

Determinants of Capital Adequacy of Nigerian Banks

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Abstract

A reliable banking system in developing economies like Nigeria is vital for economic progress as it facilitates the flow of funds to productive investment sectors. The capital adequacy requirement of banks is a crucial feature of the stability of the banks globally. Because of its importance, we have examined the antecedents to capital adequacy. We have used the data set of ten leading banks of Nigeria from 2007 to 2017. Our results indicate that ROA and loan to total assets are significantly associated with capital adequacy. However, we found that nonperforming loans and size are negatively associated with the capital adequacy. Our results do not support the association between macroeconomics variables and capital adequacy. Therefore, we recommend that all banking entities should reserve sufficient cash and cash equivalents as a percentage of deposits and apply aggressive risk management practices to reduce the magnitude of nonperforming loans. This study was restricted to one country. Future studies can be carried out in other countries. A comparative data set of more than one country may bring further insight into the phenomenon

Keywords: *Capital adequacy ratio, banks-specific determinants, macroeconomic determinants, Nigeria.*

Introduction

The sustainable economic growth of a country significantly depends on a well-structured banking system (El-Meneyari, 2019). A stable banking system can endure adverse shocks and achieve sustainable growth (Aburime, 2009). On the contrary, the failure of banks adversely affects the confidence of the general public and the structure of the financial system (Kolapo et al., 2012). The distress of prominent financial institutions like Washington Mutual,

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a large commercial bank in the US, has undermined the effectiveness of capital adequacy and regulatory requirements (Noreen, Alamdar & Tariq, 2016). In an attempt to address this weakness, supervisory bodies like the Bank for International Settlements (BIS) have increased their focus on capital adequacy requirements. Basel III accord has also suggested enhancing the capital adequacy ratio, which banks across the world have implemented.

Maintaining a higher capital adequacy ratio enable banks to have sufficient liquid assets to absorb unwarranted losses and to protect public funds. Many studies have acknowledged that sufficient capital adequacy is necessary for a stable banking system (Jasrotia et al., 2020). Aburime (2009) also suggests that capital adequacy gives leverage to the banks to deal with the uncertain and volatile environment (Kolapo et al., 2012; Aburime, 2009). A stable economy and an efficient financial system support each other. It means that they both have a bi-directional relationship (Hadjixenophontos & Christodoulou-Volos, 2018). Therefore, regulatory bodies should judiciously monitor the banking sector for its performance and reducing risk. The failure of large banks may adversely affect the entire economy and trigger a financial crisis (Oloo, 2011).

In general, the capital adequacy requirements of banks depend on both the Basel Accord and the banking statutory body of a country. In Nigeria, the banking statutory body (i.e., The Central Bank of Nigeria) regulates and monitors all banking operations. Like other central banks across the world, it has also directed the banks to adhere to the statutory capital requirements. Enforcing the capital adequacy requirements in Nigeria has brought stability to the banking system. For example, bank capital in Nigeria has increased from 2 billion nairas to 25 billion nairas. Small capital banks have merged with large capital banks. Banks that were not able to comply with the capital adequacy requirements discontinued their operations. Asikhia and Sokefun (2013) argued that capital requirements had forced banks to increase their capital, which also brought financial stability. Jasrotia et al., (2020) suggest that due to the capital adequacy requirements, customers' confidence in the banking system has increased significantly. Moreover, the deposit base of the banks has increased, which enables banks to withstand economic shocks.

There are numerous studies on capital adequacy in Nigeria and other countries. However, they had primarily focused on the "macroeconomic determinants of capital adequacy" (Williams, 2011). Moreover, other studies have only focused on "certain banks' specific proxies as determinants of capital adequacy" (Ini & Eze, 2018; Ogboi & Unuafé, 2013). There is also a shred of empirical evidence on the capital adequacy and profitability relationship (Ikue-John & Nkoro, 2019). However, previous studies on "both bank-specific and macroeconomic determinants" have not used a "unique combination of proxies," which we have used in this research. Therefore, the study investigates how "bank-specific and macroeconomic factors

affect the capital adequacy ratio" of Nigerian banks.

Literature Review

Capital structure not only has an impact on the operations of a bank, but it also affects the economy of a country. Although several theories explain how banks should structure their capital base, most of them have not adequately explained how banks should structure their capital base (Schepens, 2016). For example, Miller and Modigliani's theory indicates that financing and dividends decisions do not affect firm value under perfect conditions (Schepens, 2016). Many researchers have criticized this theory as its primary focus is on explaining the linkage between capital structure and firms' market value. The theory, according to many researchers, has not adequately addressed the issues related to the adequate capital structure (Gornall & Strebulaev, 2018; Calem & Rob, 1996; Masood & Ansari, 2016).

Most of the capital structure theories have emerged from the Modigliani-Miller irrelevance theorem. The theory assumes that firms' financing decisions have no relevance to their capital value. Thus, it is inferred that a firm's value depends on the income generated through its assets. It has no relation to how the firms finance their assets. This theory is relevant in "perfect economies" and not applicable in "imperfect economies" like Nigeria. As a result, several new theories have emerged that attempt to address the inherent weakness of the Modigliani-Miller theory. A bank for all practical purposes is a specialized firm that issues advances and receives deposits. Thus, capital structure theories apply to banks as well (Widyastuti, Komara & Layyinaturrobanayah, 2019).

The buffer theory of capital adequacy highlights the importance of having capital above the stipulated requirements to reduce risk. The capital structure of most banks in Nigeria is over and above the specified requirements. However, the banks who breach the minimum capital requirement are punished severely, which is inclusive of monetary penalties and revocation of operating licenses (Ikpefan, 2012). Ikpefan (2012) suggests that many banks in a highly volatile economy maintain a buffer capital. This buffer capital allows the banks to meet unwarranted short term obligations and meet the statutory capital requirements. Many poorly managed banks invest in ventures that are contrary to prudential regulations. These ventures in the short term might enhance the capital structure, but in the long run, it is disastrous for the bank and general public.

The moral hazard theory of capital adequacy implies that sometimes decision-makers prefer to take sub-optimal decisions in the short term, especially when such choices lead to private benefits (Noreen, Alamdar & Tariq, 2016). This situation is common in countries where accountability is low. The moral hazard theory of capital adequacy suggests that

bank managers' opportunistic behavior is likely to affect depositors and shareholders negatively. This situation arises when there is information asymmetry, and bank managers possess information which other parties are not privy to. Undercapitalized banks that select risky asset portfolios against the deposit insurance system is termed resurrection by gambling (Ahmad & Albaity, 2019). This theory suits the Nigerian banking environment that is characterized by market imperfections like information asymmetry, fraudulent practices, and weak enforcement of banking regulations (Abba et al., 2018; Ogere et al., 2013).

Thoa and Anh (2017), in a study on the banking sector of Vietnam, collected the data from 29 banks from 2011 to 2015. The study found that the net interest margin had a significant favorable influence on capital adequacy. On the other hand, liquidity, loan loss reserve, and loan to total assets had a significant negative impact on capital adequacy. The study did not find a significant effect of size and leverage on capital adequacy ratio.

Hewaidy and Alyousef (2018) analyzed the effect of bank-specific and macroeconomic factors that influence capital adequacy of Kuwaiti banks from 2009 to 2016. The results show a significant indirect relationship between capital adequacy and bank size, assets quality, and bank liquidity. Moreover, management quality was positively associated with capital adequacy, while bank type did not have a significant relationship with capital adequacy. Further, the study only found vital indirect affect inflation on capital adequacy. Similarly, Alajmi and Alqasem (2015) found a meaningful indirect relationship between bank size and capital adequacy ratio. Profitability and liquidity were found to be positively and significantly related to capital adequacy. However, the study did not find any significant relationship between dividend payout, nonperforming loans to total loans, return on equity, and capital adequacy ratio.

Aspal and Nazneen (2014) examined the capital adequacy of 20 Indian private banks from 2008-2012. The results from the regression analysis indicate that loans, management efficiency, liquidity, and sensitivity have a significant favorable influence on capital adequacy while asset quality did not have a significant negative impact on capital adequacy. Similarly, Kipruto, Wepukhulu, and Osodo (2017) investigate whether capital adequacy influences the financial performance of second-tier commercial banks in Kenya. They found that capital adequacy has a significant positive effect on the financial performance of second-tier commercial banks in Kenya.

In the context of Nigeria, Harley et al., (2018) analyzed the determinants of capital adequacy of 8 banks from 2010 to 2016. The results reveal that the net interest margin, return on assets, inflation, exchange rate, and size have a statistically significant adverse effect on the capital adequacy of Nigerian banks. The study also found a significant positive

impact of deposits on capital adequacy. On the contrary, Olarewaju and Akande (2016) found a direct and positive relationship between ROA, bank size, and CAR. They also document an inverse and significant relationship of ROA, credit risk, deposit structure, and liquidity on CAR. Likewise, Agbeja, Adelakun, and Olufemi (2015) found evidence to support a significant positive effect of capital adequacy on the profitability of selected commercial banks in Nigeria.

Methodology

Data

The study uses data of ten large conventional banks operating in Nigeria over the period 2007-2017. The banks include GT Bank Plc, UBA Plc, Access Bank Plc, Zenith Bank Plc, First Bank Plc, Sterling Bank Plc, Diamond Bank Plc, Fidelity Bank Plc, Wema Bank Plc, and Unity Bank Plc. The data for the conventional banks were collected from their annual reports. Moreover, the macroeconomic indicators data were retrieved from the Central Bank of Nigeria statistical bulletin for the same period. For empirical analysis, the study has applied a panel regression analysis on the sample data.

Research Variables

Capital Adequacy Ratio

In practice, banks use financing from three primary sources in their operations (i.e., retained earnings, debt and equity capital). The importance of capital adequacy differs among the stakeholders in financial markets, such as financial experts, regulators, and bankers. On one side, regulators prefer a higher level of equity capital for protecting depositors' interests and enhancing financial market stability by increasing bank liquidity. On the other hand, bankers prefer higher deposits, which allow higher spread and bank profitability (Koch and McDonald, 2010). Capital adequacy, therefore, remains one of the measures of the banks' financial strength measured in terms of its primary capital to risk-exposed loans. Thus, the minimum capital requirement requires banks to have a minimum amount of funds, which is sufficient to cover a part of their short term obligations (Mendoza & Rivera, 2017). The study measured the capital adequacy ratio (CAR) as the ratio of equity capital to the total asset. CAR is the dependent variable in the statistical models.

Profitability

Profitability is a critical success factor for banks. Profitable banks can maximize shareholder wealth, access capital from depositors, allocate resources to productive investment opportunities, and purchase assets. Besides, profitable banks can manage their obligations and withstand competitive pressures. Bank profitability also assists banks in

absorbing shocks due to volatile earnings (Ini & Eze, 2018). It is argued that banks' survival and ability to attract deposits depend on their profitability (Ini & Eze, 2018). Therefore, successful banking operations and a going concern status require banks to have adequate profitability. Previous researchers have used ROA as a measure of profitability (Kajola, Olabisi, Babatolu & Agbatogun, 2018; Kajola, Sanyaolu, Alao & Ojurongbe, 2019). The study used "return on assets as a measure of profitability."

Liquidity

A bank's liquidity position should be strong enough to meet its short term obligations without taking advances. The going concern status of a bank cannot be guaranteed without proper management of liquidity. Efficient financial intermediation also requires banks to manage their liquid resources without adversely affecting profitability. Adequate liquidity is negatively associated with liquidity risk, which in turn leads to a lower liquidity premium (Angbazo, 1997). The liquidity ratio used in the study was measured as the sum of cash and treasury bills as a proportion of total deposits.

Nonperforming Loans

Banks generate a large proportion of their income by acting as financial intermediaries. Financial intermediation involves taking savings/deposits and channeling them to productive investment opportunities. As financial intermediaries, banks must manage credit risk effectively by recovering loans and interest payments on a timely basis. Nonperforming loans are the advances made by banks that are doubtful and have a limited possibility of being retrieved. Kargi (2014) suggests that nonperforming loans are usually a consequence of weak profitability of projects financed with the loan capital. Nonperforming loans were measured as the proportion of unrecoverable loans to total loans.

Loan to Total Assets

Loans or advances represent the primary income-generating assets of banks. The ratio of loans to total assets should be within the statutory requirements. A bank whose loans to total assets ratio are high is more vulnerable to default. Thus, judicious portfolio management in a bank requires maintaining this ratio within the prescribed limits. Maintaining this ratio will not only have a positive effect on the financial health of the banks, but it will also help them to meet both the short term and long term obligations timely (Islam, 2018). McClelland (2019) suggests that banks should monitor the infected portfolio judiciously, and if there is a genuine need, the banks should reschedule and restructure them. This strategy will be beneficial for banks and customers. Banks should use liquidation as a last resort as it is neither useful to the banks nor to the customers (Masood & Ansari, 2016).

Bank Size

The study has measured the bank size as the natural logarithm of total assets. According to Raoudha (2016), bank size has a significant impact on the growth opportunities and capital adequacy ratio. Jorgenson, Gollop, and Fraumeni (2016) argue that the size of a bank has a negative association with the risk-bearing behavior of commercial banks. Bank size and capital adequacy ratio are positively associated, which suggest that the large banks are well equipped to meet their financial obligations (Isik, Kosaroglu & Demirci, 2018). Thus, central banks, while developing statutory requirements, should also focus on the size of a bank and differentiated capital adequacy ratio (Ali, Butt & Butt, 2019).

Economic Growth

Most economists believe that economic growth promotes the capital adequacy of the banking sector in a country. Many studies have documented that economic growth stimulates financial development. Financial development is a process that improves the quality, quantity, and efficiency of financial intermediaries. (Panayotou, 2016). McClelland (2019) argues that the relationship between economic growth and the banking sector is bi-directional. That is, commercial activities in a country make the banking sector more stable; conversely, a well-structured banking system generates economic activities. The study has measured economic growth in terms of gross domestic product. The authors have proposed that the capital adequacy ratio of a bank will be high during a period of economic growth and vice versa.

Interest Rate

Interest is the profit margin that banks generate from loans and advances to customers. The spread is the difference between the interest rate charged on advances/loans and the interest rate paid to depositors. In Nigeria, the interest rate is determined by its central bank. The interest rate and spread directly influence the profitability of banks and also their capital adequacy ratios. The study has used the annual interest rate as an independent variable.

Inflation Rate

Inflation measures the increase in the general prices of goods and services. During times of high inflation, an economy may experience a high demand for bank financing. The study has used the annual inflation rate published by the Nigerian government as an independent variable.

Variables and Measurement

The summary of variables and their measurement is provided below.

1. The dependent variable for the study is Capital Adequacy Ratio (CAR), and it was

measured as "Equity Capital/Total Assets."

2. The independent variables used in the study were as follows:

- a. CAR_{t-1}, i.e., one period lagged value of CAR.
- b. ROA measured as the Net profit after tax/total assets.
- c. Liquidity measured as Cash+ treasury bills /total deposits.
- d. Nonperforming loans measured as Total loans/total assets.
- e. Loan to total assets measured as Total loans/total Assets.
- f. Size measured as the natural logarithm of total assets.
- g. Economic growth measured through $(GDP_t - GDP_{t-1})/GDP_{t-1}$.
- h. Annual inflation rate reported by the government.
- i. Annual interest rate reported by the government.

Model

The following model was used to examine the effect of bank-specific factors and macroeconomic determinants on the capital adequacy ratio.

$$CAR_{it} = \beta_0 + \beta_1 CAR_{i,t-1} + \beta_2 ROA_{it} + \beta_3 LIQR_{it} + \beta_4 LOTA_{it} + \beta_5 NPLR_{it} + \beta_6 SZ_{it} + \beta_7 GGD P_t + \beta_8 INT_t + \beta_9 INFR_t + e_{it}$$

Where,

CAR_{it} = "Capital Adequacy ratio of bank" i in period t

$CAR_{i,t-1}$ = "The lagged capital adequacy ratio of bank" i in period t-1.

ROA_{it} = "Return on asset of the bank" i in period t

$LIQR_{it}$ = "Liquidity Ratio of the bank" i in period t

$LOTA_{it}$ = "Loan to total assets of the bank" i in period t

$NPLR_{it}$ = "The nonperforming loans ratio of the bank" i in period t

SZ_{it} = "Size of bank" i in period t

$GGDP_t$ = "Growth in gross domestic product" at time t

INF_t = "Annual inflation rate" at time t

INT_t = "Annual interest rate" at time t

e_{it} = "Error term"

Results

Descriptive statistics

The capital adequacy ratio was as low as -40.2% and as high as 80.4%. Its mean value was 14.3%. ROA values were as low as -10.5% and as high as 12%. Its average value was 10%. The minimum liquidity value was 1% and a maximum of 62%. Its average value was 21%. Loan to total asset values ranged from 3% to 453.8%, and its mean value was 51.4%.

Moreover, bank size values ranged from 17.876 to 22.416, and its mean value was 20.74. The average interest rate was 16.5%. It ranged from 14% to 18.4%. The inflation rate ranged from 8% to 16.5%. Its average value was 11.9%. The mean value of economic growth is 13.3% and ranges from -5.3% to 83%. Finally, the average value of capital adequacy was 14.3%, which complies with the BASEL guidelines. We have presented the summary of descriptive statistics in Table 1.

Table 1: Descriptive Statistics

	CAR	NPLR	ROA	LIQR	LOTA	SZ	INT	INFR	GGDP
Mean	0.143	0.099	0.010	0.211	0.516	20.74	0.165	0.119	0.133
Median	0.144	0.050	0.014	0.191	0.495	20.74	0.165	0.119	0.133
Maximum	0.804	0.970	0.120	0.622	4.538	22.416	0.184	0.165	0.830
Minimum	-0.402	0.023	-0.105	0.012	0.032	17.876	0.140	0.080	-0.053
Std. Dev	1661.506	1777.069	194.995	9.024	24790.3	4.407	6.021	5.558	198.97
Observations	100	100	100	100	100	100	100	100	100

Pairwise Correlations

The correlations between the research variables are provided in Table 2. The correlation coefficients between most variables lie between the range of -0.3 to 0.70. The relatively low correlation values imply that there is unlikely to be a multicollinearity issue.

Table 2: Correlation Matrix

	ROA	LIQR	CAR	NPLR	LOTA	SZ	INT	INFR	GGDP
ROA	1								
LIQR	.253	1							
CAR	.660	.123	1						
NPLR	-.132	-.370	-.223	1					
LOTA	.416	-.070	.630	-.085	1				
SZ	.253	.645	.077	-.3 19	-.241	1			
INT	.064	-.100	.071	.196	.045	-.145	1		
INFR	.035	-.104	.049	.202	.048	-.004	-.262	1	
GGDP	.013	.094	.001	-.055	0.025	.144	-.680	.488	1

Table 2 shows that the correlation between profitability and capital adequacy was 0.660986 implying that there is a positive association between the variables. Furthermore, nonperforming loans and capital adequacy ratio has a correlation coefficient of -0.223,

which means that an increase in the nonperforming loans is associated with a lower capital adequacy ratio. The correlation value for the total asset ratio and capital is 0.63. Moreover, the correlation between ROA and capital adequacy is 0.077. Likewise, there is a low correlation of 0.071 between the interest rate and capital adequacy, suggesting a weak positive association. The inflation rate has a relationship of 0.0497 with capital adequacy. This ratio means that the inflation rate “has a weak but positive association” with capital adequacy. Moreover, economic growth also has a very weak correlation of 0.001 with capital adequacy.

Panel Regression Results

The panel regression results presented in Table 3 were obtained from estimating the statistical model.

Table 3: Panel Regression Results

	Pooled OLS			Fixed Effects			Random Effects		
	Coeff	t-stat	P	Coeff	t-stat	P	Coeff	t-stat	P
Constant	-0.151	-0.628	0.531	0.868	1.7829	0.079	-0.151	-0.704	0.484
CAR _{t-1}	0.308	5.9271	0.000	0.256	4.808	0.000	0.308	6.643	0.000
ROA	1.301	4.543	0.000	1.491	4.883	0.000	1.301	5.092	0.000
LIQR	0.018	0.310	0.757	-0.020	-0.305	0.761	0.018	0.348	0.729
LOTA	0.128	8.269	0.000	0.117	6.372	0.000	0.126	9.268	0.000
NPLR	-0.055	-1.278	0.205	-0.099	-2.427	0.017	-0.055	-1.433	0.156
SZ	-0.006	-0.709	0.481	-0.042	-2.347	0.021	-0.006	-0.794	0.430
GGDP	0.059	1.492	0.140	0.031	0.874	0.385	0.059	1.672	0.098
INFR	0.160	0.703	0.484	0.130	0.631	0.530	0.160	0.788	0.433
INT	1.644	2.051	0.044	0.283	0.313	0.754	1.644	2.299	0.024
R-squared	0.770			0.802			0.786		
Adj.R-squared	0.743			0.781			0.769		
Prob F-stat	0.000			0.000			0.000		

Panel Regression

The panel regression results in Table 3 indicate that the previous year capital adequacy ratio has a positive and significant influence on the current year capital adequacy ratio of Nigerian banks. Moreover, ROA also has a positive and statistically significant impact on capital adequacy ratio. The positive and significant effect validates the expectation that higher retained earnings due to an increase in profitability will increase the capital adequacy ratio. Retained earnings are a substantial component of equity or bank capital. Hence, an increase in profitability would increase retained earnings and equity capital. However, a

loss would lower retained earnings and shrink the equity capital of a bank, which will also reduce the capital adequacy ratio. The result validates the findings of Ben Moussa (2018), Badalashvili (2016), Alajmi and Alqasem (2015) but is contrary to Harley et al., (2018).

Further, the liquidity ratio has a negative but no significant effect on capital adequacy. The finding is not consistent with earlier studies of (Ahmad & Albaity; 2019; Aspal & Nazneen 2014; Olarewaju & Akande, 2016; Ben-Moussa, 2018; Alajmi & Alqasem 2015, Hewaidy & Alyousef, 2018; Thoa & Anh, 2017). Thus, the results do not support the proposition of Angbazo (1997) that banks with high liquidity will have a higher capital adequacy ratio and a lower liquidity premium.

On the contrary, the loan to total assets ratio has a significant positive effect on the capital adequacy of Nigerian banks. The coefficient of 0.117 implies that a unit increase in LOTA will translate to an almost 12% increase in capital adequacy ratio. Thus, as LOTA increases, the capital adequacy ratio of banks also increases. However, nonperforming loans had a significant negative effect on capital adequacy. The coefficient of -0.099 implies that a unit increase in nonperforming loans will result in an almost 9% reduction in capital adequacy. This result is expected since the nonperforming loan reduces the earnings capability of a bank. It also ultimately reduces equity and capital adequacy ratio. The result is partially consistent with the findings of Shingjergji and Hyseni (2015), Hewaidy and Alyousef (2018), and Aspal and Nazneen (2014).

Bank size also had a significant adverse effect on capital adequacy. This finding is in line with the too-big-to-fail hypothesis. It has been observed that large banks make use of more leverage than equity. The results are similar to those of Gropp and Heider (2010), and Shrieves and Dahl (1992). These studies document that size exerts a significant negative effect on the capital adequacy ratio of banks. Thus, large banks are associated with a low capital ratio. Ahmad and Albaity (2019) argue that size serves as a proxy for a bank's asset diversification capacity and reduces their risk exposure. Therefore, the result supports the finding of Hewaidy and Alyousef (2018). In contrast, numerous studies such as Ahmad and Albaity (2019), Le and Anh (2017), Olarewaju, and Akande (2016) found a significant and positive influence of bank size on capital adequacy ratio. Among the macroeconomic variables, only interest rate had a significant positive effect on the capital adequacy ratio. However, the impact of economic growth and inflation on CAR was insignificant.

The Hausman test results suggest that the fixed effect model was appropriate. The Adjusted R-square values are also reasonably high. This implies that the independent variables explain a significant variation in the dependent variable. The probability of the F-statistics of 0.000 means that the overall model is statistically significant.

Conclusion

The study investigated the effect of bank-specific and macroeconomic determinants of capital adequacy in Nigeria during the period 2007 to 2017. Capital adequacy ratio was the dependent variable, while bank-specific factors and macroeconomic variables were the independent variables. The study found a significant positive influence of lagged capital adequacy ratio, profitability, and loan to the total asset on capital adequacy ratio of Nigerian banks. The results imply that Nigerian banks tend to maintain a reasonable capital adequacy ratio to maintain stability and comply with the requirements of the central bank. Moreover, it was observed that Nigerian banks focus on maintaining profitability and loan to total assets ratio for achieving sustainable performance.

Further, the results indicate a significant but negative influence of nonperforming loans and bank size on capital adequacy ratio. However, there was an insignificant effect of liquidity ratio on capital adequacy. These results imply that the high proportion of nonperforming loans in Nigeria has adversely affected the capital adequacy of banks in the country. Finally, among the macroeconomic variables, the only interest rate had a significant positive effect on the capital adequacy ratio. However, the impact of economic growth and inflation on CAR was not substantial. The study is limited to selected conventional banks in Nigeria. Future studies may analyze the determinants of capital adequacy of Islamic banks and micro-finance institutions.

References

- Abba, G. O., Okwa, E., Soje, E. B., and Aikpitanyi, N. L. (2018). Determinants of capital adequacy ratio of deposit money banks in Nigeria. *Journal of Accounting & Marketing*, 7(2), 1-7.
- Aburime, U. T. (2009). Impact of political affiliation on bank profitability in Nigeria. *African Journal of Accounting, Economics, Finance, and Banking Research*, 4(4), 61-75.
- Agbeja, O., Adelakun, O. J. & Olufemi, F. I. (2015). Capital adequacy ratio and bank profitability in Nigeria: A linear approach. *International Journal of Novel Research in Marketing Management and Economics*, 2(3), 91-99.
- Ahmad, M. and Albaity, M. (2019). The determinants of bank capital for East-Asian countries. *Global Business Review*, 5, 1-13.
- Alajmi, M. and Alqasem, K. (2015). Determinants of capital adequacy ratio in Kuwaiti banks. *Journal of Governance and Regulation*, 4(4), 315-322.
- Ali, R., Butt, Z. Z. & Butt, S. U. (2019). Do Non-Traditional Income, Size, and Growth Affect the Performance of the Banks?. *SEISENSE Journal of Management*, 2(3), 58-66.
- Angbazo, L., (1997). Commercial bank net interest margins, default risk, interest-rate risk, and off-balance sheet banking. *Journal of Banking & Finance*, 21(1), 55-87.
- Asikhia, O. and Sokefun, A. (2013). Capital adequacy and banks' Profitability: Empirical evidence from Nigeria. *American International Journal of Contemporary Research*, 3(10), 87-93.
- Aspal, P. K. & Nazneen, A. (2014). An empirical analysis of capital adequacy in the Indian private sector banks. *American Journal of Research Communication*, 2(11), 28-42.
- Badalashvili, I. (2016). Determinants of capital adequacy ratio in banking sector of Greece. A thesis submitted for the degree of *Master of Science (MSc) in Banking and Finance*, School of Economics, Business Administration & Legal Studies.
- Ben-Moussa, M. (2018). Determinants of bank capital: Case of Tunisia. *Journal of Applied Finance & Banking*, 8(2), 1-15.
- Calem, P. S. & Rob, R. (1996). The impact of capital based regulations on bank risk-taking. A dynamic model. Board of Governors of the Federal Reserve System, Finance and *Economic Discussions Series 96*.{Available}. <https://www.federalreserve.gov/Pubs/FEDES/1996/199612/199612pap.pdf>
- El Menyari, Y. (2019). Financial Development, Foreign Banks, and Economic Growth in Africa. *African Development Review*, 31(2), 190-201.
- Gornall, W. & Strebulaev, I. A. (2018). Financing as a supply chain: The capital structure of banks and borrowers. *Journal of Financial Economics*, 129(3), 510-530.
- Gropp, R. & Heider, F. (2010). The determinants of bank capital structure. *Review of Finance*, 14(4), 587-622.

- Hadjixenophontos, A. & Christodoulou-Volos, C. (2018). Financial crisis and capital adequacy ratio: A case study for Cypriot commercial banks. *Journal of Applied Finance & Banking*, 8(3), 87-109.
- Harley, T. W., Afolabi, T. S. and Adegbola, D. D. (2018). An empirical investigation of the determinants of capital adequacy of financial institutions in Nigeria. *International Review of Social Sciences*, 6(7), 376-386.
- Hewaidy, A. M. and Alyousef, H. Y. (2018). Bank-specific and macroeconomic determinants of capital adequacy ratio: Evidence from Kuwaiti banks. *European Journal of Economics, Finance and Administrative Sciences*, 9(9), 5-20.
- Ikpefan, O. A., (2012). Bank capitalization and performance in Nigerian banking industry (1986-2006): Empirical evidence. *European Journal of Accounting, Auditing, and Finance Research*, 1(4), 12-32.
- Ikue-John, N. & Nkoro, E. (2019). Dynamics of capital adequacy and profitability of internationalized deposit money banks in Nigeria. *Bussecon Review of Finance & Banking*, 1(1), 18-25.
- Ini, S. U. & Eze, O. R. (2018). Effect of capital adequacy requirements on the profitability of commercial banks in Nigeria. *International Research Journal of Finance and Economies*, 16(5), 80-89
- Isik, O., Kosaroglu, Ş. M. & Demirci, A. (2018). The impact of size and growth decisions on Turkish banks' profitability. *International Journal of Economics and Financial Issues*, 8(1), 21-29.
- Islam, F. T. (2018). Evaluating Loan Loss Provisioning for Nonperforming Loans and Its Impact on the Profitability of Commercial Banks in Bangladesh. *Asian Finance & Banking Review*, 2(2), 33-41.
- Jorgenson, D., Gollop, F. M. & Fraumeni, B. (2016). *Productivity and US Economic Growth*. Elsevier.
- Jasrotia, S. S., Mishra, H. G. & Sharma, R. L. (2020). Capital adequacy norms: banks compliance with Basel-III norms. *International Journal of Electronic Banking*, 2(1), 16-37.
- Kajola, S. .U., Olabisi, J., Babatolu and Agbatogun (2018). Determinants of profitability in Nigerian listed deposit money banks. *Journal of Economics and Business Research*, 24(1), 89-108.
- Kajola, S. O., Sanyaolu, W. A., Alao, A. and Ojunrongbe, O. J. (2019). Liquidity and profitability: Evidence from the Nigerian Banking Sector. *Accounting and Taxation Review*, 3(2), 1-12.
- Kargi, H. S. (2014). Credit risk and performance of Nigerian banks. *American Journal of Accounting, Economics, and Finance*, 1(1), 7-14.
- Kipruto, J. J., Wepukhulu, J. M. and Osodo, O. P. (2017). The influence of capital adequacy ratio on the financial performance of second-tier commercial banks in Kenya. *International Journal of Business and Management Review*, 5(10), 13-23.
- Koch, T. W. and Macdonald, S. S., 2010. Bank Management. 7th ed. Mason, Ohio, USA: South-Western CENGAGE Learning.
- Kolapo, T. F., Ayeni, R. K. and Oke, M. O. (2012). Credit risk and commercial banks performance in Nigeria: A panel model approach. *Australian Journal of Business and Management Research*, 2(2), 31-38.
- Le, T. & Anh, T. N. (2017). The Determinants of Banks, Liquidity in Vietnam. *VNU Journal of Science: Policy and Management Studies*, 33(2), 134-145.

- McClelland, D. C. (2019). The achievement motive in economic growth. *In The Gap Between Rich And Poor* (pp. 53-69). Routledge.
- Masood, U. and Ansari, S. (2016). Determinants of capital adequacy ratio: A perspective from the Pakistani banking sector. *International Journal of Economics, Commerce and Management*, 4(7), 247-273.
- Mendoza, R. & Rivera, J. R. (2017). The Effect of Credit Risk and Capital Adequacy on the Profitability of Rural Banks in the Philippines, *Scientific Annals of Economics and Business*, 64(1), 83-96.
- Noreen, U., Alamdar, F & Tariq, T. (2016). Capital buffers and bank risk: Empirical study of adjustment of Pakistani banks. *International Journal of Economics and Financial Issues*, 6(4), 1798-1806.
- Ogboi, C. and Unuafé, O. K. (2013). Impact of credit risk management and capital adequacy on the financial performance of commercial banks in Nigeria. *Journal of Emerging Issues in Economics, Finance, and Banking*, 2(3), 703-717.
- Ogere, A. G., Peter Z. and Inyang, E. E. (2013). Capital adequacy ratio and banking risks in the Nigerian money deposit banks, *Research Journal of Finance and Accounting*, 4(17), 2222-2847.
- Olarewaju, O. and Akanda, J. (2016). An empirical analysis of capital adequacy determinants in Nigerian banking sector. *International Journal of Economics and Finance*, 8(12), 132-142.
- Oloo, O. (2011) Banking Survey Report. The best banks this decade 2001-2010, Think Business Limited, Kenya, {Available}. www.bankingsurvey.co.ke
- Panayotou, T. (2016). Economic growth and the environment. *The environment in anthropology*, CID Working Paper Series 2000.56, Harvard University, Cambridge, MA, 140-148.
- Raoudha, D. (2016). Bank transparency and capital adequacy ratio: Empirical evidence from Tunisia. *International Journal of Economics, Finance, and Management*, 5(1), 9-20.
- Schepens, G. (2016). Taxes and bank capital structure. *Journal of Financial Economics*, 120(3), 585-600.
- Shingjergji, A. and Hyseni, M. (2015). The determinants of the capital adequacy ratio in the Albanian banking system during 2007-2014. *International Journal of Economics, Commerce and Management*, 3 (1), 1-10.
- Shrieves, R. E. & Dahl, D. (1992). The impact of regulation on bank equity infusions. *Journal of Banking and Finance*, 16(2), 439-57.
- Thoa, P. T. X. and Anh, N. N. (2017). The determinants of capital adequacy ratio: The case of the Vietnamese banking system in the period 2011-2015. *VNU Journal of Science: Economics and Business*, 33 (2), 49-58.
- Widyastuti, A., Komara, R. & Layyinaturobaniyah, L. (2019). Capital Structure And Bank Performance. *Journal Bisnis dan Manajemen*, 20(2), 136-144.
- Williams, H. T. (2011). Determinants of capital adequacy in the banking sub-sector of the Nigerian economy: Efficacy of CAMELS. (A model specification with co-integration analysis). *International Journal of Academic Research in Business and Social Sciences*, 1(3), 234-246.