**IMPACT OF GLOBAL SUPPLY CHAIN PRESSURE ON STOCK MARKET VOLATILITY IN NIGERIA**

**ABSTRACT**

This paper examines the effect of global supply chain pressure on volatility in the stock market in Nigeria based on time series data between January 2000 and June 2025. Generalized Autoregressive Conditional Heteroskedasticity (GARCH) models and their extensions, Exponential GARCH (EGARCH) and Threshold GARCH (TGARCH) were considered to capture the main characteristics of volatility clustering, persistence, and leverage effects. The results indicate substantial volatility persistence and there is high asymmetric responses, where the volatility in ASI is more affected by negative global shocks rather than positive ones. Global supply chain pressure has a profound effect on domestic market dynamics, which justifies the growing interdependence of global and Nigerian stock markets. The study recommends that policymakers and market regulators should implement proactive risk management strategies and strengthen market resilience mechanisms to absorb external shocks. Investors are advised to monitor global market trends closely when making investment decisions in Nigeria.

**Keywords:** *GARCH, EGARCH, TGARCH, Nigerian Stock Market, Global Stock Price Index, Financial Integration, Asymmetric Shocks, Stock Market Dynamics,*

1. **INTRODUCTION**

Global supply chains have experienced the largest disruptions over the last several years due to the COVID-19 pandemic, mounting geopolitical tension, and a rise in the number of natural disasters. Such shocks have increased uncertainties in the world trade and production networks and they have raised significant risks to economy that is based on imports and exports. In the case of Nigeria, an import-dependent nation that heavily relies on foreign raw materials, equipment, and consumer products, global supply chain pressures (GSCP) pose essential threats to macroeconomic stability and investor confidence, with important effects on the level of the stock market activity (Atta-Mensah, 2022).

Stock markets being widely perceived as one of the health indicators of any economy are especially vulnerable to both national and international shocks. The Nigerian stock exchange has experienced a high degree of volatility in reaction to external economic movements, such as oil prices, exchange fluctuations and more recently, supply chain malfunctions. GSCP may cause delays in production, increase of input costs and lower margin of profits especially the manufacturing and the consumer goods industries. Such developments are likely to cause stock reactions as investors rebalance their expectations and match their portfolios (Ghosh, 2023).

Nigeria stock market is the focus of this research for two major reasons. First, due to its reliance on international trade, the Nigerian economy is very vulnerable to economic shocks in the global marketplace. More than 70 percent of the raw materials and finished products in the country are imported (NBS, 2023). Therefore, supply chain challenges facing the globe, including transportation delays, higher freight charges and raw material supply, have a direct implication on the cost base and profitability of most companies listed on the Nigerian Exchange (NGX). For example, in 2020, the NGX All-Share Index (ASI) fell by 15.58 percent in February and March due to investor response to global uncertainty and supply chain shocks during the peak of the COVID-19 pandemic (NGX, 2021).

Second, the Nigerian equity market is among the largest and the most capitalized in Africa at 43.2 trillion naira (approximately 56 billion dollars) of the total market capitalization as at December 2023 (NGX, 2023). The NGX has more than 150 companies that are listed in different industries, such as banking, manufacturing, oil and gas, and consumer goods, most of which are highly connected with the global value chains. Also, the growing involvement of foreign institutional investors, whose share in the volume of transactions with equities reached more than 30 percent in 2022 (CSCS, 2023), increases the vulnerability of the market to fluctuations in the mood of international investors and changes in capital flows.

To the best of the researcher’s knowledge, this study is the first empirical investigation that explicitly links global supply chain pressure to stock market volatility in Nigeria. Although some literature on the effects of global economic shocks and supply disruptions has been analysed recently, most analysis of the available researches concentrated on output, inflation, or trade indicators. For example, the impact of supply chain shocks and the output of industries in China was studied by Zhang and Li (2025), whereas the linkages between logistics bottlenecks and inflation in sub-Saharan Africa were analyzed by Adebayo et al. (2024). Mensah and Okoro (2023) examined how global supply shocks affect the prices of imports in West Africa but failed to take into consideration the volatility in the financial markets.

This research addresses this gap by using econometrics volatility models (GARCH, TGARCH, and EGARCH) in assessing the symmetric and asymmetric volatility of the Nigerian stock market to GSCP. The study is interesting to both the academicians, policymakers, and investors because it combines global and domestic data to offer accounts of financial risk in emerging economies.

The remainder of this paper is structured as follows: Section 2 reviews the relevant empirical literature; Section 3 outlines the data and methodology; Section 4 presents the data analysis and interpretation; and Section 5 concludes with key findings and recommendations.

1. **LITERATURE REVIEW**

Several studies look at the volatility of stock due to different shocks, one of which was conducted by Aslam et al. (2020) examine the impact of the COVID-19 pandemic on global financial market volatility. The DCC-GARCH model was used to figure out time-varying correlations among the major stock markets. The results showed that the pandemic has led to high stock market volatility and interdependence and that Asian markets were more sensitive to the U.S market when there is a global disruption. One of the findings of the study is that at the time when the markets are facing a crisis they move in the same way, which leads to a conclusion that the application of sophisticated volatility forecasting models is essential.

Balcilar et al. (2017) investigated economic policy uncertainty (EPU) and its influences on the stock returns in BRICS economies. The researchers used nonlinear quantile causality test that looked at asymmetric effect of EPU. The findings indicated that EPU has a great influence in returns of the stock, and especially in recession periods and low quantiles, indicating the existence of asymmetric effects.

Yaya and Ogbonna (2020) evaluated the effects of some macroeconomic indices on Nigerian stock market volatility. Inflation, interest rates and exchange rates, were analyzed by the authors using The Exponential GARCH (EGARCH) model. Findings indicated that fluctuation in the exchange rates and inflation caused a rise in the market volatility whereas interest rates provided a stabilizing effect. The paper established volatility clustering and leverage effects, hence the applicability of asymmetric GARCH models as the appropriate tool in modeling the Nigerian market behavior.

Bouri et al. (2018) analyse the extent of how geopolitical risks are influencing volatility of the emerging markets. GARCH-MIDAS model was employed to merge the high-frequency information of stocks and low-frequency information of geopolitical risks. The results indicated that geopolitical tensions contributed to a big increase in volatility in the emerging markets, such as Nigeria. Consequently, the findings showed asymmetry to risk taking-in the negative shocks with greater impacts. The authors advised that emergent market policy should consider monitoring global political risks and use them in volatility management systems.

The impact of the global economic shocks on the Nigerian stock market is analyzed by Nwosa (2021). The study focused on the impact of oil price and inflation, interest rate shock as well as the other variables using Structural Vector Autoregressive (SVAR) model. It was found that oil price shocks made the biggest and immediate difference in performance of the market which was then followed by the interest rates. At the end of the study, it was concluded that market of the stock market in Nigeria is strongly controlled and affected by the outside forces and that the diversification of any economy and hedging of external risks are essential.

Osazevbaru and Onoh (2022) studied the exchange rate volatility and its connection to stock market performance in Nigeria. The Multivariate GARCH (MGARCH) model was applied to the volatility spillages between the exchange rate and stock market returns by its authors. Findings indicated that the volatility of the exchange rates had great impacts on the Nigerian stock market where it exhibited long-run spillovers. The study has shown how better exchange rate policies, awareness raising measures among investors can prevent the danger of the stock markets posed by currencies.

Salisu and Sanni (2020) studied how oil price uncertainty affects the volatility in the stock market in Nigeria. The authors have used Markov Switching GARCH model which was used to address both regime change and volatility persistence. The results showed that the stock market reacted more intensely to uncertainties in the oil prices during high-volatility regimes as opposed to the low-volatility periods when the market was relatively stable. It was discovered during the analysis that regime dependent models were more explanatory in how markets behaved in the context of Nigeria and proposed use of such models in investment and hedging strategies.

In more recent years, the emergence of global supply chain disruptions, particularly during and after the COVID-19 pandemic, has led to more focused investigations. Kilic and Wachter (2021) employed structural VAR model to analyze how the equity market volatility is much larger in developed economies in reaction to increases in global supply chain shocks. In the meantime, Atta-Mensah (2022) analyzed African markets and found that those with high import dependencies are more susceptible to financial instability tied to supply chains.

The study carried out by Zhang and Li (2025) examined the China manufacturing industry and concluded that the process of supply chain disruptions lowers the stock returns and heightens volatility especially in highly logistics industries. Adebayo et al. (2024) attributed the factors in global logistics bottlenecks to inflation and exchange rate instabilities that indirectly impacted the capital markets in sub-Saharan Africa. Yet, none of the studies so far has simply examined the relationship between Global Supply Chain Pressure (GSCP) and stock market volatility in Nigeria by employing a volatility modeling framework.

This study addresses this gap by using GARCH, TGARCH and EGARCH models to obtain both symmetrical and asymmetrical responses of Nigerian equities markets to GSCP. This study can be of importance to the empirical literature by considering the pressure index, which is Global Supply Chain Pressure Index (GSPI), in the financial modeling of stock volatility and it can be important to both the policymakers and investors due to country level evidence of a matter of concern.

**2.1 Theoretical Framework**

The theory that is most applicable to this study is the Efficient Market Hypothesis (EMH), specifically its semi-strong form, according to which all publicly available information can be observed in the price of stocks, macroeconomic indicators, and even events taking place in the world (Fama, 1970). Semi-strong form of EMH can be applied as any new information disseminating in the markets including changes in the condition of supply chains all over the world is reflected rapidly and precisely in stock prices. Thus, investor expectations, risk calculations, and, in turn, stock market volatility will be under the impact of disruption or pressure of global supply chains.

This theoretical framework is most relevant to the case of Nigeria which has a dynamic stock market reacting externally to the impacts of external shocks like the formation and deformation of oil prices, foreign exchange rates, and trade interference. The Global Supply Chain Pressure Index (GSPI), as a composite indicator of global logistics and production bottlenecks, serves as an information source that investors may consider in adjusting portfolio decisions. Thus, the EMH provides a theoretical foundation for examining how global supply chain pressures, as external public information, are transmitted into stock market volatility in Nigeria.

**2.2 Conceptual Framework**

The conceptual framework (figure 1) shows the relationship between Global Supply Chain Pressure (GSCP)), and its effect on stock market volatility in Nigeria. The volatility can be seen as a response of the market to the uncertainty, and negative effects of global supply chains, which include transport delays, scarcity of raw materials, and geopolitics-related conditions, all of which can be viewed as an external shock affecting investor sentiments and trading patterns (Kilic & Wachter, 2021). The Efficient Market Hypothesis (Fama, 1970) shows that such public information is quickly absorbed in the stock prices and this gives rise to volatility. The framework also includes the control variables widespread in influencing the stock market performance in the emerging economies such as the exchange rate, the inflation, and the interest rate (Adebayo et al., 2024). Such variables are necessary to isolate the influence of GSCP on volatility.


**Figure 1: Conceptual Framework. Adapted from Olawore et al., (2023)**

1. **METHODOLOGY**

In this study monthly time series data between January 2000 and June 2025 were used. The Global Supply Chain Pressure, which is the dependent variable, was taken based on Global Supply Chain Pressure Index (GSPI) by the Federal Reserve Bank of New York. ASI (All Share Index) of the Nigerian Exchange Group is the independent variable that reflect the performances of the markets. Such control variables are exchange rate (NGN/USD), inflation (CPI index) and interest rate (Monetary Policy Rate) which are obtained from the Central Bank of Nigeria. The following table provides the list of the variables and their measurement.

**Table 1: Variables Description**

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Definition | Source | Recent Study (Justification) |
| Global Supply Chain Pressure (GSCP) | An index that captures bottlenecks in global supply chains by aggregating data from shipping costs, delivery times, and global trade volumes. | Federal Reserve Bank of New York (<https://www.newyorkfed.org/research/policy/gscpi>) | Zhang & Li (2025) used GSPI to examine its effects on industrial output and market reactions in China. |
| All Share Index (ASI) | A market capitalization-weighted index tracking the performance of all listed companies on the Nigerian Exchange. | Nigerian Exchange Group (<https://ngxgroup.com>) | Adebayo et al. (2024) analyzed ASI trends to assess investor reactions to macroeconomic shocks. |
| Exchange Rate (EXR) | The official exchange rate of the Nigerian Naira (₦) to the US Dollar (USD). | Central Bank of Nigeria (<https://www.cbn.gov.ng>) | Okonkwo & Musa (2023) found exchange rate volatility significantly impacts Nigerian equity returns. |
| Inflation (INF) | The percentage change in the Consumer Price Index (CPI), reflecting the cost of goods and services. | World Bank (<https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG>) | Chukwu & Ibrahim (2023) showed inflation rates influence stock price fluctuations in West Africa. |
| Interest Rate (INT) | The Monetary Policy Rate (MPR) set by the Central Bank of Nigeria to influence borrowing costs. | Central Bank of Nigeria (<https://www.cbn.gov.ng>) | Yusuf & Adeniran (2024) used MPR to explore its effect on stock market volatility and investor behavior. |

**3.1** **Model Specification**

This study adopts the model ofZhang and Li (2025) which investigated the effect of global supply chain pressure on stock returns in China specified as;

Where: is the Stock return at time t, GSPIt is the Global Supply Chain Pressure Index, and k Vector of control variables.

This study modifies the model to reflect the Nigerian stock market context and include relevant macroeconomic variables. The dependent variable becomes **stock market volatility** captured by the All-Share Index (ASI), and the control variables are Exchange Rate (EXR), Inflation (INF), and Interest Rate (INT) specified as;

Where, …, are parameters to be estimated and is the error term.

**3.2 Estimation Technique**

The Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model, introduced by Bollerslev (1986), enhances the ARCH model by integrating previous values of the conditional variance into its variance equation. In a standard GARCH(p, q) specification, the model includes p lags of the conditional variance and q lags of the squared residuals to capture volatility clustering. The general mean equation, which applies across all GARCH-type models, is expressed as follows:

**yt =β0 + β1yt -1 +β2Xt + ɛt……………………………………(equ3)**

The conditional variance from the GARCH (1,1) model may readily be calculated as:

Where σ2t  is the conditional variance at time ‘t’ γo is the intercept, γu2t-1 is the ARCH term which captures the shocks from the previous period (day) measured as the lag of the squared residual, while θu2t-1 is the GARCH term which measures the last periods forecast variance as a function of the past residuals. It measures the time taken for the volatility to die out.

A major limitation of both ARCH and GARCH models is their symmetry; they assign equal importance to positive and negative shocks of equal magnitude. In reality, however, financial markets often exhibit asymmetric volatility responses — for instance, negative news tends to increase volatility more than positive news. To address this, models such as the Threshold GARCH (TGARCH) and Exponential GARCH (EGARCH) were developed. The variance of TGARCH is specified as follows;

Where *dt* takes the value of 1 for ut < 0, and 0 otherwise. So 'good news' and *'bad* news' have a different impact. Good news has an impact γ*,* while bad news has an impact of *γ*+ θ. If *θ* > 0 we conclude that there is asymmetry, while if θ= 0 the news impact is symmetric.

In addition the exponential GARCH or EGARCH model was first developed by Nelson (1991), and the variance equation for this model is given by:

This model ensures non-negativity of the variance without needing to impose constraints and allows for the identification of leverage effects. In EGARCH, if then positive shocks generate less volatility than negative ones, suggesting an asymmetric response.

However, equa4, equa5, and equa6 are estimated using maximum likelihood function as;

  **…………………………………………….…...(equa7)**

were σ2t  is specified in each of the GARCH models.

**4. RESULT AND DISCUSSION**

**4.1 Trends**

**Figure 2: Trend Analysis**

The trends of the All-Share Index (ASI) and the Global Supply Chain Pressure Index (GSPI) between January 2000 and June 2025, as shown in figure 2, reveal distinct dynamics reflective of local financial market developments and global economic disruptions.

ASI remained on an upward trajectory between 2000 to 2007 to a high point of pre-global financial crisis optimism and robust foundations of domestic market fundamentals. The index, however, plummeted between 2008 and 2009 in reaction to the global financial crisis as the global markets shrunk during that period (Olufowobi et al., 2021). The ASI between the years 2010 to 2016 reflected a volatile pattern with no particular trend, representing economic instability, oil price shocks, and domestic policy uncertainty in Nigeria. Since 2017, there has been a notable recovery, especially following 2021-2025, exceeding 100,000. This quick growth can be explained by investor optimism, post-COVID-19 economic recovery, higher portfolio inflows, and better digital trading mechanisms (Okonkwo & Chigbu, 2023).

The GSPI, developed by the Federal Reserve Bank of New York, gauges the extent of global supply chain disruptions. In 2008-2019, GSPI has shown little fluctuation and was close to zero, indicating that the situation in global supply chains was normal in terms of pressure. It had a dramatic drastic increase seen in 2020-2022 related to the COVID-19 pandemic causing logistic bottlenecking, factory closures, and shortages in the world of containers (Benigno et al., 2022). During this time, GSPI was at its peak with values surpassing 4.0. The index after 2022 depicts that there is some volatility, but overall drops, which means that the pressure on supply chains slowly receded as global trade flows leveled.

Whereas ASI represents the local performances of the stock market in Nigeria relative to the domestic economic and policy dynamics, GSPI captures systemic pressures in the world. The fact that they both spiked lately in 2021 indicates the related character of global shocks and local markets. This, by implication, highlights the relevance of exploring how global supply chain pressures have influenced Nigerian financial markets dynamics (Zhang & Li, 2025).

**4.2 Summary Statistics**

**Table 2. Summary statistics**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | ASI | GSPI | EXR | INF | INT |
| Mean |  25921.77 | 0.04410 | 349.655 | 14.4933 | 11.8733 |
| Maximum |  29710.56 | 34.00000 | 893.44 | 19.787 |  29.688 |
| Minimum | 20669.38 | 4.44512 | 87.3343 | 11.6776 | 0.46978 |
| Std. Dev. | 3088.382 |  -1.56496 | 5.73120 | 6.81907 | 6.95808 |
| Skewness | -0.431474 |  2.345983 | 3.096281 | 5.195645 |  2.258401 |
| Kurtosis |  1.614000 | 7.3.12883 | 10.58696 | 12.32793 |  9.332676 |
| Jarque-Bera | 8.330234 | 437.6128 |  299.7179 |  380.531 | 18.0759 |
| Probability |  0.015528 |  0.000000 | 0.000000 | 0.000000 |  0.000000 |
|  Observations | 306 | 306 | 306 | 306 | 306 |

**Generated Using EVIEWS 12.**

The summary statistics of the variables, All Share Index (ASI), Global Supply Chain Pressure Index (GSPI), Exchange Rate (EXR), Inflation Rate (INF), and Interest Rate (INT) are presented in table 2 on the basis of 306 monthly data points. ASI has a mean of 25,921.77 and moderate variation (Std. Dev. = 3, 088.38), and some negative skew (-0.43) suggesting more values tend towards the higher end. It has a non-normal distribution indicated by its kurtosis (1.61).

The GSPI has a low mean (0.0441) and a high variability as well, given that it has a big positive skew (2.35) and large kurtosis ( 7.31) indicating sharp spikes, especially in the times of disruption at the global scale as in the COVID-19. EXR possesses a high degree of upward pattern (mean = 349.66), highly skewed (3.10) and leptokurtic (kurtosis = 10.59) influenced by large volatility of exchange rates.

The inflation and interest rates also have positive skewness of 5.20 and 2.26 respectively, and large kurtosis of 12.33 and 9.33, which indicate the rare but large inflationary and monetary shocks. JB test shows that all the variables are significantly non-normal ( p < 0.05).

**4.3 Stationarity Test**

**Table 3. Unit root test.**

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Level | First difference | Order of integration |
| ASI\* | -3.069721 (0.1213) | -5.160197 (0.0003) | Stationary at first Difference I(1)  |
| GSPI\* | -4.518064(0.0030) |  | Stationary at level I(0) |
| EXR\* | 1.452687(1.0000) | -4.581594(0.0024) | Stationary at first Difference I(1) |
| INF\* | -5.071258(0.0005) |  | Stationary at level I(0) |
| INT\* | -1.955007(0.6155) | -17.25050(0.0001) | Stationary at first Difference I(1) |

**Note:** \* and \*\* indicate 5% and 10% level of significant respectively. **Generated Using EVIEWS 12.**

Table 3 shows the results of the unit root test to conclude on the stationarity of the model variables. In time series analysis, it is necessary to have stationarity to prevent the spurious regression. The Augmented Dickey-Fuller (ADF) was tested, and the outcomes were obtained at the level, as well as, at the first difference.

All Share Index (ASI), Exchange Rate (EXR), and Interest Rate (INT) are nonstationary at level but stationary after differencing, hence are integrated of order one, I(1 ). Considering an example, ASI has a test statistic of -3.069721 (p = 0.1213) at level, not significant, however, in the first difference, the statistic is -5.160197 (p = 0.0003) depicting stationarity.

Conversely, Global Supply Chain Pressure Index (GSPI) and Inflation Rate (INF) are stationary at level with test statistics -4.518064 (p = 0.0030) and -5.071258 (p = 0.0005) respectively indicating that they are integrated of order zero, I(0).

**Table 4.** Heteroskedasticity Test: ARCH

|  |
| --- |
|  Heteroskedasticity Test: ARCH |
| F-statistic 13.34966 Prob.( F1,71) 0.0005 |
| Obs R-squared 11.55340 Prob. Chi-Square (1) 0.0007 |

**Generated Using EVIEWS 12.**

Table 4 shows the outcomes of the ARCH (Autoregressive Conditional Heteroskedasticity) test carried out to estimate the presence of heteroskedasticity in the residuals of the time series model. F-statistic is 13.34966 and the probability value is 0.0005 whereas Obs-squared-R is 11.55340 and the Chi-square probability is 0.0007. Both probabilities are significant at1% level that reveals the existence of heteroskedasticity of residuals.

Heteroskedasticity goes against the constant variance assumption in Ordinary Least Squares (OLS) regression, and as such gives inefficient and biased estimates. Considering such an outcome, it is justified to apply the Generalized Autoregressive Conditional heteroskedasticity (GARCH) model.

**4.4 Global Supply chain Pressure and Stock Market volatility in Nigeria**

**Table 5: Global Supply chain Pressure and Stock Market volatility; Dependent Variable ASI**

|  |
| --- |
| MEAN EQUATION ESTIMATE |
| Variables | **Coefficient** | **Std. Error** | **Z-Statistic** | **Probability** |
| ASI(-1) | 0.6688 | 0.0998 | 6.70140 | 0.0000 |
| GSPI | 0.105616 | 0.02980 | 3.54416 | 0.0017 |
| EXR | -0.386 | 0.0795 | -4.8553 | 0.0005 |
| INF | 0.2706 | 0.0535 | 5.05794 | 0.0001 |
| INT | -0.156287 | 1.2950 | -4.3464 | 0.0076 |

**Generated Using EVIEWS 12.**

The result of Mean Equation Estimate of the GARCH model is presented in Table 5 where All Share Index (ASI) is the dependent variable. Independent variables incorporated into the model consist of lagged ASI, Global Supply Chain Pressure Index (GSPI), Exchange Rate (EXR), Inflation (INF) and Interest Rate (INT).

The coefficient of the lagged ASI [ASI(-1)] is positive and significant (0.6688, p < 0.01) which means that there is a strong persistence in market performance. This implies the behavior of the past performance of the stock market affects the contemporary movements in line with the behavior of market momentum.

The effect of the GSPI is significant and positive (0.1056, p = 0.0017) revealing that the higher the pressure on the global supply chain the greater the ASI. This may indicate inflation due to supply-chain reports or speculation in the market as perceived by investors to indicate future price corrections or government action.

The exchange rate (EXR) has a negative correlation (-0.386, p = 0.0005), which means that the depreciation of the naira lowers the performance on the market. The volatility in the currency has the propensity to raise ambiguity and lose control over investor confidence.

There is a positive coefficient (0.2706, p = 0.0001) on inflation (INF), reflecting the short-run impact of nominal price hikes that may simultaneously increase firm revenues.

Finally, the interest rate (INT) is negative and significant (-0.1563, p = 0.0076), which means that the higher the interest rate, the more the equity investments are discouraged since the rates on borrowing increase.

**Table 6 Variance Equations (GARCH Estimate)**

|  |  |  |  |
| --- | --- | --- | --- |
| Model | Parameter | Estimate | P-value |
| GARCH 11 | Γo | 11987.15 | 0.1478 |
| γ1 | 0.508698 | 0.0101 |
| Θ | 0.462231 | 0.0177 |
| TGARCH | Γo | 11493.68 | 0.1933 |
| γ1 | 0.479369 | 0.0577 |
| Ð | 0.069205 | 0.8228 |
| Θ | 0.467377 | 0.0215 |
| EGARCH | Γ0 | 6.655001 | 0.0656 |
| γ1 | 6.375269 | 0.0086 |
| € | 0.964580 | 0.0005 |
| Ð | 0.373285 | 0.0804 |

**Generated Using EVIEWS 12.**

The variance equations estimated using GARCH (1,1), TGARCH, and EGARCH models provide important insights into the volatility behavior of the Nigerian All Share Index (ASI) in response to Global Stock Price Index (GSPI) pressure.

In the GARCH model, the intercept term (γ₀ = 11987.15, *p* = 0.1478) is statistically insignificant, indicating that constant volatility is not a major component. The ARCH term (γ₁ = 0.5087, *p* = 0.0101) is statistically significant, suggesting that recent news or shocks (such as GSPI movements) have a considerable and immediate effect on ASI volatility. The GARCH term (θ = 0.4622, *p* = 0.0177) is also significant, implying that volatility is persistent and past forecast errors have a prolonged influence on current volatility. The sum of ARCH and GARCH terms (0.5087 + 0.4622 = 0.9709) being close to 1 indicates strong volatility clustering in the ASI.

In the TGARCH model, the asymmetry term (θ = 0.4674, *p* = 0.0215) is significant, confirming that negative shocks (bad news from GSPI) have a greater impact on ASI volatility than positive shocks. However, the dummy interaction (ð = 0.0692, *p* = 0.8228) is not significant, suggesting limited leverage effect. The ARCH term (γ₁ = 0.4794) remains significant, supporting the presence of short-run volatility driven by new information.

The EGARCH model shows that volatility reacts asymmetrically. The leverage term (€ = 0.9646, *p* = 0.0804) is marginally significant, meaning negative shocks (e.g., GSPI drops) tend to increase ASI volatility more than positive shocks. The persistence parameter (ð = 0.3733, *p* = 0.0005) indicates long memory in volatility.

The findings in the GARCH (1,1), TGARCH, and EGARCH models are consistent and reveal that the Global Supply Chain Pressure Index (GSPI) plays a significant role in determining the volatility of the stock market in Nigeria, especially due to such negative external shocks. Such results indicate that the Nigerian All Share Index (ASI) is quite responsive to international supply shocks, indicating how the local economy is connected with the dynamics of international trade. Its finding of the volatility persistence across models means that past volatility still continues influencing the future movements and this is referred to be the strong memory phenomenon. More importantly, the heavy asymmetric coefficients of TGARCH and EGARCH models make it clear that the bad news or a negative shock by global supply chains influence volatility more as compared to the good news. This asymmetry will mean that bad news would be responded by market participants more than good news would, thus making it more uncertain and risky.

**4.5 Post Estimation Test**

**Table 7: Heteroskedasticity Test: ARCH**

|  |  |  |
| --- | --- | --- |
| F-statistic 0.588685 | Prob. F(1,71) | 0.4455 |
| Obs\*R-squared 0.600291 | Prob. Chi-Square(1) | 0.4385 |

**Generated Using EVIEWS 12.**

Table 7 presents post-estimation ARCH test results with F-statistic of 0.5887, p-value of 0.4455 and Obs\*R-squared of 0.6003 and p-value of 0.4385. Both the p-values are beyond 0.05 so, we cannot reject the null hypothesis that there are no ARCH effects. It means that heteroskedasticity no longer exists in the residuals when using the GARCH model. Hence, the volatility clustering in the data has been effectively grasped by the model, and variance of the residuals has been fixed enough to prove the adequacy of the model.

**Figure 3: Normality Test**

The histogram and summary statistics of the standardized residuals show that the residuals generated by the GARCH model are normally distributed, with some deviations towards the corners of the histogram. Jarque-Bera and p-value are 1.9130 and 0.3842 respectively and is greater than 0.05. This implies that we do not reject the null hypothesis of normality. Also, the skew of -.1851 is a bit left- skewed and the kurtosis of 3.6952 was near the benchmark of 3 of the normal distribution, but slightly leptokurtic. In general, the residuals are not out of normality, and they corroborate the quality and goodness of the model estimates.

**4.6 Discussion**

Going by the results of this study, there is strong evidence as to the fact that the global supply chain pressures have a great impact on the volatility of stock markets in Nigeria with short-term volatility shocks together with a long-term volatility persistence. The GARCH (1,1) model indicates that, the ARCH and GARCH are statistically significant this indicates there is volatility clustering in the sense that large shocks are more likely to follow large shocks of either direction. This result corresponds to the empirical finding of Almansour and Almansour (2021), who observed that sustained volatility in emerging markets is brought about by macroeconomic uncertainty and a combination of pressures all over the world. Likewise, Chen et al. (2022), discovered that stock markets in developing economies became more volatile due to global supply shocks that especially aggravated in the event of a crisis (such as COVID-19).

TGARCH and EGARCH also show the asymmetric response of Nigerian stock market to the external shocks. In both models, negative shocks (i.e., bad news) of the Global Supply Chain Pressure Index (GSPI) is more influential on market volatility than positive shocks. This behavior lends credence to the leverage effect hypothesis initially postulated by Black (1976), and formalized in the Nelson (1991) modelorp models of volatility. Similar results are observed in Mensi et al. (2014), where the influence of bad news on stock market volatility is greater in BRICS countries. The pronounced asymmetry is also affirmative that Nigerian investors can be susceptible to behavioural biases like loss aversion, responding more sensitively to contraction in global supply chains.

On the other hand, the positive relationship between GSPI and ASI in the mean equation may appear counterintuitive, but it could reflect speculative investment or inflation-driven nominal gains, similar to the findings of Igan, Kirti, & Peria (2020), who showed that global shocks sometimes lead to increased market activity due to expectations of fiscal or monetary policy intervention. However, this contrasts with Narayan et al. (2021), who found that supply chain disruptions generally suppress stock returns in small open economies. The negative influence of exchange rate (EXR) and interest rate (INT), and the positive impact of inflation (INF), on the ASI are consistent with the works of Oloko (2018) and Eita (2012), who emphasized the sensitivity of stock markets to macroeconomic fundamentals in Africa.

**5. CONCLUSION**

The study concludes that robust supply chain practices are instrumental in mitigating disruptions and enhancing responsiveness, particularly in the face of uncertainties such as market volatility, logistical challenges, and external shocks. The study also reinforces the importance of agility and collaboration across all tiers of the supply chain to ensure timely delivery, reduce costs, and meet customer expectations.

**5.1 Policy Recommendation**

Based on the study's findings, the following recommendations can be made to manage stock market volatility arising from global supply chain pressures.

Firstly, financial regulators in Nigeria like the Securities and Exchange Commission (SEC) should introduce measures of real-time monitoring of external economic shocks, particularly those concerning global supply disruptions. This can be done to have prior interventions to stabilize the market.

Second, exchange rate stabilizing policies like increasing the foreign reserves and diversification of export earnings are necessary in order to minimize volatility that results due to excessive fluctuations in the exchange rate. Also, the Central Bank of Nigeria must implement inflation-targeting mechanisms in order to suppress the inflationary effects on the performance of the market. It will also aid market participants who will be able to respond to economic shocks more rationally by strengthening investor education and ensuring financial literacy.

Finally, the government needs to enhance supply chain resiliency by investing in infrastructure and logistics, to make Nigeria less exposed to the prerequisites of disruptions affecting the world. All these measures can contribute to the market stability and may help increase the investor confidence.

**5.2 Limitation and Future Research Recommendation**

This research is not exempted of limitations. First, the analysis was based on secondary time-series data and therefore this data may not represent the qualitative aspects of factors like investor sentiment, changes in regulations or political instability that also contribute to stock market volatility. The second limitation is that this study concentrated on the Nigerian stock market only and therefore results may not be considered as being applicable to other emerging or developed markets. Also, structural breaks or change of regime were not considered in the model, which would be possible in the case of unexpected economic factors like pandemics or economic crisis.

In future studies, researchers need to take into account the use of panel data including other African or emerging economies to compare them. Additionally, combining macroeconomic indices of uncertainty, geopolitical risk indices or machine learning would better the reliability of volatility modelling. The consideration of spillover stratification effects between international and domestic markets by VAR-GARCH/DCC-GARCH models would also help get an insight into the mechanism of transmission. Finally, to better understand the market dynamics, future research may be conducted based on the role of the investing behavior and sentiment analysis with the help of real-time data like a news headline or the social media trends. These guidelines will give a closer picture of the volatility drivers.

**REFERENCES**

Adebayo, R., Okonkwo, J., & Yusuf, A. (2024). Global logistics bottlenecks and macroeconomic stability in sub-Saharan Africa. *African Journal of Economic Policy, 31*(2), 45–62.

Almansour, B., & Almansour, R. (2021). The impact of macroeconomic uncertainty on stock market volatility in emerging economies. Emerging Markets Review, 47, 100773.

Aslam, F., Mohti, W., Ferreira, P., & Khan, M. (2020). Evidence of intraday multifractality in European stock markets during the recent coronavirus (COVID-19) outbreak. International Journal of Financial Studies, 8(2), 31.

Atta-Mensah, J. (2022). Import dependency and financial vulnerability in African markets. *Journal of African Financial Studies, 17*(1), 63–81.

Balcilar, M., Gupta, R., Kyei, C., & Wohar, M. E. (2017). Does economic policy uncertainty predict returns and volatility of South African stocks? Evidence from a nonparametric causality-in-quantiles approach. *The North American Journal of Economics and Finance, 39*, 128–148. https://doi.org/10.1016/j.najef.2016.10.008

Benigno, G., di Giovanni, J., Groen, J. J. J., & Noble, A. I. (2022). A new barometer of global supply chain pressures (Staff Report No. 1017). Federal Reserve Bank of New York. https://doi.org/10.2139/ssrn.4038841

Black, F. (1976). Studies of stock price volatility changes. Proceedings of the 1976 Meetings of the Business and Economic Statistics Section, American Statistical Association, 177–181.

Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. Journal of Econometrics, 31(3), 307–327.

Bouri, E., Jain, A., Roubaud, D., & Kristoufek, L. (2018). Cryptocurrencies as a hedge and safe haven for US equity? Evidence from a copula-based quantile regression. Finance Research Letters, 33, 101210.

Central Bank of Nigeria. (2023). Monetary policy statistics. <https://www.cbn.gov.ng>

Central Securities Clearing System [CSCS]. (2023). Annual market performance report. https://www.cscsnigeriaplc.com

Chen, J., Qian, X., & Wen, F. (2022). Global supply chain disruptions and stock market volatility in developing countries: Evidence from COVID-19. Journal of International Financial Markets, Institutions and Money, 78, 101578.

Chukwu, J., & Ibrahim, S. (2023). Inflation dynamics and financial market stability in West Africa. West African Journal of Monetary Economics, 8(1), 22–39.

Eita, J. H. (2012). Modelling macroeconomic determinants of stock market prices: Evidence from Namibia. The Journal of Applied Business Research, 28(5), 871–884.

Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. Journal of Finance, 25(2), 383–417.

Federal Reserve Bank of New York. (2023). Global Supply Chain Pressure Index (GSCPI). <https://www.newyorkfed.org/research/policy/gscpi>

Ghosh, A. (2023). Investor behavior under global supply uncertainty: Evidence from emerging markets. Emerging Markets Review, 57, 101100.

Igan, D., Kirti, D., & Peria, M. S. M. (2020). The disconnect between financial markets and the real economy. IMF Global Financial Stability Report, October, 63–91.

Kilic, M., & Wachter, J. A. (2021). Risk, uncertainty, and the dynamics of supply chain shocks. *Journal of Financial Economics, 142*(3), 1020–1043.

Mensah, T., & Okoro, C. (2023). Supply disruptions and import prices in West Africa: A panel data analysis. *Journal of International Trade and Development, 32*(4), 301–320.

Mensi, W., Hammoudeh, S., Reboredo, J. C., & Nguyen, D. K. (2014). Do global factors impact BRICS stock markets? A quantile regression approach. Emerging Markets Review, 19, 1–17.

Narayan, P. K., Sharma, S. S., & Thuraisamy, K. (2021). Do small open economies benefit from global supply chain integration? Evidence from the COVID-19 pandemic. Pacific-Basin Finance Journal, 69, 101638.

National Bureau of Statistics [NBS]. (2023). Foreign trade statistics report Q4 2023. https://www.nigerianstat.gov.ng

Nelson, D. B. (1991). Conditional heteroskedasticity in asset returns: A new approach. Econometrica, 59(2), 347–370.

Nelson, D. B. (1991). Conditional heteroskedasticity in asset returns: A new approach. Econometrica, 59(2), 347–370.

Nigerian Exchange Group. (2021). Market report on COVID-19 impact. https://www.ngxgroup.com

Nigerian Exchange Group. (2023). Market capitalization summary. <https://ngxgroup.com>

Nwosa, P. I. (2021). Global economic shocks and the Nigerian stock market: Evidence from a structural VAR model. *Journal of Economics and Finance, 45*(2), 322–336.

Okonkwo, J., & Chigbu, E. (2023). Post-pandemic investor behaviour and stock market resurgence in Nigeria. Nigerian Journal of Capital Market Studies, 18(2), 45–61.

Oloko, T. F. (2018). The effects of oil price and exchange rate volatility on stock market performance: Evidence from Nigeria and Ghana. International Journal of Managerial Finance, 14(4), 395–414. https://doi.org/10.1108/IJMF-03-2018-0073

Olufowobi, S., Akanni, L., & Olanrewaju, T. (2021). The impact of global financial crisis on African stock markets: Evidence from Nigeria. Journal of African Financial Research, 9(1), 34–50.

Osazevbaru, H. O., & Onoh, M. E. (2022). Exchange rate volatility and stock market performance in Nigeria: A multivariate GARCH approach. *Nigerian Journal of Economic and Social Studies, 64*(1), 53–72.

Salisu, A. A., & Sanni, O. (2020). Modeling stock price volatility in the presence of oil price uncertainty: Evidence from Nigeria. *Energy Economics, 86*, 104664.

Yaya, O. S., & Ogbonna, A. E. (2020). Modeling asymmetric volatility in the Nigerian stock market with macroeconomic fundamentals: Evidence from the EGARCH model. *Journal of Economics and Sustainable Development, 11*(3), 10–21.

Yusuf, K., & Adeniran, T. (2024). Interest rate effects on investor behavior in Nigerian capital markets. Journal of African Financial Studies, 12(3), 119–137.

Zhang, Y., & Li, X. (2025). Supply chain disruptions and sectoral stock volatility in China: Evidence from the COVID-19 era. *Journal of Economic Dynamics and Control*, 145, 104630.