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Banks' Price Behaviour and its Determinants in Nigeria

Oyebola Fatima Etudaiye-Muhtar¹, Abdulrazaq Taiye Jimoh², Abdulazeez Adewuyi
Abdurraheem³, Wasiu Oluwatoyin Ibrahim⁴

Department of Finance,
Faculty of Management Sciences,
University of Ilorin, Ilorin,
Nigeria.

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¹ etudaiye.mf@unilorin.edu.ng, Corresponding author

² ajidejoke@gmail.com

³ aabdulaziz70@yahoo.co.uk

⁴ wasbro@gmail.com

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Abstract

Bank-based financial systems, through the financial intermediation function, enhance economic growth. However, in the performance of this function, banks are faced with issues such as information asymmetry and inefficient institutional qualities that may lead to increased operational costs which reflects as social costs of financial intermediation and are passed on to economic units. Consequently, banks may be confronted with the problem of determining the right price for its products and services. On this premise, this study examines the pricing behaviour of Nigerian commercial banks and its determinants. The random effects regression estimation technique is used on annual panel data of 15 publicly listed Nigerian commercial banks for the period 2005 – 2017. Results from the investigation show that bank-specific factors such as bank size (0.871, $p < 0.05$) liquidity (0.256, $p < 0.01$), credit quality (0.095, $p < 0.1$), and inflation (0.436, $p < 0.05$) as a macroeconomic variable, have positive and significant effects on bank price behaviour. These findings suggest that the variables are associated with higher social costs of financial intermediation in commercial banks in Nigeria. It is recommended that in order to lower borrowing costs, banks should endeavour to reduce the level of these bank-specific factors which would lead to reduction in costs associated with information asymmetry and inefficiency. In terms of inflation, banks are recommended to factor in inflation related costs into their pricing process while monetary policy regulators should put in place, policies that target reduction in inflation rates.

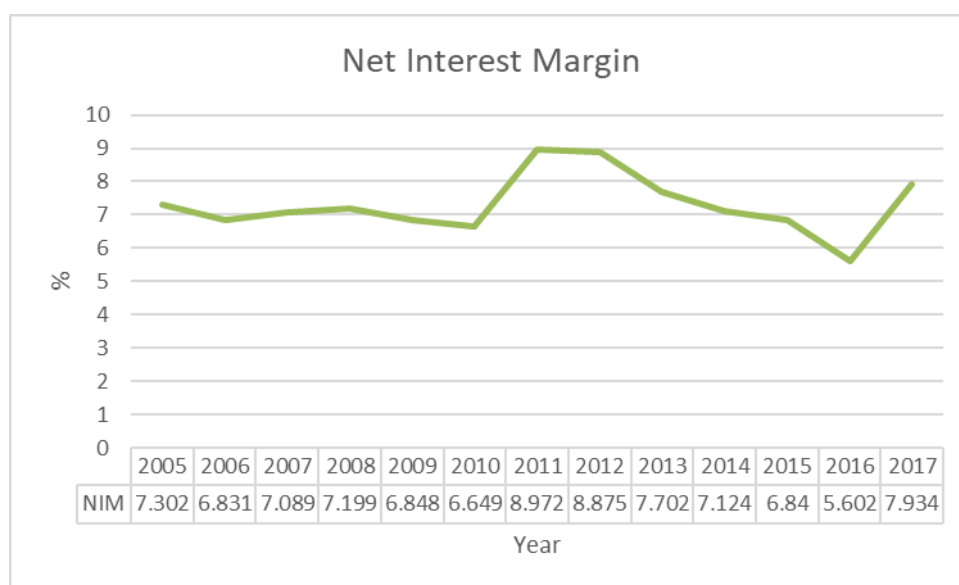
Keywords: Net interest margin, price behaviour, Nigeria, random effect

1.0 Introduction

In bank-based developing financial systems such as Nigeria, the financial intermediation process is an important function of the banking system that promotes economic growth (Levine, 2005). Supporting the finance-growth hypothesis, statistics obtained from the World Bank Development Indicators for Nigeria showed that bank deposits as share of gross domestic product grew from 12.1% in 2007 to 16.3% in 2017 while credit to the private sector by banks increased from 11.5% to 14.3% for the same period. The increase in these two financial ratios suggests the success attained by Nigerian banks in the intermediation

process and the reallocation of resources between various economic units. Nonetheless, literature shows that achieving this success comes at a cost to banks who in turn pass it on to economic agents. Gyeke-Dako, Agbloyor, Turkson, and Baffour (2018) identified this as social costs of financial intermediation represented with net interest margin i.e. the difference between the interest income and payments scaled by total assets and borne by economic units in the society. High interest margins may discourage savings and investments that would exert a negative effect on economic growth. Furthermore, the level of net interest margin suggests the efficiency of bank operations in the provision of financial intermediation. On one hand, higher margins in the sector is a reflection of an inefficient and non-competitive banking sector operating in an environment with insufficient institutional qualities and high information asymmetries (Aydemir & Guloglu, 2017). On the other hand, higher margins enhance profitability thereby strengthening bank capital and stabilising the banking sector (Etudaiye-Muhtar, Abdulkadir, & Gold, 2017).

Figure 1 shows that the average net interest margin of Nigerian banks for the period 2005 – 2017 is 8.38% with the lowest in 2016 (5.6%) and highest in 2011 (8.97%). The peak in Figure 1 is observed to be after the 2009 global financial crisis and maybe due to the spread between lower deposit rates and higher lending rates. Higher spreads are common in developing capital markets where banks are the main source of credit available to individual and firms. It would be recalled that the financial crisis had a greater impact on the capital market than the banking sector because of the reforms carried out in the sector (Sanusi, 2011). Thus, the first choice of credit for deficit units were banks and would suggest a pass on of the cost of financial intermediation to economic units as put forward by Gyeke-Dako et al. (2018).



Source: Data obtained from World Development Indicators Database
Figure1: Average Net Interest Margin in Nigeria (2005 -2017)

Most literature on Nigerian banks focus on the determinants of bank profitability (Adeusi, Kolapo, & Aluko, 2014; Babalola, 2012; Etudaiye-Muhtar et al., 2017; Obamuyi, 2013; Osuagwu, 2014; Ozili, 2015) with no investigation on pricing behaviour or cost of financial intermediation. A few others investigated the effects of factors such as credit risk (Kargi, 2011; Kolapo, Ayeni, & Oke, 2012) and capital adequacy (Olalekan & Adeyinka, 2013) on bank profit. Notwithstanding the dearth of studies on bank price behaviour in Nigeria, two

closely related studies are Olokoyo (2011) and Olusanya, Oyebo, and Ohadebere (2012) who examined the lending behaviour of banks. The main objective of these authors was investigating the determinants of lending volume without providing an insight into the pricing dynamics. Furthermore, both studies used macro-level data which do not account for firm-level specifics. The non-inclusion of pricing dynamics and use of macro-level data do not adequately capture the social cost of financial intermediation as observed by Aydemir and Guloglu (2017); Gyeke-Dako et al. (2018). Thus, problems relating to information asymmetry, bank efficiency, inadequate capital, liquidity etc. are not properly addressed in extant literature. Consequently, this paper investigates the determinants of banks' price behaviour in Nigeria using bank-level data while the accompanying research question is: what are the determinants of banks' price behaviour in Nigeria given the inadequacies of previous studies? Thus, this paper contributes to literature by investigating the factors determining Nigerian commercial banks' price behaviour with specific focus on net interest margin because it reflects cost of financial intermediation and pure operational bank efficiencies. It also accounts for firm-level specifics by using individual banks' data for the investigation.

The remainder of this paper is structured as follows. Section 2 discusses literature relevant to the investigation in the study. In Section 3, we describe the research model, variables and data used in our investigation while Section 4 presents result and discussion. Section 5 concludes the paper with relevant research implications.

2.0 Literature Review

The dealership banking model of Ho and Saunders (1981) recognises the different factors that affects price behaviour of banks thus forming the underlying theory of bank price behaviour and its determinants. The model elucidates how the financial intermediation function of banks' lending from surplus economic units to deficit ones in an economy transfer resources between the units in ways that benefits both parties. Consequently, banks have to structure interest income and payments to benefit the lender and the borrower. However, in the performance of this function, asymmetric information, transaction costs and other issues not recognised by the dealership model are factors banks have to contend with. Identifying this, a number of studies extends the model by introducing some other variables such as capital (Zarruk, 1989), size (Wong, 1997), operating costs and risks (Maudos & De Guevara, 2004) into the study of bank price behaviour.

Findings from previous literature reveal that net interest margin is used for a number of proxies such as bank pricing behaviour, cost of financial intermediation and profit. Likewise, there are also studies that investigated the determinants of net interest margin with the argument that it reflects the operational efficiency and competitive nature of the bank. This paper specifically uses interest margin as a measure of price banking behaviour while investigating the determinants. As a measure for bank pricing behaviour, Qureshi, Ghafoor, and Khan (2017) in the investigation of Pakistan banks found that in addition to bank concentration, size, liquidity, bank overhead, state of the economy, interest rate and mergers and acquisitions are significant predictors of bank pricing behaviour (net interest margin). Likewise, Perera, Skully and Nguyen (2011) examined the effect of market concentration and other variables on pricing behaviour in Sri Lanka. Variables in the study found to significantly affect net interest margin include market share, bank capital, operational cost, ownership structure, gross domestic product, stock market capitalization and money market rate. Carbó, Humphrey, Maudos, and Molyneux (2009) examining a cross-country sample of banks in 14 European countries found that cost efficiency, gross domestic product, inflation

and fee income were responsible for variations in pricing power of the banks in the study. In the context of financial intermediation cost, Gyeke-Dako et al. (2018) using data from 260 banks across 29 African countries showed that financial development, diversification, size, competition, liquidity, credit quality, inflation, institutional quality and gross domestic product significantly affect cost of financial intermediation.

In the context of determinants, extant studies reveal that factors affecting bank pricing behaviour are similar with the determinants of net interest margins. For instance, in a panel study of 230 banks in four South Asian countries, Islam and Nishiyama (2016) showed that liquidity, capital, monetary policy and operating costs exert positive effects on net interest margin while size, market power and economic growth affects net interest margin negatively. In the Caucasus and Central Asian region, Almarzoqi and Naceur (2015) presented findings that indicated the economic significance of operating costs, credit and liquidity risk, bank size, bank diversification and competition in determining net interest margins of banks. The sample consisted of panel data obtained from 110 banks in six countries for the period 1998 to 2013 and analysed with a dynamic model. Similarly, Ahmad and Matemilola (2013) using panel regression for a sample of 142 banks in four East Asian countries showed that capital adequacy, management efficiency, liquidity and size were the predictors of net interest margins. Ahokposi (2013) also presented comparable findings in results obtained from a sample of 456 banks in 41 Sub-Saharan African countries. However, the economic significance and effect of the variables varied from country to country in each of the four preceding cross-country studies. The variations in the effects arise from differences in financial, institutional, operational and regulatory environments existing in individual countries. thus, providing support for single country studies. Variations in cross-country studies makes country comparison difficult necessitating the need to account for single country investigations where the environment is homogenous.

Overcoming the heterogenous nature of cross-country studies, single country studies such as Barik and Raje (2019) investigated the effect of bank-specific and macroeconomic variables on net interest margin in 42 Indian banks for the period 2011- 2017 using a dynamic regression model on quarterly data. The study found that capital adequacy, liquidity, operating cost, size, monetary policy and economic growth are important predictors of net interest margin. All variables had positive effects on net interest margin. Specifically, for 15 Indian public sector banks, Wani, Haque, and Raina (2019) found that liquidity, bank capital, economic growth and inflation affected net interest margin positively while credit quality had a negative effect indicating the economic significance of these variables in India. In a sample of 12 publicly listed Turkish banks, Işık and Belke (2017) showed that while size and management efficiency had inverse effects on net interest margin, variables such operating cost, credit risk and interest payments had positive effects. Macroeconomic factors were found not to be determinants of net interest margin. For a sample of 20 Ghanaian banks for the period 1997 – 2011, Amuakwa-Mensah and Marbuah (2015) showed that bank capital, credit risk, operational costs and inflation were positively related with net interest margin while gross domestic product had a negative relationship indicating their importance as predictors of net interest margin.

From the foregoing review, this study attempts to fill the gap in literature for Nigerian commercial banks by providing an insight into bank price behaviour in view of the differences / inconclusiveness of various studies reviewed.

3.0 The Research Model, Variables and Data

We investigate bank price behaviour (using net interest margin as a proxy) and its determinants in Nigerian commercial banks following Wani et al. (2019) with the model specified in Eq. (1):

$$\text{Net Interest Margin}_{it} = \beta_1 \text{Size}_{it} + \beta_2 \text{Capital Adequacy}_{it} + \beta_3 \text{Bank Liquidity}_{it} + \beta_4 \text{Management Efficiency}_{it} + \beta_5 \text{Credit Quality}_{it} + \beta_6 \text{Gross Domestic Product}_{it} + \beta_7 \text{Inflation}_{it} + \varepsilon_{it} \text{-----}(1)$$

where: β_1 - β_7 = coefficients to be estimated, i,t =bank i at time, t , ε = random variable. All other variables and the expected theoretical relationship are as described in Table 1.

The variables in Eq. (1) consists of bank-specific and macroeconomic variables that have been established in literature to affect bank price behaviour. The dependent variable i.e. net interest margin is used to reflect cost of financial intermediation in an economy, operational efficiency and pricing power of banks (Barik & Raje, 2019). Bank intermediation efficiencies are better measured using ex-post spreads (the difference between interest income and interest expense) because it accounts for loan defaults due to high-yield and risky asset (Ahmad & Matemilola, 2013; Demirgüç-Kunt & Huizinga, 2000). In this study, we measure net interest margin as the difference between interest income and interest expense divided by total assets. Bank size which is calculated as the natural logarithm of bank total assets is an indicator of banks' diseconomies / economies of scale. Size also reflects the level of asymmetric information of the bank. The larger the bank, the more problems relating to asymmetric information encountered (Wong, 1997). The dealership theory predicts a positive relationship between interest margins and size because larger operations are expected to absorb potential losses from increased credit and market risks (Chronopoulos, Liu, McMillan, & Wilson, 2015). However, as argued by Fungáčová and Poghosyan (2011), banks that grant more loans would take advantage of their size and have lower margins due to scale efficiencies suggesting a negative relationship. Thus, the expected relationship could either be positive or negative. Capital adequacy which is calculated as the ratio of equity to total assets, is an indicator of how much capital a bank has to cushion unforeseen shocks that may destabilise the bank and a bank's risk aversion (Dietrich & Wanzenried, 2014). On one hand, banks with low capital ratio taking on riskier assets would compensate for the increased risk by charging higher margins thus, implying a positive effect on net interest margin (Kumari, 2014; Perera et al., 2012). On the other hand, a lower margin is expected where banks with high capital ratios are involved in less risky activities i.e. a negative relationship (Isik & Belke, 2017). The expected theoretical relationship is also ambiguous. Bank liquidity, measured as ratio of liquid assets to total assets, reflects a bank's liquidity risk and solvency. Higher ratios suggest reduced liquidity risk and insolvency but increased opportunity cost of holding liquid assets that may lead to increased margins to compensate for the increased cost. This position implies a positive relationship between liquidity and net interest margin (Isik & Belke, 2017; Islam & Nishiyama, 2016). Management efficiency captures the effect of operational costs on interest margin and is calculated as the ratio of cost to income in this study. Higher operational costs are transferred to customers through increased margins implying a positive coefficient for management efficiency variable (Fungáčová & Poghosyan, 2011; Perera et al., 2012). Credit quality as measured by the ratio of loan loss reserves to gross loan depicts the amount of loan provision not yet written in bank's book and captures the credit risk of the bank. The coefficient for credit quality is expected to be positive because banks would compensate for likely default by charging higher margins (Bektas, 2014).

The state of a country’s economy has also been shown in extant literature to influence banks’ net interest margin (Ahmad & Matemilola, 2013; Etudaiye-Muhtar et al., 2017; Işık & Belke, 2017; Tan, 2012; Wani et al., 2019). Consequently, we include gross domestic product (GDP) measured as year on year growth rate of real GDP and inflation calculated as annual growth of consumer price index are included in our investigation. Gross domestic product captures overall economic activity and business cycle fluctuations in an economy. A booming economy enhances business operations leading to improved performance and lowering of default rates thus a lower interest margin charged by banks. Nonetheless, a positive coefficient is expected through market power when increased credit requests leads to banks increasing interest rates to maintain the deposit spread (Işık & Belke, 2017; Tan, 2012). In developing economies with higher inflation rates, inflation leads to higher net interest margins because of the existence of information asymmetries resulting in higher inflation-related costs (Boyd, Levine, & Smith, 2001). In such economies, banks attempt to compensate for increased costs by charging higher margins (Wani et al., 2019).

Table 1: Variable description and sources

S/N	Variable	Description	Source	Expected Relationship
1	Net Interest Margin	Difference between interest income and interest expense over total assets (%)	Published Annual Bank reports	
2	Size	Natural logarithm of bank total assets	Published Annual Bank reports	+ / -
3	Capital Adequacy	Ratio of equity to total assets (%)	Published Annual Bank reports	+ / -
4	Bank Liquidity	Ratio of liquid assets to total assets (%)	Published Annual Bank reports	+
5	Management Efficiency	Operational cost to income ratio (%)	Published Annual Bank reports	+
6	Credit Quality	Ratio of loan loss reserves to gross loan (%)	Published Annual Bank reports	+
7	Gross Domestic Product	Year on year growth rate of real GDP (%)	World Bank Development Indicators Database.	+ / -
8	Inflation	Annual growth of consumer price index (%)	World Bank Development Indicators Database.	+

Source: Authors’ review of literature

We use panel data which consists of cross-sectional and time series data in this study because it provides insight about objects over a period of time (Baltagi, 2008; Gujarati & Porter, 2009). The advantages of using panel as shown in literature include accounting for omitted variable bias, provision of more observation points with diverse individual cross section units and dealing with collinearity between the variables (Baltagi, 2008). Bank-specific data is obtained from annual published reports of 15 commercial banks listed on the Nigerian Stock

Exchange and whose data are available.⁵ The data period starts in 2005 and coincides with the post-consolidation reforms. The ending period, 2017, is guided by data availability. Macroeconomic data is obtained from World Bank Development Indicators Database (WDI) for the same period.

To determine the better estimation technique to use between pooled ordinary least squares (POLS) or generalised least square (GLS) regression to analyse Eq. (1), we run the Breusch-Pagan – Lagrange Multiplier (BP-LM) test for heteroscedasticity with the null hypothesis of homoskedasticity of errors in regression. If the test result is significant, a Hausman Test would decide the choice between fixed effects or random effects regression.

4.0 Results and Discussion

Table 2 presents descriptive statistics of variables described in Table 1. The mean of net interest margin (5.96) when compared with other developing countries such as India (3.47), Tunisia (3.28), Turkey (3.86) and Sri Lanka (3.67) is higher and could be interpreted as higher financial intermediation costs for Nigerian banks. Nonetheless, when compared to earlier studies such as Buchs & Matisen (2005), interest margin is observed to be lower than Ghana’s (7.5) implying lower costs for Nigerian Banks. Bank liquidity is most volatile at 25.01 and may be attributed to the volatile nature of bank liquid assets while the least as seen in credit quality (0.127) could be due to management’s effort at reducing credit risk.

Table 2: Descriptive Statistics

Variable	Mean (%)	Standard Deviation (%)	Minimum (%)	Maximum (%)
Net Interest Margin	5.960	5.785	-0.079	59.208
Size	17.054	3.101	11.232	21.976
Capital Adequacy	15.858	10.515	2.5	97
Bank Liquidity	24.662	25.006	1.634	96.448
Management Efficiency	62.333	15.241	14.1	92
Credit Quality	0.071	0.127	-0.059	1.246
Gross Domestic Product	4.845	2.789	-1.617	8.211
Inflation	11.145	3.186	5.382	17.863

Source: bank-level and country level data as outlined in the data section

We present results of the correlation analysis and variance inflation factor (VIF) to check for the presence of multicollinearity in Table 3. The results show low levels of collinearity among the independent variables with all values below 0.7. According to Kennedy (2008), correlation coefficients greater than 0.7 would indicate multicollinearity issues. The low collinearity is further strengthened by the VIF values which are all below 5 implying moderately correlated variables (Choi, 2007; Madden, 2008).

Table 3: Correlation Matrix

Variables	1	2	3	4	5	6	7	8	VIF
1 Net Interest Margin	1								
2 Size	-0.152 ^b	1							1.08
3 Capital Adequacy	-0.067	0.053	1						1.08
4 Bank Liquidity	0.946 ^c	-0.108	-0.059	1					1.05
5 Management	0.053	0.257 ^c	-0.204 ^c	0.046	1				1.09

⁵ See Appendix 1 for the list of banks in the study.

	Efficiency								
6	Credit Quality	0.283 ^c	0.088 ^c	-0.079	0.224 ^b	0.065	1		1.16
7	Gross Domestic Product	0.174 ^b	-0.050	-0.082	-0.110	0.132	-0.110	1	1.33
8	Inflation	0.167	-0.011	0.106	0.118	-0.004	0.636	0.576 ^c	1 1.36

Notes: Variables are as defined in Table 1. ^a, ^b and ^c refer to 10%, 5% and 1% levels of significance respectively. Dependent variable is net interest margin.

The significance of the BP-LM test for heteroscedasticity in Table 4 indicates that the GLS regression is more appropriate than the POLS regression. Consequently, we proceed to run a generalised least squares regression analysis using the fixed effects (FE) and random effects (RE) method.

Table 4: BP-LM Test Result

χ^2	p-value	Hypothesis
16.31	0.000	Reject Ho

Decision: Pooled OLS is not an appropriate method to use for the analysis due to the presence of a significant difference across units i.e. the existence of a panel effect.

The choice of whether to report outcomes of either the FE or RE method is based on the result obtained in Table 5 i.e. the Hausman Test which shows that random effects is the appropriate method due to the non-significance of chi-square statistics (p=0.9957).

Table 5: Hausman Test

χ^2	p-value	Hypothesis
1.29	0.9957	Do not reject Ho

Decision: Random effects regression is appropriate i.e. difference in coefficients is not systematic.

Test: Ho: difference in coefficients not systematic

Table 6 reports results from RE regression and show that the coefficients of size, bank liquidity, credit quality and inflation are positive and significant implying that they are important determinants of net interest margins in Nigerian commercial banks. Capital adequacy, management efficiency and GDP coefficients are not significant although they have the expected signs. The F-statistics that indicates the overall significance of the regression equation is observed to be statistically significant at 1% level of significance while 26.35% of the variance in net interest margin is explained by the independent variables. Although, the R² appears to be low, it does not pose a problem as there is no evidence of multicollinearity and overall model is statistically significant.

Table 6: Random Effects Regression

Independent Variable	Coefficient	Robust Standard Error	P-Value
Size	0.871 ^b	0.412	0.034
Capital Adequacy	-0.367	0.031	0.231
Bank Liquidity	0.256 ^c	0.047	0.000
Management Efficiency	0.065	0.104	0.531
Credit Quality	0.095 ^a	0.049	0.054

Gross Domestic Product	0.013	0.085	0.876
Inflation	0.436 ^b	0.184	0.017
F-statistics	45.82 ^c		0.000
R ²	0.2635		
No of Observations	165		
N	15		

Notes: Variables are as defined in Table 1. ^a, ^b and ^c refer to 10%, 5% and 1% levels of significance respectively. Dependent variable is net interest margin.

The coefficient of size is positive and significant at 5% level of significance indicating that net interest margin increases by 0.871 units with every unit increase in size. This supports the dealership theory prediction of a positive relationship between interest margins and size suggesting that commercial banks in Nigeria with larger operations absorbs potential losses from increased credit and market risks due to information asymmetries. The banks are able to do this by increasing interest margins to mitigate effects of the increased risks and is consistent with the studies of Almarzoqi and Naceur (2015); Chronopoulos et al. (2015). Still on the sign and significance of the size variable, it may be suggested that larger banks in the study are faced with more problems associated with information asymmetry as argued by Wong (1997).

In terms of liquidity and credit risks, commercial banks in this study are observed to compensate for the increase in these risks by charging higher net interest margins as seen in the positive and significant coefficients (0.256; $p < 0.01$, 0.095; $p < 0.1$ for liquidity and credit respectively). These findings are in line with the arguments of previous literature that financial costs of intermediation are passed on to economic agents through higher margins. Examples of these literature include Amuakwa-Mensah and Marbuah (2015); Islam and Nishiyama (2016); Ahmad and Matemilola (2013) for liquidity and Gyeke-Dako et al. (2018); Barik and Raje (2019); Isik and Belke (2017) for credit quality.

For macroeconomic variables, findings for inflation (0.436; $p < 0.05$) suggest that Nigerian banks in this study anticipate and incorporate increased costs due to inflation in their pricing which is consistent with recent findings from Gyeke-Dako et al. (2018); Wani et al. (2019). Furthermore, the positive effect of inflation buttresses the arguments of Boyd et al. (2001) and Wani et al. (2001) of higher inflation-related costs due to increased information asymmetries.

5.0 Conclusion and Policy Implications

This study investigates commercial banks pricing behaviour in Nigeria using a sample of 15 publicly listed banks over a 12-year period (2005-2017). Annual panel data is analysed using the random effects regression method. Results obtained showed that bank size, bank liquidity, bank credit quality and inflation are important variables that positively affect price behaviour of the sampled banks. The findings are in support of the dealership model that banks' financial intermediation function leads to increased costs which are thereafter passed to economics agents through higher interest margins. Nonetheless, we do not find any support for capital adequacy, bank liquidity, management efficiency and gross domestic product as predictors of price bank behaviour in Nigerian commercial banks.

Against the background of these findings, bank management should endeavour to reduce social costs of financial intermediation portrayed through increase in net interest margins. These may be achieved in a number of ways. One is to use bank size to build on economies of scale to reduce information asymmetry. Two, reducing and mitigating the level of liquidity and credit risks would lower net interest margins. Three, expected increase in inflationary

costs should be built into bank pricing. Implementing these recommendations would lower net interest margins and encourage savings and investments by economic units which would in turn, promote economic growth as postulated by finance-growth proponents. At the same time, banks would be seen as being socially responsible to the society. In terms of macroeconomic policy implications, regulatory authorities should put in place policies that target reduction in inflation rates so that increased margins due to inflation are not passed to economic units at high prices.

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Appendix 1

S/N	Bank
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1	Access Bank Plc
2	Diamond Bank Plc
3	Ecobank Plc
4	Fidelity Bank Plc
5	First Bank Plc
6	First City Monument Bank
7	GT Bank Plc
8	Skye Bank Plc
9	Stanbic IBTC
10	Sterling Bank Plc
11	Union Bank Plc
12	United Bank for Africa Plc
13	Unity Bank Plc
14	Wema Bank Plc
15	Zenith Bank Plc