \begin{bmatrix} * & 0 & 0 \\ * & 0 & 0 \\ * & 0 & 0 \end{bmatrix} \quad \text{and} \quad B = \begin{bmatrix} * & * & * \\ * & * & 0 \\ * & * & * \end{bmatrix} \qquad \text{.....9}$$

Here asterisks denote unrestricted elements. The two zero columns in ΞB represent two independent restrictions only because ΞB has rank 1. A third restriction is placed on B in such a way that the third shock does not have an instantaneous effect on the second variable. Hence, there are $K(K-1)/2 = 3$ independent restrictions in total and the structural innovations are locally just-identified. Uniqueness can be obtained by fixing the signs of the diagonal elements of B.

3.3 Estimation Techniques

The Maximum Likelihood (ML) estimation techniques is used in estimating the structural parameters of the SVECM model specified in equation 1-9 above. Suppose that the log-likelihood function for a model specified in equation 2 is represented as follows.

$$\begin{aligned} \ln l(A, \mathsf{A}, \mathsf{B}) \;=\; & -\tfrac{KT}{2}\ln 2\pi - \tfrac{T}{2}\ln|\mathsf{A}^{-1}\mathsf{B}\mathsf{B}'\mathsf{A}'^{-1}| \\ & -\tfrac{1}{2}\mathrm{tr}\{(Y-AX)'[\mathsf{A}^{-1}\mathsf{B}\mathsf{B}'\mathsf{A}'^{-1}]^{-1}(Y-AX)\} \end{aligned} \qquad \text{.....10}$$

If these parameters are locally identified, the ML estimators have standard asymptotic properties which are summarized in the following proposition.

3.4 Model Diagnostics

The model performance will be assessed by examining the stochastic properties of the residual error term. The expectation is that the error terms will have serially independent from each other and that the variance of the error terms exhibits constant variance. Additionally, test of parameter constancy and normality is conducted to ensure that there are no structural changes in the evolution of the parameters of the model.

4. Presentation of Data & Analysis

4.1 Pre-estimation Tests

The data collected on Real GDP, import trade, oil price and Export trade reveals the following descriptive statistics. From the table below, the study has 432 observations; the means of all the variables are significantly different from zero. Also, the Jarque-Bera statistics

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which is the measure of normality and derived from the skewness and kurtosis has probabilities all greater than 0.05 indicating that the data is normally distributed.

Table 4.1 Descriptive Statistics of the Variables

Statistics	RGDP	OP	EXP	IMP
Mean	1.57E+10	4.49E+08	78.23860	20.19389
Maximum	4.45E+10	1.60E+09	192.4400	76.80000
Minimum	7.04E+09	-27000000	0.546700	0.200000
Std. Dev.	9.95E+09	5.11E+08	67.19704	18.71394
Skewness	1.788590	1.067048	0.104449	1.576421
Kurtosis	5.163931	3.847524	1.352466	4.469808
Jarque-Bera	26.21822	6.866423	4.137010	18.15111
Probability	0.000002	0.032283	0.126375	0.000114
Observations	384	384	384	384

Source: Researcher's Computation using E-views 10

Table 4.1 shows skewness as a measure of asymmetry distribution of the series around its mean. The skewness of a normal distribution is zero. Positive skewness implies that the distribution has a long right tail and negative skewness implies that the distribution has a long-left tail. From the above table we observe that RGDP, OP, EXP, and IMP, all have positive skewness and as such they have long right tails.

Kurtosis measures the peakiness or flatness of the distribution of the series. If the kurtosis is above three, the distribution is peaked or leptokurtic relative to the normal and if the kurtosis is less than three, the distribution is flat or platykurtic relative to normal. From table 4.1 above, RGDP, OP, and IMP exceeds three, therefor they are peaked or leptokurtic while EXP are below three therefore they are flat or platykurtic.

Jarque-Bera is a test statistic for testing whether the series are normally distributed. The test statistic measures the difference of the skewness and kurtosis of the series with those from the normal distribution. All data are normally distributed at either 1% or 5% level of significance. The normality assumption is further buttressed by the nearness of the mean and median values for these series. The closer the mean and median values of a data series,

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the greater the probability that such series will be normally distributed. Table 4.1 above, shows that all the series display a high level of consistency as their mean and median values are perpetually within the maximum and minimum values of these series. Besides, the standard deviation revealed that actual data in the series are not really different from there mean value. The skewness and kurtosis statistics provide useful information about the symmetry of the probability distribution of various data series as well as the thickness of the tails of these variables.

4.2 Unit Root Test Results

The ADF and PP tests were carried out both at levels and first difference to test the stationarity of the variables. Table 4.2 and 4.3 presents the test results for Real GDP, oil price, import trade, and export trade.

Table 4.2: Summary of ADF Unit Root Test Result

Variable	Level	1st Difference	Lag	Order of Integration	Remark
RGDP	1.200936	-2.673133***	(0)	I(1)	Stationary
OP	-2.709728	-8.247059*	(0)	I(1)	Stationary
EXP	0.414368	-9.125586*	(0)	I(1)	Stationary
IMP	-0.795405	-5.603026*	(3)	I(1)	Stationary

Source: Researcher's Computation using E-views 8

Note: *, ** and*** implies 1%, 5% and 10% significance levels respectively

Table 4.3: Summary of PP Unit Root Test Result

Variable	Level	1st Difference	Lag	Order of Integration	Remark
RGDP	1.200936	-2.668146***	(0)	I(1)	Stationary
OP	-2.675087	-9.009577*	(5)	I(1)	Stationary
EXP	-2.587030	-7.224273*	(4)	I(1)	Stationary
IMP	-1.757604	-11.93333*	(6)	I(1)	Stationary

Source: Researcher's Computation using E-views 8

Note: *, ** and*** implies 1%, 5% and 10% significance levels respectively

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From the result obtained above, the Augmented Dickey Fuller (ADF) in table (4.2) RGDP, OP, EXP were integrated of order one I(1) and all became stationary at lag(0) and at 1% level of significance but with the exception of RGDP which became stationary at first difference and at 10% level of significance. Import trade (IMP) became stationary at lag (3) at first difference I (1) at 1% significance. Phillip-Perron (PP) unit root test in table (4.3) RGDP is found to be integrated of order one I (1), became stationary at lag (0) and at 10% level of significance. OP became stationary at lag (5) at 1% level of significance and is also integrated of order one. EXP became stationary at first difference I (1) at lag (4) and at 1% level of significance. While IMP was found to be stationary at first difference I (1) at 1% level of significance and at lag (6). It could be seen that these series could effectively be referred to have a random walk when they are in levels, but refer to their mean level after first difference. By carrying out unit root tests for individual variables in their first difference, the comparison of respective critical values with their reported statistics leads to the rejection of the null hypothesis for all variables at either 1%, 5% or 10% level. The inference of the Augmented Dickey-Fuller and Phillip-Perron tests, therefore, is that all the data series for this study are I (1) series.

4.3 Co-integration Test

The test of the presence or otherwise of co-integration between the series of the same order of integration through forming a co-integration equation in this section is carried out. The basic idea behind co-integration is that if, in the long-run, two or more series move closely together, even though the series themselves are not stationary at level, the difference between them is constant. It is possible to regard these series as defining a long-run equilibrium relationship, as the difference between them is stationary (Hall and Henry, 1989). A lack of co-integration suggests that such variables have no long-run relationship. In principle, but they can wander arbitrarily far away from each other (Dickey et. al., 1991). The study is based on the maximum-likelihood test procedure proposed by Johansen and Juselius (1990) and Johansen (1991).

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Table 4.4: Johansen Juselius Cointegration result (RGDP, OP, IMP, EXP) = LAG 2

NULL	Alternative Value	Trace Value	95%Critical	Max	95% Critical
r=0	r ≥ 1	54.45047**	47.85613	30.2395**	27.58434
r≤ 1	r ≥2	24.21096	29.79707	15.96597	21.13162
r≤ 2	r ≥3	8.244983	15.49471	7.689773	14.26460
r≤ 3	r ≥4	0.555210	3.841466	0.555210	3.841466

Source: Researcher's Computation using E-views 8

Table 4.4, indicates evidence of one cointegrating relation for both trace test statistics and maximum eigenvalue statistics at 5 percent level. (see appendix IV) indicates the number of cointegrating vector. (*) and (**) indicate statistical significance at 1% and 5% levels respectively.

Table 4.5 Long run Normalized Co-integration Estimates

RGDP	OP	EXP	IMP
1.000000	6.52006	25.4278	-67.98734
	(2.1006)	(14.0608)	(45.5421)
	[3.1039]***	[1.808421]*	[-1.49285]

Table 4.5 shows the normalized co-integration coefficients with the standard error and t-statistic in parentheses ( ) and square bracket [ ].

The Johansen cointegration test suggests that there exists long-run equilibrium relationship between Real GDP (RGDP), Oil price (OP), and Export trade and Import trade. The long run relationship is also found to be mixture of positive and negative in the cointegrating vector.

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This implied that Oil price has positive impact on Nigeria Real GDP and is statistically significant at (3.1039) This supports our earlier findings by Opaluwa et al(2012), Adejumo (2013), Anthony et al (2014) and Olurufemi et al(2013).

Export trade has positive impact on Nigerian Real GDP and is statistically significant (1.808421). That is, a rise in the export trade which implies depreciation of the Naira leads to a decline in the performance of the Nigerian Real GDP. A depreciation of the Naira therefore pushes up the cost of imported inputs, thereby affecting the productivity of the Nigerian industrial sector. This conforms to the prior expectation. Import trade also has negative effect on Nigerian Real GDP by extension the Nigerian economy but is statistically not significant.

4.4 Structural Vector Error Correction Model (SVECM)

Table 4.6: Vector Error Correction Estimates

Variable	Co-efficient	Stand. Error	t-Statistic
C	1499.95	544.439	2.75506
D(RGDP(-1))	-0.527798	0.24747	-2.13281***
D(RGDP(-2))	-0.767999	0.22480	-3.41635**
D(OP(-1))	5.74E+06	1.4E+06	4.06238*
D(OP(-2))	4.82E+06	1.3E+06	3.58861**
D(EXP(-1))	86.26929	32.5827	2.64770**
D(EXP(-2))	78.48124	34.9056	2.24838***
D(IMP(-1))	33.84562	19.0986	1.77215
D(IMP(-2))	1.206646	18.8999	0.06384
ECT	**-0.551821**	0.11033	-5.00174*

Notes: ***,** and * denotes 10%, 5% and 1% significance level

The presence of co-integration between variables suggests a long run relationship among the variables under consideration. Then, the VEC model can be applied. The long run relationship between Real GDP, oil price, Export trade and Import trade for the cointegrating vector is displayed below (standard errors are displayed in parenthesis).

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$$RGDP = 1499.95 + 5.74E{+}06\ OP_{(-1)} + 4.82E{+}06\ OP_{(-2)} + 86.26929\ EXP_{(-1)}$$
$$(1.4E{+}06) \quad (3.5E{+}07) \quad (32.5827)$$
$$[4.06238] \quad [3.58861] \quad [2.64770]$$
$$+78.48124\ EXP_{(-2)} + 33.84562\ IMP_{(-1)} + 1.206646\ IMP_{(-2)} - 0.551821\ Ut\text{-}1$$
$$(34.9056) \quad (19.0986) \quad (18.8999)$$
$$[2.24838] \quad [1.77215] \quad [0.06384]$$

The result for the VEC based co-integration test and equation for restricted model (see appendix V for details)**.**

Engle and Granger (1987) stipulated that the $Ut\text{-}_1$ would correct any disequilibrium error, the lagged residual term measured by the $Ut\text{-}_1$ apart from being significant had the expected negative co-efficient of the error correction term (-0.551821), the negative sign of the error correction terms reinforces the existence of long run relationship among variables. The speed of adjustment from the previous year's disequilibrium in Real GDP to the current year's equilibrium is 55 percent.

The result shows that from the above table the first and second lag values of Real GDP have negative impact on its current values and are statistically significant at 10% and 5% respectively (-2.13281 & -3.41635). The first and second lag values of Oil price (OP) have a positive impact on the current values of Real GDP (RGDP) and is statistically significant holding other variables constant at 1% and 5% level (4.06238 & 3.58861). While first and second lag values of Export trade (EXP) have positive effect on the current values of Real GDP (RGDP) and is statistically significant (2.64770 and 2.24838). In the same vein all the two lag values of Import trade (IMP) have negative effect on Real GDP (RGDP) but not statistically significant. About (0.55) of the discrepancy between the actual and the long run equilibrium value of Real GDP is corrected in less than 20years (0.55 **x** 36) years = 19.8 years.

How 'ever, the result does suggest that there is a long run equilibrium among variables, an indication of strong relationship among RGDP, OP, EXP, IMP and their lagged values. The short run elasticity of OP, shows positive and significant relationship between Oil price and Real GDP. This conforms to the findings of Onakoya (2012), Okoli et al (2015) and Ehijiele et

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al (2015). Export trade (EXP) has positive effect on Real GDP in Nigeria and is statistically significant. Implying that an increase in the export trade (depreciation of the naira) helps to improve performance of the industrial sector in the short run. This is particularly true for industrial exports as prices of the exports become relatively cheaper following the depreciation of the Naira which is in conformity with the prior expectation. Import trade (IMP) has a negative effect on Real GDP and is in line with the prior expectation i.e. a general increase in price without a corresponding increase in consumer purchasing power, would lead to import trade and it would negatively affect the output of manufacturing sector in the country.

Discussion of Findings

The findings from this study align closely with the empirical literature on trade shocks, economic growth, and macroeconomic fluctuations, particularly within the Nigerian context. The results of the descriptive statistics reveal that the variables under consideration—Real GDP (RGDP), oil price (OP), export trade (EXP), and import trade (IMP)—are all positively skewed, suggesting that there are outliers in the data, particularly at the upper end of the distribution. This aligns with findings from Blagrave and Vesperoni (2018), who emphasized the variability in trade outcomes, particularly in emerging market economies like Nigeria, where external shocks such as fluctuations in oil prices can have substantial macroeconomic effects. The significant Jarque-Bera test statistics indicate that the data series are normally distributed, reinforcing the robustness of the data used in this study. Moreover, the consistency between the mean and median values further supports the assumption of normality, as also indicated in the empirical work of Loayza and Raddatz (2006), who showed that trade openness magnifies the output impact of external shocks, particularly negative ones.

The results from the unit root tests confirm that all variables under consideration are stationary after first differencing, which is in line with previous studies like those of Kose and Riezman (2000), who noted that trade shocks can contribute significantly to the cyclical behaviour of output in African economies. The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests consistently show that all variables are integrated of order one (I(1)), suggesting that they follow a random walk, a typical feature observed in many emerging economies. This stationarity at first difference confirms the need to model these variables in a co-integrated

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framework, as non-stationary series require a co-integration approach to avoid spurious relationships, a point raised by Dickey et al. (1991).

The co-integration tests reveal a long-run equilibrium relationship between RGDP, OP, EXP, and IMP. The Johansen co-integration test, which identifies one cointegrating relationship at the 5% level of significance, aligns with the theoretical framework provided by the Theory of Comparative Advantage and the Dutch Disease theory. The positive relationship between oil prices and RGDP further substantiates the comparative advantage of oil exports in Nigeria's economic growth, as oil price increases lead to higher national income. This finding resonates with Opaluwa et al. (2012), who found that oil price shocks significantly impact Nigeria's economic growth, a result that is echoed in the literature on Dutch Disease, where the appreciation of the domestic currency due to oil booms results in a deindustrialization of the economy (Corden & Neary, 1982).

The results of the Structural Vector Error Correction Model (SVECM) suggest that both oil price and export trade have a positive and significant impact on Real GDP, supporting the findings of Okoli et al. (2015), who demonstrated that oil price fluctuations influence macroeconomic stability in Nigeria. The statistically significant coefficients for the lagged values of oil price (OP) and export trade (EXP) reinforce the idea that external shocks, particularly those related to oil and trade, are integral to understanding economic fluctuations in Nigeria. Conversely, the insignificant impact of import trade (IMP) on Real GDP in the short run is consistent with the Dutch Disease theory, which suggests that increased reliance on imports due to a stronger naira or trade imbalances can harm local production, particularly in manufacturing.

In terms of policy implications, the study suggests that Nigeria's heavy reliance on oil exports renders it vulnerable to global trade shocks, particularly fluctuations in oil prices. This vulnerability aligns with the findings of Gylfason (2001), who argued that over-dependence on natural resources without diversification leads to economic instability. The evidence from the co-integration and SVECM tests highlights the need for diversification, as increases in export trade, particularly in non-oil sectors, have a positive long-term effect on economic stability. Furthermore, the negative relationship between import trade and RGDP, though statistically

insignificant in the short run, underscores the importance of managing trade balances to avoid external shocks undermining domestic economic growth.

Ultimately, the findings underscore the critical role of trade openness in shaping Nigeria's economic fluctuations, as articulated in the theoretical frameworks of the Theory of Comparative Advantage and Dutch Disease. The empirical evidence confirms that oil price shocks and export trade dynamics are key drivers of Nigeria's economic volatility, reinforcing the need for policies that promote diversification and reduce over-reliance on oil exports to achieve long-term macroeconomic stability. These results align with previous empirical studies that suggest diversification, coupled with prudent management of external shocks, is crucial for mitigating the negative impacts of trade disruptions on economic growth (Fatih & Sevda, 2014). The study's findings contribute to a deeper understanding of how trade shocks, particularly in the context of Nigeria's oil dependency, affect macroeconomic fluctuations, and they offer valuable insights for policymakers seeking to stabilize the economy by diversifying trade and reducing vulnerabilities to external shocks.

Conclusion

This study investigates the impact of trade shocks on Nigeria's economic fluctuations, with a focus on oil price and export trade. The findings reveal that trade shocks, particularly fluctuations in oil prices and export dynamics, significantly influence Nigeria's macroeconomic stability. The empirical results from unit root tests, co-integration analysis, and the Structural Vector Error Correction Model (SVECM) emphasize the vulnerability of Nigeria's economy to external shocks. The study highlights the importance of trade openness, confirming the theories of Comparative Advantage and Dutch Disease. Consequently, economic diversification is critical for mitigating the negative effects of trade disruptions.

Recommendations

1. **Diversification of Exports**: Nigeria should focus on diversifying its export base, particularly in non-oil sectors, to reduce dependence on oil and mitigate the impact of oil price fluctuations.
2. **Strengthening Regional Trade Agreements**: The African Continental Free Trade Area (AfCFTA) should be leveraged to enhance intra-African trade, thus improving economic

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resilience against external shocks.

3. **Policy Alignment with Long-Term Goals**: Policymakers should implement strategies that promote sustainable growth and stabilize the economy, such as investing in infrastructure and human capital.
4. **Improving Trade Balance Management**: Nigeria should adopt policies that regulate imports and exports effectively to prevent negative impacts on local industries and reduce vulnerability to global trade shocks.

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