

Does Natural Gas Utilization Reduce Unemployment in Nigeria?

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ABSTRACT: This study investigates the asymmetric impacts of natural gas utilization on unemployment in Nigeria. The study proxied natural gas utilization by total domestic gas utilization (TDG) while unemployment was proxied by unemployment rate. The study made use of annual time series data which were sourced from National Bureau of Statistics (NBS) report, Nigerian National Petroleum Corporation (NNPC) Annual Statistical Bulletins. Employing the nonlinear autoregressive distributed lag (NARDL) regression framework on time series data from 1990 to 2023, the research offers nuanced insights. Key findings reveal that total domestic gas utilization (TDG) has no long-run effect on unemployment and short-run effects are irrelevant due to symmetry. This research challenges traditional symmetric models, providing crucial insights for Nigerian policymakers to mitigate risks and foster sustainable, inclusive growth by addressing the economy's unique sensitivities to energy.

KEYWORDS: Natural Gas Utilization, Unemployment, Domestic Gas Utilization, Inflation Rate, Exchange Rate, Gas utilization, Energy Transition, Price Stability.

1.0 INTRODUCTION

The use of natural gas as a major energy source dates back to the early twentieth century, but its strategic importance in economic development became more evident after the global oil crises of the 1970s, when countries began diversifying their energy sources to reduce dependence on volatile oil markets. Natural gas gradually emerged as a reliable and cost-effective alternative (Yergin, 2020). In recent years, it has also gained global attention as a relatively cleaner fossil fuel, attracting significant investment, particularly in resource-rich countries such as Nigeria. Formed from the decomposition of organic materials subjected to heat and pressure over millions of years, natural gas is widely regarded as the cleanest fossil fuel and possesses high energy-conversion efficiency for electricity generation.

Nigeria holds over 210 trillion cubic feet of proven natural gas reserves, ranking among the top ten globally and positioning the country as a major exporter of liquefied natural gas. Despite this vast resource base, Nigeria historically prioritized crude oil exploration and exports following the discovery of oil in 1956, while associated gas was largely neglected. In recent years, however, the country has increasingly been described as a gas-rich economy that produces oil, prompting stronger calls for expanded domestic gas utilization (Onolemhemhen et al., 2017). Domestic gas utilization plays a significant role in economic development by providing reliable energy for households, power generation, and industrial production. Natural gas supports cleaner energy consumption, improves living standards, and reduces energy poverty (Nwatu, Dosumu & Nteegah, 2023). It also serves as a critical input in industries such as fertilizers, petrochemicals, and manufacturing, promoting employment, technological development, and economic growth.

Despite its abundant reserves, Nigeria has not fully harnessed its natural gas for domestic use. Large volumes are still flared or exported, while local industries and households continue to face significant energy supply constraints. The Nigerian Gas Marketing Company reports only 40% of domestic gas demand is met, with severe deficits in industrial and commercial sectors (World Bank, 2023). It is against the identified problem that this study seeks to empirically examine the impact of domestic gas utilization and trade openness on economic development in Nigeria.

2.0 LITERATURE REVIEW

a. Energy Transition Theory

Energy Transition theory was propounded by Hosier and Dowd (1987) and Leach (1992) who linked the nature of energy consumed to income. Energy transition theory is a framework used to understand and analyze the process of transitioning from one energy system to another, typically from conventional, fossil fuel-based energy sources to renewable and sustainable alternatives. This

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theory examines the drivers, dynamics, challenges, and opportunities associated with shifting towards cleaner, more efficient, and environmentally sustainable energy systems. Energy transition theory encompasses various dimensions, including technological, economic, social, political, and environmental factors, and seeks to explain the complex interactions and transformations occurring within energy systems over time. Energy is argued to be one of the main drivers of modern economy especially across countries that have witnessed rapid growth in recent years. The theory explains that the type of energy consumed by a nation strongly depends on the level of per capita income. Drawing from consumer theory, the theory posits that as income increases, energy consumers tend to transit from traditional or inferior energy to modern energy due to ease of use and comfort. The theory holds that there is a direct link between level of income and energy consumption; high income countries tend to consume more quality energy than poor countries. Furthermore, Energy Transition theory maintains that poor access to modern energy limits a nation's potentials to reduce poverty and ensure sustainable growth. This is because access to energy is central to any poverty reduction drive as energy deprivation inhibits production and limits level of economic activities (Kaygusuz, 2011; Sovacool, 2012).

b. Resource Curse Theory

The Resource Curse theory, also known as the paradox of plenty, was introduced by Richard Auty in 1993. The theory argues that countries rich in natural resources often experience slower economic growth, weaker institutions, and higher levels of corruption than countries with fewer natural resources. This contradicts the common assumption that resource abundance automatically leads to prosperity and development. According to the theory, heavy dependence on natural resource extraction can distort economic structures. It encourages rent-seeking behaviour, discourages economic diversification, and weakens governance institutions. Scholars such as Sachs and Warner (1995) further argue that resource-rich countries are particularly vulnerable to commodity price volatility, which can create macroeconomic instability. In addition, large resource revenues may reduce governments' dependence on taxation, weakening accountability between the state and citizens and increasing the risk of corruption and authoritarian governance.

The theory is often applied to explain how domestic gas or oil wealth can hinder economic development despite its potential benefits. Excessive reliance on natural gas revenues may appreciate the national currency (phenomenon known as Dutch Disease), which reduces the competitiveness of sectors such as agriculture and manufacturing. Resource wealth may also reduce incentives to invest in human capital and productive industries while encouraging corruption and political instability. Countries such as Nigeria and Venezuela illustrate this paradox, where large hydrocarbon reserves coexist with limited economic diversification. However, the theory also recognizes that the resource curse is not inevitable. With strong institutions, transparent governance, and prudent fiscal management, natural resource wealth can support sustainable development. Norway's management of oil and gas revenues through effective policies and long-term investments demonstrates how resource wealth can be transformed into broad-based economic growth.

c. Empirical Literature Review

Ugbede, Toyin and Aleruchi (2025) examined the impact of domestic natural gas utilization on Nigeria's power sector performance between 2000 and 2022 using the Autoregressive Distributed Lag (ARDL) model. The results show that natural gas supply significantly increases electricity generation in both the short and long run. The error correction mechanism confirms rapid adjustment to long-run equilibrium, while diagnostic tests indicate strong model reliability. Ngwu and Ofoegbu (2024) analysed the effect of gas utilization on Nigeria's economic growth from 1999 to 2021 using multiple regression analysis. Their findings reveal that both the Domestic Gas Market and Export Gas Market have significant positive effects on GDP, suggesting that investments in domestic gas and LNG infrastructure could enhance economic growth. Similarly, Diala, Nteegah, Ezurum and Joseph (2024) investigated the relationship between natural gas supply, pricing, taxation, and utilization on economic growth using ARDL-ECM techniques. Their results show that natural gas supply and efficient gas utilization significantly promote economic growth, highlighting the importance of transparent pricing and effective gas management policies.

Kufre (2024) explored the economic impact of Nigeria's natural gas exports between 1999 and 2022 using the ARDL model. The findings indicate that natural gas exports positively and significantly influence economic growth, while foreign direct investment also contributes positively. Sorde and Nteegah (2023) assessed the effect of natural gas utilization on per capita income in Nigeria using ARDL analysis. Their findings show that gas demand in the power and transport sectors contributed to a decline in per capita income in the long run. Other studies also present mixed outcomes. For instance, Nwatu, Dosumu and Nteegah (2023) found that natural gas consumption had a negative but insignificant effect on economic growth in selected African countries, while studies such as Okafor, Ibe and Nwachukwu (2021) and Yahya and Nkawatoh (2021) reported that natural gas utilization significantly promotes economic growth and economic activities in Nigeria.

3.0 METHODOLOGY

The research design adopted in this study is *ex-post facto* research design. An *ex post facto* investigation seeks to reveal possible relationships by observing an existing condition or state of affairs and searching back in time for plausible contributing factors. *Ex-post facto* research design is therefore deemed appropriate for the study because the study is non-experimental, and seeks to

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investigate causal relationship between the independent variable (domestic gas utilization) and the dependent variable (unemployment), making use of already existing data (annual time series data) which cannot be controlled or manipulated. Furthermore, annual time series data from 1990 to 2023 were used. These data were sourced/extracted from National Bureau of Statistics (NBS) report, Nigerian National Petroleum Corporation (NNPC) Annual Statistical Bulletins.

Model Specification

This section developed and specified the model adopted in this study to empirically determine the effect of domestic gas utilization on unemployment in Nigeria. Theoretically, the framework of this study assumes a standard neoclassical production function which premise on changes in quantities of factors of production account for growth. The Neo-Classical model is based on the Cobb-Douglas production function and is given as:

$$Y = f(A_t, K_t, L_t) \quad (3.1)$$

The Neo-Classical model states that the changes in quantities of factor inputs in production (capital and labour) account for growth of output.

Where,

Y = Aggregate real output

K = Capital

L = Labour force

A = Level of technology

t = Time dimension

Therefore, a standard Cobb-Douglas production function of the form in equation 3.1 can be extended to include energy (domestic gas utilization). The impact of domestic gas utilization and trade openness on economic development can operate through the endogenous factors, A(K). Thus, A(K) is a function of domestic gas utilization (DGU), and other exogenous factors (C) which can also include degree of openness. Mathematically, the above statement can be expressed as:

$$A(K) = f(DGU, C) \quad (3.2)$$

For this study, it is assumed that the effect of domestic gas utilization on unemployment operates through total factor productivity (A). Specifically, total factor productivity is considered a function of domestic gas utilization (DGU) and other control factors (C). In practical terms, domestic gas utilization is measured by the volume of gas supplied for domestic use. The empirical model is adapted from the work of Bello, Chijioke and Alwell (2023), who examined the relationship between natural gas industrialization and unemployment in Nigeria. However, the model is slightly modified to incorporate additional variables that align with the objectives of this study.

The functional form of the modified model is specified as follows:

$$UMR = f(TDG, INFL, EXCR) \dots\dots\dots (3.3)$$

Equation (3.3) is transformed into mathematical model as follows:

$$UMR_t = \alpha_0 + \alpha_1 TDG_t + \alpha_2 INFL_t + \alpha_3 EXCR_t \dots\dots\dots (3.4)$$

Equation (3.4) is transformed into econometric model as follows:

$$UMR_t = \alpha_0 + \alpha_1 TDG_t + \alpha_2 INFL_t + \alpha_3 EXCR_t + \mu_t \dots\dots\dots (3.5)$$

Where:

UMR	=	Unemployment rate
TDG	=	Total domestic gas utilization
INFL	=	Inflation rate
EXCR	=	Official exchange rate
α_0	=	Regression intercept
α_1	=	Parameter of total domestic gas utilization
α_2	=	Parameter of inflation rate
α_3	=	Parameter of official exchange rate
t	=	Time subscript
μ_t	=	Error term

A Priori Expectation

The a priori expectation for the model is summarized as: $\alpha_1 < 0$: This means that total domestic gas utilization is expected to impact negatively on unemployment rate.

Data Analysis Technique

This study conducted pre-estimation tests to ensure that the estimated model is not spurious and to determine whether a cointegrating relationship exists among the variables. The variables exhibit mixed orders of integration, with some stationary at level [I(0)] and others at first difference [I(1)], which justifies the adoption of the Nonlinear Autoregressive Distributed Lag (NARDL) model. The

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NARDL framework, developed by Shin Yongcheol et al. (2014), extends the bounds testing approach to cointegration introduced by M. Hashem Pesaran et al. (2001). A key advantage of the NARDL model is its flexibility, as it can be applied when regressors are $I(0)$, $I(1)$, or a mixture of both, provided none are integrated of order two [$I(2)$]. Consequently, unit root testing remains necessary to confirm that no variable is $I(2)$ and to validate the bounds testing procedure.

The NARDL approach is preferred over the linear ARDL model because it captures possible asymmetries in the relationship between gas utilization and trade openness in Nigeria. Like the ARDL model, it is suitable for small samples and robust to potential endogeneity among regressors. More importantly, it allows the analysis of both short-run and long-run asymmetric effects of key variables, including industrial gas utilization, residential gas utilization, domestic gas price, and trade openness on economic development outcomes.

4.0 RESULTS AND DISCUSSIONS

Statistics Analysis

These calculations were performed using the actual values of the variables being analysed. Descriptive statistics helps to elucidate the characteristics of the data. Table 4.1 presents a concise overview of the dataset, based on the number of observations ($N = 34$). This table displays the summary statistics including the means, standard deviations, minimum and maximum values, skewness, and kurtosis. Statistical characterization of the variables is essential for examining the distribution and variability of the variables under study.

- **Unemployment Rate (UMR)** has a mean of 4.83%, but the SD of 2.29% and positive skewness (1.198) imply that unemployment has spiked in certain years, pulling the distribution rightward. The kurtosis (2.905) is close to normal, indicating moderate tail behavior.
- **Gas Utilization** shows high variability, especially in residential and total usage, with large SDs and positive skewness (0.75–0.88), suggesting increasing consumption over time. The kurtosis values (2.2–2.57) indicate mild leptokurtic distributions—some extreme values but not overly concentrated.
- **Price Stability Index** and **Exchange Rates (Official and Real)** all exhibit high skewness (≥ 1.4) and kurtosis (> 5), indicating distributions with sharp upward movements and heavy tails. These reflect Nigeria's exposure to inflation, currency devaluation, and macroeconomic instability.

The summary statistics highlight pronounced volatility and asymmetry in key economic indicators such as gas prices, exchange rates, and price stability, reflecting the impact of policy shocks and macroeconomic instability. Most variables deviate from normality, suggesting the need for data transformation or robust econometric techniques to ensure reliable analysis. These distributional patterns, combined with high variability in gas utilization and pricing and modest foreign direct investment, underscore structural inefficiencies in Nigeria's economy and signal an urgent need for targeted reforms in energy pricing, trade openness, and macroeconomic policy frameworks.

Table 4.1: The Results of Summary Statistics for Selected Variables ($T = 34$)

Variables	Mean	SD.	Min.	Max.	Skew.	Kurt.
Unemployment rate	4.831	2.287	1.900	10.100	1.198	2.905
Total domestic gas utilized	461845	282967	156190	1157800	0.881	2.571
Price stability	18.278	15.902	5.388	72.846	2.180	6.855
Official exchange rate	161.217	143.197	8.038	645.194	1.427	5.185
Real exchange rate	109.505	48.089	49.777	273.015	1.833	6.486

Source: Authors' Computation, 2025.

Unit Root Tests

The Augmented Dickey–Fuller (ADF) unit root test results in Table 4.2 show that Unemployment Rate (UMR) and Inflation (INFL) are non-stationary at level but become stationary after first differencing, indicating they are integrated of order one, $I(1)$. Total Domestic Gas Utilized (TDG), Domestic Gas Price (DGP), Official Exchange Rate (EXCR), and Real Exchange Rate (REXC) are stationary at level, indicating they are integrated of order zero, $I(0)$. These mixed orders of integration—two variables being $I(1)$ and three being $I(0)$ —suggest that econometric techniques such as the Autoregressive Distributed Lag (ARDL) model or bounds testing approach are appropriate, as they accommodate variables with different integration orders. This stationarity profile is crucial for ensuring robust model specification and avoiding spurious regression results in analyzing Nigeria's macroeconomic and energy dynamics.

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Table 4.2: Results of the Augmented Dickey–Fuller (ADF) Unit Root Test

Variables	Level			First Difference			Order of Integration
	Constant + Trend	Constant	None	Constant + Trend	Constant	None	
	Stat. (5% Crit.)	Stat. (5% Crit.)	Stat. (5% Crit.)	Stat. (5% Crit.)	Stat. (5% Crit.)	Stat. (5% Crit.)	
UMR	2.398 (3.572)	1.904 (2.980)	0.906 (1.950)	1.731 (3.576)	2.095 (2.983)	2.239** (1.950)	I (1)
TDG	2.677 (2.980)	0.031 (3.572)	3.885*** (1.950)	-	-	-	I (0)
INFL	2.708 (2.980)	3.160 (3.572)	1.501 (1.950)	4.324*** (2.983)	4.259*** (3.576)	-4.403*** (1.950)	I (1)
EXCR	2.924 (2.980)	1.953 (3.572)	3.331*** (1.950)	-	-	-	I (0)
REXC	3.019*** (2.980)	2.961 (3.572)	0.792 (1.950)	-	-	-	I (0)

Note: *, **, and *** signifies significance at 10%, 5%, and 1% levels respectively
Source: Authors' Computation, 2025.

Cointegration Test

The results of the Bounds Testing in NARDL (BDM) and Pesaran, Shin, and Smith (2001) Bounds Test (PSS) for the models estimated to examine the impact of total domestic gas utilization on per unemployment rate are presented Table 4.3. From the result presented in Table 4.3, for the model assessing the impact on unemployment rate shows no long-run asymmetric ($2.020 < 2.034$) or level ($2.210 < 3.32$) relationship. This result suggests that total domestic gas utilization does not exhibit a long-run relationship with unemployment rate.

Table 4.3: Results of the Bounds Cointegration Tests For Estimators Assessing the Impact of Total Domestic Gas Utilization on Unemployment Rate

Model	Bounds Testing in NARDL (Shin, Yu, Greenwood-Nimmo, 2014) t_{BDM}	Pesaran, Shin, and Smith (2001) Bounds Test F_{PSS}
UMR Model	-2.020	2.210

Note 1: While the t_{crit} at 95% confidence interval is ± 2.034 , the F_{crit} at 95% confidence interval is 3.32. **Note 2:** UMR Model estimates the impact of total domestic gas utilization (TDG) on unemployment rate.
Source: Authors' computation, 2025.

Wald Test of Asymmetry

Table 4.4 presents the results of tests for positive (+) and negative (−) asymmetric long-run effects, along with long- and short-run asymmetries, in the models estimating the impact of total domestic gas utilization on unemployment rate. In the results, significant coefficients were observed for both positive and negative long-run changes in total domestic gas utilization, indicating a meaningful long-run asymmetric effect. However, the short-run asymmetry in this model was statistically insignificant. These findings suggest that total domestic gas utilization exerts significant long-run effects (both positive and negative) on unemployment rate, with evidence of long-run asymmetry in the model.

Table 4.4: Results of Wald test of Asymmetry for Estimators Assessing the Impact of Total Domestic Gas Utilization on Unemployment Rate

Models	Long-run effect [+]			Long-run effect [-]		
	Coeff	F-stat	P>F	Coeff	F-stat	P>F
UMR Model	0.014***	41.61	0.000	-0.116***	20.8	0.001
	Long-run asymmetry			Short-run asymmetry		
	F-stat		P>F	F-stat		P>F
UMR Model	18.56***		0.002	0.348		0.568

Note 2: ***, **, and * signifies p-values less than 0.01, 0.05, and 0.10 respectively. **Note 2:** UMR Model estimates the impact of total domestic gas utilization (TDG) on unemployment rate, respectively.
Source: Authors' computation, 2025.

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Parameter Estimates and Asymmetry Multiplier Effect

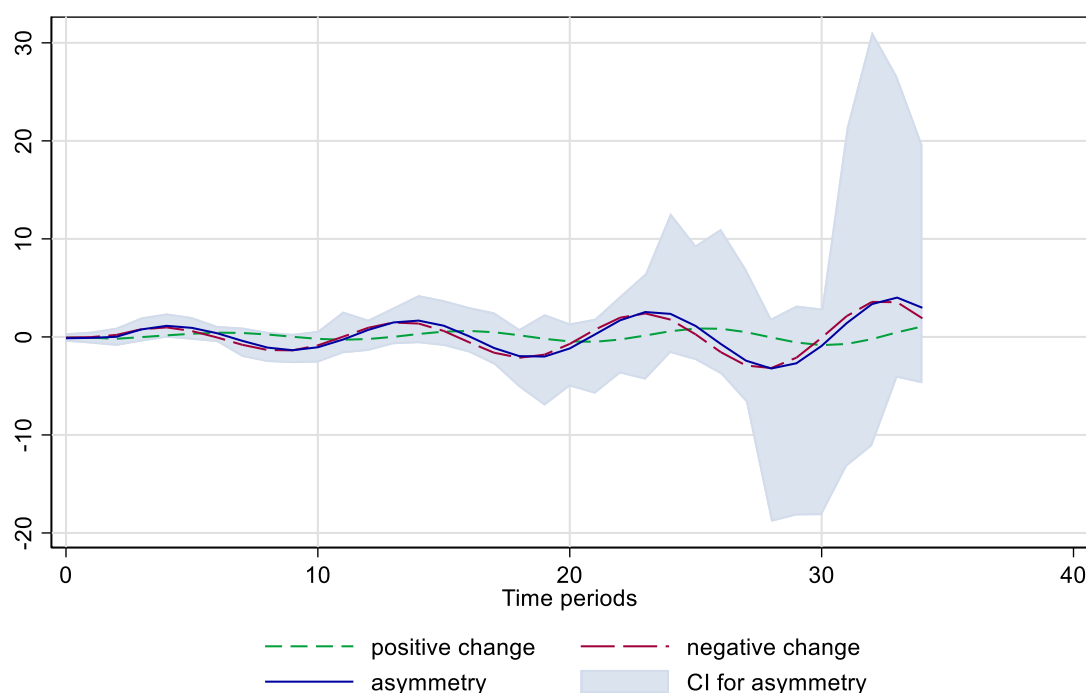
Table 4.5 reports the nonlinear ARDL results for both long- and short-run effects of total domestic gas utilization (TDG) on unemployment rate in Nigeria. The Wald test confirms the presence of long-run asymmetry in the model, indicating that TDG exerts asymmetric long-run effects on unemployment rate. In the result also, both positive and negative long-run shocks are statistically insignificant, implying no meaningful long-run effect on unemployment. Nonetheless, due to the confirmed symmetry in the unemployment model, these short-run effects are considered economically irrelevant for unemployment dynamics. Total domestic gas utilization has no meaningful short- or long-run effect on unemployment rate in Nigeria.

Table 4.5: Results of the Nonlinear ARDL Estimators Examining the Impact of Total Domestic Gas Utilization on Unemployment Rate in Nigeria

Variables	UMR Model			
		Coeff.	Std. error	P> t
LR				
PCI _{t-1}				
UMR _{t-1}		-1.766*	0.874	0.071
TDG ⁺ _{t-1}		0.025	0.015	0.128
TDG ⁻ _{t-1}		0.205	0.132	0.153
SR				
ΔUMR _{t-1}		1.080	0.603	0.103
ΔUMR _{t-2}		0.767	0.551	0.194
ΔUMR _{t-3}		0.362	0.421	0.410
ΔTDG ⁺ _t		-0.001	0.006	0.865
ΔTDG ⁺ _{t-1}		-0.018	0.016	0.291
ΔTDG ⁺ _{t-2}		-0.014	0.014	0.314
ΔTDG ⁺ _{t-3}		-0.006	0.013	0.653
ΔTDG ⁺ _{t-4}		0.001	0.009	0.946
ΔTDG ⁻ _t		0.005	0.053	0.920
ΔTDG ⁻ _{t-1}		-0.155	0.121	0.232
ΔTDG ⁻ _{t-2}		-0.070	0.102	0.506
ΔTDG ⁻ _{t-3}		0.012	0.062	0.849
ΔTDG ⁻ _{t-4}		0.002	0.070	0.979
INFL		-0.004	0.006	0.481
EXCR		-0.012	0.016	0.479
Constant		6.732	3.717	0.100
Note 1: ***, **, and * signifies p-values less than 0.01, 0.05, and 0.10 respectively. Note 2: UMR Model estimates the impact of total domestic gas utilization (TDG) on unemployment rate. Source: Authors' Computation, 2025.				

Figures 4.1 illustrates the dynamic long-run responses of unemployment rate to positive and negative shocks in total domestic gas utilization (TDG). The visual evidence reveals a clear asymmetric adjustment toward new long-term equilibria, where negative shocks in TDG produce larger and faster adverse effects on employment than the gains realized from positive shocks. Specifically, the unemployment rate reacts more sharply to negative TDG shocks, while its response to positive shocks is sluggish and limited. These patterns suggest that Nigeria's economic stability and capacity for inclusive growth are highly susceptible to volatility in domestic gas utilization. To mitigate these risks, the findings emphasize the need for enhanced gas production efficiency, reduced waste, and strategic export-oriented policies to stabilize income levels and foster job creation.

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Note: 95% bootstrap CI is based on 100 replications

Fig. 4.1 SR and LR Asymmetry Multiplier Effect of Total Domestic Gas Utilization on Unemployment Rate

Post-Estimation Diagnostics

Table 4.6 presents the post-estimation diagnostic results, indicating that UMR model—unemployment rate—performed satisfactorily across all tests. The portmanteau serial correlation test shows statistically insignificant p-values, suggesting no evidence of serial correlation and that the residuals approximate white noise. The Breusch-Pagan heteroskedasticity test also yields insignificant p-values, supporting the null hypothesis of homoskedasticity and confirming the absence of heteroskedasticity. Similarly, the Ramsey RESET test results indicate no functional form misspecification, as the null hypothesis of correct model specification cannot be rejected. Finally, the Jarque-Bera test results affirm that the residuals are approximately normally distributed, with p-values supporting the null hypothesis of normality in both models. The diagnostic tests confirm that both models are statistically robust, well-specified, and free from major estimation issues.

Table 4.6: Results of Model Diagnostics for Estimators Assessing the Impact of Total Domestic Gas Utilization on Unemployment Rate

Tests	Model 1		UMR Model	
	Stat.	P-value	Stat.	P-value
Portmanteau Serial Correlation (SC) test (χ^2)	10.97	0.531	9.839	0.630
Breusch/Pagan heteroskedasticity (HET) test (χ^2)	0.191	0.662	2.85	0.091
Ramsey RESET test (F)	1.432	0.312	2.371	0.156
Jarque-Bera test on normality (χ^2)	0.848	0.654	0.888	0.641
Note 1: ***, **, and * signifies p-values less than 0.01, 0.05, and 0.10 respectively. Computation, 2025.				

Discussion of Findings

The current study reveals positive and negative long-run shocks in TDG are statistically insignificant. Short-run effects are considered economically irrelevant due to symmetry. Nevertheless, the unemployment rate reacts more sharply to negative TDG shocks visually. The current study's finding that both positive and negative TDG shocks reduce per capita income in the long run significantly contradicts the prevailing literature that generally supports a positive link between energy/gas consumption and economic growth. Many studies, such as those by Ngwu and Ofoegbu (2024), Diala, Nteegah, Ezurum and Joseph (2024), and Okafor, Ibe and Nwachukwu (2021), consistently report a positive and significant impact of gas utilization on economic growth in Nigeria and other developing nations. The current study's assertion that the economy is vulnerable to TDG disruptions aligns with broader concerns in the literature about energy supply and stability. Sorde and Nteegah (2023) found that gas demand and cost

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contributed to a decline in per capita income and hampered economic well-being in Nigeria. This underscores the importance of a stable and affordable energy supply for economic progress. The current study's mixed and largely insignificant findings for TDG on unemployment rate reflect the broader ambiguity noted in the literature concerning the energy consumption-employment nexus.

5.0 CONCLUSION AND RECOMMENDATIONS

Total domestic gas utilization shows long-run asymmetry but short-run symmetry for the unemployment rate. Negative total domestic gas utilization shocks cause the unemployment rate to react more sharply, while the response to positive shocks is sluggish and limited. Overall, the Nigerian economy exhibits strong asymmetric sensitivity to negative shocks in domestic gas utilization, implying that its stability and capacity for inclusive growth are highly susceptible to volatility in domestic gas utilization. The study recommended that to leverage immediate and substantial improvements in per capita income, policies should focus on increasing industrial gas utilization. This could involve incentives for industrial expansion, improving infrastructure to deliver gas to industries, and promoting gas-dependent manufacturing sectors. Also, given the strong asymmetric sensitivity of the Nigerian economy to negative shocks in TDG and its adverse impact on income and unemployment, urgent action is needed to enhance gas production efficiency and reduce waste. Strategic export-oriented policies should also be pursued to stabilize income levels and foster job creation. This implies a need for investment in gas infrastructure, reducing gas flaring, and ensuring reliable domestic gas supply.

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