Macroeconomics Indicators and Bank Profitability in Nigeria

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Abstract

This study examined the effect of macroeconomic indicators on the profitability of deposit money banks in Nigeria. However, in order to achieve the objectives of this study, the study utilised five explanatory variables as proxies for macroeconomic indicators (gross domestic product, inflation rate, interest rate, crude oil price, and exchange rate) while banking sector return on assets was used as a proxy for bank profitability in Nigeria. The study covered a time period of 2000 to 2022. The Ordinary Least Squares (OLS) technique was adopted for the analysis based on the fact that the variables were stationery at levels. The Augmented Dickey Fuller (ADF) and the Elliot-Rothenberg-Stock unit root tests showed that gross domestic product, inflation rate, interest rate, crude oil price, and exchange rate and bank profitability were stationery at levels based on the fact that ADF statistics > ADF at 5%. The regression results revealed that there is a positive and significant relationship gross domestic product and bank profitability, inflation rate has an insignificant effect on bank profitability, interest rate has an insignificant effect on bank profitability, crude oil price was found to have a positive and significant effect on bank profitability while exchange rate was found to have a negative and insignificant effect on bank profitability. Based on these findings, it was recommended that government through their fiscal and monetary policy tools should ensure that rise in crude oil prices as macroeconomic indicator could utilized effectively to developed the banking sector in Nigeria. It was also suggested that monetary authority should ensure that increase in real gross domestic product coupled with cash reserve requirement would help banks to better position to give more credit facilities to the public and in turn enhance the overall development of the banking sector.

Keywords: Bank Profitability, Crude Oil Price, Exchange Rate, Gross Domestic Product, Inflation rate, Interest rate.

Introduction

Emerging Market Economies (EMEs) such as Nigeria banking has witnessed important transformations during the last two decades. The domestic output growth and easy funding conditions in global markets - particularly after the great financial crisis - total bank credit to the private sector measured in U.S. dollars, expanded nine-fold in emerging market economies since 2000 and tripled since the end of 2007 (Kohlscheen, Murcia & Contreras, 2018). The profitability of Deposit Money Banks (DMBs) may be vulnerable to anticipated and unanticipated, and this calls for management action in taking the right measures to limit the effects on the soundness of the financial economy (Ugbah, Esan & Akrawah, 2022). The DMBs contribute to aggregate investment and consumption in the economy. These functions of the banks help to accelerate the process of economic growth and development.

Macroeconomic factors are not related to the internal process of the banks, but factors like inflation, interest rate, GDP growth and exchange might affect bank profitability significantly. Others include foreign direct investment (FDI), foreign portfolio investment (FPI), aggregate investment and unemployment rate (Olokoyo, Ibhagui, Babajide, &Yinka-Banjo, 2021). The

level of financial integration, globalization and advancement in information and telecommunication technology and financial markets are increasingly recognized by researchers and regulators as macroeconomic indicators could have on bank profitability. Macroeconomic indicators, excluding key macroeconomic indicators that tend to influence output in Nigeria, such as oil prices / oil revenue and foreign capital flows (Osamwonyi & Chijuka, 2014). However, there is paucity of empirical evidence on the use of remittance and other components of capital flows as factors which may influence bank profitability in Nigeria. The rationale behind the motivation of this study is that indicators have assumed critical importance in the Nigerian economy and should not be ignored thereby leading to the investigation of the relationship between macroeconomic indicators and bank profitability in Nigeria.

Conceptual Clarification

Profitability

Profitability is a relative measure of a company's operational performance. Profitability is seen as company's earning capacity or capability to earn profit now and in the future (White, 2019). Chen (2020) defined profitability as a given investment's ability to earn a return on its use. This indicates that profit refers to a company's current operating performance and efficiency, whereas ability refers to a company's ability to earn profits, which indicates the company's earning power or operating performance. Profitability demonstrates the end results of business operations (Johnson & Smith, 2018). Profit is a financial gain which is the difference between the amount earned and the amount spent in buying, operating, or producing something, while profitability means the ability to make profit from all the activities of an organisation, company, firm, or enterprise (Peters & Thompson, 2020). Profitability is critical to the success and growth of any business (Green, Johnson & Smith, 2017). From this, one can deduce that a firm's long-term survival is highly dependent on its profitability.

Macroeconomic Indicators

Macroeconomic indicators are the variables of interest explored in this study that affect a large population rather than select individuals and are relevant to a broad economy at the regional or national level. Macroeconomic indicators include economic downturns or slowdowns, recessions, low savings rates, weak markets, industrial production depressions, reductions in per capita income levels, and, most importantly, inflation levels in the economy (Smith & Johnson, 2020). Macroeconomic indicators are elements that characterize a country's economy and business environment. These macroeconomic f indicators in an economy are not under the control of a single firm (Williams & Thompson, 2019). The government, on the other hand, frequently influences macroeconomic indicators through the enactment of legislation and/or policies. Inflation, GDP, interest rate, foreign exchange rate, money supply, and other factors are examples of these (Anderson & Williams, 2021). Businesses, including deposit money banks, prefer a stable macroeconomic environment because it is more predictable; risk is also lower in such conditions. Hence, the macroeconomic indicators explored in this study were interest rate, real GDP, oil revenue, exchange rate and inflation rate.

Gross Domestic Product

Gross Domestic Product (GDP) is a measure of a country's total economic activity that is usually adjusted for inflation. It is expected to have an impact on a number of factors related to the demand and supply for bank loans and deposits. According to the literature on financial sector profitability and economic growth (GDP) grow this expected to benefit bank profitability (Emase, 2017). The GDP, which can be nominal or real, is a popular metric for measuring

economic growth. The nominal GDP is the monetary value of goods and services generated in a given period, whereas the real GDP is the monetary value of goods and services after inflation is taken in to account. There are various definitions of economic growth and techniques for measuring it. Olowofeso, Adeleke, and Udoji (2015) asserted that the primary definition is growth in the economy's long-run productive capacity, which is commonly measured by real GDP growth.

Interest Rates

The interest rate is a measure of time preference and serves as an incentive for individuals to part with liquidity for a set period of time. Mankiw (2021) defined the interest rate as the price paid for the use of money, which can be seen as the opportunity cost of deferring current spending into the future. Interest rates are reflected in savings rates, lending rates, and discount rates. Mishkin (2020) puts interest as the cost or price that balances the supply of savings and the net increase in the money supply with the demand for investment and net hoarding over time. In this view, the interest rate serves as the price of credit, determined by the forces of supply and demand for loanable funds. Smith and Johnson (2020) argued that interest rates represent the cost for borrowers to rent money and the compensation for lenders for forgoing liquidity. Interest rates, as with other prices, act as a rationing mechanism, allocating a finite amount of funds among various competing desires. Yellen (2015) defined the interest rate as the rate at which inflation is stable and the output gap is zero, often referred to in discussions of monetary policy. As interest rates rise, the cost of borrowing increases, potentially limiting investors' capacity to secure funds from banks. This suggests that an uptick in interest rates can negatively impact bank profitability over time.

Crude Oil Price

Crude oil is a naturally occurring liquid petroleum product composed of hydrocarbon deposits and other organic materials formed from the remains of animals and plants that lived millions of years ago (Aljamali & Salih, 2021).These organisms were covered by layers of sand, silt, and rock, subject to heat and pressure, and eventually turned in to a type of fossil fuel that is refined in to usable products including gasoline, diesel, liquefied petroleum gases, and feed stock for the petrochemical industry. Crude oil prices measure the spot price of various barrels of oil, the most common of which are West Texas Intermediate, Brent Blend, the Dubai Mercantile Exchange; the basket price of the Organization of Petroleum Exporting Countries (OPEC) and the futures price of the New York Mercantile Exchange (Amadeo, 2022). Crude oil prices are driven mainly by the principles of supply and demand. Over supply and shrinking demand lower prices, while rising demand and short supply pushes prices up. Perceived supply and demand changes can be driven by geo political events or natural disasters that affect oil-producing nations (Khan, et al., 2021).

Exchange Rates

The exchange rate is the price of one country's currency expressed in terms of the currency of another country (Okorontah & Odoemena, 2016). The Nigerian Naira, for example, has an exchange rate against the US dollar and a number of other currencies. It can be expressed as either a nominal or actual exchange rate. The nominal exchange rate (N/S) is a monetary phrase that measures the relative price of two currencies, such as the Nigerian naira in relation to the US dollar, whereas the real exchange rate (R/S) is a real notion that measures the relative price or worth of different countries' products. It is also feasible to have a fixed or floating exchange rate system. A fixed exchange rate system is one in which a country's currency rate remains constant or swings within a narrow band around a fixed par value. With floating rates, external

shocks, particularly international trade shocks, are less disruptive, and monetary policy is more successful in influencing aggregate demand, resulting in economic growth (Pugel, 2007).

Inflation Rate

Inflation is defined as a general increase in the price of commodities over a given time period (Smith & Johnson, 2020). Inflation has a tendency to raise commodity prices without increasing their real value. Banks are harmed by inflation because they tend to hold investments for long periods of time between acquisitions and exit (Johnson & Peters, 2020). Inflation, according to Smith and Johnson (2020), is defined as a continuous increase in the general level of price. It can evaluate in a variety of ways. Nonetheless, the GDP Deflator and a CPI indicator are two commonly used evaluations. Higher prices are likely to reduce aggregate buyer spending, resulting in a decrease in GDP. However, in this situation, inflation is not necessarily negative; rapidly increasing inflation rates indicate the likelihood of poor macroeconomic health (Williams & Thompson, 2019).

Empirical Review

In the literature, Olokoyo, Ibhagui, Babajide and Yinka-Banjo (2021) investigated the macroeconomic determinants of Nigerian bank performance. The study findings show that economic growth, trade, and interest rates are significant macroeconomic predictors of bank performance in Nigeria. They discovered that growth and trade promote bank performance while high interest rates impede bank performance. Agwu, Ogbonna and Ogbulu (2020) investigated the relationship between macroeconomic variables and the performance of deposit money banks in Nigeria. The macroeconomic variables such as GDP rate, interest rate, inflation rate, money supply, and exchange rate are or are not under the control of the banking sector's management. The models were analysed using appropriate financial metric tools such as Error Correction Model and General Method Moments results show that none of the macroeconomic variables used in this study (economic growth rate, interest rate, inflation rate, money supply, and exchange rate) have a significant relationship with bank performance.

Thompson and Jones (2021) found a significant relationship between the inflation rate and commercial bank profitability, with ROA and the inflation rate being significantly correlated. In another study, the impact of inflation on financial sector performance was investigated using the GMM methodology; the results revealed a significant relationship between inflation rate and ROA. In his research, Rogers (2020) discovered a significant relationship between the inflation rate and the firm's ROA. As a result, the inflation rate is strongly related to the firm's ROA. Combey and Togbenou (2017) examined the short-run and long-run relationship between three major macroeconomic indicators (GDP growth, real effective exchange rate, and inflation) and banking sector profitability using the Pool Mean Group estimator (return on assets and return on equity). They found out that real GDP growth and the real effective exchange rate were found to have a negative and significant impact on banks' return on assets, while inflation has no effect. In terms of bank return on equity, long-run results show that real GDP growth, real effective exchange rate, and inflation have a negative impact on bank return on equity. Akani, Nwana, and Mbachu, (2016) investigated the effects of selected macroeconomic variables on commercial bank performance in Nigeria with the goal of unraveling the effects of selected macroeconomic shocks (inflation rate, real GDP, real interest rate, exchange rate, broad money supply, and unemployment rate) on Nigerian bank performance (ROA and ROE). They used three multiple regression models, as well as the Johansen co-integration test, the Unit Root test, the Vector Error (VECM), and the Granger Causality tests. The findings show that inflation rate, real GDP, exchange rate, broad money supply, interest rate, and unemployment rate have insignificant effects on ROA and ROE. Kiganda (2014) conducted research in to how macroeconomic variables affect commercial

bank profitability in Kenya. The case study of Equity Bank Limited employed a correlation research design and collected secondary data from 2008 to 2012. The data was analysed using ordinary least squares regression. The study concludes that macroeconomic indicators (GDP, inflation rate, and exchange rate) have no effect on profitability.

Theoretical Review

Modern portfolio theory is the theory adopted in the study, which explains the relationship between macroeconomic factors and bank profitability. The theory was propounded by Markowitz, in the year, 1952. The underlying assumption of the theory is to maximize returns and minimize risks. This means that any investment firm should have a portfolio of investments in various types of investments. It is standard practice for banks to invest in a diversified portfolio in order to reduce risk and maximize the returns from the various investment options available (Cumming, 2009). The portfolio selection process can be divided in to two stages. The first stage begins with observation and experience and ends with beliefs about how available securities will perform in the future. The second stage begins with relevant beliefs about future performance and concludes with portfolio selection. MPT seeks to reduce the total variance of the portfolio return by combining different assets whose returns are not perfectly positively correlated. MPT also assumes rational investors and efficient markets (Markowitz, 1952). Consistent with the portfolio theory's essentials of diversification and risk minimization, modern financial theory has focused on macroeconomic variables as likely sources of systematic risk. According to this theory, macroeconomic variables may have an impact on the efficiency and thus performance of deposit money banks.

Methodology

The research design used in this study is *Ex-Post-facto* research design. The population of the study is made up of the totality of deposit money banks licensed to operate in Nigeria. This amounts to a population of twenty-four (24) deposit money banks including Jaiz bank and excluding non-interest and merchant banks. The data were obtained from the Central Bank of Nigeria (CBN) statistical bulletin and deposit money banks' annual statement of accounts for various years under review (2000 to 2022). The ordinary least squares (OLS) econometric technique was used to analyse the empirical model and examine the effect of macro-economic indicators on bank profitability in Nigeria. Various tests were conducted to evaluate the results, which include t-test, R-Squared and f-test. Time series analysis was carried out to test the data for stationarity or non-stationarity problems using Augmented Dickey-Fuller (ADF), which is an extension of Dickey-Fuller test. Also, the unit root test was carried out to determine whether the orders of integration of the variables of interest were compatible with the selected econometric methodological framework.

Model Specification

This study modifies the model adopted by Olokoyo, et al. (2021) as stated below:

$BPV_t = f(MV_t)$---------- (3.1)

Where; BPV was a vector of LQR, ROA and CAD; MV was a vector of GDPG, INF, FKF, INT, EXR and TRD.

The relationships between the components of BPV and the different independent variables were rewritten implicitly as follows:

$LQRt = f(GDPG_t, INF_t, FKF_t, INTt, EXR_t, TRD_t, v_t)$ ----------(3.2)

$ROA_t = f(GDPG_t, INF_t, FKF_t, INTt, EXRt, TRD_t, \mu_t)$---------- ----------(3.3)

$CAD_t = f(GDPG_t, INF_t, FKF_t, INT_t, EXRt, TRD_t, e_t)$----------(3.4)

LQR, ROA, CAD, GDPG, INF, FKF, INT, EXR and TRD represents liquidity ratio, return on asset (profitability proxy), capital adequacy, growth of real gross domestic product, inflation, foreign capital flows, interest rate, exchange rate and trade respectively. In addition, *t* represents time while v, μ and *e* are stochastic error terms. The current study makes little modification to this model by adopting a single model to show the aggregate return on asset as a function of macro-economic factors. The modified model is presented in its functional form below:

$\sum ROA_t = f(GDP_t, INFR_t, INTR_t, COP_t, EXR_t)$----------(3.5)

The multiple linear regression analysis models which would be used were given as follows;

$\sum ROA_t = \beta_{0t} + \beta_1 GDP_t + \beta_2 INFR_t + \beta_3 INTR_t + \beta_4 COP_t + \beta_5 COP_t + \varepsilon_t$---------- (3.6)

Where;

$\sum ROA_t$ = Aggregate Return on Assets of the banking sector at time t; GDP_t = Gross domestic product at time t; $INFR_t$ = Inflation rate at time t; $INTR_t$ = Interest rate at time t; COP_t= Crude oil price at time t; EXR_t= Exchange rate at time t; β_0 is the intercept; β_1, β_2, β_3, β_4 and β_5 are parameters to be estimated; εt = Error term;

Result of the Findings

Descriptive statistics are used in this study to assess the individual characteristics of the variables AND shown in the table below.

Table 4.1 Descriptive Statistics

	ROA	GDP	INFR	INTR	COP	EXR
Mean	1.174286	44465.66	65.08714	17.59143	60.76190	92.51336
Maximum	3.260000	69799.94	355.9100	24.85000	99.67000	155.7536
Minimum	-12.83000	11332.25	5.380000	12.32000	25.98000	58.24839
Std. Dev.	3.338282	20297.83	114.0867	2.400938	24.86116	26.81876
Skewness	-3.737479	-0.214045	1.672248	0.917879	0.223814	1.197273
Kurtosis	16.28827	1.614823	3.980790	5.885951	1.789108	3.374890
Jarque-Bera	203.3964	1.839228	10.62915	10.23638	1.458301	5.629627
Probability	0.000000	0.398673	0.004919	0.005987	0.482319	0.059916
Observations	23	23	23	23	23	23

Source: Author's Computation from E-view 10.0.

The individual characteristics of the variables used in this study that the banking sector return on assets (ROA) has a mean of 1.174 and a relatively low standard deviation of 3.338 when compared to other variables (GDP, INFR & COP) of the study. The mean value of gross domestic product is 44465.66 and a standard deviation of 20297.83. The mean value of inflation rate is 65.08714 and a standard deviation of 114.0867. Interest rate has a mean value of 17.59 and a standard deviation of 2.40 representing the lowest deviation from the mean point amongst the variables. Crude oil price has a mean of 60.76 and a standard deviation of 24.86. Exchange rate has a mean value of 92.51 and a standard deviation of 26.81 representing the

lowest deviation from the mean point amongst the variables. It was observed that the Jarque-Bera value of the variables with their probabilities values indicated an acceptable threshold which shown that it is normally distributed except GDP and COP.

Unit Root Test

To examine the long-run relationship among the variable, the Augmented Dickey Fuller (ADF) and the Elliot-Rothenberg-Stock unit root tests were used to test for stationary in the series and the result is presented in Table 4.2 below;

Table 4.2: Augmented Dickey-Fuller Unit Root Test

		ADF Statistics	ADF (95%)	Remark
	ROA	-5.17	-3.00	Stationery
	GDP	7.11	-3.00	Stationery
	INTR	4.32	2.97	Stationery
	INFR	173.03	2.97	Stationery
LEVEL	COP	7.04	2.97	Stationery
	EXR	7.90	2.97	Stationery

Source: Author's Computation from E-view 10.0

It was observed from the table above that all the variables were stationary at levels. This implies that ordinary least square regression model is more appropriate in testing our formulated hypotheses. Therefore, the ordinary least square regression analysis estimate and the result is presented in Table 4.3 below:

Table 4.3: OLS result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	0.000233	0.000115	2.015555	0.0539
INFR	-0.000257	0.000354	-0.727201	0.4734
INTR	-0.059680	0.067394	-0.885538	0.3837
COP	66.46148	13.07339	5.083721	0.0000
EXR	-47.30082	38.63338	-1.224351	0.2366
C	211.5791	33.29474	6.354731	0.0000
R-squared	0.645624	Mean dependent var		41.48125
Adjusted R-squared	0.593124	S.D. dependent var		6.397350
S.E. of regression	4.080668	Akaike info criterion		5.792999
Sum squared resid	449.5999	Schwarz criterion		6.022020
Log likelihood	-87.68799	Hannan-Quinn criter.		5.868913
F-statistic	12.29757	Durbin-Watson stat		2.233534
Prob(F-statistic)	0.000008			

Source: Author's Computation Using E-View Version 10.0

Using the estimated result of the OLS in Table 4.3, it was observed that the coefficient of determination (R^2) is 0.6456 with adjusted R^2 value of 0.5931, which shows that the explanatory power of the variables is strong. This implies that about 59.31% of the variations in banking sector return on assets are explained by the variations in gross domestic products, inflation rate, interest rate, crude oil price, and exchange rate. The F-test was applied to check the overall significance of the model. The Fstatistic is instrumental in verifying the overall significance of an estimated model. Table 4.3 shows f-statistics value of 12.2976 with its probability value of 0.000000 which is highly significant. The Durbin Watson D-Statistic obtained was 2.23 which can be approximated to 2. This means that there is no auto correlation in the model. Hence, the model can be used for realistic forecasts.

Essentially, the result from the OLS revealed that real gross domestic product (GDP) has a significant positive effect on bank profitability at 5% significance level. This implies that 1 unit change in GDP would lead to a 0.0002 increase in the aggregate banking sector's ROA, and this effect is significant at 5% significance level. Inflation rate (INFR) has an insignificant negative effect on bank profitability at p-value >0.05. This implies that a 1 percentage change in INFR would lead to a 0.0003 decrease in the aggregate banking sector's ROA, and this effect is insignificant at p-value > 0.05. Interest rate (INTR) has an insignificant negative effect on bank profitability at p-value >0.05. This means that 1 percentage change in INTR would lead to a 0.0059 decrease in the aggregate banking sector's ROA, and this effect is insignificant at p-value > 0.05. Crude oil price (COP) has a significant positive effect on bank profitability at 1% significance level. The result revealed that a 1 unit change in COP would lead to a 66.46 increase in the aggregate banking sector's return on assets, and this effect is significant at 1% significance level. Exchange rate (EXR) has an insignificant negative effect on bank profitability at p-value >0.05. This indicates that a 1 unit change in EXR would lead to a 47.30 decrease in the aggregate banking sector's ROA, and this effect is insignificant at p-value > 0.05.

Discussion of Findings

The regression results show that real gross domestic product has a significant positive effect on bank profitability at 5% significance level. The result is consistent with the findings of Olokoyo, et al. (2021) that growth and trade promote bank profitability. Inflation rate has an insignificant negative effect on bank profitability. The result is inconsistent with the findings of Thompson and Jones (2021) that there is a significant relationship between the inflation rate and bank profitability. Interest rate has an insignificant negative effect on bank profitability. This result is inconsistent with the findings of Agwu, et al. (2020) that interest rate significantly influences bank profitability. Crude oil price has a significant positive effect on bank profitability at 1% significance level. The result is consistent with the findings of Olokoyo, et al. (2021) that oil price strong influence bank profitability. Exchange rate (EXR) has an insignificant negative effect on bank profitability. This result is inconsistent with findings of Agwu, et al (2020) that exchange rate has a significant relationship with bank profitability.

Conclusion

The study empirically investigated the relationship between macroeconomic indicators and bank profitability in Nigeria for a period of 23 years (2000 to 2022). The rationale for the present study is predicated on the fact that macroeconomic indicators play a significant role in the determination of banking profitability in any country across the globe. Specifically, the result shows that macroeconomic indicators such as gross domestic product and crude oil price exert significant effect on the profitability of the Nigerian banking sector. It was concluded that, the government through their fiscal and monetary policy tools should try and come up with more responsive mechanisms to better react to ever changing macroeconomic shocks affecting the profitability of the banking sector and the economy in general. This is true because, a healthy economy is a function of a healthy and vibrant banking sector.

Recommendations

The following specific policy recommendations are raised:

(i) The government through their fiscal and monetary policy tools should ensure that rise in crude oil prices as macroeconomic indicator could utilized effectively to developed the banking sector in Nigeria.

(ii) Therefore, monetary authority should ensure that increase in real gross domestic product coupled with cash reserve requirement would help banks to better position to give more

credit facilities to the public and in turn enhance the overall development of the banking sector.

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