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Oil demand-supply equilibria in some selected regions: macroeconomic implications for market stability and energy security

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Abstract: The relationship between Gross National Income and the unemployment rate in the context of regional oil demand-supply equilibria was examined, emphasizing their macroeconomic implications on market stability and energy security. The analysis employs GMM to investigate short-term dynamics and also utilizes forecasts from the OPEC and World Bank, in conjunction with projections from the World Energy Outlook and Global Economic Prospects. The GNI has a positive and statistically significant effect on oil demand-supply balance, while unemployment shows a negative but statistically significant influence. The analyses indicate that the models sufficiently exhibit stability, and results' reliability. This study provides oil demand analysis from the combined effect of historical trends with expected future changes, including the macroeconomic forecasts. This study underscores the significance of strategies that integrate economic growth with job creation and diversification of economy toward ensuring stability in energy markets.

Keywords: oil demand-supply, macroeconomic instruments, gross national income (gni), unemployment rate

Introduction

The international oil market has become one of the most important dynamics that influence industries, businesses, trade and as well as energy security globally. Over the years, oil resources have remained the dominant and most consumed energy resource worldwide. This is so despite the increasing level of public awareness of its environmental predicaments, on the one hand, and the progress recorded in the renewable energy technologies, on the other. However, the high level of its adaptability, high density and applications in both private (such as household consumptions) and commercial (such as industrial and transportation systems)

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activities, accounts for its dominant use as energy resource. According to the global report of International Energy Agency (IEA, 2021) on energy consumption for the year 2021, fossil fuels constituted approximately 80% of primary energy consumption, with oil consumption representing the highest component. Currently, oil producing countries allocate significant revenues generated from their oil resources' exports to strengthen their national budgets, improve nuclear and infrastructure facilities, fortify foreign reserves, and support economic transformation. However, according to Okoro (2021), oil import dependent nations, on the other hand, often face challenges associated with rising domestic expenses due to regular fluctuations in the global oil prices.

In the last two decades, the global oil market has passed through a number of significant changes, particularly with regard to demand-supply dynamics, resulting from price fluctuations. For instance, the transformations in the oil market brought about by the United States' shale revolution significantly impacted global supply chains, reduced over reliance on Middle East and Africa to control the price-setting dynamics (Kim, 2020). However, the influence of the Organization of Petroleum Exporting Countries (OPEC) and OPEC+ in achieving prices stability through supply management is considerable (Baumeister & Kilian, 2016). Recently, the geopolitical issues, particularly the Russia – Ukraine war, has further highlighted the vulnerability in the global energy interdependence. Unprecedented price levels have arisen as a result of supply chain disruptions, underscoring the importance of maintaining a global robust and diverse energy system (Agbede et al., 2024).

Furthermore, beyond the energy economy, the variations in global oil prices also influence numerous economic factors, such as employment, trade balances and inflation, among others. Oil exporting countries, such as Nigeria and Venezuela, encountered budgetary difficulties, economic uncertainties, currency devaluation, and social unrests of economic consequences during the event of a decline in oil prices (Hassan, 2022). Economies that heavily relied on imports encountered inflationary pressures and a decrease in industrial competitiveness as prices surge (Wang et al., 2022). The findings are mainly influenced by two primary macroeconomic indicators: gross national income (GNI) and unemployment. The increase in GNI often indicates an expanding economy and an increase in energy consumption. Conversely, an elevation in levels of unemployment results in a reduction of consumers' spending and diminishing business activity (Xu & Zhao, 2023).

The relationship between GNI and unemployment as macroeconomic factors with the oil demand-supply dynamics poses certain challenges to global energy security. In conventional models of oil demand-supply dynamics, the essential components include availability, affordability, and reliability (Novikau, 2023). However, the current energy security framework needs to take into consideration the global transition to low-carbon energy sources and adapt accordingly. The World Energy Council (2021) points out that, despite the growth in renewable energy capacity and tendency, fossil fuel continues to play a crucial role in maintaining

energy supply stability in the periods when the supply of renewable energy is insufficient.

Earlier studies mainly depended on macroeconomic factors like gross domestic products (GDP), inflation, and interest rates in the evaluation of the oil demand-supply dynamics (Baumeister & Kilian, 2016; Hamilton, 2020). However, GNI is now considered a more reliable evaluation of economic capacity and purchasing power, as it takes into account both the foreign and domestic income sources. In addition, despite its significant impacts on energy consumption and industrial productivity, unemployment, as an indication of challenges in the labour market, remains underexplored. The limitations present challenges for policymakers in forecasting how the economic fluctuations will affect the stability in the oil market. This study therefore seeks to empirically analyse the effects of GNI and unemployment on the equilibrium of global oil demand-supply from 2022 to 2026. This contributes to the existing body of literature by indicating the potential impacts of GNI and unemployment on the oil market from two distinct macroeconomic perspectives. The specific objectives of this study are: to analyse the influence of GNI on the global oil demand-supply equilibrium and; to examine the impact of unemployment on the global oil market performance.

1. Literature review

The global oil market is so significant that any fluctuations intricately affect not just the state of fiscal stability and the assurance of energy security but also the overall well-being of the global economy. Oil, as a source of energy remains the most crucial, playing an important role in the global economy and seamlessly integrating with the current energy infrastructure, even amidst shift in favour of renewable energy (IEA, 2021). Instances of global shocks in economic growth as consequences of oil price fluctuations are observed in the oil shocks of the 1970s, the 2008 financial crisis and the 2020 Covid 19 pandemic (Baumeister & Kilian, 2016; Wang, et al., 2022). These incidents underscore the importance of assessing the impact of some macroeconomic factors, such as GNI and unemployment, on the dynamics in the oil market. The notion of energy security focusing on four primary elements: availability, accessibility, affordability, and sustainability is no longer enough to explain the reality of the dynamics in the oil demand-supply framework (Hassan, 2022). The volatility of oil markets jeopardises these commodities, posing huge challenges for energy import dependent countries. Furthermore, the Russia and Ukraine conflict that commenced in 2022 also highlighted the weaknesses of energy networks built on a narrow range of supply sources. Consequently, nations without oil energy resources began to expand their approaches to energy security by hastening increased investments in renewable energy and/or boosting imports of Liquefied Natural Gas (Agbede et al., 2024). Oil exporting countries encounter considerable difficulties during price declines, as evidenced in the 2016 and 2020

global oil prices drop, as they faced budget deficits and several degrees of variations in currency values (Hamilton, 2020). It is therefore important for importers and exporters to maintain oil market equilibrium.

In addition, it is indicated that GNI plays an important and significant role in understanding the shifts in energy consumption trends over time as it encompasses funds from abroad and it also indicates the individuals' spending capacity within a nation (World Bank, 2022). On the other hand, economic growth signifies a heightened demand for oil, given its crucial role in building new infrastructure, fostering business development and enabling the transportation of individuals and goods. Therefore, based on the analysis, a reduction in GNI, as seen during the 2008 financial crisis and the 2020 Covid 19 pandemic, leads to a drop in energy consumption (IEA, 2022). In oil dependent economies, GNI rises alongside increasing oil prices (Rotimi, 2021). This is an indication that a decrease in oil prices results in not just heightened economic instability but also in a GDP growth slowdown. The GNI completely demonstrates how both the direct and indirect effects of oil prices variation affect individuals in a nation. Also, unemployment reduces the global demand in oil by sufficiently widening the time required for production, distribution and consumption. In the same direction, elevated unemployment results in diminished industrial activity, reduced consumer spending, and decreased demand for public transportation (Mahmood, 2019).

Similarly, historical data illustrate that the inverse relationship, that is, during the 2008 financial crisis and the COVID-19 pandemic, significant job losses were associated with the reduction in energy consumption and the global decline in oil demand (Wang et al., 2022; Aktar et al., 2021). In oil producing economies, job losses in the upstream sub-sector, that is exploration and refining, exacerbate economic downturns (Alfalih, 2024). This evidence significantly illustrates the relationship between job markets and energy systems. Furthermore, theoretical frameworks elucidate these relationships and connections. For instance, the classical theory of supply and demand explains the cyclical fluctuations in oil prices and the factors behind the short-term stability in its consumption (Fisher, 2015). In addition, the theory of resource dependence explained the overwhelming vulnerabilities and restrictions in diversification that could be encountered by nations that depend on oil only, as this could lead to economic fragility and stagnation (Abdelkawy & Al Shammre, 2024; Pfeffer & Salancik, 1978). All these insights underscore the direct influence of nations' GNI and unemployment rate on oil markets as shaped by the economic activities and structural dependence therein.

Empirical evidence supports both the historical understanding and theoretical frameworks that explain the existence of association between macroeconomic factors and energy resources. For instance, the study of Hamilton (2020) found a significant positive association between oil demand and economic progress in both long- and short-term runs, especially in developing nations and emerging economies. Similarly, Hassan (2022) established the existence of a unidirectional relationship

between GNI and oil demand in India, indicating that the energy consumption in the economy plays a considerable role in driving income growth. In addition, Baumeister and Kilian (2016) indicated that a significant decline in oil consumption takes place when there is limited production, as revealed by a reduction in GNI. Using a different approach, Nusair (2020) highlighted the variations in spending behaviours, revealing that there is a rapid increase in demand during the times of economic expansion as against the period of recessions in the economy. However, in the study conducted across the European countries, Michieka and Gearhart (2015) revealed that increasing unemployment rates result in a decrease in oil demand across the region. Comparable trends were noted across the Organization of European Countries Development (OECD) and G7 countries, where GNI and employment serve as significant determinants controlling oil demand (Abbass et al., 2018; Katircioglu, et al., 2015). Finally, Kisswani (2021) indicated that lower income levels economies in Asia are more significantly affected by GNI fluctuations than their higher income levels economies. In spite of these empirical contributions, a comprehensive and updated global model that combines the impacts of both GNI and unemployment on the energy system remains predominantly inadequate and ineffective. Consequently, this study has bridged this gap by examining the interaction of these different macroeconomic factors on the oil demand-supply equilibria, thereby enhancing both theoretical and empirical understanding of stability in the energy market. Based on the analysed literature, the following hypotheses are put forward, to be analysed by this study:

H1: GNI has a significant impact on global oil demand.

H2: Unemployment rate has a significant impact on global oil demand.

2. Materials and method

This study uses a quantitative research methodology and a panel data econometric approach to examine the relationship between macroeconomic variables and global oil consumption. Using a panel data approach is better because it combines changes over time and across groups, which makes estimates more accurate. The study uses secondary data from World Bank database and Organization of the Petroleum Exporting Countries (OPEC) across nine (9) countries. These countries include the USA and Canada (representing North America); France and Russia (representing Europe); China and India (representing Asia); South Africa (representing Africa); Qatar (representing the Middle East), and Ecuador (representing Latin America), spanning from 2022 to 2026. The variables and methods used to measure them in the study are presented in Table 1 below:

Table 1. Variables measurement

Variables Type	Name & Abbreviation	Definition	Source	Period
Dependent	Oil Demand (OIL_DEMAND)	Oil demand-supply equilibria measured in million barrels per day (mb/d).	OPEC	2022 – 2026
Independent	Gross National Income (GNI)	Total national income including net foreign income per capita (constant US$).	World Bank	2022 – 2026
Independent	Unemployment (UNEMPLOYMENT)	Share of the labour force without employment (%).	World Bank	2022 – 2026

Source: OPEC; World Bank (2025)

The set of nine countries is intended to provide a balanced cross-section across regions and market roles (importer vs exporter) while keeping the sample tractable for the focused, policy-relevant analysis performed here. We acknowledge this is not a full "global census"; results are therefore interpreted as regionally representative and indicative of global dynamics rather than exhaustive global averages.

2.1. Panel Least Squares (PLS) Estimation

The Panel Least Squares (PLS) estimate is utilised to examine the influence of GNI and unemployment on global oil demand through the subsequent model:

$$Oil\ Demand_{it} = \alpha_0 + \alpha_1(GNI)_{it} + \alpha_2(Unemployment)_{it} + \varepsilon_{it} \quad (1)$$

where:

i represents the country, and t represents the time period.

α_0 is the intercept.

α_1, α_2 are coefficients for GNI and unemployment, respectively.

ε_{it} denotes white noise.

PLS serves as a transparent baseline estimator under the classical assumptions. The estimator is retained as an initial diagnostic step before accounting for unobserved heterogeneity.

2.2. Robust Least Squares (RLS) Estimation

The Robust Least Squares (RLS) estimate is utilised to mitigate the effects of probable outliers and heteroscedasticity in the dataset. The robust regression model is written as:

$$Oil\ Demand_{it} = \alpha_0 + \alpha_1(GNI)_{it} + \alpha_2(Unemployment)_{it} + \eta_{it} \quad (2)$$

where η_{it} is a disturbance term that has been changed to account for heteroscedasticity and outliers.

The RLS estimation protects inference from outliers and heteroscedasticity.

2.3. Generalized Method of Moments (GMM) Estimation

To address endogeneity concerns, the Generalized Method of Moments (GMM) estimator is employed. The structural model is specified as:

$$Oil\ Demand_{it} = \alpha_0 + \alpha_1(GNI)_{it} + \alpha_2(Unemployment)_{it} + \alpha_3(Oil\ Demand)_{it-1} + \alpha_4(GNI)_{it-1} + \alpha_5(Unemployment)_{it-1} + \upsilon_{it} \quad (3).$$

Where:

$(Oil\ Demand)_{it-1}, (GNI)_{it-1}$ and $(Unemployment)_{it-1}$ are the lagged dependent and independent variables to control for persistence in oil demand trends (Instrumental variable).

The moment conditions for the GMM estimation are: $E[Z'_{it}(\epsilon_{it})] = 0$

Where Z_{it} represents the instrument matrix consisting of lagged values of the independent variables to ensure valid instrumental variables.

GMM is appropriate for panel data with short time period and moderate number of variables, and it handles dynamic endogeneity. The selection of the model for this study is valid due to its capacity to utilise both time-series (inter-annual) and cross-sectional (inter-country) variations, thereby improving estimation efficiency while capturing country-specific heterogeneity. The inclusion of a number of countries guarantees external validity, while the five (5) year panel facilitates the detection of the short-term dynamics. Panel data also allows for the control of unobservable differences that may affect the results of single series.

3. Results

Table 2 presents the summary statistics of the variables used in this study: global oil demand (log demand); gross national income (log GNI) and; unemployment rate (log unemployment). The mean values indicate that the average log-transformed for oil demand; unemployment rate and; GNI are: (0.980); (0.541) and; (3.213) respectively. The standard deviation indicates the extent of fluctuation of the variables which are shows that oil demand; GNI and; unemployment have (0.281); (0.763) and; (0.780) respectively. This means that changes in unemployment are easier to see than changes in oil demand and GNI. The negative kurtosis values for demand (-1.486) and GNI (-1.005) show that the distribution is flatter than the normal curve. On the other hand, the positive kurtosis value for unemployment (4.869) shows that the distribution is heavy-tailed.

Table 2. Summary statistics

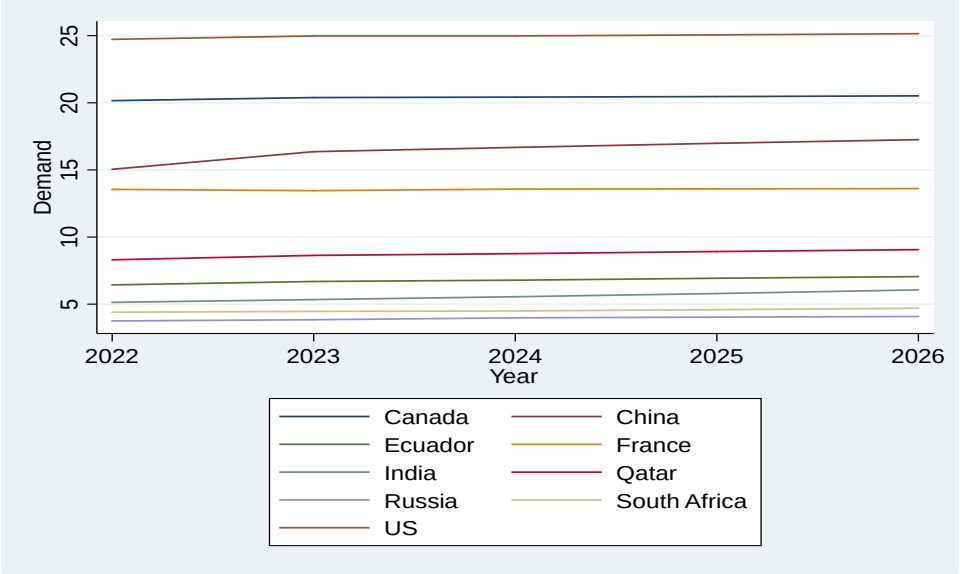
Variables	Log (Demand)	Log (GNI)	Log (UNEMPL)
Mean	0.980	3.213	0.541
Median	0.943	3.335	0.723
Standard Deviation	0.281	0.763	0.780
Sample Variance	0.079	0.582	0.608
Kurtosis	-1.486	-1.005	4.869
Skewness	0.088	-0.130	-2.210
Range	0.826	2.469	3.555

Source: authors' representation

Additionally, skewness values indicate that oil demand is nearly symmetrical (0.088), GNI is slightly negatively skewed (-0.130), and unemployment is strongly negatively skewed (-2.210), indicating that lower unemployment values are more prevalent than higher ones. The range values show that unemployment has the largest spread (3.555), indicating a greater disparity across observations, while oil demand has the lowest range (0.826), indicating greater stability.

$$Oil\ Demand = \log(Demand), GNI = \log(GNI), Unemployment = log(UNEMPL)$$

Figure 1. Oil needs of selected countries between 2022 and 2026



Source: authors' representation

Table 3 shows the correlation matrix for log-transformed variables. Log (Demand) and log (GNI) have a moderate positive relationship given that the correlation is 0.575. This means that when GNI goes up, the demand for oil also goes up. On the other hand, Log (Unemployment) and log (Demand) have a weak negative correlation of -0.038. This means that unemployment has a very small effect on oil demand. There is also a low correlation of 0.353 between log (GNI) and log (Unemployment), which means that there is no problem of multicollinearity between the independent variables.

Table 3. Correlation matrix

Items	Log (Demand)	Log (GNI)	Log (UNEMPL)
Log (Demand)	1		
Log (GNI)	0.575	1	
Log (UNEMPL)	-0.038	0.353	1

Source: authors' representation

$Oil\ Demand = \log(Demand), GNI = \log(GNI), Unemployment = log(UNEMPL)$

Table 4. Panel Least Square Coefficient

Oil Demand-Supply	Coefficient	Std. Error	t-Statistic	Prob.
Log (GNI)	0.247656	0.047184	5.248678	0.0000
Log (UNEMPL)	-0.099429	0.046178	-2.153148	0.0371
C	0.549095	0.341883	1.606088	0.1157
R-squared	0.396993	**Mean dependent var**		2.257621
Adjusted R-squared	0.368279	**S.D. dependent var**		0.647191
S.E. of regression	0.514393	**Akaike info criterion**		1.572684
Sum squared resid	11.11322	**Schwarz criterion**		1.693128
Log likelihood	-32.38538	**Hannan-Quinn criter.**		1.617584
F-statistic	13.82548			
Prob(F-statistic)	0.000024			

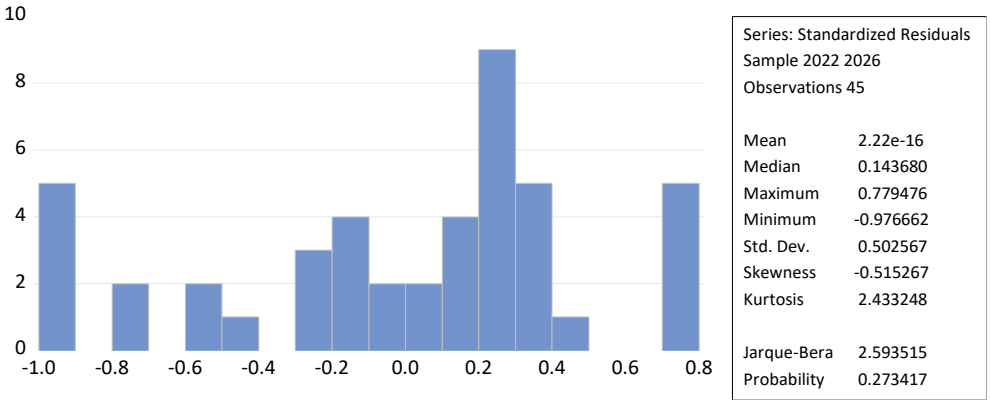
Source: authors' representation

Table 4 presents the results of the PLS regression analysis, which provided how the GNI and unemployment rate affect oil demand. The coefficient of log (GNI) is (0.2477), and the p-value is 0.0000. These values indicate that GNI has a significant positive effect on oil demand. This supports H_1, which states that people consume more oil when their average individual or country's income increases. However, the coefficient for log (Unemployment), on the other hand, is (-0.0994), and the p-value (p = 0.0371), which indicates statistical significance. This means that the more jobs are lost, the less the demand for oil. This supports H_2, which states that when unemployment rises, economic activities decrease, which leads to less energy utilization and consumption. The model of this study explains about 39.7% of the

changes in world oil demand (i.e. $R^2 = 0.39699$), and the F-statistic (13.82548, p = 0.000024) indicates that the regression model is important and fits well. Therefore, the structural model for this study becomes:

$$Oil\ Demand_{it} = 0.549 + 0.248(GNI)_{it} - 0.099(Unemployment)_{it}$$

Figure 2. PLS Normality Plot and Test



Source: authors' representation

Figure 2 presents the PLS estimation's normality plot and histogram of standardized residuals. The skewness value of (-0.5152) indicates a slight leftward asymmetry, however, within an acceptable range for normality. The kurtosis value of (2.4332), which is close to the expected value for a normal distribution (i.e., 3) is an indication that the residuals are normally distributed. The Jarque-Bera statistic of (2.5935) and its probability value of (0.2734) further indicated that the residuals are normally distributed, because the usual p-value of 0.05 level is lower than the obtained p-value. The results therefore indicated that the PLS estimate is accurate because the residuals are close to a normal distribution.

Table 5. Robust Least Square Coefficient

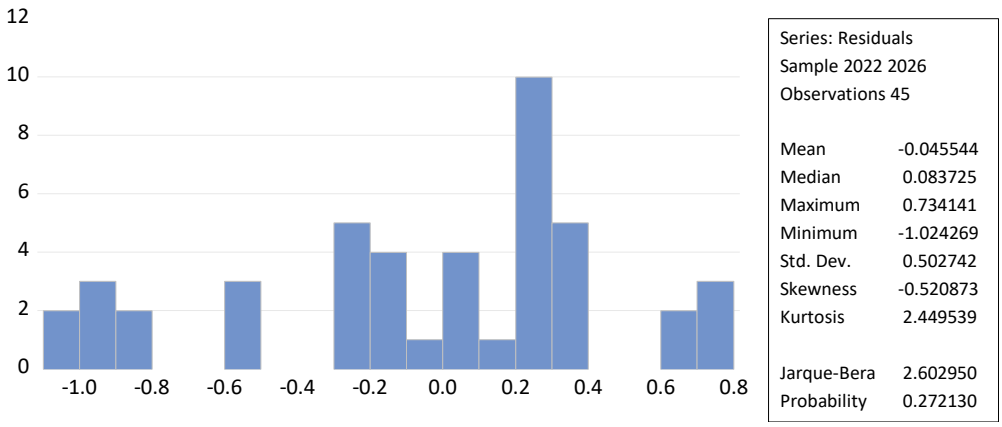
Oil Demand-Supply	**Coefficient**	**Std. Error**	**z-Statistic**	**Prob.**
Log (GNI)	0.255711	0.051935	4.923715	0.0000
Log (UNEMPL)	-0.101740	0.050827	-2.001693	0.0453
C	0.537915	0.376302	1.429478	0.1529
	Robust Statistics			
R-squared	0.395125	**Adjusted R-squared**		0.366321
Rw-squared	0.494859	**Adjust Rw-squared**		0.494859
Akaike info criterion	62.55345	**Schwarz criterion**		67.32716
Deviance	9.349758	**Scale**		0.408946
Rn-squared statistic	24.32176	**Prob(Rn-squared stat.)**		0.000005

Source: authors' representation

Table 5 shows the results of the RLS regression, which considers heteroskedasticity and outlier effects possible. The coefficient for Log(GNI) is (0.2557), with a z-statistic of (4.9237) and p-value of (0.0000). These values indicate that GNI has a positive and statistically significant effect on oil demand, at a 5% significance level. This supports H_1, which states that people in countries with higher incomes use more oil. However, on the other hand, the Log (Unemployment) coefficient is (-0.1017), the z-statistic is (-2.0017), and the p-value is (0.0453). This means that unemployment rate has a negative but statistically significant effect on oil demand at the 5% significance level. This supports H_2, which states that higher unemployment lowers oil demand. The R-squared value of (0.3951) indicates that the combined effect of GNI and unemployment explains about 39.5% of the changes in oil demand. However, the robust R-squared (Rw-squared) value of (0.4949) indicates that the model works better. The all-important Rn-squared statistic of (p = 0.000005) indicates that the model is more reliable. These results therefore support the understanding that oil demand goes up when the economy grows and otherwise when unemployment rate increases. Hence, the structural model given in the form below:

$$Oil\ Demand_{it} = 0.538 + 0.256(GNI)_{it} - 0.102(Unemployment)_{it}$$

Figure 3. Robust Least Square Normality Plot and Test



Source: authors' representation

Figure 3 shows the histogram and the RLS residual normality plot and test. The Jarque-Bera test statistic which is (2.602950), and the probability value of (0.272130), which is greater than 0.05, indicate that the residuals are normally distributed. The skewness value of (-0.520873) also suggests a slight leftward asymmetry, however, also within an acceptable range for normality. The kurtosis value of (2.449539), which is close to the expected value for a normal distribution (i.e., 3) indicates that the distribution is almost mesokurtic. These results, therefore,

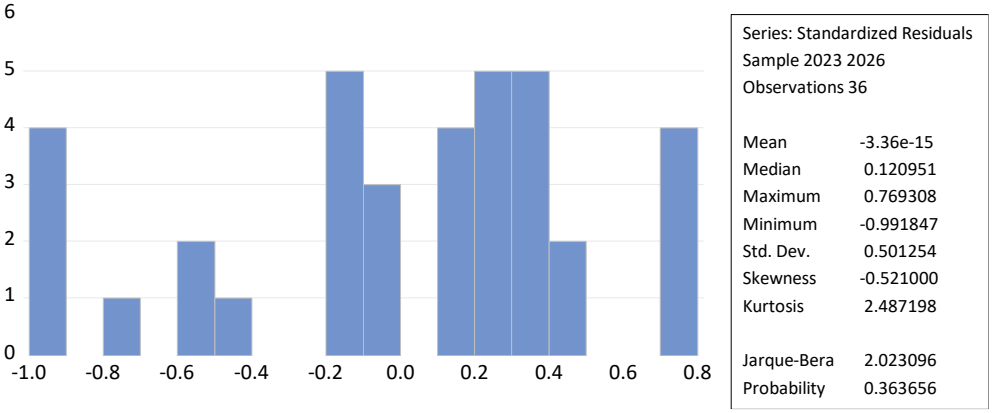
indicate that the model's residuals are normally distributed, which shows a significant support for the accuracy of the regression estimates.

Table 6. Generalize Method of Moment (GMM)

Oil Demand-Supply	Coefficient	Std. Error	t-Statistic	Prob.
Log (GNI)	0.256530	0.054191	4.733836	0.0000
Log (UNEMPL)	-0.106626	0.051923	-2.053527	0.0480
C	0.505105	0.389217	1.297748	0.2034
R-squared	0.397665	Mean dependent var		2.267910
Adjusted R-squared	0.361160	S.D. dependent var		0.645860
S.E. of regression	0.516220	Sum squared resid		8.793930
J-statistic	32.29840			
Instrument rank	4	Prob(J-statistic)		0.000000

Source: authors' representation

Figure 4. GMM Normality Plot and Test



Source: authors' representation

Table 6 shows the results of the GMM estimation, which account for the impact of GNI and unemployment on the oil demand-supply. The coefficient for Log(GNI), which is (0.2565), with a t-statistic of (4.7338) and a p-value of (0.0000), means that the GNI has a positive and statistically significant effect on oil demand at a 5% significance level. This supports H_1, which says that people in countries with higher incomes use more oil. However, on the other hand, the Log(Unemployment) coefficient, which is (-0.1066), with a t-statistic of (-2.0535), and the p-value of (0.0480) means that the unemployment rate has a negative but statistically significant effect on oil demand at the 5% significance level. The model's independent variables (i.e., GNI and unemployment) account for about 39.77% of the change in oil demand, with an R-squared of (0.3977). The J-statistic of (32.2984) with a probability of (0.0000) indicate that the instrumental variables employed in the GMM estimation are valid. The results confirm the substantial impacts of GNI and

unemployment on global oil demand. Hence, the structural model for this study takes the following form:

$$Oil\ Demand_{it} = 0.505 + 0.257(GNI)_{it} - 0.107(Unemployment)_{it}$$

Figure 4 displays the histogram of standardized residuals for the GMM estimation and the normality test. The Jarque-Bera statistic of (2.0231) and its probability value of (0.3637) indicate that the residuals are normally distributed, since the p-value is greater than the value of 0.05. The results therefore show that the GMM estimate is accurate since residuals are close to a normal distribution.

3.1. Discussion of findings

The results presented indicate that GNI positively and significantly influences the global oil demand-supply equilibrium, but that, in contrast, unemployment has a substantial negative effect. This confirms that the increase in individual or national income drives energy consumption, while job losses lead to constraints in industrial production and consumption. These findings are consistent with the established demand theory and also support the studies by Baumeister and Kilian (2016), Hamilton (2020), and Xu and Zhao (2023) by emphasising the relevance of macroeconomic stability in energy market dynamics. The uniformity of results, as indicated by the PLS, RLS, and GMM estimations substantiates their reliability and further underscores the association between oil demand, income and labour market performance. The implication of these findings is that the economies dependent on oil exports ought to diversify and source for alternative means of national income to reduce the shock or risks associated with oil price fluctuations. On the other hand, economies reliant on oil imports need to prioritize job creation opportunities to guarantee stability in demand levels. Based on the foregoing, this study theoretically expands the existing literature on resource dependence by indicating that a combination of GNI and unemployment influence the oil market stability and, by extension, the global energy security.

Conclusion

This study has empirically examined the effects of the relationship between GNI and unemployment on the global oil demand-supply balance. In order to achieve this, the analysis utilised nine selected countries to represent key areas and market roles - major producers, consumers, and emerging economies - which provided an in-depth, yet well-focused global oil dynamics. The use of the nations' GNI per capita, rather than total GNI, improved the model stability and also reduced the possible influence that may be due to cross-sectional variance. The findings consistently indicate that oil production and consumption are enhanced by increased

income levels, while higher unemployment levels negatively impact oil demand by constraining industrial activities and reducing household spending. The relationships exhibit consistent patterns across all estimation methods, strengthening the reliability of the findings. The results of this study provide that macroeconomic stability is necessary to ensure the required equilibrium in the global oil market. It is further emphasised that the continuous growth in income and creation of job opportunities are necessary to maintain market stability in the oil market, which further guarantees global energy security. In order to strengthen economic resilience, therefore, oil-exporting countries should explore other opportunities that will assist in diversifying the economy towards other revenue sources to reduce the potential vulnerability to global economic crises that may result from oil prices fluctuations. Also, all import oil nations across the globe need to focus their energy towards ensuring economic growth by exploring opportunities in human capital development, job creation and employment to support their increasing oil demand. Conclusively, this study enhances the understanding of macroeconomic variables in relation to global oil market dynamics in both short and medium terms, providing solid foundations for developing macroeconomic policies and stronger global energy systems.

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