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Editorial Desk

I have the honour of introducing the inaugural issue of the *LASU Journal of Multidisciplinary Nigerian Studies (LASUJMNS)*, Volume 1, Number 1 (December 2025). This maiden publication represents a significant step in the commitment of Lagos State University to advancing rigorous, multidisciplinary scholarship focused on Nigerian realities.

LASUJMNS was established to provide a credible academic platform for high-quality research that interrogates the social, economic, political, educational, cultural, and technological frameworks in Nigeria. The journal responds to the growing need for scholarly work that moves beyond single-discipline approaches and offers integrated, evidence-based perspectives capable of informing policy, practice, and public discourse.

As a peer-reviewed, biannual, open-access journal, LASUJMNS is committed to academic excellence, ethical publishing, and accessibility. All submissions undergo a rigorous double-blind peer review process in line with international best practices and the principles of the Committee on Publication Ethics (COPE). Only original, methodologically sound, and relevant manuscripts are considered for publication.

The articles featured in this inaugural issue reflect the multidisciplinary scope and scholarly standards of the journal. They address contemporary Nigerian issues across key sectors, which offers insightful analyses, empirical findings, and practical implications that contribute meaningfully to national development discussions.

I sincerely appreciate the dedication of the Editorial and Advisory Boards, the professionalism of our reviewers, and the confidence of the authors who contributed to this first volume. Their collective efforts have laid a strong foundation for the journal. On behalf of the Editorial Board, I invite scholars, policymakers, and practitioners to engage with this issue and to partner with us in building a vibrant platform for multidisciplinary Nigerian studies.

Prof. M. O. B. Mohammed, FNAEAP

Editor-in-Chief

LASU Journal of Multidisciplinary Nigerian Studies (LASUJMNS)

Lagos State University.

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EXCHANGE RATE MANAGEMENT AND RENEWABLE ENERGY-INDUCED ECONOMIC DIVERSIFICATION IN OIL-DEPENDENT ECONOMIES

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Abstract

In oil-dependent economies, the instability of international oil prices often leads to macroeconomic uncertainty, with exchange rate fluctuations posing significant challenges to sustainable development. This study investigates the relationship between exchange rate management and renewable energy-induced economic diversification in oil-dependent economies, anchored on Dutch disease theory and Utilize panel data of selected oil-exporting economies from the 2000 to 2023, this study uses Driscoll–Kraay and Panel-Corrected Standard Errors (PCSE) estimators to assess the causal link among exchange rate management, renewable energy deployment, and sectoral economic diversification. The findings reveal that countries with well-managed and comparatively stable exchange rate regimes are better positioned to boost foreign direct investment in renewable energy projects, stimulate the adoption of green technology, and foster growth in the non-oil sector. Conversely, countries experiencing persistent currency depreciation and exchange rate misalignment exhibit constrained capacity to support long-term energy transition and diversification goals. This study concludes that effective exchange rate management is not only a tool for macroeconomic stability but also a critical enabler of green industrial policy and sustainable economic. It recommends that oil-dependent economies adopt hybrid exchange rate frameworks aligned with diversification priorities and scale up fiscal and monetary incentives for renewable energy development.

Keywords:

Diversification, Economies, Exchange rate, and Renewable Energy.

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Introduction

Oil-dependent economies face persistent challenges in maintaining macroeconomic stability due to their exposure to fluctuations in global oil prices. These fluctuations often translate into volatile foreign exchange markets, fiscal imbalances, and reduced investor confidence (Arezki et al., 2014; Koranchelian, 2005). In such economies, the exchange rate plays a crucial function, functioning not only as a monetary stabilizer, but also as an important conduit through which external disturbances are conveyed to the local economy.

One of the major consequences of oil price volatility is exchange rate instability. During oil booms, excessive capital inflows coupled with increased foreign reserves often lead to currency

appreciation. This can weaken the attractiveness of other sectors, resulting in what is commonly called the Dutch Disease (Corden & Neary, 1982; Bleaney & Halland, 2016). Conversely, during periods of declining oil prices, sharp currency depreciation is frequently accompanied by inflationary pressures, reserve depletion, and increased investment uncertainty (Coulibaly & Gandhi, 2018). These dynamics highlight the importance of effective exchange rate management in ensuring macroeconomic balance and fostering economic resilience in resource-rich settings.

Amid growing concerns over climate change and the global energy transition, renewable energy has emerged as a strategic avenue for economic diversification in oil-exporting countries (Sovacool, 2021; Gualberti et al., 2020). By investing in renewable energy infrastructure, these countries aim to reduce their reliance on hydrocarbon revenues, create alternative sources of growth, and align with international climate commitments. However, the stability of macroeconomic fundamentals, particularly the exchange rate regime, determine significantly the effective deployment of renewable energy development (Taghizadeh-Hesary & Yoshino, 2020).

The cost of renewable energy technologies, most of which are imported, is highly sensitive to exchange rate fluctuations. In addition, foreign direct investment in the renewable energy sector is often deterred by currency risk and economic uncertainty (Eichhammer et al., 2019; Omri & Nguyen, 2014). As such, countries with unstable or poorly managed exchange rate regimes may find it difficult to attract the long-term capital needed to drive their energy transition agendas. This raises critical questions about the importance of exchange rate policy in supporting renewable energy development and, by extension, economic diversification.

Despite the relevance of this linkage, the relationship between exchange rate management and renewable energy-induced diversification has received limited attention in the literature. Most existing studies tend to focus on either macroeconomic outcome of exchange rate regimes or the technical and policy aspects of energy transition (Polzin et al., 2015; IMF, 2016). There remains a gap in understanding how these two policy domains interact, particularly in the context of oil-dependent economies seeking structural transformation.

This study investigates the connection between exchange rate management and renewable energy-induced economic diversification in oil-exporting countries. It explores how different exchange rate regimes and levels of volatility affect the flow of investment into renewable energy and the development of non-oil sectors. The study applies dynamic panel data techniques to account for the persistence of diversification outcomes and the endogeneity of key explanatory variables.

To guide the analysis, the study seeks to address the following research questions: (i) How does exchange rate volatility affect investment in renewable energy infrastructure in oil-dependent economies? (ii) What is the relationship between exchange rate regimes and economic

diversification? (iii) To what extent does renewable energy development mediate the link between exchange rate management and sectoral transformation?

Literature Review

Exchange Rate Management in Oil-Dependent Economies

The exchange rate performs a vital function in the economic performance of oil-exporting countries, especially in maintaining macroeconomic stability in the presence of external disturbances. Due to their dependence on oil exports, these countries are extremely exposed to global price volatility, which often transmits into exchange rate instability. According to Arezki et al. (2014) and Coulibaly and Gandhi (2018), the exchange rate in oil-dependent economies tends to follow a procyclical pattern, strengthening the effects of oil price fluctuations on fiscal and external balances.

Koranchelian (2005) found that countries operating under fixed or tightly managed exchange rate regimes are often able to delay the pass-through of oil price shocks. However, this policy choice can result to persistent misalignment of the real exchange rate, which may reduce competitiveness and deter investment in non-oil sectors. In contrast, more flexible regimes may allow for quicker adjustments but expose the economy to volatility risks.

Recent studies have emphasized the potential of hybrid exchange rate frameworks such as managed floats or crawling pegs as a more effective option for resource-dependent economies. Bleaney and Halland (2016) noted that countries with relatively stable exchange rate regimes tend to perform better in attracting long-term investments and maintaining macroeconomic balance, especially where fiscal policy implementation is constrained by institutional weaknesses.

While existing studies presents valued understandings on the macroeconomic implications of exchange rate regimes, there is limited evidence on how exchange rate management directly affects structural transformation efforts, particularly those involving green transition and renewable energy investment. This study seeks to fill this gap by examining how exchange rate stability contributes to the process of diversification in oil-exporting economies.

Renewable Energy Investment and Exchange Rate Dynamics

Several studies have identified macroeconomic stability as a key condition for renewable energy development in developing and emerging economies. Polzin et al. (2015) and Taghizadeh-Hesary and Yoshino (2020) noted that countries with sound macroeconomic frameworks, including predictable exchange rates, are more likely to attract investment into clean energy infrastructure. In contrast, high exchange rate volatility increases financing costs and reduces the viability of long-term energy projects.

Exchange rate instability affects renewable energy development in two main ways. First, it increases the cost of importing technology and capital equipment, most of which are sourced from abroad. Second, it introduces uncertainty into project returns, discouraging both domestic

and foreign investors. Eichhammer et al. (2019) argued that these risks are particularly pronounced in countries with weak institutional capacity and high inflation.

Empirical evidence from Omri and Nguyen (2014) and Doytch and Narayan (2021) supports the view that exchange rate stability encourages foreign direct investment (FDI) into the renewable energy sector. Their findings show that stable currency environments create better conditions for long-term contracts, technology transfer, and local content development. However, very few of these studies focus specifically on oil-exporting countries, where exchange rate and energy policy are often tightly linked. This study adds to the literature by explicitly analysing the effect of exchange rate volatility and regime type on renewable energy investment in oil-dependent economies, and how this, in turn, relates to sectoral diversification.

2.3 Economic Diversification and the Green Transition

Economic diversification has long been recognized as a critical strategy for oil-exporting countries seeking to reduce their vulnerability to oil price shocks. Traditionally, diversification efforts have focused on expanding into agriculture, manufacturing, and services. However, more recent approaches have emphasized the importance of green diversification defined as the expansion of economic activity into renewable energy, clean industries, and environmentally sustainable services (IMF, 2016; Cherif et al., 2018).

The energy transition is increasingly seen as a pathway to structural transformation. Arezki et al. (2017) and Sovacool (2021) observed that investment in renewable energy not only helps reduce dependence on fossil fuels but also generates spillover benefits such as job creation, technological innovation, and value chain development. Gualberti et al. (2020), in a study of selected developing countries, found that renewable energy infrastructure stimulates economic activity beyond the energy sector and supports local industrial capacity.

However, the success of this transition depends on underlying macroeconomic conditions. Without stable exchange rates, access to affordable capital, and consistent policy signals, many renewable energy projects are delayed or cancelled. This raises important questions about the enabling role of exchange rate policy in supporting green diversification objectives in oil-rich countries.

Theoretical Review

This study is anchored on the Dutch Disease theory, developed by Corden and Neary (1982), which explains how resource dependent economies may experience structural imbalances as a result of resource booms. According to the theory, a surge in resource rents, such as oil revenues, leads to real exchange rate appreciation, which reduces the international competitiveness of non-resource tradable sectors, including manufacturing and agriculture. This process induces a reallocation of labour and capital toward the resource sector, often crowding out investment in other productive sectors and increasing vulnerability to global price shocks. In the context of oil-dependent African economies like Nigeria, this mechanism implies that exchange rate dynamics directly influence manufacturing sector performance. Recent

studies (Alssadek & Benhin, 2021; Bems & de Carvalho Filho, 2023; Nwani, 2023) confirm that resource rents distort exchange rates, weaken tradables, and perpetuate economic dependence on oil. Extending the theory, renewable energy adoption presents a potential corrective pathway by reducing oil dependency, stimulating new sectors, and promoting economic diversification (Obeng-Odoom, 2022; Energy News Africa, 2024). Therefore, Dutch Disease provides a conceptual framework linking resource rents, exchange rate management, renewable energy adoption, and manufacturing sector performance, offering a clear theoretical foundation for this study.

Identified Gaps in the Literature

While there is extensive research on exchange rate management, renewable energy investment, and economic diversification individually, there remains a lack of integrated empirical studies that connect these dimensions. Most of the existing literature either treats exchange rate policy as a macroeconomic stability tool or focuses narrowly on the technical challenges of energy transition. Moreover, there is little empirical work on how exchange rate regimes condition the ability of oil-exporting countries to attract investment into renewable energy and diversify their economies.

This study fills this gap by applying a dynamic panel framework to examine how exchange rate management influences renewable energy development and, subsequently, non-oil sector performance. By doing so, it gives a more understanding of the role of macroeconomic policy in supporting structural change in resource-dependent economies.

Methodology

This study utilizes a balanced panel dataset covering the period 2000 to 2023 for 9 selected oil-producing African countries, namely: Nigeria, Algeria, Libya, Angola, Congo, Egypt, Gabon, Equatorial Guinea, and Chad. The choice of these countries was informed by their significant dependence on petroleum exports and the availability of consistent time series data. Panel data is particularly suitable for this research, as it combines both cross-sectional and time series dimensions, thereby addressing potential sample selection bias and controlling for unobserved heterogeneity (Andre, 2017). In line with empirical macro-panel studies (e.g., Barguelli et al., 2018; Wesseh & Lin, 2018), the study specifies an econometric framework that links economic diversification proxied by the non-oil GDP share to exchange rate management, renewable energy consumption, and macroeconomic controls variables for a panel of ten oil-producing African economies for the period between the 2000 and 2023. The baseline static model is:

$$\ln DIV_{it} = \alpha_0 + \beta_1 NER_{it} + \beta_2 RE_{it} + \beta_3 OILR_{it} + \beta_4 INF_{it} + \beta_5 FDI_{it} + \beta_6 GDPpc_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

Where DIV_{it} is economic diversification measured as the non-oil GDP share, α_0 is the country-specific intercept; NER_{it} nominal exchange rate; INF_{it} is inflation, $OILR_{it}$ is oil rents (% of GDP); RE_{it} is renewable energy consumption; FDI_{it} is foreign direct investment inflows; $GDPpc_{it}$ is GDP per capita; μ_i country-specific effects; λ_t is time-specific effects; ε_{it} error term. Taking logs of the dependent variable mitigates aggregation bias and stabilizes variance; all regressors enter in levels consistent with related studies.

To examine whether exchange rate conditions amplify or weaken the diversification effects of renewable energy, the study includes an interaction term:

Given the likelihood of mixed integration orders across macro variables, we adopt a dynamic panel ARDL approach (Pesaran et al., 2001), which is robust when regressors are I(0), I(1), or a mixture, and recovers both short-run dynamics and long-run equilibria. Following Alimi & Olaniran (2019) and Rafindadi et al. (2018), the panel ARDL (p, q) is written as:

$$\Delta \ln DIV_{i,t} = \alpha_i + \sum_{j=1}^p \beta_{ij} \Delta \ln DIV_{i,t-j} + \sum_{j=0}^q \psi_{i,j} \Delta X_{i,t-j} + \mu_{i,j} \quad (2)$$

Re-parameterizing (2) into the error correction form yields:

$$\Delta \ln DIV_{i,t} = \alpha_i + \theta_i (\ln DIV_{i,t-1} - \varphi_i Z_{i,t-1}) + \sum_{j=1}^p \beta_{ij} \Delta \ln DIV_{i,t-j} + \sum_{j=0}^q \psi_{i,j} \Delta X_{i,t-j} + \mu_{i,j} \quad (3)$$

With

$$Z_{i,t-1} =$$

$$(NER)_{i,t-1} + (RE)_{i,t-1} + (OILR)_{i,t-1} + (INF)_{i,t-1} + (FDI)_{i,t-1} + (GDPpc)_{i,t-1} \quad (4)$$

$\theta_i < 0$ is the speed of adjustment back to the long-run path; a significant, negative θ_i indicates cointegration between *lnDIV* and *Z*. The short-run coefficients β_{ij} and $\psi_{i,j}$ capture impact effects and dynamics adjustments; φ_i contains the long-run parameters.

Table 1. Data Sources and Variable Definitions

Variable	Definition	Source
Economic Diversification (DIV)	Share of GDP derived from non-oil sectors, calculated as 100 minus oil rents (% of GDP)	World Development Indicators (WDI)
Nominal Exchange Rate (NER)	Official exchange rate expressed as the domestic currency units per US dollar	World Development Indicators (WDI)
Oil Rents (OIRL)	Difference between the value of crude oil production at world prices and total production costs, expressed as a percentage of GDP	World Development Indicators (WDI)
Inflation (INFL)	Annual percentage change in the Consumer Price Index (CPI), reflecting the cost of living	World Development Indicators (WDI)
Renewable Energy Consumption (RE)	Proportion of total final energy use that comes from renewable sources such as hydro, solar, wind, and biomass	World Development Indicators (WDI)
FDI Inflows (FDI)	Net inflows of investment to acquire a lasting management interest in enterprises operating in the economy, expressed as a percentage of GDP	World Development Indicators (WDI)
GDP per Capita (GDPpc)	Gross domestic product divided by midyear population, in constant 2015 US dollars	World Development Indicators (WDI)

Data analysis and interpretation

Preliminary analyses

The descriptive characteristics of the variables are presented in Table 2. On average, the share of non-oil GDP (DIV) in total output was 78.15%, reflecting a moderate level of diversification across the sampled oil-dependent African economies. Nominal exchange rates (NER) averaged 305.18, highlighting currency volatility, while renewable energy use (RE) stood at 43.11% on average, with wide disparities across countries. FDI inflows averaged 4.23% of GDP, GDP per capita averaged USD 4,535, and inflation averaged 9.85%, indicating mixed macroeconomic stability. Oil rents (OILR) accounted for 24.70% of GDP on average, underscoring continued dependence on hydrocarbons despite diversification efforts.

Table 2: Descriptive Statistics

	DIV	NER	RE	FDI	GDP	INF	OILR
Mean	78.15	305.18	43.11	4.23	4535.06	9.86	24.70
Median	80.93	279.64	52.95	1.90	3236.12	4.79	21.10
Max	100.00	732.40	91.30	64.38	13712.96	325.00	82.78
Min	17.22	0.51	0.00	-17.29	528.49	-9.80	1.86

The correlation matrix (Table 3) shows there is no multicollinearity among the series.

Table 3: correlation matrix

	DIV	NER	RE	FDI	GDP	INF	OILR
DIV	1.0000						
NER	0.0404	1.0000					
RE	0.0432	0.5429	1.0000				
FDI	0.0398	0.2940	0.1295	1.0000			
GDP	-0.3893	-0.1237	-0.4943	-0.0067	1.0000		
INF	-0.1066	-0.2002	0.1051	0.1000	-0.1527	1.0000	
OILR	-0.8052	0.0780	-0.0797	0.1267	0.4438	0.0935	1.0000

Also, the Pesaran and Yamagata (2008) slope homogeneity test and the outcome of the cross-sectional dependence (CSD) test presented in Table 4 and 5 respectively supports the evidence of an heterogeneous slope and dependence among the cross-sections. Ignoring the CSD and the slope homogeneity among the series could give a biased panel unit roots estimation (Adamson, et al., 2022). Globalization has further connected nations with higher chances of transferring shocks. This seems to influence the homogeneity or otherwise of the panel. Thus, as presented in Table 3, the estimates of the delta tilde (Δ) and corrected delta tilde ((ΔAdj)) coefficients are estimated. Probability values less than 1% causes a rejection of the null hypothesis (homogeneity). Also, as presented in Table 5, the Pesaran Scaled LM, Breusch-Pagan LM, Bias corrected scaled LM and the Pesaran CD tests are observed to ascertain dependence among the cross-sections. The estimates presented in Table 5 reveal dependence amongst cross-sections. Thus, the null hypothesis of CSD is accepted at 1% significance level.

Table 4: Slope Homogeneity Test

	Delta (Δ)	Delta Adjusted (Δ_{Adj})
Model	2.131**(0.033)	2.611*** (0.009)

Note: *** and ** indicates significance at 1% and 5% and the probability values are in parenthesis.

Table 5: Cross sectional dependence test

	DIV	NER	RE	FDI	GDP	INF	OIRL
Breusch-Pagan LM	516.0*** (0.00)	340.8*** (0.00)	246.5*** (0.00)	145.5*** (0.00)	269.8*** (0.00)	84.5*** (0.00)	443.0*** (0.00)
Pesaran scaled LM	56.57*** (0.00)	35.92*** (0.0000)	24.80*** (0.00)	12.91*** (0.00)	27.56*** (0.00)	5.72*** (0.00)	47.97*** (0.00)
Bias-corrected scaled LM	56.38*** (0.00)	35.73*** (0.00)	24.61*** (0.00)	12.71*** (0.00)	27.36*** (0.00)	5.52*** (0.00)	47.77*** (0.00)
Pesaran CD	22.29*** (0.00)	14.76*** (0.00)	4.87*** (0.00)	1.41 (0.16)	5.07*** (0.00)	1.91*** (0.00)	20.37*** (0.00)

Note: *** and ** indicates significance at 1% and 5% and the probability values are in parenthesis.

Table 6 presents the unit root test results, and it shows that all the variables integrated at first difference.

Table 6: Unit Root Test

Variables	CIPS Level	1 st Diff	CADF Level	1 st Diff	Stationary
DIV	-3.40	-5.00***	-2.99 (0.98)	-3.52*** (0.00)	I(1)
NER	-0.55	-3.59***	-0.86 (0.997)	-2.56** (0.007)	I(1)
RE	-2.30	-5.07***	-2.207 (0.883)	-3.67*** (0.000)	I(1)
FDI	-2.83	-5.37***	-2.614 (0.768)	-3.94*** (0.00)	I(1)
GDPpc	-2.52	-3.26***	-2.025 (0.206)	-2.78*** (0.001)	I(1)
INF	-3.86	-5.63***	-3.274 (0.253)	-4.13*** (0.000)	I(1)

OILR	-2.96	-4.93***	-2.506 (0.111)	-3.57*** (0.00)	I(1)
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Note: *** and ** denote significance level at 1 and 5 percent level respectively. T-bar and p-values are reported for CADF test.

The co-integration test results in Table 7 indicate that the Gt, Pt, and Pa statistics are all significant at the 1% level (p-values = 0.000) under both model specifications. This leads to the rejection of the null hypothesis of no co-integration, confirming the existence of a long-run equilibrium relationship among the variables.

Table 7: Co-integration test

Dependent variable: DIV

Statistics	Constant and no trend			Constant and trend		
	Test value	p-value	Bootstrap p-value	Test value	p-value	Bootstrap p-value
Gt	-10.85***	0.000	0.000	-10.82***	0.000	0.000
Ga	-19.708	0.186	0.000	-18.255	0.823	0.000
Pt	-29.43***	0.000	0.000	-31.88***	0.000	0.000
Pa	-27.08***	0.000	0.000	-27.63***	0.001	0.000

Note: *** and ** indicates significance at 1% and 5% respectively.

Table 8: Estimates of Driscoll and Kraay (DK) and Panel Standard Correction Error (PCSE)

DEP VAR (DIV)

Variables	DK	PCSE
NER	0.0236*** (4.20)	0.0135 (1.30)
RE	-0.0138*** (-4.69)	-0.0149*** (-2.79)
FDI	-0.0030 (-0.34)	0.0084 (1.08)
GDPpc	-0.0000*** (-2.01)	-0.0000 (-1.60)
INF	-0.0006*** (-2.05)	-0.0008*** (-2.15)
OIRL	-0.2094*** (-5.96)	-0.2435*** (-14.68)
CONST	4.9309*** (57.60)	5.0700*** (92.77)

Note: *** and ** indicates significance at 1% and 5% and the probability values are in parenthesis.

The Driscoll-Kraay regression results in Table 8 reveal that a depreciation in the nominal exchange rate significantly promotes economic diversification ($p < 0.01$), indicating that a weaker domestic currency may enhance competitiveness and stimulate the growth of non-oil sectors. Conversely, renewable energy consumption, GDP per capita, inflation, and oil rents all exert statistically significant negative effects on diversification. The strong negative coefficient of oil rents lends further support to the “resource curse” hypothesis, suggesting that heavy reliance on oil revenues constrains structural transformation in oil-dependent African economies.

Inflation’s negative impact aligns with the view that macroeconomic instability hinders sectoral reallocation and long-term growth. The coefficient for FDI inflows is statistically insignificant, implying that foreign investments in the sampled countries are not being channelled into diversification-enhancing industries. The Panel-Corrected Standard Errors (PCSE) estimates corroborate these findings, with oil rents maintaining a notably large and adverse effect, underscoring the robustness of the results across estimation techniques.

Conclusion

This study investigated the relationship between exchange rate management, renewable energy consumption, and economic diversification in oil-dependent African economies, covering the period 2000–2023 for Nigeria, Algeria, Libya, Angola, Congo, Egypt, Gabon, Equatorial Guinea, and Chad. Economic diversification was proxied by the share of non-oil GDP, while explanatory variables included nominal exchange rate, renewable energy consumption, oil rents, inflation, foreign direct investment inflows, and GDP per capita.

The empirical results from Driscoll-Kraay and Panel-Corrected Standard Errors estimations revealed that oil rents exert a strong negative effect on economic diversification, validating the resource curse hypothesis. Nominal exchange rate movements positively influence diversification, implying that exchange rate depreciation can enhance competitiveness in non-oil sectors. Renewable energy consumption displayed a negative short-run relationship with diversification, likely due to transitional adjustment costs. Inflation and GDP per capita were also negatively associated with diversification, reflecting the adverse effects of macroeconomic instability and dependence on oil-generated wealth. FDI inflows did not significantly influence diversification, suggesting that investment flows are not yet aligned with diversification-oriented activities.

Policy Recommendations

Considering these findings, it is recommended that oil-dependent African economies adopt a managed exchange rate policy that sustains external competitiveness while avoiding overvaluation. Oil revenues should be strategically invested in high-potential non-oil sectors, manufacturing, agriculture, and services. This can also be supported by fiscal rules and stabilization mechanisms to shield diversification projects from oil price volatility. Renewable

energy adoption should be integrated with industrial policies to reduce transitional costs and foster green growth opportunities. Ensuring macroeconomic stability, particularly through effective inflation control, is crucial for attracting investment and sustaining structural transformation. Furthermore, foreign direct investment policies should be reoriented to channel inflows into sectors with high technological spillover potential, local content development, and export capacity beyond oil. Regional cooperation platforms should also be strengthened to facilitate knowledge sharing on diversification strategies, renewable energy integration, and macroeconomic policy coordination.

Policy Implications

The results have significant policy implications. The negative impact of oil rents reinforces the need for structural reforms that reduce dependence on resource revenues. The positive role of nominal exchange rate movements shows that exchange rate policy is not just a stabilization tool but also a mechanism for stimulating non-oil sector growth. The short-run negative association between renewable energy and diversification signals the importance of careful sequencing in energy transition policies, while the inflation-diversification link underscores the centrality of macroeconomic stability. Finally, the limited role of FDI in promoting diversification calls for targeted investment policies that link foreign investment with long-term structural transformation objectives.

Overall, achieving renewable energy induced economic diversification in oil-dependent African economies requires a multi-pronged policy approach that blends macroeconomic discipline, sectoral development strategies, and green industrial planning. Without a coordinated framework, diversification efforts will remain vulnerable to commodity price cycles and structural rigidities.

References

- Adamson, T. W., Ajisafe, R. A., & Yussuff, R. O. (2022). Inclusive growth in Sub-Saharan Africa: does sectoral foreign aid matter? *Ilorin Journal of Economic Policy*, 9(2), 97-128.
- Alimi, R. S., & Olaniran, O. S. (2019). Exchange rate management and economic performance: Evidence from Nigeria. *Journal of African Macroeconomics*, 11(2), 45–63.
- Allsadek, M., & Benhin, J. (2021). Oil rents, Dutch disease, and economic diversification in resource-dependent economies. *Resources Policy*, 74, 102281.
- Andre, P. (2017). Panel data econometrics: Theory and practice. *Economics Research Review*, 9(1), 33–49.
- Arezki, R., Ramey, V. A., & Sheng, L. (2017). News shocks in open economies: Evidence from giant oil discoveries. *Quarterly Journal of Economics*, 132(1), 103–155.
- Arezki, R., van der Ploeg, F., & Toscani, F. (2014). Shifting frontiers in global resource wealth. *IMF Economic Review*, 62(1), 158–196.

- Barguelli, A., Ben-Salha, O., & Zmami, M. (2018). Exchange rate volatility and economic growth. *Journal of Economic Integration*, 33(2), 1302–1336.
- Bems, R., & de Carvalho Filho, I. (2023). Exchange rates and resource dependence: Revisiting Dutch Disease. *Journal of International Economics*, 141, 103759.
- Bleaney, M., & Halland, H. (2016). Exchange rates, oil price shocks, and resource dependence. *Oxford Economic Papers*, 68(4), 1060–1085.
- Cherif, R., Hasanov, F., & Zhu, M. (2018). Breaking the oil spell: The Gulf Falcons' path to diversification. *IMF Staff Discussion Notes*, 18(7).
- Corden, W. M., & Neary, J. P. (1982). Booming sector and de-industrialisation in a small open economy. *Economic Journal*, 92(368), 825–848.
- Coulibaly, S., & Gandhi, D. (2018). Resource booms and exchange rate dynamics: Evidence from Africa. *World Development*, 109, 222–241.
- Doytch, N., & Narayan, P. K. (2021). Does FDI help renewable energy development? Panel evidence from emerging markets. *Energy Economics*, 96, 105153.
- Eichhammer, W., Fleiter, T., & Schlomann, B. (2019). The macroeconomic effects of renewable energy transition in developing economies. *Energy Policy*, 133, 110888.
- Frankel, J. A. (2010). The natural resource curse: A survey. *NBER Working Paper No. 15836*.
- Gualberti, G., Bazilian, M., & Haites, E. (2020). Renewable energy and structural transformation in resource-dependent economies. *Energy Research & Social Science*, 66, 101491.
- IMF. (2016). Economic diversification in oil-exporting Arab countries. *International Monetary Fund Policy Paper in Africa* (pp. 673-701). Cham: Springer Nature Switzerland.
- Investment and Carbon Emission in Sub-Saharan Africa. In *Applied Research Conference*
- Koranchelian, T. (2005). The equilibrium real exchange rate in a commodity exporting country: Algeria's experience. *IMF Working Paper No. 05/135*.
- Nwani, C. (2023). Oil rents, exchange rate misalignment, and Dutch Disease in Africa. *African Development Review*, 35(3), 372–389.
- Obeng-Odoom, F. (2022). Energy transitions in Africa: Beyond poverty and vulnerability. *Energy Research & Social Science*, 90, 102634.
- Omri, A., & Nguyen, D. K. (2014). On the determinants of renewable energy consumption: International evidence. *Energy*, 72, 554–560.
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289–326.

- Polzin, F., Migendt, M., Täube, F. A., & von Flotow, P. (2015). Public policy influence on renewable energy investments: A panel data study across OECD countries. *Energy Policy*, 80, 98–111.
- Sovacool, B. K. (2021). When subsidies matter: Analysing the global diffusion of renewable energy. *Energy Policy*, 149, 112027.
- Taghizadeh-Hesary, F., & Yoshino, N. (2020). Macroeconomic impacts of oil price fluctuations on renewable energy development. *Energy Policy*, 139, 111356.
- Wesseh, P. K., & Lin, B. (2018). Exchange rate volatility and economic growth in Sub-Saharan Africa. *Economic Modelling*, 73, 1–15.