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THE IMPACT OF MACRO-ECONOMIC VARIABLES ON THE PROFITABILITY OF SELECTED LISTED COMMERCIAL BANKS IN NIGERIA, 1990-2016

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ABSTRACT

The study investigated the relationships between macro-economic variables and the profitability of selected listed commercial banks in Nigeria from 1990-2016. Three different measures of profitability were used: Return on Assets (ROA), Return on Equity (ROE) and Equity Multiplier (EM), as defined in the body of the study. The applicable model is the GMM and the pooled regression model. What is of significance in the present study, is that for the Nigerian economy, the real GDP and lending rate have a positive relationship with the profitability of banks, whichever way it is being measured, using ROA, ROE or EM. Other important results are that with all these three measures of profitability, the real GDP's correlation is insignificant, while that of the lending rate is very significant. Also, using the three measures of profitability above, the inflation rate is negative with low significance. The results indicate that the impact of macro-economic variables on the profitability of commercial banks depends on how the variables used are being measured.

Keywords*:* commercial banks, GMM model, Nigeria, macro-economic variables, profitability

1. INTRODUCTION

Financial institutions play a crucial role in the development of an economy. They are the institutions which allocate funds where needed. They act as intermediaries between those who want to save and those who want to borrow, which will bring about investment and employment opportunities, as well as economic development in a country. In the financial institution, the banking sector is regarded as the key sector and is potent for economic growth. A developed banking sector promotes a healthy economy and is a smooth investment decision.

In the Nigerian economy, there have been many consolidation exercises to reform the banking sector. In as much as there are many banks, especially commercial banks, in the past with weak capital bases, the government of Nigeria in the past stepped into the position of the banks and reduced them to strong, reliable numbers. Some of them merged and some of them faded away. Well-performing commercial banks stimulate economic growth.

A bank's profitability is variously defined. Rose (1999) defined profitability of a bank as net after-tax income, which is being measured by return on assets and also return on equity ratios. Profitability could be generally defined as a measure of efficiency, that is, the performance of banks or any organisation. These two ratios could be used at any point in time. There are factors that can affect these ratios, whether to improve them or to affect them negatively. These factors include:

- Inflation rate
- Real interest rate
- Real Gross Domestic Product (GDP)
- Imports and exports of a country, among other variables
- Minimum lending rate etc.

There is no doubt that commercial banks are extremely important for the development of a nation. The importance of these banks could be hindered or affected by the behaviour of the macro-economic variables and conditions. In Nigeria, one can observe a noticeable growth in the profitability indicators of commercial banks. The fact remains that growth in profitability indicators

might not be correlated with the growth in the economy's GDP. Even though the commercial banks are making progress, their progress must be related or in line with the economy's progress.

The economic circumstances of a nation will also be a determinant of the healthiness of the commercial banks. Many banks have failed because of the conditions of a nation. At the same time, an effective and efficient functioning of the financial sector of a nation is a result of a sound and favourable macro-economic national environment. We are now in the era of globalisation where the whole world is a global village, and where every nation is now well connected and well integrated.

The financial sector is not exempt. However, there are fluctuations all over the world. Given world economic integration, fluctuation or disturbances in any part of the world affect other parts of the world. These disturbances must be addressed and carefully monitored. All fluctuations affect commercial banks in different ways because commercial banks are also integrated into the world economy.

Profitability measures of banks are being affected by macro-economic factors. What are the profitability measures of interest in this study? These include:

ROA = Return on Assets
ROE = Return on Equity
EM = Equity multiplier

The macro-economic variable of interest in this study include the inflation rate, interest rate, GDP growth rate, and the minimum lending rate. How did all these macro-economic variables affect the profitability of commercial banks in Nigeria? The banks' real interest rate is their trading instrument, which can affect profitability. This rate is the rate of interest that an investor will be expecting to receive or earn on the money invested after taking into consideration the prevailing inflation rate.

According to Fisher (1930), the real interest rate is approximately the nominal interest rate minus the inflation rate. GDP itself is an inflation-adjusted measure expressed in base-year prices. The minimum lending rate

is the rate that borrowers will pay on the amount borrowed, which is about the same as the going interest rate. These macro-economic variables affect the financial profitability of commercial banks.

1.1 Problem statement and justification for the study

Banks need to be profitable in order to survive in the long run. The factors that can generate either an increase or a decrease in the profitability of a bank need to be identified so that they can be resolved. Once the determinants of profitability are known, they can be managed. Every stakeholder in a bank needs information about its credit-worthiness. These stakeholders are:

- Owners of the bank
- The depositors
- The debtors
- The investors
- The creditors
- The regulators and the managers of the bank, and
- The government

All these parties involved will need to know the state of the profitability of a firm in their decision-making. It is expected that banks must continue to develop in order to give the bank a competitive edge over others in the same financial institution. In Nigeria, the study of the macro-economic variable impact on commercial banks has received minimal academic interest. This study aims to comprehensively interrogate those macro-economic variables and their importance concerning the profitability of commercial banks. It will also reveal the magnitude of each of the macro-economic variables on the profitability of commercial banks and individually on the measures of profitability.

1.2 Objectives of the Study

The main objective of this study is to investigate the impact of macro-economic determinants of commercial banks profitability. Other objectives are:

- To identify the significance of each of the selected macro-economic variables as a determinant of commercial bank profitability.
- To know the significance of the macro-economic variables on each of the profitability measurements of commercial banks.

1.3 Hypotheses to be Tested

H_1: Inflation rate is negatively associated with bank profitability.
H_2: GDP has a positive significant relationship with profitability.
H_3: Real interest rate or the minimum lending rate is positively related to bank profitability.

2. LITERATURE REVIEW

The macro-economic variable policies always affect firms in one way or the other. The first aspect of a firm that the macro-economic variables will affect is its profitability. Commercial banks in Nigeria have been constantly undertaking one form of structural change or another for the past two decades. In the Nigerian economy, few studies have been conducted on macro-economic variables and the commercial banks' profitability. Various authors have made use of different profitability and macro-economic variables. The widely used variables of profitability are Return of Asset (ROA), Return on Equity (ROE), and Equity Multiplier (EM). While some authors believe that macro-economic variables have an impact on commercial banks' profitability, others argue that either there is no impact, or the impact is insignificant.

Kosmidou, Tannas and Pasiouras (2005) found that in the United Kingdom (UK) economy, there is a strong positive relationship among all factors. Pasiouras and Kosmidou's (2007) studies determined that both foreign and domestic commercial banks in some European Union countries came out with a significant macro-economic condition on return on assets. Kanwal and Nadeem (2013) studied the Pakistan economy and their findings show that there is a strong positive correlation between real interest rate and return on assets. Saksonova and Solovjova (2011) carried out a comparative study for five big Latvian commercial banks. Even though GDP growth is positively

correlated with profit, inflation is negatively correlated with return on assets. Shaher, Kasawneh and Salem's (2011) research found that GDP is positively related to earnings.

The Pakistan economy was studied by Ali, Akhtar and Ahmed (2011), where 22 banks were involved. The results show a positive and significant relationship of GDP growth rate and Consumer Price Index (CPI) on assets and equity return ratios. In the case of Gul, Falza, and Khalid (2011), a strong and positive relationship was established between external variables and the performance indicators in Pakistan. However, there are other authors who found insignificant, negative results of variables on a firm's profitability. Some authors have identified other macro-economic variables that have contributed negatively to the profitability of banks. Scott and Arias (2011) were able to prove that GDP growth has no direct bearing on the banks' profitability in the United States.

Sufian and Kamarudin (2011) investigated more than 11 Korean commercial banks and reported that there is a negative impact of Gross Domestic Product on return on assets, and a positive impact of inflation, which contrasts with other outcomes. Hoffmann (2011) also recorded that GDP growth does not directly affect the profit level of United States banks. Ongore and Kusa (2013) established an insignificant relationship between macro-economic variables and banks' profitability.

Athanasoglou, Dellis and Staikouras (2006) found a negative relationship between interest rates and profitability. Khrawish (2011) established a negative relationship between the GDP and the inflation rate with that of return on assets and return on equity for Jordanian commercial banks.

Looking at the literature so far, one would realise that the relationship between macro-economic variables and commercial banks' profitability varies from country to country and from variable to variable. There is thus no consensus in the literature. The major focus of this study is therefore to establish the relationship between macro-economic variables and the commercial banks' profitability for the Nigerian economy between 1990 and 2016.

2.1 Theoretical Framework

Theory shows that commercial banks are vital in their role when dealing with the economic resource allocation of a country. They make funds available for investors to borrow as well as financial deepening or increasing provision for financial services, in the country, thereby potentially increasing the ratio of money supply to GDP. The theory of portfolio is very relevant. There are also macro-economic conditions that determine the degree of the credit-worthiness of borrowers; the quality of assets, among other things, are sources of macro-economic shocks to a bank's portfolio. It has been proven in Sharpes' (1970) portfolio theory, that the regulatory environment of any economy, the level of financial development, and the concentration level of the financial sector, also explain bank profitability.

The capital asset pricing model is pertinent in this study. The capital asset pricing model works for a portfolio of assets just as it does for individual assets. The financial sector acts as intermediary between investors and end-users of deposits. The model acts by allocating assets to profitable ends and also reduces the risk associated with each asset, in such a way that the assets do not move in the same direction.

An asset pricing model states that the expected return on an investment or a financial asset could be related to different macro-economic variables. The macro-economic variables that affect bank profitability can be identified and their impact established.

3. DATA AND METHODOLOGY

The data used for this study was taken from the statement of accounts of leading selected banks listed in the stock exchange. These are registered commercial banks with the stock exchange. The secondary data from the annual balance sheets of these selected banks spanning 26 years (1990-2016) was used.

The source of the macro-economic data utilised was the World Bank Publication (WDI, 2016) and also the Economic Survey of banks in Nigeria. The financial ratio data was sourced from the consolidated annual financial

statements of selected banks. The profitability ratio of selected banks and their measurements are as shown in Table 1.

Table 1: Dependent Variables and their Measurement

	NOTATION	MEASUREMENT
Return on Assets	ROA	$\frac{\text{Net income}}{\text{Total Assets}}$
Return on Equity	ROE	$\frac{\text{Net income}}{\text{Shareholders' Equity}}$
Equity Multiplier	EM	$\frac{\text{Total Assets}}{\text{Shareholders' Equity}}$

The profit earned per *naira* invested is measured by the ROA. This is an efficiency measure of how the banks manage their assets for profit-making. The ratio of the return on equity shows effectiveness in the way the banks manage and transform the shareholders' money to profit for the banks and also for the shareholders' equity. Equity multiplier is a measure of profitability because it has a multiplier effect on the return on asset of commercial banks. This will determine the banks' return on equity. It is a measure of financial leverage.

Table 2: Explanatory Variables and their Measurement

VARIABLE	NOTATIONS	MEASUREMENTS	HYPOTHESIZED RELATIONSHIP WITH PROFITABILITY
Inflation	Inf	Movement in annual price of consumer goods	+ -
Real GDP	RGDP	Annual growth rate in GDP	+ -
Real interest rate or Minimum lending rate	RInt or Mlr	Lending with inflation rate adjusted	+or-

The regression equation is of the form:

$$Y_{it} = \beta_0 + x_{1it} + \beta_2 x_{2it} + \beta_3 x_{3it} + \Sigma$$

That is, $ROA = \beta_0 + \beta_1 In + \beta_2 Int + \beta_3 gdp + \Sigma$

$$ROE = \beta_0 + \beta_1 In + \beta_2 Int + \beta_3 gdp + \Sigma$$

$$EM = \beta_0 + \beta_1 In + \beta_2 Int + \beta_3 gdp + \Sigma$$

The independent variables are regressed on each of the profitability ratio measures one after the other, using a Generalized Method of Moments (GMM) model. This is because the variables are all integrated of order zero and they are stationary at level as shown in Table 3.

Table 3: Descriptive Analysis

COLUMN 1	EM	INF	LENDING_RATE	GDPGR
Mean	9.24423	18.8865	19.78346	5.650619
Median	10.7149	11.8975	18.77	4.649226
Maximum	15	72.8355	31.65	33.73578
Minimum	0.79602	5.38222	15.48	-0.617851
Std. Dev.	4.53764	18.0933	3.686236	6.570706
Skewness	-0.4936	1.86253	1.483672	3.114683
Kurtosis	1.80423	5.18547	5.233784	14.07079
Jarque-Bera	2.60479	20.2068	14.9445	174.8148
Probability	0.27188	4.1E-05	0.000569	0
Sum	240.35	491.049	514.37	146.9161
Sum Sq. Dev.	514.755	8184.16	339.7084	1079.354
Observations	26	26	26	26

Table 3 summarises the values of the selected variables for this study. On average, the value of EM, inflation, lending rate and GDP Growth Rate (GR) are 9.2%, 18%, 19.78% and 5.7% respectively. The lending rate has a minimum deviation from the mean. This was reflected in its 1.483672 skewness value. However, the standard deviation and skewness figures of Table 3 show that relatively, the variables are distributed normally.

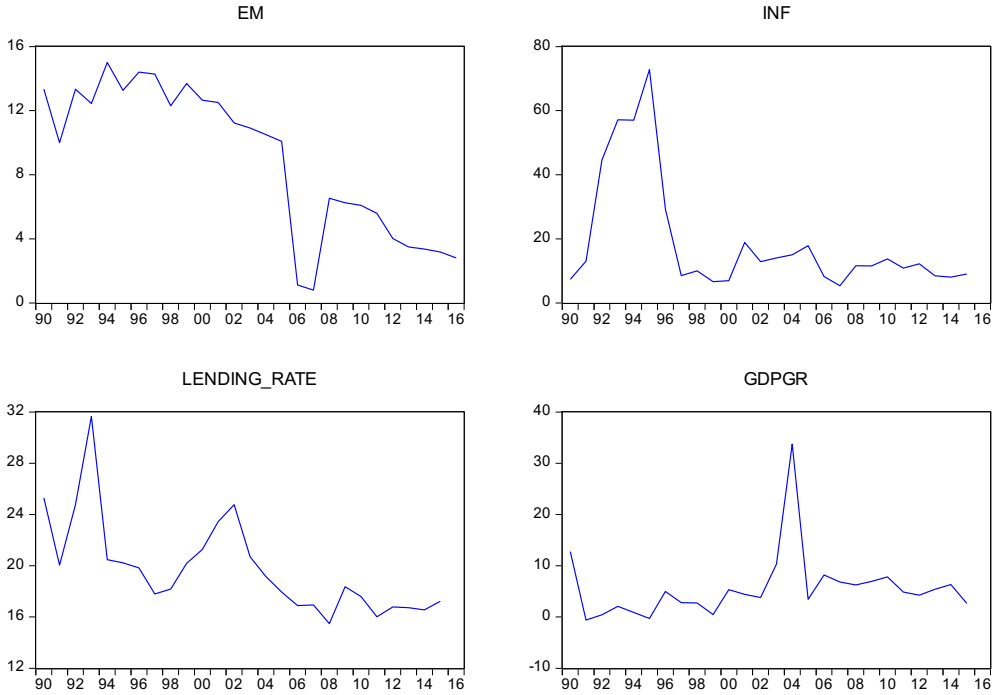

Figure 1: Trend of EM, inflation, lending rate and GDPGR

The trend analysis shows that the selected variables depict a cyclical pattern in their distribution from 1990 to 2016. Therefore, this distribution pattern warrants a test for unit root as shown in Table 4.

Table 4: Unit Root Test

VARIABLES	ADF AT LEVEL	CRITICAL VALUE AT 5%	ORDER OF INTEGRATION	PROBABILITY
ROA	-7.05884	3.02060	1(0)	0.0000
ROE	-4.8835	-2.9862	1(0)	0.0006
EM	-4.4898	-2.9918	1(0)	0.0016
INF	-4.0217	-2.9918	1(0)	0.0052
GDPGR	-4.2651	-2.9862	1(0)	0.0028
MPR	-3.4463	-3.0206	1(0)	0.0213

All the variables are stationary at levels and of order zero. For this reason, the GMM model is applicable.

GMM Output

Equation 1

$ROA = \beta_0 + \beta_1 Inf + \beta_2 Gdpr + \beta_3\ lending\ rate + \ \varepsilon$

Table 5: Dependent variable ROA

Method: Generalized Method of Moments
Sample (Adjusted): 1990-2015
Included observations: 26 after adjustments
Instrument specification: INF, GDPGR, MPR

Variable	Coefficient	Std Error		t-Stat	Prob.
C	-0.021	0.012		-1.98	0.000
INF	-0.001	0.000		-1.71	0.295
GDPGR	6.32E	0.001		0.60	0.566
Lending rate	0.2	0.06		3.33	0.005
R-squared	0.65		Mean dependent		0.015
Adjusted R-squared	0.59		variable		0.005
Std. Error	0.007		S.D. dep. Variable		0.001
Durbin Watson	1.84		Sum Squared residual		0.000
Instrumental rate	4		J-statistic		

Table 6: Endogeneity Test

Specification: ROA, CINF, GDPGR, LENDING RATE
Instrumental specification: CINF GDPGR MPR

	Value		Df	Prob
Difference in J-statistic	3.629		1	0.0568
J-statistics summary				
	Value			
Restricted J-statistic	3.629			
Unrestricted J-statistic	0.0000			

Equation 2

$$ROE = \beta_0 + \beta_1 Inf + \beta_2 Gdpgr + \beta_3\, lending\, rate + \varepsilon$$

Table 7: Dependent variable ROE

Method: Generalized Method of Moments
Sample (Adjusted): 1990-2015
Included observations: 26 after adjustments
Instrument specification: ROE CINF, GDPGR, Lending R

Variable	Coefficient	Std Error	t-Stat	Prob
C	-0.158	0.099	-1.159	0.027
INF	0.011	0.001	1.220	0.052
GDPGR	0.021	0.029	0.72	0.495
Lending rate	0.041	0.005	8.20	0.006
R-squared	0.68	Mean dependent variable		0.147
Adjusted R-squared	0.62	S.D. dep. Variable		0.088
Std. Error	0.068	Sum Squared residual		0.104
Durbin Watson	1.75	J-statistic		7.324
Instrumental rate	5			0.007

Table 8: Endogeneity Test

Specification: ROE, INF, GDPGR, LENDING RATE
Instrumental specification: CINF GDPGR LENDING Rate

	Value	Df	Prob
Difference in J-statistic	5.656	1	0.017
J-statistics summary			
	Value		
Restricted J-statistic	5.656		
Unrestricted J-statistic	0.0000		

Equation 3

$$EM = \beta_0 + \beta_1 Infl + \beta_2 Gdpgr + \beta_3 LR + \varepsilon$$

Table 9: Dependent variable EM

Method: Generalized Method of Moments
Sample (Adjusted): 1990-2015
Included observations: 26 after adjustments
Instrument specification: EM, CINFL, GDPGR, LR

Variable	Coefficient	Std Error	t-Stat	Prob
C	-29.84	12.316	--2.422	0.024
INF	-0.291	0.131	-0.222	0.826
GDPGR	0.290	0.149	-0.194	0.847
Lending rate	2.0162	0.754	2.674	0.012
R-squared	0.65	Mean dependent variable		9.244
Adjusted R-squared	0.58			4.537
Std. Error	6.216	S.D. dep. Variable		5.85
Durbin Watson	1.64	Sum Squared residual		2.52
Instrumental rate	5	J-statistic		0.011

Table 10: Endogeneity Test
Specification: EM, CINF, GDPGR, LR
Instrumental specification: EM CINF GDPGR LR

	Value	Df	Prob
Difference in J-statistic	4.799	1	0.0286
J-statistics summary			
	Value		
Restricted J-statistic	5.916		
Unrestricted J-statistic	0.0000		

4. INTERPRETATION AND DISCUSSION OF RESULTS

4.1 Model 1: The dependent variable is ROA

Table 5 shows the GMM output for model one. The three external variables that can influence ROA, and their impacts on ROA are shown.

$$ROA = \beta_0 + \beta_1 Inf + \beta_2 Gdpr + \beta_3\ lending\ rate + \mu$$

The R^2 of the regression stood at 0.65. This shows the minimal contribution of the macro-economic variables (that is, inflation, real GDP and minimum lending rate), towards the profitability of selected listed commercial banks. The remaining % of 35% variations will be due to other factors, regarded as internal factors that can influence the profitability of commercial banks. From the results, it shows that the inflation rate is negatively related to the profitability of the selected commercial banks. This outcome is in line with the outcome of Kanwal and Nadeem (2013) in their study on Pakistan's commercial banks' profitability. This shows that a 1% change in inflation rate will bring about a 0.10% decrease in profitability. This outcome is still very mild and thus does not pose any threat to the profitability of banks using the return on asset (ROA) as the dependent variable. The GDPGR (real GDP) shows a positive but insignificant influence on profitability.

This study is in line with that of Simiyu and Ngile (2015) on the commercial banks of Nairobi. Though GDP measures economic growth, GDP might not influence banks' profitability if per capita GDP is not increasing, and the purchasing power is not increasing. A 1% increase in GDP will bring about 0.0003% in bank profitability. The lending rate is very significant and highly positive in terms of its contribution to banks' profitability. This is also in line with the study by Kanwal and Nadeem (2013) in Pakistan. A 1% increase in the lending rate will increase profitability by 20%. This study however, digresses from that of Simiyu and Ngile (2015) with a negative outcome.

4.2 Model 2: The Dependent Variable is ROE

$$ROE = \beta_0 + \beta_1 Infl + \beta_2 GDPgr + \beta_3 LR + \mu$$

Looking at Table 7, the R^2 stood at 68%, showing that the explanatory variables are 68% of the variation in the dependent variable, while 32% are explained by other factors; surprisingly, all the explanatory variables exert a positive influence on ROE ratio. Only the lending rate is very significant and the GDPGR is very insignificant. The inflation rate is partially significant. The result here shows that a 1% change in the inflation rate, real gross domestic product and the lending rate, will bring about respectively a 1.10%, 2.10% and 4.10% change. The study by Ngumo (2012) shows that, for example, the lending rate effect on the profitability of banks, especially the return on equity, is neutral. That is, it does not change the performance of banks. The work of Sangmi and Tabassum (2010) discovered that a rise in lending rates is associated with lower profits, lower cash inflows and a higher required rate of return for business investors. This can bring about a reduction in the value of the company's stock.

4.3 Model 3: The Dependent Variable is EM

$$EM = \beta_0 + \beta_1 Infl + \beta_2 Gdpgr + \beta_3 LR + \mu$$

The inflation rate and the real GDP are both negatively related to the equity multiplier, but they are both insignificant. The lending rate is significant and is positively related to the equity multiplier. However, the inflation rate and the real GDP are both insignificant in their contributions to the equity multiplier. The fact that they are both negative means that their effects will decrease the equity multiplier of banks. The three variables, inflation, real GDP and lending rates explained 65% of the variation in the dependent variable (equity multiplier).

The real GDP insignificant contribution to return on asset and return on equity, is in line with the studies of Alper, Anbar and Tabassumi (2011); Athanasoglou *et al.* and Staikouras (2006); Demurgue-Kunt and Hiuzinga (1999); Flamini, McDonald and Schumacher (2009), and Vong and Chan (2009). From this variable, a significant positive relationship is expected. This is because the GDP is a measure of economic growth and enhances profits. The insignificant

result could be due to other reasons such as the customer's preference or choice of depositing excess liquid funds or when there is not enough information with respect to economic changes in a country (Kanwal & Nadeem, 2013).

The lending rate is significantly correlated with return on assets and return on equity and also the equity multiplier. This outcome is in line with other studies such as Aburime (2008), Anwar and Herwany (2006).

4.4. Summary

This study established an insignificant real GDP relationship with commercial profitability in the Nigerian economy. This outcome concurs with the findings of many authors in the literature. These authors include Simiyu and Ngile (2015), and Ongore and Kusa (2013). Even though there is no significant contribution of real GDP to banks' profitability, studies have shown that there is a positive correlation between real GDP, which is a measure of economic growth, and the profitability of banks. Hoffmann (2011) made use of the GMM model and pooled OLS estimation approach and showed that U.B. banks also revealed the same conclusion. This is not to say that there is no study with a negative outcome. For example, the study by Sufian and Kamarudin (2011) for the Korean commercial banks between 1992-2003, showed a negative impact of real GDP with return on assets (ROA).

The important aspect to note in this study is that for the Nigerian economy, the real GDP and lending rate have a positive relationship with the profitability of banks, whichever way it is being measured, using ROA, ROE, or EM. However, with all these three measures of profitability, the real GDP's correlation is insignificant, while that of the lending rate is very significant. Also, using the three measures of profitability above, the inflation rate is negative with a low significance.

5. CONCLUSION AND RECOMMENDATIONS

The results obtained from the analysis suggests the type of recommendations made here. The real gross domestic product has been identified in the literature as an engine of growth. Our result shows that this macro-economic variable, even though its contribution to bank profitability is positive, is not significant.

Given the importance of this variable, the government needs to intervene concerning its proper growth. Real GDP value could be increased to an extent by government intervention, by reducing the cost of doing business and producing a well-managed GDP. Thus the real GDP of any nation could be managed through different means by the government, such as:

- Tax rebates
- Managed exchange rate for goods import bill reduction
- Support for local sourcing of raw materials for production
- Stimulation of the growth of the GDP through policy mixes
- Control of inflation rates

To analyse a bank's profitability, one needs to conduct a careful analysis of numerous factors. As there are various methods to measure bank profitability, this study adopted three measures of profitability, that is, ROA, ROE and EM. The selected factors impacting on the profitability of banks were Inflation rates, Real Gross Domestic Products and Bank Lending rates.

This study investigated the impact of these factors on bank profitability. It revealed information on the relationships between these variables, with analysis covering a period of 26 years (1990 to 2016).

From the analysis, it was concluded that the selected macro-economic variables do not contribute significantly to the profitability of commercial banks using the three profitability ratios, with the exception of the lending rate that is positively significant in its impact on profitability using the three profitability ratios.

Depending on the state of the economy and the degree of expectation in the economy, a rise in the bank lending from the present study will bring about a significant increase in bank profitability and *vice versa*.

Although theoretical, there is always a negative relationship between the lending rate and investment and demand for a bank loan. It has been proven in the literature that this position might not always be valid, due to the rate of expectation, the marginal efficiency of investment and the state of the economy. Further studies in other countries and for certain periods can only inform us better.

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