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LONG-RUN AND SHORT-RUN EFFECT OF OIL PRICE SHOCKS ON BANK LIQUIDITY RISK IN MAJOR OIL EXPORTING COUNTRIES IN AFRICA

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ABSTRACT: *This paper examines the relationship between global oil price shocks and bank liquidity risk for top major oil exporting countries in Africa from 2000 to 2021. The study employs the novel appropriate autoregressive distributed lag (ARDL) model because of its fitness to the time series unit root test results. The findings reveal a negative and 1% significant long-run effect of global oil price shocks on bank liquidity risk. It shows that a persistent decline in global oil prices would potentially lead to a decrease in bank-credit-bank deposits, thus increasing bank liquidity risk. Additionally, GDP and RIR show a significant positive and negative long-run relationship with bank credit-to-bank deposit ratios respectively. The results suggest that there is a need for adequate asset management strategies in the banking sector as it relates to the global oil price supply and demand shocks.*

KEYWORDS: Cointegration liquidity risk, macroeconomic factors, emerging markets, and global oil price shock

JEL Classification: B26, C33, C22, G1, G2

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INTRODUCTION

It is well-established that financial institutions spur economic growth by providing capital to public and private sector investments, especially for producing and exporting crude oil. In return, gains from oil prices are a vital source of income for investments, economic growth, and development for oil-exporting countries. It is also believed that rising oil prices can positively or negatively affect banks' performance because it increases bank deposits or liquidity risk respectively. Cologni and Manera (2007) claim that rising oil market prices slow the economic performance in most emerging countries. Therefore, the co-movement between oil price shocks and banks' liquidity risks needs an investigation in top oil exporting countries in emerging markets.

Based on the direct and indirect role banks play in loan provision to investors in oil-producing companies, banks typically experience liquidity and credit risks. However, little is known about the relationship between oil-producing countries and banking liquidity risks in regional markets such as Africa's major oil-exporting countries. Over the years, empirical studies have examined the long-run and short-run, direct and indirect effects, of oil price shocks on banks, macroeconomic variables, and economic performance. For example, Poghosyan and Hesse (2009) reveal that oil price shocks positively affect banking profitability in the Middle East and North Africa (MENA) countries. Lee and Lee (2019) analyze oil price shocks with the collection of assets such as capital adequacy, asset quality, management, earnings, and liquidity (CAMEL), and find significant negative impacts with these assets. Tan and Uprasen (2023) find that oil price increases could widen income inequality in oil-importing countries and narrow income inequality in oil-exporting countries. Sarf-alyousfi, et al. (2021) generally find that oil price shocks directly affect banking performance through bank depository creation and high lending behavior. Cologni and Manera (2007) deploy a structural cointegration VAR model and find a direct positive effect of oil price shocks on output and price in some developed countries. Recently, Belanes et al. (2024) deploy the autoregressive distributed lag (ARDL) model and find that fluctuations in oil prices have a significant long-run and short-run effect on the Saudi stock market index. Khan, et al. (2021) stress that global oil price movements severely affect developed and developing economies. Recently, narratives have started to apply the ARDL methodology to investigate the influence of oil prices on the stock market in the developed economy with limited interest in the banking sector. This study attempts to fill the gap by investigating the relationship between oil price shocks and the Bank's liquidity risk in five major oil-exporting countries.

This study advances the following contributions in the ongoing literature. To my knowledge, no study has examined the long-run and short-run relationship between global oil price shocks and banks' liquidity risk proxy as a credit-to-deposit at the country level. Effective credit management strategies in banks can serve as a lifeblood in spurring economic growth and modernization in an economy. Conversely, it can also hurt financial institutions in case of a high default rate from borrowing institutions leading to high credit and liquidity risks.

Additionally, investigating the short-run and long-run relationship between global oil price shocks and banks' liquidity can provide policymakers with ideas on how to regulate banking activities in emerging economies. The strong association between global oil price shocks and banking activities is directly linked to the industrial, manufacturing, and pharmaceutical industries through the bank's ability to fund investment projects. Applying the ARDL model and adequate results diagnostic test reveals the best model specification for policymakers to

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use when drafting and implementing rules and laws in banking regulation in their countries. I integrate the classical economic theories and empirical findings from Khan, et al. (2016) for the inclusion of FDI and crude oil price shocks while omitting Exchange rates because of the best model specification. I augment the model with theoretical perceptions of variables such as Inflation (IF), real interest rate (RIR), GDP growth, and the net flow of foreign direct investment (FDI).

Results can provide valuable insight to shareholders and investors in evaluating and predicting future economic trends and risk mitigation, optimizing asset strategies, and portfolio return not only in emerging markets but with far-reaching implications in the global capital market. Raising oil prices can increase cash deposits in financial institutions due to the inflow of cash from oil sales. Conversely, falling oil prices can exacerbate liquidity risk in banking because of high credit defaults by oil companies. This can induce banking panic and the contagion effect of banks in the economy. Such an effect can weaken investors' and shareholders' confidence in global economic activities. In this study, I attempt to investigate the relationship between oil price shocks and bank liquidity ratios proxy as credit-to-bank deposits. Hence, a high credit-to-bank deposit implies more loans are given to companies than deposits in banks, which signifies an increase in banking risk. Furthermore, the liquidity rate provides financial health and banking stability because it shows the bank's ability to recover loans from borrowers. Finally, the study also analyzes the influence of global oil price fluctuation on macroeconomic factors such as IF, RIR, FDI, and GDP growth. Investigating the short-run and long-run effects of the oil price shocks by deploying the ARDL approach on the macroeconomic indicators in the major oil exporting countries in Africa can yield robust results that can help policymakers access their fiscal and monetary policy in their respective countries.

The subsequent session of this paper is outlined as follows. Section 2 presents the synopsis of the literature, Section 3 describes the data Sector 4 systematically presents the methodology, Sector 5 presents the findings, and Sector 6 concludes

LITERATURE REVIEW

The literature on oil price volatilities on banking performance has received limited attention in Africa. Some studies analyze oil price movement with stock returns, economic growth, and financial performance. However, no study has examined the short-run and long-run relationship between global oil price shocks and banks' liquidity risk as measured by bank credit-to-bank deposits in most African oil-exporting countries.

Literature in Africa has examined the direct and indirect channels via which oil price shocks could affect banking assets. For example, Poghosyan and Hesse (2009) investigate the direct and indirect channels through which oil price movements can affect bank profitability. It deploys 145 banks in the Middle East and North African oil exporting countries (MENA) and, finds oil price shocks have a significant indirect effect on banks' profitability through inflation, interest rate, and monetary and fiscal policy channels. Moreover, there is no significant direct effect of oil price shocks on banking profitability in the region. The study fails to address the long-run and short-run relationship between oil price shock and bank liquidity risk. It is obvious, to analyze the relationship between oil price shocks and financial assets such as liquidity ratio, financial ratios, macroeconomic liquidity ratios total value of demand, time, and saving deposits at domestic deposit money banks as a share of GDP. The financial resources

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provided to the private sector by domestic money banks as a share of total deposits, and Liquid liabilities are also known as broad money or M3. They are the sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency (M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements (M2), plus travelers' checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents. Related studies have revealed that oil price changes could potentially affect the economic performance of developing countries. For instance, Abdelmounaim and Abdelmounaim (2024) apply a structural vector-autoregressive (SVAR) methodology to analyze the relationship between oil price shocks and macroeconomic variables such as GDP, government spending, and inflation. The authors find that a 1% increase in oil price shocks results in a 0.24% decline in government spending, a 1.16 % decline in inflation, and a 0.17% decline in GDP in the Algerian economy. Alenoghena (2020) analyzes the relationship between oil price shocks and macroeconomic performance in Nigeria using structural vector autoregression (SVAR) on output growth, inflation, interest rate, exchange rate, and industrial productivity index. Results indicate that an increase in oil price shocks has a significantly negative effect on the macroeconomic variables including output growth, inflation, interest rate, and industrial productivity index. Cologni and Manera (2007) apply the SVAR to examine the relationship between oil price shocks and economic performance in G-7 countries and find that an increase in oil price shocks is negatively associated with inflation and output.

Regarding oil price shocks and banks' performance, Nkwadochi et al. (2020) find that falling oil prices have a significant negative relationship with banking liquidity in Nigeria. Osuma et al. (2019), purport that declining oil prices have a deteriorating effect on the profit performance in Nigerian banks. The impact of falling oil prices can be reflected in a dramatic fall in the bank's revenue, poor asset quality, lay-off staff, declining cash deposits, and high non-performing loans. Chidozie and Ayadi (2017) apply various financial metrics such as loan-to-deposit ratio, loan-to-total assets ratio, and total assets as proxies for banks' profitability, and find that crude oil price increase is negatively associated with return on average equity. Wang and Luo (2020) test the effect of oil price fluctuation on banks' credit risk. Applying a sample of 279 banks in the Middle East and North African countries from 2011 to 2017, the results reveal that the credit risk of the bank loan portfolio is negatively linked to an increase in oil price movements. Few studies have examined the short-run and long-run relationship between oil price shocks and bank asset quality.

Studies in other emerging market economies reveal that oil price shocks positively affect specific banking assets. For example, Saif-Alyousfi et al. (2021) investigate the effect of oil and gas price fluctuations on bank performance in the major oil exporting countries of the Cooperation Council for the Arab States of the Gulf (GCC) and reveal that a fall in the oil price and gas hurts bank performance. The rise in oil and gas prices directly affects banking performance through the channel of price-inducing banking deposits and loans given to the business. According to this study, persistent increases in the prices of goods and services discourage household savings and increase the cost of borrowing due to tight monetary policy.

Comparably studies in developed countries have shown a negative relationship between oil price volatility and bank performance. Killins and Mollick (2020) apply the panel technique across several banks in Canada to examine banks' assets quality as oil prices fluctuate. Using the return on assets (ROA) is a measure of bank performance, which is associated with the

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level of capital, the cost of capital (interest expense), and the gain from the investment. They find that profit growth was estimated to be 40% with a positive impact on oil price fluctuation.

Killins and Mollick (2020) found that oil prices have a direct positive impact on banks' profits. The banks' profit was estimated to be 40 % because of the positive direct impact of the oil price movement. They also found that the positive movement of oil prices was directly associated with an increase in non-interest income. It can be suggested that an increase in oil prices turns to an increase in banking transactions and related banking fees, which in turn lead to high profits.

Al-Khazali and Mirzaei (2017) focus on examining the economic and financial sector performance caused by oil price fluctuations. The study seeks to investigate whether oil price shocks have any form of impact on bank non-performing loans (NPL) among the various banks. The study applies the GMM model across 2310 commercial banks in 30 oil-exporting countries from 2000 to 2014. The results show that a rise in oil prices is associated with a decrease in NPL while a fall in oil price is associated with a decrease in NPL. Additionally, oil price movements have an asymmetric effect on bank loans with a negative oil price movement having a greater impact than positive oil price movements. Oil price movements are directly linked to NPL because adverse fluctuations of oil prices increase loan default rates and hence increase NPL, which overall leads to instability in the banks' financials. Lee and Lee (2019) investigated the impact of oil price fluctuation on bank performance via the integration of specific financial metrics such as capital adequacy, asset quality, management, earnings, and liquidity from 2000 to 2014. The study also examines how the correlations between oil price movements and bank performance can change due to macroeconomic risk factors such as financial, political, and economic indicators. Their findings indicate that oil price fluctuation has a significant impact on bank performance. For example, when oil price increases, bank performance as a proxy by capitalization, management efficiency, earning power, and liquidity drops. Unfortunately, few studies have examined the short-run and long-run relationship between oil price shocks and banking sector performance. This paper explores how oil price shocks are associated with a bank's liquidity, financial, and macroeconomic liquidity in five major oil-exporting countries such as Algeria, Angola, Libya, Nigeria, and Egypt (5).

Hypotheses

This study investigates the relationship between global oil price shocks and banks' liquidity risk proxy as credit-to-bank deposits (BC). It is the financial resources available in the private sector provided by domestic money banks as a share of total deposits. Domestic money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits. Total deposits include demand, time, and saving deposits in deposit money banks.

- H_0 There is no short-run or long-run relationship between global oil price shocks and banks' credit-to-deposit in the major oil-exporting countries in Africa.
- H_0 There is no short-run or long-run relationship between global oil price shocks and macroeconomic variables such as inflation, real interest rate, foreign direct investment, and GDP growth.

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Data Descriptions

The sample consists of annual time series data for five African oil-exporting countries from 2000 to 2021. The paper explores the short-run and long-run relationship between global oil price shocks and banks' liquidity ratios in five major oil-exporting countries in Africa. Due to missing and limited data, the study focuses on the top five major oil-exporting countries. The variables are obtained from the World Bank database (WB) and represent global banking industries in the five major oil exporting countries. The variables are expressed as a percentage of GDP, which indicates the proportionate distribution of GDP to the bank asset portfolio. It serves as a method of standardizing the variables in the statistical model. The samples are structured in a panel data frame using Excel. The 5 countries include Nigeria, Angola, Libya, Algeria, and Egypt. The variables include bank credit to deposit, inflation, Interest rate, foreign direct investment, GDP growth, and global Bent oil price shocks. Few missing data are obtained using the interpolation method. The global oil prices are collected from the Federal Reserve Bank (FRED) of St. Lous at https://fred.stlouisfed.org/series/POILBREUSDM. The study applies the Global price of Brent crude oil prices because the major oil-exporting countries in Africa often price their oil using Brent crude oil as a benchmark. The geographical proximity to Europe serves as a reduction in transportation costs; a reason, why most of these oil-producing countries in Africa should market their oil based on Brent crude oil price

Oil prices often fall due to supply shocks caused by macroeconomic and geopolitical turbulence in the oil-producing regions around the world. There is no precise measurement of oil price shocks in the ongoing literature; however, Poghosyan and Hesse (2009) apply four different measurements, using the daily spot price of the Brent crude oil price. Nevertheless, an oil price shock can be best defined as a significant change in the price of global oil, which can dramatically affect industries and the general economy because of an increase in the price of goods and services. Although developed countries are shifting their efforts to renewable energy sources such as Solar Power, wind power, hydropower, Biomass, and geothermal energy, these African oil-exporting countries still depend heavily on crude oil. In this study, I deploy the monthly global Brent crude oil price and apply the formula below to compute oil price shock.

Generally:

$$Oil\ price\ shock = \frac{(current\ oil\ price - basedline\ oil\ price)}{baseline\ oil\ price} * 100$$

Specifically: $oil\ price\ shoock_i = \frac{(Current\ oil\ price_i - basedline\ oil\ price_i\ )}{basedline\ oil\ price_i} * 100/12$

The average annual growth rate of oil price is calculated using the arithmetic mean of monthly for the 12-month spot prices.

Model Specification

The study deploys a dynamic ARDL approach to explore the relationship between oil price shocks and the bank's liquidity ratios and macroeconomic indicators in the top five major oil exporters in Africa. Unlike the SVAR method which is likely to experience the issue of omitted variable biases, the novel ARDL approach in panel data framework is most efficient in time series analysis because oftentimes the series are integrated of different orders such as I (0) and I (1). In recent literature, Belanes et al (2024), Bouzidi et al. (2024), and Khan et al. (2021)

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have adopted the ARDL approach in exploring the relationship between global oil price shocks and stock market performance, inflation, banking efficiency, and stability. Results from this statistical approach seem more credible because of the simplistic and effective technique which mitigates the issue of omitted variables in the model. From the YouTube presentation by Obi, the author illustrates the specification and deduction of the error correction term as presented below.

Panel ARDL Model Specification

$$\Delta Bank\ Liquid\ Ratios_{it} = \sum_{k=1}^{p-1} \gamma_{ik} \Delta Bank\ Liquid\ ratios_{it-1} + \sum_{k=0}^{q-1} \delta_{ik} \Delta\ MacroVariables_{it-k} + \varphi_i Bank\ Liquit\ ratios_{it-1} + \beta_i MacroVariables_{it} + \omega_i + \varepsilon_{it}$$

In the above dynamic heterogenous panel, the lagged value of the dependent variables which is the bank liquidity ratios are included in the regressors.

ω_i *is the group − specific fixed effects error term*

ε_{it} is the error term

$\mathrm{MacroVariables}_{\mathrm{it-k}}$ is kx1 vector of explanatory variables for countries i which can be I(0), I(1)

γ_{ik} is the coefficent of the lag dependent variable for the respective countries over time

δ_{ik} is kx1 coefficent vectors

Conceptually, the short-run coefficients are $\gamma_{ik}$and δ_{ik} while the long-run coefficients in the model are φ_i *and* β which captures the long-run relationship in the model. For the model to satisfy the best linear unbiased estimator assumptions, the Akaike information criterion is deployed to optimal lag length criteria which mitigates the serial correlation issue of the error terms. In this model, the regressors involve a mixture of order zero or first difference in the time series I (0) and I (1) variables except the I (2) series. The parameter of interest follows the long-run coefficient, short-run coefficient, and the speed of adjustment to the long-run equilibrium. I perform the panel unit root test to establish that no variable is I (2). Then specify the dynamic panel ARDL cointegration model using the Akaike information criterion to determine the optimal lag length for the model.

Deriving the Error Correction Model (ECM)

Based on the long-run model structures stipulated as

$y_{it} = \alpha_{1i} + \alpha_{2i} X_{it} + \mu_{it}$ Where i=1, 2,…………………, N and t=1, 2, …, T

According to Pesaran et al. (1999), the base ARDL (1,1) model which applies one lag in each of the two variables

$y_{it} = \mu_i + \gamma_i y_{it-1} + \delta_{10i} X_{it} + \delta_{11i} X_{it-1} + \varepsilon_{it}$……………………………… (1)

Based on the above short-run equation, we can redefine the two variables as established below.

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- $y_{it} = \Delta y_{it} + y_{it-1} \leftrightarrow y_{it} - y_{it-1}$
- $x_{it} = \Delta x_{it} + x_{it-1} \leftrightarrow x_{it} - x_{it-1}$

Replacing it to the above equestion one to obtain the ECM

$\Delta y_{it} + y_{it-1} = \mu_i + \gamma_i y_{it-1} + \delta_{10i}\Delta x_{it} + x_{it-1} + \delta_{11i}X_{it-1} + \varepsilon_{it}$

After applying simplification and rearranging the term, we derive the error correction model

$$\Delta y_{it} = -(1-\gamma_i)\left[y_{it-1} - \frac{\delta_{10i}+\delta_{11i}}{1-\gamma_i}x_{it-1}\right] + \gamma_{ioi}\Delta X_{it-1} + \mu_i + x_{it-1} + \varepsilon_{it}$$

From the above equation, the error correction term is $ECT_{t-1} = y_{it-1} - \frac{\delta_{10i}+\delta_{11i}}{1-\gamma_i}x_{it-1}$

The speed of adjustment is the parenthetical coefficient equal to $-(1-\gamma_i)$

As illustrated in the above model, the country-specific error term is captured in the stochastic term ε_{it}

Definition of terms

- Bank deposits GDP (%) The total value of demand, time, and saving deposits at domestic deposit money banks as a share of GDP. Deposit money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits.
- Bank credit to bank deposits (%) is the financial resources available to the private sector from the domestic money banks as a share of total deposits. Domestic money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits. Total deposits include demand, time, and saving deposits in deposit money banks.
- Foreign direct investment net inflows (% of GDP) refers to the net inflows of capital investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors and is divided by GDP.
- Liquidity Risk is the risk that a financial institution such as a bank cannot be able to address short-term financial obligations. Its severity in the banking sector can lead to poor financial health and stability which if not checked might cause a bank contagion effect.
- Inflation, consumer prices (annual %) Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a

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basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.

- ❖ Global price of Brent Crude, U.S. Dollars per Barrel, Monthly, Not Seasonally Adjusted

Empirical Results

Table 1 Unit Root Test.

		LLC-T-statistics		IPS W-statistics		ADF-Fisher-Chi Square	Order of integration
Variables	Level	Difference	Level	Difference	Level	Difference	
BC	-3.89981***	-1.62088	-1.35012	-2.78444***	16.3807	25.1922***	I (1)
Bent oil prices	-2.652330***		-4.04858***		34.4434***		I (0)
IF	-0.50790	-3.02155***	-2.98825***	-6.41831***	27.1688***	56.0728***	I(0)
RIR	-4.01733***		-3.70962***		32.4136***		I(0)
GDP	-0.24591	-3.61206***	-0.66014	-6.56481***	12.7616	57.5336***	I(1)
FDI	-1.27066	-4.58923***	-1.18704	-4.39424***	14.4821	34.7889***	I(1)

Note: ** and *** indicate rejection of the respective null hypothesis at the 5% and 1% significance

The variables exhibit unit root properties while others seem stationary at the level of the form. In the analysis, I reject the application of I (2) variables in the specification of ARDL because it is not valid in ARDL and has a strong possibility of spurious regression results. Therefore, the first step is to check for the level of integration in the model and reject variables that are integrated in order I (2). The ARDL model was a perfect fit for the analysis because after checking for the unit root, the series exhibit the I (0) and I (1) level of integration. In dictating for the unit root, three different methods of unit root tests such as Levin, Lin & Chu, Pesaran and Shin W-Stat, and ADF-Fisher Chi-Square. As mentioned above, all the variables are stationary in order of I (0), and I (1), which supports the suitability and adequacy of the dynamic ARDL model. For the BC as measured by the bank's credit-to-deposit in the commercial banks, the test results for Levin, Lin & Chu indicate stationarily at levels. For the Pesaran, Shin W-Stat, and ADF-Fisher Chi-Square the series was not stationary at the 5% P-value. However, it becomes stationary at a 1% level after taking the first difference (1). The Bent oil price shock is stationary at 1% P-value. Additionally, the consumer price index or inflation rate denoted as IF, and the real interest rate denoted as RIR were all stationary at the level of the 1% P-value. On the other hand, the GDP growth and the net foreign direct investment denote that GDP and FDI become stationary after taking the first difference at 1% P-value. The Akaike information criterion was used to determine the lag length.

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Table 2: ARDL Cointegration Analysis

Dependent Variable: D(BC)

Method: ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
	Long Run Equation			
BENT_OIL_PRICE	-19.77442	5.034409	-3.927852	0.0003
IF	-0.599662	0.881329	-0.680406	0.4998
GDP	8.848315	2.282854	3.875988	0.0003
RIR	-2.291339	0.975880	-2.347972	0.0234
FDI	-1.217305	2.225695	-0.546932	0.5872
	Short Run Equation			
COINTEQ01	-0.121800	0.035515	-3.429556	0.0013
D(BENT_OIL_PRICE)	2.149866	0.994662	2.161403	0.0361
D(BENT_OIL_PRICE (-1))	1.318350	0.674684	1.954027	0.0571
D(IF)	-0.048360	0.245062	-0.197337	0.8445
D(IF(-1))	-0.153159	0.238685	-0.641678	0.5244
D(GDP)	-0.444429	0.156530	-2.839262	0.0068
D(GDP(-1))	-0.339882	0.359218	-0.946173	0.3492
D(RIR)	0.240154	0.104047	2.308127	0.0258
D(RIR(-1))	0.208800	0.164716	1.267638	0.2116
D(FDI)	0.574138	0.890066	0.645051	0.5222
D(FDI(-1))	1.279547	1.805685	0.708621	0.4823
C	4.273384	4.038336	1.058204	0.2957
Root MSE	2.571294	Mean dependent var		-0.656467
S.D. dependent var	6.033628	S.E. of regression		4.047050
Akaike info criterion	5.337994	Sum squared resid		720.6592
Schwarz criterion	6.942926	Log likelihood		-225.9207
Hannan-Quinn criter.	5.988852			

*Note: p-values and any subsequent tests do not account for model selection.

Included observations: 99, Sample: 2002 2020 Model selection method: Akaike info criterion (AIC) ARDL (1, 2, 2, 2, 2) ** and *** indicate rejection of the respective null hypothesis at the 5% and 1% significance

After I have carried out the unit root test, the next step was to investigate if there is co-integration among the variables in the ARDL models.

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Dynamic ARDL Model

Table 2 reveals the results of the dynamic ARDL. According to Pesaran et al. (1999), the ARDL model is well suitable for short-term data. In this study, the country-level data run from 2000 to 2021 because of missing data points within cross-sectional groups. Five major oil exporting countries such as Algeria, Angola, Libya, Nigeria, and Egypt, which exhibit uneven economic growth and development are chosen. Let's examine the long-run results generalized model as regards the results displayed in Table 2.

$$\Delta BC = \alpha_{1t} + \alpha_{2t} Bent\ oil\ price_{it} + \alpha_{3t} IF_{it} + \alpha_{4t} GDP_{it} + \alpha_{5t} RIR_{it} + \alpha_{6t} FDI_{it} + \varepsilon_{it}$$

Brent oil price is the global oil price shock

BC is the bank credit-to-bank deposit. It captures the banking sector liquidity risk in the top five major oil exporting countries.

IF is the inflation, consumer prices (annual %)

GDP is the growth of gross domestic product

RIR is the real interest rate. It measures the lending rate adjusted for inflation as measured by the GDP deflator.

FDI is the net foreign direct investment. It is the net inflow of FDI as a percentage of GDP.

As depicted in Table 2, the global oil price shocks have a negative and significant relationship with bank's credit-to-deposit ratios. This reveals that global oil price shocks have a significant long-run causal effect on credit-to-deposit in all the five major oil exporting countries in Africa. Additionally, GDP and RIR have a positive and negative significant long-run causal effect on credit-to-bank deposit ratios at 1% and 5% significant levels. The results reveal that if the global oil price shock experiences a 1% movement, bank credit-to-bank deposit growth will fall by a 1,977% growth rate. Generally, I find out that if there is a negative oil price shock bank lending will eventually decrease, which will potentially lead to a reduction in bank deposits. Therefore, negative oil price shocks will potentially increase bank liquidity risks in the five major oil-exporting countries in Africa. The implication is that a falling oil price will hurt oil exporting countries because of its significant long-run effects on general economic performance and financial stability in the region.

Moreover, if GDP rises by 1% BC will increase by 884% growth rate while if RIR rises by 1%, BC will fall by 229%. The error correction coefficient is a relevant variable, indicating the speed of adjustment to the long-run equilibrium relationship. From Table 2, the error correction coefficient is -0.121800 indicating that about 12% of departure from the long-run equilibrium is corrected each period because the value is negative and significant at 1%. According to the results, it is evident that the variables are cointegrated, and three regressors which include global oil price shocks, GDP growth, and real the (RIR) Granger-Cause BC in the long run.

The short-run coefficients reveal that global oil price shocks have a positive and significant in 5% level short-run effect on BC in the five major oil-exporting countries in Africa.

The financial resources are provided to the private sector by domestic money banks as a share of total deposits. Domestic money banks comprise commercial banks and other financial

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institutions that accept transferable deposits, such as demand deposits. Total deposits include demand, time and saving deposits in deposit money banks.

Johansen Fisher Panel Cointegration Test Series: BC BENT_OIL_PRICE IF FDI GDP RIR

Included observations: 110

Trend assumption: Linear deterministic trend Lags interval (in first differences): 1 1

Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen t...	Prob.
None	271.9	0.0000	155.6	0.0000
At most 1	142.8	0.0000	77.55	0.0000
At most 2	81.47	0.0000	59.80	0.0000
At most 3	33.12	0.0003	19.01	0.0402
At most 4	24.34	0.0067	20.01	0.0292
At most 5	19.11	0.0388	19.11	0.0388

* Probabilities are computed using asymptotic Chi-square distribution.

Individual cross-section results

Trace Test Cross Section	Statistics	Prob.**	Max-Eign Statistics	Test Prob.**
The hypothesis of no cointegration				
Algeria	151.2296	0.0000	62.4991	0.0000
Angola	200.6674	0.0000	92.0873	0.0000
Libya	296.2120	0.0000	162.2222	0.0000
Nigeria	248.1456	0.0000	107.6216	0.0000
Egypt	244.5492	0.0000	139.1784	0.0000
Hypothesis of at most 1 cointegration on relation ship				
Algeria	88.7304	0.0008	36.0955	0.0267
Angola	108.5802	0.0000	44.1306	0.0021
Libya	133.9897	0.0000	61.8397	0.0000
Nigeria	140.5240	0.0000	60.1108	0.0000
Egypt	105.3707	0.0000	40.3208	0.0074
Hypothesis of at most 2 cointegration on relation ship				
Algeria	52.6349	0.0166	24.5413	0.1169
Angola	64.4495	0.0007	27.1065	0.0575
Libya	72.1500	0.0001	42.6321	0.0003
Nigeria	80.4133	0.0000	51.2928	0.0000
Egypt	65.0499	0.0006	34.9494	0.0047
Hypothesis of at most 3 cointegration on relation ship				
Algeria	28.0936	0.0776	21.5239	0.0440
Angola	37.3431	0.0056	19.4399	0.0848
Libya	29.5180	0.0538	16.5459	0.1946
Nigeria	29.1204	0.0597	15.1199	0.2806

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Egypt Hypothesis	30.1005	0.0461	13.9868	0.3661
of at	most 4 cointegration	on relation	ship	
Algeria	6.5697	0.6281	6.5632	0.5420
Angola	17.9032	0.0213	14.9406	0.0390
Libya	12.9721	0.1158	10.9188	0.1583
Nigeria	14.0005	0.0829	12.4820	0.0938
Egypt Hypothesis	16.1136	0.0403	11.2110	0.1440
of at	most 5 cointegration	on relation	ship	
Algeria	0.0064	0.9354	0.0064	0.9354
Angola	2.9626	0.0852	2.9626	0.0852
Libya	2.0533	0.1519	2.0533	0.1519
Nigeria	1.5186	0.2178	1.5186	0.2178
Egypt	4.9027	0.0268	4.9027	0.0268

**MacKinnon-Haug-Michelis (1999) p-values

Table 3. Using the EView version 12 statistical packet, I perform the Fisher Johansen panel cointegration test display in Table 3. According to the stated hypotheses. H_0: There is no cointegration among the variables in the dynamic ARDL model H_1: There is a cointegration among the variables in the model. The fisher statistics from the trace test and the fisher statistic from the max eigen test and their respective probabilities in the unrestricted cointegration indicate that at the 5% significant value, the probability values of the fisher trace statistics and eigen statistics are less than 0.05 indicating that we reject the null hypothesis of no cointegration and accept the alternative hypothesis that the variables exhibit a long-run association. These results confirm the ARDL estimates of long-run association among the variables. In addition, the individual cross-section test results, reveal that the hypothesis of at least two cointegration relationships exist among the variables, almost all countries including Angola, Libya, Nigeria, and Egypt except Algeria exhibit a significant long-run relationship. However, the individual cross-country results at the hypothesis of three cointegration, only Algeria with a probability value of 0.04 indicates a marginal long-run relationship.

Figure 1: Diagnostic Analysis Normality of Residual

Figure 1 shows the outcome of the Jarque-Bera (JB) test for normality, which refers to the statistics of the D' Agostino- Pearson or Brown-Shenton test. It reveals the goodness-of-fit of the ARDL model specification, which can yield meaningful results. Such results would provide insightful information for policymakers and investors in their decision-making process. As shown in the Figure, the JB test statistics are a sum of the standardized third and fourth moments. It asymptotically follows a $\chi_2{}^2$-distribution with two degrees of freedom (Gel & Gastwirh, 2007). Following the 5% level of significance, the results indicate that the null hypothesis of normality of the residual error terms cannot be rejected. Instead, I accept the normality of the error term at a 5% significant level. The model is good and can be used for making policy formulation and prediction in the five major oil exporting countries in Africa.

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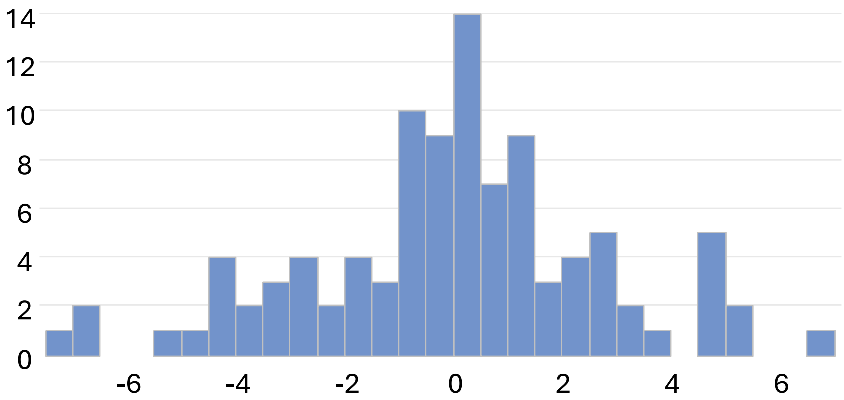

Series: Residuals	
Sample 2000 2021	
Observations 99	
Mean	3.13e-16
Median	0.045618
Maximum	6.532343
Minimum	-7.115320
Std. Dev.	2.711764
Skewness	-0.200786
Kurtosis	3.247413
Jarque-Bera	0.917701
Probability	0.632010

Notes ** and *** indicate rejection of the respective null hypothesis at the 5% and 1% significance. The null hypothesis is that the error terms are normally distributed.

Figure 1 Normality of the Stochastic Error terms.

CONCLUSION

In this paper, I explore whether global oil price shocks have a long-run or short-run significant relationship with bank credit-to-bank deposit and macroeconomic factors in the major oil exporting countries in Africa. Since bank-credit-to-bank-deposit measures the liquidity risks in the banking sector in these countries, the fluctuations of global oil prices are directly related to the banking sector liquidity risks within the major oil exporting countries in Africa. Based on the findings, I conclude that a decline in global oil prices will exacerbate declining bank lending behavior and a fall in bank deposits. Therefore, bank liquidity risk within the 5 major oil exporting countries could potentially hurt capital allocation in oil companies. These ideas are corroborated by Fondem and Luo's (2023) stipulation of the high need for diversification in agriculture, industrial, and financial sectors in Africa.

Additionally, there is a negative and significant long-run effect on the real interest rate (RIR) and bank-credit-bank deposit, which implies that in these countries, low RIR encourages lending behavior, thus reducing bank deposits. This reveals inefficient asset management strategies in the banking sectors. Thus, increasing the long-run liquidity risk. I also find that GDP is positive and has a significant long-run effect on bank credit-to-bank deposits, which suggests that as the economy of these countries grows banks tend to lend more as related to their deposits. It supports the theoretical idea that the increase in bank lending is strongly associated with investment and economic growth. These results imply that the 5 major oil exporting countries such as Algeria, Angola, Libya, Nigeria, and Egypt are experiencing high liquidity risk in their banking sectors when there is a decline in global oil prices. Based on the findings, it is evident that the African bank's regulators should be more sensitive and monitor global economic factors such as geopolitical shocks, seasonal variations, market risks, and political risks when implementing lending policy in financial institutions.

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REFERENCES

Al-khazali, M., & Mirzaei, A. (2017). The impact of oil price movements on bank non-performing loans. *Emerging Market Review, 31*, https://doi.org/10.1016/j.ememar.2017.05.006

Alenoghena, R. (2020) Oil price shocks and macroeconomic performance of the Nigerian Economy. *Facta Universitatis Series Economics and Organization, 17*(4), https://doi.org/10.22190/FUEO200801022A

Belanès, A., Ben Maatoug, A. and Triki, M.B. (2024), "The dynamic impact of oil shocks on the Saudi stock market: new evidence through dynamic simulated ARDL approach", *Journal of Risk Finance*, 25 (1), 115-129. https://doi.org/10.1108/JRF-04-2023-0091

Belinga, T., Zhou, J., Doumbe, D. E., Gahe, Z. S. Y., & Koffi, S. L. (2016). Causality Relationship between bank credit and economic growth. *Social and Behavioral Science,* 664-671. doi: 10.1016/j.sbspro.2016.11.061

Bouzidi, M. F., Nefzi, A. A., & Yousif, M. (2024). Impact of international oil price shocks and inflation on bank efficiency and financial stability. *Risk and Financial Management, 17*(12)
https://doi.org/10.3390/jrfm17120543

Chidozie, E. U., & Ayadi, S. F. (2017). Macroeconomy and banks' profitability in Nigeria, *African Research Review, 11*(2), DOI:10.4314/afrrev. v11i2.10

Cologni, A., & Manera, M. (2008) Oil price inflation and interest rates in a structural cointegrated VAR model for G-7 countries. *Energy Economics, 30(*2), https://doi.org/10.1016/j.eneco.2006.11.001

Fondem, B. D., & Luo, L., (2023). Export-Led Policy, Agricultural, Industrial, and Financial Sectors Growth in Cameroon. *Business and Economic Research, 13(*4), DOI: https://doi.org/10.5296/ber.v13i4.21373

Hesse, H., & Poghosyan, T. (200). Oil prices and bank profitability. International Monetary Fund, Retrieved: file:///C:/Users/divin/Downloads/_wp09220%20(8).pdf

Killins, N. R., & Mollick, V. A. (2020). Performance of Canadian banks and oil price movements. *International Business and Finance, 54,* https://doi.org/10.1016/j.ribaf.2020.101258

Khan, I. M., Teng, J., khan, K. M., Jadoon, U., & Khan, F. M. (2016). The impact of oil prices on stock market development in Pakistan. Resource Policy, 60, https://doi.org/10.1016/j.resourpol.2020.101899

Lee, C., & Lee, C. (2019) Oil price shocks and Chinese banking performance. Energy Economy, 77, 49-53. https://doi.org/10.1016/j.eneco.2018.01.010

Lee, Y.M. and Wang, K.M. (2015). "Dynamic heterogeneous panel analysis of the correlation between stock prices and exchange rates," *Economic Research-Ekonomska Istraživanja, 28*(1): 749-772 (https://www.tandfonline.com/doi/full/10.1080/1331677X.2015.1084889)

Nkwadochi. C. K., Patience, S.B., & Iwedi, M. (2020). Covid-19 outbreak, oil price shock, and banking system liquidity. *Greener Journal of Economics and Accounting, 8*(1), 6-11. file:///C:/Users/divin/Downloads/110220137Kochaetal.pdf

Osuma, G. O., Babajide, A. A., Ikpefan, O. A., Nwuba, E. B., & Jegede, P. W. (2019). Effects of Global Decline in Oil Price on the Financial Performance of Selected Deposit Money Banks in Nigeria. *International Journal of Energy Economics and Policy*, *9*(3), 187–195. Retrieved from https://www.econjournals.com.tr/index.php/ijeep/article/view/7514

Pesaran, M.H.; Shin, Y.; and Smith, R.P. (1999). "Pooled Mean Group Estimation of Dynamic Heterogeneous Panels," *Journal of the American Statistical Association, 94*(446): 621-634. https://doi.org/10.2307/2670182

Saif-Alyousfi, A., Saha, A., Rus, M. R., & Mohd, N. K. (2020). Do oil and gas price shocks have an impact on bank performance? Journal of Commodity Market, 22(87), DOI:10.1016/j.jcomm.2020.100147

Tan, Y., & Uprasen, U. (2023). Asymmetric effects of oil price shocks on income inequality in ASEAN countries, Energy Economics. 126, Retrieved: https://doi.org/10.1016/j.eneco.2023.107033

Wang, R. and Luo, H.(R). (2020), Oil prices and bank credit risk in MENA countries after the 2008 financial crisis *International Journal of Islamic and Middle Eastern Finance and Management*, 13(2), 219-247. https://doi.org/10.1108/IMEFM-03-2019-0103

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