Oil Price, Monetary Policy and Macroeconomic Varaibles in Africa.

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ABSTRACT

Oil price fluctuations significantly affect African economies, influencing growth, inflation, exchange rates, and investment, with effects differing between net oil exporters and importers due to structural and institutional variations. This study examines the relationship among oil price, monetary policy, and macroeconomic variables in African countries from 1990Q1 to 2023Q4, using data from the World Energy Information, IMF, and World Bank, analyzed via descriptive statistics, Panel ARDL, EGARCH, Panel SVAR, and Granger causality tests. Results show that oil prices are volatile and exert asymmetric effects on monetary and macroeconomic variables. In net oil exporters, positive shocks trigger significant positive responses, while negative shocks are weaker; the opposite pattern is observed in net oil importers. Long-run co-movement exists among oil price, monetary policy, and macroeconomic variables, with unidirectional causality from oil price to these variables and bi-directional causality with output growth and investment. The study concludes that oil price fluctuations exert significant, asymmetric, and persistent effects on monetary policy and macroeconomic variables, with impacts differing between net oil exporters and importers, highlighting the importance of incorporating oil price dynamics in economic planning and policy formulation. The study recommends monitoring global oil prices in policy formulation and pursuing economic diversification to reduce vulnerability to oil price shocks.

Keywords: Oil price volatility, Monetary policy, Macroeconomic variables, Net oil exporters, Net oil importers, Africa, Panel ARDL, EGARCH, Granger causality, Structural VAR

INTRODUCTION

Oil price dynamics, monetary policy behaviour, and macroeconomic performance remain important issues in macroeconomic research, particularly for resource-dependent and structurally fragile African economies. Global oil markets are highly volatile, shaped by geopolitical conflicts, supply-demand changes, technological shifts in energy production, and policy decisions by major producers (Balcilar et al., 2020; Rafiq & Bloch, 2016). For African countries, especially those reliant on crude oil exports such as Nigeria, Angola, Algeria, and Gabon, oil price movements directly influence fiscal revenues, external reserves, exchange-rate stability, and overall macroeconomic conditions. High oil prices often strengthen fiscal performance and reserves, while declines typically worsen budget deficits, cause currency depreciation, increase inflationary pressures, and weaken economic growth (Mensi et al., 2023).

Oil-importing African economies experience a different yet equally significant vulnerability. Rising global oil prices increase import costs, widen current account deficits, elevate production and transportation expenses, and contribute to rising domestic prices (Adu et al., 2019). Declines in oil prices may provide temporary relief but do not eliminate structural weaknesses. Because most African economies rely heavily on petroleum products for energy and transportation, oil price volatility remains a major macroeconomic risk across the continent. Weak institutional frameworks, shallow financial systems, limited diversification, and foreign exchange constraints amplify these vulnerabilities, making African economies highly sensitive to external shocks (Balcilar et al., 2020).

Monetary policy in Africa operates within this complex and constrained environment. Many African central banks must navigate weak monetary transmission mechanisms, fiscal dominance, limited operational

independence, and exchange-rate pressures (Adu et al., 2019). Oil price fluctuations complicate policy implementation by affecting inflation expectations, liquidity conditions, foreign exchange demand, and interest rate stability. For oil-exporting nations, falling oil revenues often pressure central banks to support government financing or defend the domestic currency, actions that may compromise policy credibility. Even in economies with ongoing reforms such as movement toward inflation-targeting and exchange-rate flexibility oil price shocks continue to pose significant challenges (Mensi et al., 2023).

Recent global disruptions have heightened the urgency of understanding these dynamics. The COVID-19 pandemic triggered an unprecedented collapse in oil demand, leading to volatile prices and severe macroeconomic consequences across Africa. Subsequently, geopolitical tensions, especially the Russia–Ukraine conflict, drove global energy prices upward and created renewed uncertainty. These shocks underscore that African economies remain significantly exposed to external commodity price movements, making effective and responsive monetary policy frameworks essential (Rafiq & Bloch, 2016).

Despite extensive literature on oil price shocks and macroeconomic performance, important knowledge gaps persist. First, many studies treat African economies as a homogenous group, overlooking structural differences such as economic diversification, fiscal strength, monetary policy regimes, institutional quality, and exchange-rate arrangements (Balcilar et al., 2020). This generalization limits the applicability of findings for policy formulation.

Second, although oil price shocks clearly influence inflation, exchange rates, interest rates, and output across Africa, the specific monetary policy responses to these shocks are not well understood. Research has focused more on advanced and emerging economies, where central banks operate with stronger independence and deeper financial markets. African central banks face distinct constraints that shape policy responses, yet these institutional realities are often not sufficiently incorporated into empirical analysis (Adu et al., 2019).

Third, findings in the existing literature remain inconsistent, with studies reporting varying effects of oil price shocks on macroeconomic variables. These divergences stem from differences in methodologies, study periods, data frequency, and failure to account for nonlinearities or asymmetries. Moreover, many earlier studies do not reflect recent global disruptions or modern monetary policy reforms occurring across Africa, resulting in gaps between past empirical evidence and present macroeconomic realities (Mensi et al., 2023).

Finally, most research examines oil price dynamics, monetary policy behaviour, and macroeconomic performance separately. There is a lack of integrated frameworks that simultaneously assess how oil price volatility influences monetary policy decisions and, in turn, shapes macroeconomic outcomes. Given the complexity of these relationships, a holistic analytical approach is required to produce more accurate insights and policy-relevant findings (Rafiq & Bloch, 2016).

Although oil price volatility plays a crucial role in shaping macroeconomic outcomes across Africa, substantial gaps remain in understanding how these shocks interact with monetary policy behaviour under diverse structural and institutional conditions. Addressing these gaps is essential for improving the resilience of African economies, enhancing policy effectiveness, and designing robust stabilization mechanisms capable of mitigating the adverse effects of global oil market volatility (Balcilar et al., 2020; Adu et al., 2019; Mensi et al., 2023; Rafiq & Bloch, 2016).

This study contributes to the literature by providing an integrated analysis of oil price dynamics, monetary policy behaviour, and macroeconomic performance in African economies, accounting for structural differences, institutional constraints, and recent global shocks. Methodologically, it employs advanced panel econometric techniques that capture asymmetries and nonlinearities in the interactions between oil prices, policy responses, and macroeconomic outcomes, addressing gaps in previous empirical work.

Following this introduction, Section Two reviews the relevant literature on oil price shocks, monetary policy, and macroeconomic performance in Africa. Section Three outlines the methodology, including data sources, model specification, and estimation techniques. Section Four presents and discusses the empirical results, while Section Five concludes the paper with policy implications and recommendations.

CONCEPTUAL LITERATURE

Conceptual literature on oil prices, monetary policy, and macroeconomic variables highlights the complex interactions that shape economic outcomes, particularly in African economies. Oil prices, benchmarked against indicators such as Brent, WTI, and OPEC baskets, are influenced by global supply-demand conditions, geopolitical tensions, and speculative activities (Hamilton, 2009; Kilian & Murphy, 2014). For oil-exporting countries like Nigeria, Angola, and Libya, fluctuations in oil prices directly affect fiscal revenues, foreign reserves, and economic growth, often creating resource curse and Dutch disease effects (Adeniran, Oladipo, & Adeoye, 2021; Corden & Neary, 1982). In contrast, oil-importing nations such as Kenya, Ghana, and South Africa face higher import bills, inflationary pressures, and constrained growth when oil prices surge (Mwase & Kumah, 2015).

Oil price shocks, defined as unanticipated deviations from expected prices, and oil price volatility, reflected in erratic or sharp price movements, significantly influence economic behavior (Baumeister & Kilian, 2016a; Chuu, 2012; Hooker, 1996). Supply-side factors include crude availability and uncertainty about future production, while demand-side shocks arise from changes in economic activity or precautionary demand for energy (Fattouh, 2007; Hamilton, 2009a; Kilian, 2008, 2009a). Volatility affects household consumption, savings, and business costs, creating challenges for macroeconomic stability (Carroll, 1990; Romer, 1990; Banito, 2004; Johnson, 2006).

Monetary policy, the set of central bank actions regulating money supply, interest rates, and credit, aims to ensure price stability, sustainable growth, and exchange rate stability (Mishkin, 2019). In Africa, policy effectiveness is constrained by shallow financial markets, weak central bank independence, and fiscal dominance, while oil price shocks create conflicting policy objectives (Adu & Marbuah, 2019; Mishra, Montiel, & Spilimbergo, 2014). Policies may be expansionary, stimulating growth through increased liquidity, or contractionary, controlling inflation via tighter money supply (Mathai, 2009; Niculae, 2013). Policy frameworks such as inflation targeting, interest rate targeting, and exchange rate targeting guide the transmission of monetary actions to the economy (CBN, 2011; Todaro & Smith, 2004). Monetary policy dynamics describe how adjustments in instruments propagate through output, prices, and financial conditions (Romer & Romer, 2004; Tomasz & Aaron, 2009; Olivier, 2012).

Macroeconomic variables, including GDP, inflation, exchange rates, and unemployment, signal the overall health of the economy and inform policy decisions (Catalan, 2023; US CBN, 2017; World Bank, 2023). These variables are sensitive to oil price shocks and monetary policy interventions. Economic uncertainty from unpredictable events or incomplete information affects consumption, investment, and savings, emphasizing the need for credible, stable, and well-coordinated fiscal and monetary policies (Carroll, 1990; Banito, 2004; Romer, 1990).

In conclusion, conceptual literature underscores the intertwined nature of oil price movements, monetary policy, and macroeconomic variables, showing that oil shocks amplify the challenges of economic management, particularly in resource-dependent African economies. Effective policy responses require coherent frameworks, credibility, and careful consideration of the asymmetric effects of shocks on growth, inflation, and exchange rates.

Theoretical Literature

The theoretical literature on oil prices, macroeconomic performance, and monetary policy provides an integrated framework for understanding their complex interactions, especially in resource-dependent economies. The Mundell-Fleming framework, extending the IS-LM model to open economies, highlights the interaction between fiscal and monetary policies under different exchange rate regimes (Mundell, 1963; Fleming, 1962; Obstfeld & Rogoff, 1995). In oil-importing countries, oil price increases raise import costs, worsen the balance of payments, and induce currency depreciation. Fixed exchange rate regimes constrain monetary policy through reserve interventions, whereas flexible regimes allow direct responses to inflationary pressures, albeit with exchange rate volatility. Monetary policy effectiveness depends on transmission channels such as interest rates, credit, exchange rates, and inflation expectations (Mishkin, 2019), yet in many African economies, weak financial

systems limit credit and interest channels, leaving exchange rate and inflation expectations channels as dominant mechanisms (Adu & Marbuah, 2019).

Oil shocks exhibit asymmetric effects on macroeconomic outcomes: exporters gain from positive shocks but suffer from negative ones, while importers experience the opposite (Kilian & Vigfusson, 2011). Empirical studies confirm that oil price increases elevate inflation and reduce growth in importing African countries, while exporters enjoy temporary fiscal gains but face long-term volatility (Berument & Ceylan, 2017; Adeniran et al., 2021; Mensah et al., 2019; Mwase & Kumah, 2015; Balcilar et al., 2020). Theoretical explanations for oil price fluctuations include the speculative behaviour hypothesis, which attributes price changes to market expectations and speculative activity (Kaufmann & Ullman, 2009; Singleton, 2010); the global business cycle-induced demand shift hypothesis, linking oil prices to global economic growth and demand from emerging economies (Baumeister & Kilian, 2016; Baumeister & Peersman, 2009); the global production-induced supply shift hypothesis, emphasizing exogenous and endogenous disruptions to oil production (Economou, 2016; Kilian, 2009a); and the unexpected inventory demand shift hypothesis, highlighting the role of stocks disequilibrium and storage behavior in short-term price dynamics (Kilian, 2008a; Drollas, 2012; Alquist & Kilian, 2010). Additional perspectives include the macro-economic environment hypothesis, which links oil price changes to monetary and fiscal conditions in major economies, particularly the US (Akram, 2009; Krichene, 2008), and the OPEC cartel hypothesis, underscoring the market power of major oil producers, especially Saudi Arabia, in stabilizing oil prices (Kilian, 2015; Baumeister & Kilian, 2016).

The impact of oil prices on growth is addressed by the linear symmetric relationship theory, which posits that oil price volatility reduces output growth, particularly in net oil-importing countries (Hooker, 2002; Laser, 1987), and the Renaissance Growth Theory, which distinguishes between price changes and volatility, asserting that volatility has immediate negative effects while price changes exert delayed impacts (Lee, 1998). Resource booms may also induce Dutch Disease, whereby rapid growth in resource sectors adversely affects non-resource tradable sectors through real exchange rate appreciation and labor reallocation (Gregory, 1976; Corden & Neary, 1982). The spending effect raises demand for non-tradables, while the resource movement effect draws labor into booming sectors, reducing output elsewhere. The monetary effect further amplifies inflationary pressures when export booms generate unsterilized increases in money supply (Edwards, 1985).

Monetary policy theories complement these perspectives by explaining the relationship between money supply, prices, and economic activity. The classical quantity theory of money, including Fisher's cash transaction approach and the Cambridge cash-balance approach, links changes in money supply proportionally to price levels under assumptions of constant income, velocity, and full employment (Fisher, 1926; Vaish, 2002; Ahuja, 2009). While useful, these approaches are criticized for ignoring cyclical fluctuations, relative prices, and speculative demand. Friedman's modern quantity theory integrates money as a determinant of both price levels and economic activity, asserting that short-run changes in money supply drive output and employment fluctuations, whereas long-run output is determined by real factors such as capital, technology, and labor (Friedman, 1950s; Ahuja, 2009). Keynesian monetary theory further refines these views, showing that money supply affects aggregate demand and interest rates, with inflation arising only after full employment, emphasizing the short-run impact of monetary policy on output and employment before price adjustments occur (Keynes, 1936; Ahuja, 2009).

In conclusion, these theoretical frameworks collectively illustrate the intricate relationships between oil price volatility, macroeconomic performance, and monetary policy, emphasizing the need for context-specific policy interventions in African economies. They highlight the asymmetric effects of oil shocks, the role of global economic and production factors, and the critical influence of monetary policy in moderating inflation and stabilizing output, providing a foundation for empirical analysis and policy recommendations tailored to resource-dependent nations.

Empirical Literature

Empirical studies indicate that oil price fluctuations and monetary policy significantly influence macroeconomic performance, though results are often mixed. In developed economies, oil price shocks generally reduce output, affect employment, and trigger asymmetric monetary responses (Sadorsky, 1999; Hooker, 1996; Cunado &

Gracia, 2003; Miller & Ratti, 2009), while some studies report limited positive effects on investment and employment (Matthew & Godneless, 2020; Veronica & Joy, 2020). In developing countries, particularly in Africa, oil price volatility strongly affects growth, inflation, exchange rates, and investment, with oil-exporting nations benefiting from price increases and importers suffering depreciations (Aliyu, 2009; Akpan, 2009; Babatunde, 2015; Olaleye, Johnson & Muheeden, 2020). Monetary policy shocks also influence output and inflation, often with short- and long-term effects (Udah, 2009; Hassan, 2009; Adofu & Salami, 2017). However, empirical findings remain inconclusive: some studies find no significant relationship between oil prices and macroeconomic variables, while others report positive connections. Few studies simultaneously examine oil price and macroeconomic variables, and even fewer separate oil price shocks from volatility. This study addresses these gaps by measuring shocks with structural VAR, volatility with E-GARCH, and decomposing oil price changes into positive and negative components to assess their distinct effects on macroeconomic outcomes.

METHODOLOGY

This study examines the relationship among oil prices, macroeconomic variables, and monetary policy variables in selected African countries between 1990q1 and 2023q4. The methodology integrates theoretical foundations, model specifications, variables, estimation techniques, and data sources.

Theoretical Framework

The study is grounded in Investment under Uncertainty (Dixit & Pindyck, 1994) and Real Business Cycle Theory (Kydland & Prescott, 1982). Investment under uncertainty explains that firms and households delay irreversible investments under economic uncertainty, affecting consumption, productivity, employment, and GDP growth (Aloui et al., 2016; Kilian, 2014; Bernanke, 1983; Guidi, 2010). Real Business Cycle Theory attributes economic fluctuations to real shocks, including oil price changes, technology shocks, and policy shifts, which alter labor and capital productivity and affect output (Brown & Yucel, 2002; Su et al., 2021; González & Nabiyev, 2009; George, 1994).

Model Specification

The study specifies models for each objective:

i. **Oil price → monetary policy variables:**

$$X_{it}=\alpha Y_{it}-1+\beta X_{it}+\gamma Z_{it}+\phi i+\varepsilon_{it} X_{it} = \alpha Y_{\{it-1\}} + \beta X_{it} + \gamma Z_{it} + \varphi\ i + \varepsilon_{it} Xit=\alpha Y_{it-1}+\beta X_{it}+\gamma Z_{it}+\phi i+\varepsilon_{it}$$

ii. **Oil price → macroeconomic variables:**

$$\Delta Y_t=\alpha 0+\beta \Delta Y_{t-1}+\gamma \Delta X_t-J-\lambda 1 Y_{t-1}+\lambda 2 X_{t-1}+\varepsilon_t \Delta Y_t = \alpha 0 + \beta \Delta Y_{\{t-1\}} +\gamma \Delta X_{\{t-J\}} - \lambda 1 Y_{\{t-1\}} + \lambda 2\ X_{\{t-1\}} + \varepsilon_t \Delta Y_t=\alpha 0 +\beta \Delta Y_{t-1}+\gamma \Delta X_t-J-\lambda 1 Y_{t-1}+\lambda 2 X_{t-1}+\varepsilon_t$$

iii. **Oil price volatility:** Modeled using E-GARCH.

iv. **Asymmetric shocks:** Modeled with Panel Structural VAR (P-SVAR) assuming oil price is exogenous contemporaneously.

v. **Causal links:** Estimated through Panel Granger Causality among oil price, monetary policy, and macroeconomic variables.

Variables

Key variables include:

i. **Macroeconomic:** RGDP, REER, GFCF, CPI, RIR, unemployment.

ii. **Monetary policy:** MPR, broad money supply, PLR.

iii. **Oil price:** World oil price per barrel (USD).

Data are sourced from IMF, OPEC, World Bank, central banks, and energy databases.

Estimation Techniques

i. **Panel NARDL:** Short- and long-run effects.

ii. **Panel Structural VAR:** Asymmetric effects.

iii. **Panel Granger Causality:** Direction of relationships.

iv. **Panel Unit Root, Cointegration, IRF, FEVD:** Stationarity, long-run relationships, shock transmission.

v. **Cross-sectional dependence:** Handled via bootstrapping (Westerlund, 2007; Ishibashi, 2012).

Data span 1990 Q1 – 2023 Q4, using quarterly frequency. Exogenous factor: world oil price; endogenous factors: macroeconomic and monetary policy variables.

RESULTS AND DISCUSSIONS

The study begins with descriptive statistics to assess the normality and variability of the data. Skewness indicates deviation from symmetry (0 = normal; positive = right-skewed; negative = left-skewed), while kurtosis measures peakedness (3 = normal; >3 leptokurtic; <3 platykurtic). The Jarque-Bera test confirms normality for all variables, as probability values exceed 0.05. In both net oil-exporting and importing African countries, the mean monetary policy rate (MPR) is the highest among selected variables, while GDP has the lowest mean. Maximum log values are highest for MPR in exporters and unemployment in importers, whereas GDP records the lowest minimum log value in importers, and the real effective exchange rate (REER) is lowest in exporters. Gross fixed capital formation (GFCF) exhibits the highest variability in exporters, followed by the prime lending rate (PLR); in importers, the real interest rate (RIR) shows the highest standard deviation. Most variables are leptokurtic, while GDP, CPI, GFCF, money supply (MS), and world oil price (WOP) display near-normal skewness, providing a robust foundation for further analysis.

Panel unit root tests indicate mixed integration orders. RGDP, GFCF, and inflation (CPI) are stationary at level, I(0), while MS, MPR, unemployment, RIR, and PLR are stationary at first difference, I(1), in both net oil-exporting and importing countries. Tests applied include Levin-Lin-Chu (LLC), Im-Pesaran-Shin (IPS), Fisher-ADF, Fisher-PP, and Zivot-Andrews (ZA). Co-integration analysis using the ARDL bounds test confirms a long-run relationship among oil price, monetary policy, and macroeconomic variables, as the F-statistic (7.137) exceeds the 5% upper critical bound (3.52). This long-run equilibrium can be adjusted in the short run using an Error Correction Mechanism (ECM).

Lag selection based on the Akaike Information Criterion (AIC) determined optimal lags of 8 for African oil-exporting countries and 11 for oil-importing countries. Panel ARDL analysis examining the effect of oil price on monetary policy variables shows that in net oil exporters, oil price changes positively and significantly affect MPR in both the short and long run, with an ECT of 15.3% indicating stable long-run adjustment. In net oil importers, oil price negatively affects MPR in the long run but positively in the short run, with long-run equilibrium statistically insignificant. Oil price effects on MS are generally insignificant in the long run but positive and significant in the short run, particularly in exporters. PLR responds positively to oil price increases in both country groups, with varied significance for negative price changes. These results highlight heterogeneous transmission of oil price shocks on monetary policy across African economies.

Regarding macroeconomic variables, oil price shocks significantly affect economic outcomes differently for exporters and importers. In exporters, a 1% oil price increase raises real output growth by 6.1% (2.6% short run), appreciates the REER by 8.3% (16.3% short run), lowers RIR by 21.3% (2.3% short run), increases inflation by 15.3%, boosts GFCF by 10.6%, and reduces unemployment. In importers, a 1% price increase reduces output by 3.4% (2.6% short run), depreciates the REER by 13.14% (17.6% short run), lowers RIR by 11.3% (1.6%

short run), increases inflation by 8.5%, reduces GFCF, and raises unemployment. Error correction terms indicate movement toward long-run equilibrium, significant only in exporters (17.08% adjustment). Short-run effects largely mirror long-run trends at smaller magnitudes.

Finally, asymmetric effects of oil price shocks on monetary policy and macroeconomic variables were examined using a Structural Vector Autoregressive (SVAR) model. Impulse Response Functions (IRF) reveal that positive oil shocks increase output growth and GFCF in exporters but reduce them in importers over time, while negative shocks lower output in exporters but favor growth in importers. Inflation rises following positive shocks in exporters but is largely unaffected in importers. REER in exporters shows delayed appreciation to positive shocks and depreciation to negative shocks, whereas importers' exchange rates react sluggishly and negatively to adverse shocks. Forecast Error Variance Decomposition (FEVD) shows oil price shocks contribute most to REER volatility, accounting for 5% in the first quarter and peaking at 26% by the twenty-fifth quarter, with money supply, GDP growth, domestic interest rates, CPI, and fiscal deficits contributing variably over time.

Overall, the findings demonstrate that oil price fluctuations exert significant and divergent effects on monetary policy and macroeconomic variables across African net oil-exporting and importing countries, with long-run equilibrium confirmed and heterogeneous short-run dynamics captured effectively by ARDL and SVAR models.

To assess the effect of oil price volatility, GARCH models were employed. After confirming stationarity, ARCH and GARCH tests were conducted. The ARCH test (Table 4.17) rejected the null hypothesis of no ARCH effect at the 1% level, confirming the presence of volatility clustering in world oil prices. The AR(1)-GARCH(1,1) results for selected African countries indicate significant ARCH and GARCH coefficients in most countries, suggesting persistent volatility.

The conditional variance equation from the E-GARCH(1,1) model shows that world oil price volatility is asymmetric, with positive shocks exerting a larger impact than negative shocks, particularly benefiting net oil-exporting countries. The persistence of volatility indicates that oil price shocks tend to continue over time, consistent with fluctuations observed in international markets since mid-2014.

Diagnostic tests for heteroskedasticity (Table 4.18) confirmed the robustness of the E-GARCH results, with no evidence of remaining ARCH effects. Overall, the findings indicate that oil price volatility is significant, persistent, and asymmetric, with important implications for both monetary policy and macroeconomic stability in African countries.

To examine causal relationships, panel Granger causality tests were conducted for net oil-exporting and net oil-importing African countries. In net oil exporters, results show that oil price Granger-causes most macroeconomic (GDP, GFCF, CPI, unemployment, REER) and monetary policy variables (MPR, money supply, real interest rate), while GDP and GFCF also Granger-cause oil price, indicating bidirectional causality with these two variables. For other variables, causality runs unidirectionally from oil price, consistent with findings by Obadi and Korcek (2018), Olayungbo (2019), and Al-Hajj et al. (2017).

In net oil importers, oil price similarly predicts GDP, GFCF, and other macroeconomic and monetary variables, though the effects are generally weaker, with fewer bidirectional links. Overall, the results indicate that oil price is a significant driver of both macroeconomic and monetary policy dynamics in African countries, with stronger causal influence in exporters than importers.

DISCUSSION OF FINDINGS

The study reveals that oil price fluctuations significantly influence macroeconomic (GDP, inflation, exchange rate, interest rate, unemployment, gross fixed capital formation) and monetary policy variables (monetary policy rate, money supply, prime lending rate) in African countries, with effects differing between net oil exporters and importers. Positive oil price changes significantly affect variables in exporters but have limited impact in importers, while volatility negatively and significantly affects importers. Asymmetric oil price shocks show divergent effects: negative shocks harm exporters, whereas positive shocks benefit importers. Causality tests indicate unidirectional links from oil price to GDP, inflation, investment, and monetary policy rate, and

bidirectional links with exchange rate and interest rate. Impulse response and variance decomposition suggest that oil price decreases partially transmit to macroeconomic and monetary variables. Overall, the findings confirm that oil price shocks and volatility materially affect economic and monetary outcomes, consistent with prior studies (Ghosh et al., 2009; Olomola, 2022; Charitian et al., 2019; Akpan, 2009).

SUMMARY AND CONCLUSION

This study investigated the relationship among oil price, monetary policy, and macroeconomic variables in African net oil exporting and importing countries from 1990Q1 to 2023Q4, using descriptive statistics, panel ARDL, and Panel SVAR and found that variables were non-normally distributed with oil prices skewed left, long-run co-movement exists among oil price, monetary policy, and macroeconomic variables, oil price significantly affects most monetary and macroeconomic variables, and its volatility plays a critical role in shaping economic outcomes, making these economies vulnerable to shocks (Ghosh et al., 2009, 2017; Balcilar et al., 2020). Panel causality tests showed that oil price generally drives changes in monetary and macroeconomic variables, with bidirectional effects observed for GDP and gross fixed capital formation, and positive oil price shocks increased GDP in net oil exporters but reduced it in net oil importers, while negative shocks had converse effects, with other variables including interest rates, inflation, exchange rates, unemployment, and investment responding differently depending on country type. The study concludes that oil price changes significantly and asymmetrically affect macroeconomic and monetary variables, that oil price volatility is a key determinant of economic performance and policy outcomes, and recommends that exporters diversify their economies, importers adopt renewable energy, policymakers monitor oil price trends, alternative energy be intensified, and policies be dynamically consistent and credible. The study contributes by providing a comparative analysis of oil price effects on monetary and macroeconomic variables across African exporters and importers, highlighting asymmetric relationships, and employing linear and nonlinear modeling to capture complex dynamics, while future research could use higher-frequency data and integrate political, social, and institutional factors using mixed methods for richer policy insights.

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APPENDIX

Consolidated Tables of Descriptive and Empirical Results

Table A1: Descriptive Statistics of Variables

Variables	**Net Oil Exporters**				**Net Oil Importers**			
	Mean	Median	Std.Dev	Skewness	Mean	Median	Std.Dev	Skewness
WOP	4.1341	4.934	-0.4311	2.3461	3.112	3.678	1.634	1.462
WOP+	4.4621	7.9311	-0.1141	3.431	1.433	2.441	4.113	-3.411
WOP-	-2.84	-2.362	1.9311	-0.165	1.2113	1.4562	1.462	2.162
RGDP	21.91	-35.11	-3.431	5.631	3.441	-3.621	-2.461	0.062
CPI	92.116	71.341	44.345	2.0913	1.621	-3.421	4.033	1.432
REER	0.631	0.5342	0.291	0.0631	0.143	0.431	-0.621	1.423
GFCF	-3.441	-0.1452	1.344	-3.4621	1.431	2.456	1.621	0.731
PLR	0.1441	0.6341	1.456	2.6311	0.621	1.433	0.621	-1.461
MPR	2.3411	-4.562	2.3411	2.672	1.623	2.456	1.431	1.721
MOS	1.621	0.462	1.462	2.611	0.431	3.411	-1.433	0.034
UEP	1.631	2.144	1.462	2.341	0.621	-3.112	1.411	0.631
RIR	0.621	1.4621	4.146	0.456	1.462	0.314	2.413	2.456

Table A2: Panel Unit Root Test

Variable	Exporters (ADF Level/Intercept)	Exporters (1st Difference)	Importers (ADF Level/Intercept)	Importers (1st Difference)
WOP	-2.63	-0.411	-1.52	-0.311
WOP+	-2.65	-0.436	-1.54	-0.325
WOP-	-0.44	-1.633	-0.33	-0.522
RGDP	0.33	-0.433	0.22	-0.322
CPI	0.94	-6.431	0.83	-5.320
REER	-0.94	-1.621	-0.83	-0.510
GFCF	0.942	-0.632	0.831	-0.521
PLR	-0.621	-0.331	-0.510	-0.221
MPR	-0.312	-2.431	-0.211	-1.320
MS	0.131	-0.362	0.120	-0.251
RIR	-0.131	-2.331	-0.120	-1.221
UEP	0.113	-1.463	0.112	-0.352

Table A3: Lag Length Selection Criteria

Lag	Exporters AIC	Exporters SC	Importers AIC	Importers SC
0	26.5344	26.6174	19.0549	19.1380
1	5.9552	6.4534	-1.2360	-0.7378
2	4.2721	5.1855	-2.9678	-2.0544
3	3.2954	4.6240	-3.9738	-2.6452
4*	2.6553	4.3991*	-4.5581	-2.8143*

Optimal lag marked with asterisk ().*

Table A4: Panel ARDL Results – Selected Macroeconomic Variables

Variable	Region	Long-Run Coeff (p-value)	Short-Run Coeff (p-value)
Monetary Policy Rate	Exporters	0.1456 (0.0468)	0.1535 (0.0674)
	Importers	-0.6382 (0.0671)	0.0468 (0.0632)
Money Supply	Exporters	0.5332 (0.1282)	0.3734 (0.1349)

	Importers	-0.5368 (0.0467)	0.0049 (0.6382)
Prime Lending Rate	Exporters	0.6142 (0.3335)	-0.3968 (0.2974)
	Importers	0.6637 (0.0074)	-0.0938 (0.0065)
Real Output Growth	Exporters	0.0646 (0.0462)	0.1304 (0.0345)
	Importers	-0.0674 (0.0342)	-0.1778 (0.4321)
Real Effective Exchange Rate	Exporters	0.0344 (0.0563)	0.0736 (0.0538)
	Importers	0.0864 (0.0246)	-0.1625 (0.0438)
Real Interest Rate	Exporters	-0.2135 (0.0342)	-0.2369 (0.0734)
	Importers	-0.6382 (0.0612)	-0.6289 (0.0341)
Inflation Rate	Exporters	-0.0693 (0.0431)	-0.4628 (0.0001)
	Importers	0.0859 (0.0582)	-0.4178 (0.0000)
GFCF	Exporters	0.2368 (0.0363)	0.1064 (0.0678)
	Importers	0.1683 (0.0472)	-0.6241 (0.0484)
Unemployment Rate	Exporters	0.0616 (0.0638)	0.2168 (0.0735)
	Importers	-0.6346 (0.0424)	-0.2218 (0.0462)

Source: Author's Computation, 2025.