

## Capital Adequacy and Profit before Tax of Deposit Money Banks in Nigeria

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### **Abstract**

*The issue of capital inadequacy, operational inefficiency and credit risk in terms of low profit margins and inflated overhead costs, risk management and heaps of non-performing loans which have posed significant threat to the banking sector. And over the years, Nigeria have experienced varying degrees of bank failure and this have had some harsh effects on the financial sector and the economy at large. In effect, this study investigated effect of capital adequacy on profit before tax of deposit money banks in Nigeria (2004 – 2022). The major objective of the study was to examine the effect of total qualifying capital, adjusted shareholders fund (tier 1 capital) and capital-to risk weighted average ratio of deposit money banks on profit before tax. Quasi experimental research design was adopted. Data for the study was time series secondary data obtained from NDIC 2022 Annual statistical report and CBN. The variables were tested for unit root and were found to be stationary at level and first difference; hence granger casualty test was conducted to ensure co-integration exists among the variables. ARDL model was used to test the hypotheses. From the findings it was discovered that, total qualifying capital has a negative and significant effect on profit before tax of deposit money banks in Nigeria, adjusted shareholders fund has a positive and significant effect on profit before tax of deposit money banks in Nigeria. The researcher therefore recommended that it is advisable for deposit money banks to perform more agility of their capital through improving their adjusted shareholders fund (tier-1-capital) in order to absorb customers' financial request without unnecessary delay.*

**Keywords:** *Capital adequacy, profit before tax, deposit money banks*

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### **INTRODUCTION**

For the past two decades Nigerian banks have experienced varying degrees of bank failures with harsh effect on the financial system stability of the economy. And as such, the Central Bank of Nigeria (CBN) as the Apex Regulator of the banking sector increased the minimum capital-base for deposit money banks to ₦25billion in 2005; and during the consolidation exercise some of the 25 banks that emerged after the exercise started to have one problem or the other. Thus, in 2010, the CBN as part of its effort to enhance the resilience of deposit money banks reviewed the minimum requirement to any such amount that CBN may be prescribed to

be eligible for regulatory purposes as per the Basel 111 standards. Yet, some banks were still having serious capital and liquidity problems, specifically, Wema bank, Skye bank, Diamond bank, and others that led CBN to step in and approved their acquisition by other stronger banks, and replaced their top management (Ezu, Nwanna & Eke-Jeff, 2023). Also, the CBN Guidelines on regulatory capital requirements demand that banks are to maintain regulatory capital adequacy ratio (CAR) of 15% and 16% respectively for banks with international authorization and domestic-systemically important banks (D-SIBs) while a CAR of 10% is applicable to banks with national authorization. This acts as a benchmark in measuring the level of capital adequacy of deposit money banks in Nigeria (CBN, 2019, 2020). The successful recapitalization of these banks in Nigeria has significantly engendered economic growth and development as a result of the soundness, healthiness and stability achieved by the entire system. Despite this achievement however, some banks like Skye bank, Diamond bank, Wema bank and others incurred losses that eroded their capital in 2017 (Ofeimun & Akpotor, 2020).

In addition, as stated under the Basel Accord, a bank has to maintain a certain level of cash or liquid assets as a ratio of its risk-weighted assets (Steven, Robert & Marcus, 2021). The Basel Accords are series of three sets of banking regulations that help to ensure financial institutions have enough capital on hand to handle obligations. The Accords set the capital adequacy ratio (CAR) to define these holdings for banks. Under Basel III, a bank's tier 1 and tier 2 assets must be at least 10.5% of its risk-weighted assets. The Tier 1 capital is the primary funding source of the bank. Tier 1 capital represents the core equity assets of a bank or financial institution. It is largely composed of disclosed reserves (also known as retained earnings) and common stock. It can also include noncumulative, nonredeemable preferred stock. Tier 1 capital identifies the main components of equity capital: unavailable balance sheet reserves and shareholders' retained earnings, accrued over the life of the bank. It represents the amount of capital that allows a bank to absorb losses without affecting interests of depositors. Tier 2 capital includes revaluation reserves, hybrid capital instruments and subordinated term debt, general loan-loss reserves, and undisclosed reserves (Steven, Robert & Marcus, 2021). Previously the tiers of capital included a third layer. Tier 3 capital is tertiary capital, which many banks hold to support their market risk, commodities risk, and foreign currency risk, derived from trading activities. Tier 3 capital includes a greater variety of debt than tier 1 and tier 2 capital but is of a much lower quality than either of the two. Under the Basel III accords, tier 3 capital is being completely abolished. In 2019, under Basel III, the minimum total capital ratio is 12.9%, which indicates the minimum tier 2 capital ratio is 2%, as opposed to 10.9% for the tier 1 capital ratio (Steven, Robert & Marcus, 2021).

The recent financial crisis in the banking sector has clearly demonstrated that both the quality and size of the capital and liquidity base of the global banking system were insufficient to withstand severe economic shocks. Hence, at Pittsburgh (2013) during the G20 leaders agreed to strengthen international frameworks for prudential regulation (Basel Committee) published a package of proposals to strengthen global capital and liquidity regulations with the goal of promoting a more resilient banking sector. However, according to the prevalent view from CBN (2017) and prior to the crisis relatively stable regulatory bank capital ratios masked increasing risks from off-balance-sheet activities, securitization, and housing-related credit. In response, Basel III raised minimum bank capital requirements from 8 percent to up to 15.5 percent of risk-weighted assets, when all surcharges are activated. It also introduced a leverage ratio requirement and raised the quality of capital by requiring a larger fraction of capital to consist of tangible common equity and by tightening eligibility requirements for instruments that count as capital. Some jurisdictions opted for even higher standards. For example,

Switzerland is enforcing 19 percent capital ratios for its largest banks. The impact of these changes is really invisible in the evolution of capital ratios for some banks in developing. Against this background, a key policy question for bank regulation is whether these reforms have gone too far or not far enough. It is against this backdrop that this study examined the impact of capital adequacy on profitability of deposit money banks in Nigeria.

## **REVIEW OF RELATED LITERATURE**

### **Concept of capital adequacy**

Capital adequacy is a situation whereby the adjusted capital of the bank can serve as a cushion against all losses and able to shield fixed assets of the bank leaving a comfortable surplus for the current operational activities and future advancements (Ebhodaghe, 2019). Capital adequacy is a situation where the adjusted capital is sufficient to absorb all losses and cover fixed assets of the bank leaving a comfortable surplus for the current operation and future expansion (Obienusi 2015). Functionally, adequate capital is regarded as the amount of capital that can effectively discharge the primary function of preventing bank failures by absorbing losses. Capital adequacy by definition is seen as a quantum of fund, which a financial institution should have and plan to maintain in order to conduct its business in a prudent manner (Kishore, 2015).

### **Profitability**

Profitability refers to the company's ability to generate profits as return on their money invested; profitability ratios reflect the competitive situation of the company in addition to the quality management. Profitability matters significantly for long term growth and survival of any business outfit. Profitable firms can increase their level of operation, meet the needs of customers, diversify into other areas of business, be able to withstand competition from firms in similar industries and enjoy economies of scale with the attendant reduction in the cost of production. Profit before tax is a measure that looks at a company's profits before the company has to pay corporate income tax. It essentially is all of a company's profits without the consideration of any taxes. Profit before tax can be found on the income statement as operating profit minus interest. Profit before tax is the value used to calculate a company's tax obligation. Profit before tax may also be referred to as earnings before tax (EBT) or pre-tax profit. The measure shows all of a company's profits before tax. A run through of the income statement shows the different kinds of expenses a company must pay leading up to the operating profit calculation. Gross profit deducts costs of goods sold (COGS). Operating profit factors in both COGS and all operational expenses. Operating profit is also known as earnings before interest and tax (EBIT). After EBIT only interest and taxes remain for deduction before arriving at net income.

### **Total qualifying capital**

Total qualifying capital means Tier 1 capital plus Tier 2 capital, less: investments in and loans to unconsolidated financial subsidiaries; investments in the capital of other financial institutions; encumbered assets (assets acquired using capital funds but subsequently pledged to secure loans or that are no longer available to cover losses from operations); and reciprocal holdings of capital instruments of banks. These capital instruments must have an original weighted average maturity of at least five years and otherwise be eligible for inclusion in Tier 2 capital as discussed in the risk-based capital guidelines. Total qualifying capital (i.e., Tier 1 and Tier 2 capital) allowable under the risk-based capital guidelines. Report the amount of total

capital, that is, Tier 1 plus Tier 2 capital less deductions that is allowable under the risk-based capital guidelines (sum of items 1 and 2).

#### **i. Tier 1 capital**

This includes only permanent shareholders' equity (issued and fully paid ordinary shares/common stock and perpetual non-cumulative preference shares) and disclosed reserves (created or increased by appropriations of retained earnings or other surpluses). Tier 1 capital would include the following elements:

- 1) Paid-up share capital;
- 2) Irredeemable preference shares;
- 3) Share premiums;
- 4) General reserve (retained profit),
- 5) SMEEIS reserves,
- 6) Statutory reserve;
- 7) Other reserves as may be determined by the CBN.

Tier 1 capital consists of Common Equity Tier 1 (CET1) and Additional Tier 1 (AT1). CET1 consists of common equity share capital, retained earnings and some other reserves.

#### **ii. Tier 2 capital**

Tier 2 capital is the sum of upper Tier 2 capital and lower Tier 2 capital. The total amount of lower Tier 2 capital before deductions enumerated in paragraph 10 that may be included in total Tier 2 capital shall be limited to a maximum of 50% of total Tier 1 capital (net of deductions enumerated). The total amount of upper and lower Tier 2 capital both before deductions enumerated in paragraph 10 that may be included in total qualifying capital shall be limited to a maximum of 100% of total Tier 1 capital (net of deductions enumerated).

#### **Capital-to risk weighted average ratio**

In an economic sense, bank capital consists of the value of equity owned by shareholders. Bank economic capital can be defined as the value of the equity of a bank that can withstand losses. It has the lowest priority if the bank liquidates. Although there are several types of equity instruments (for example, common stock, contributed capital, and retained earnings), equity consists mainly of the profits retained by a bank or obtained from selling shares to investors. However, measuring equity is not simple because its value depends on how all financial instruments and on and off-balance sheet assets of banks are valued (Ezu *et al.*, 2023). Equity measured by its book value reflects the assets and liabilities that a bank reports on its balance sheet, thereby ignoring most off-balance sheet items and providing a historical accounting value rather than a current one. Equity measured by its market value reflects the value of the bank according to the stock market. It has become impossible to discuss the concept of capital adequacy ratio in the banking industry without referring to value at risk (VaR). The 'capital adequacy' principle states that bank's capital should match risks. Since capital is the most scarce and costly resource, the focus of risk monitoring and risk measurement follows. The central role of risk-based capital in regulations is a major incentive to the development of new tools and management techniques. Undoubtedly a most important innovation of recent years in terms of the modelling 'toolbox' is the VaR concept for assessing capital requirements. The VaR concept is a foundation of risk-based capital or, equivalently, 'economic capital' (Marcus, 2019).

## **Bank capital**

Capital is one of the most important concepts in banking. Unfortunately, it can be difficult for those outside the financial field to grasp, since there is no close analogy to capital in ordinary life. In its simplest form, capital represents the portion of a bank's assets which have no associated contractual commitment for repayment. It is, therefore, available as a cushion in case the value of the bank's assets declines or its liabilities rise. Capital is intended to protect certain parties from losses, including depositors, bank customers, and bank counterparties. Any losses that occur would fall instead on the owners of the bank or occasionally some other party that is of lesser concern to those establishing the capital rules. Regulators and rating agencies are generally not directly concerned about losses ultimately falling on shareholders of the bank, since they have purchased the shares knowing that they share both the upside and the risks of ownership.

Capital is adequate either when it reduces the chances of future insolvency of an institution to some predetermine level of alternately when the premium paid by the banks to an insurer is 'fair', that is, when it fully covers the risks borne by the insurer. Such risks, in turn, depend upon the risk in the portfolio selected by the bank, on its capital and on term of the insurance with respect to when insolvency will be determined and when loss will be paid (Maisel, 2012). Rosenbergas (1982) has defined capital in relation with banking as a long-term debt plus owner's equity. The efficient functioning of markets requires participants to have confidence in each other's stability and ability to transact business. Patheja (1994) has defined banks capital as common stock plus surplus undivided profits plus reserves for contingencies and other capital reserves.

### **a. Benefits**

First, capital serves as a buffer that absorbs losses and reduces the probability of bank failure. This protects bank creditors and, in systems with explicit or implicit public guarantees, taxpayers. Second, capital has a preventative role by improving incentives for better risk management. When asymmetric information prevents creditors from pricing bank risk taking at the margin, banks operating under the protection of limited liability will tend to take excessive risks. Capital can limit these excesses by increasing shareholders' "skin in the game": the amount of equity at risk in the event of bank failure (Myers & Majluf 1984 as cited in Marcus, 2019 and Hellmann, Murdock & Stiglitz, 2018). This includes the role of bank capital in helping minimize market discipline distortions associated with deposit insurance and implicit government "too-big-to-fail" guarantees. Market forces push banks to maintain some positive level of capital. For example, higher capital helps banks attract funds, maintain long-term customer relationships (Allen, Carletti & Marquez, 2017), and carry risks essential to lending.

### **b. Costs**

In analyzing the costs of bank capital it is important to distinguish between the transition impact and steady-state impact of higher capital requirements. The costs associated with the transition to heightened capital requirements are not relevant at the steady state. These are costs stemming from raising new external equity or reducing the growth of assets. Equity issuance is subject to non-negligible underwriting fees, usually of 5-7 percent. Also, there are signaling costs: issuing equity may require substantial discounts when incumbent investors and managers have information about the firm that new equity investors do not have (Myers & Majluf, 1984).



Therefore, one would expect that any rapid increase in mandatory capital ratios would take place at least partially through an adjustment of bank assets, with potentially large negative effects on credit and macroeconomic performance. In principle, these transition costs could be mitigated by giving banks time to adjust their balance sheets gradually. This might enable banks to increase capital using retained earnings or external capital issuance timed to beneficial market conditions. In practice, however, this may prove difficult to the extent that market pressures might force banks to adjust rapidly to the new capital standards. The steady-state costs of higher capital requirements are those that occur after a permanent change in the funding mix of banks is completed. Some of the costs associated with a heavier reliance on equity are similar for banks and nonfinancial firms. For example, in many jurisdictions, debt has a more favorable tax treatment than equity (De-Mooji, 2017). Aside from tax issues, equity can be more costly if, due to various frictions, a decrease in leverage does not lower the required return on equity. In addition, some of the costs associated with more equity are specific to the banking system.

### **Theoretical Review**

This part covers the theoretical underpinnings that the study is based.

#### **Buffer Theory of Capital Adequacy:**

The buffer theory propounded by Calem and Rob (1996) predicts that a bank approaching the regulatory minimum capital ratio may have an incentive to boost capital and reduce risk in order to avoid the regulatory costs triggered by a breach of the capital requirements. However, poorly capitalized banks may also be tempted to take more risk in the hope that higher expected returns will help them to increase their capital. This is one of the ways risks relating to lower capital adequacy affects banking operations. Banks may prefer to hold a ‘buffer’ of excess capital to reduce the probability of falling under the legal capital requirements, especially if their capital adequacy ratio is very volatile (Calem and Rob, 1996). Capital requirements constitute the main banking supervisory instrument in Nigeria. The Central Bank of Nigeria (CBN) intervenes little in banks’ activities but does directly conduct on-site examination and at times delegating this task to external auditors. By contrast, a breach of the capital requirements is considered a major infringement of banking legislation and is not tolerated by the Central Bank of Nigeria (CBN).

#### **Review of Empirical Studies**

Mbaeri, Uwalake and Gimba (2021) examined the effect of capital adequacy ratio on the performance of listed commercial banks in Nigeria proxied by return on capital employed from 2014-2019. Data for this study, collected from the sampled commercial banks annual financial reports for the period covered, were analysed using panel regression. The study found that capital adequacy ratio had significant and positive effect on return on capital employed of listed commercial banks in Nigeria. Based on this finding, the Central Bank of Nigeria is advised to increase the Capital Adequacy Ratio of commercial banks and ensure that they are complied with. This is expected to bring about improved performance of the banking sector.

Oloruntobi (2021) investigated the moderating effect of capital adequacy on financial performance on Deposit Money Banks in Nigeria from 2012-2019. The listed DMBs are 15 as at 31st December, 2019, out of which 12 banks were selected based on the availability of data. Specifically, the study seeks to identify the effect of Liquidity, loan loss provision, Return on Asset and firm size on the capital adequacy of listed deposit money banks in Nigeria. The study

adopts Correlational and ex-post facto Designs and data were analyzed with the aid of multiple regression technique using 96 firm-year paneled observations. Data were extracted from the audited annual reports and accounts of the selected banks. The study reveals that liquidity and loan loss provision are positive and have significant impact on the capital adequacy of listed deposit money banks at 1% and 1% level of significance respectively. The study also found out that return on asset and firm size have no significant impact on the capital adequacy of listed deposit money banks. The study concludes that liquidity and loan loss provision constitute the determinants of capital adequacy of listed deposit money banks. Therefore, it is recommended among others that these variables should be considered in determining the capital adequacy of deposit money banks in Nigeria.

Masoud and Alirahm (2018) analyzed the effect of capital adequacy ratio on the ratio of the bank reserves accepted in the Tehran stock exchange also it was based on the Kashyap and Stein pattern (2004) and modified variables of Levintal (2005) research. Required data from the statistical population including 16 Iranian exchange banks has been achieved for a 5 years period from 2009 to 2013. The results of the research that indicated a direct relationship between capital adequacy ratio and bank reserves as an absorption rate of different deposits of customers in banks were considered as dependent variable. In addition, the interpretation of control variables slope in estimated relationship showed that there was an inverse relationship between rate of granted facilities and the size of bank with bank reserves; also there was a direct relationship between growth opportunities and profit volatility. Student t-test for estimated coefficients and Fisher test for total estimated relationship supported the ability to generalize relationships between variables at 95% level. The coefficient of determination showed that between 83.5% and 87.5% changes between independent and control variables with bank reserves through expressed estimated relationship and estimated relationship between variables has had a fairly complete explanatory power.

### **Gab in literature**

From the discussed literature, most studies have been carried out in area of capital adequacy, but studies that single out profit after-tax as a sole independent variable are rarely found in the body of literature to the best of researchers' knowledge. More so, adopting total qualifying capital, adjusted shareholders fund (tier 1 capital) and capital-to risk weighted average ratio as objective of the study is another area that is not found in the body of literature by the researcher. Hence, this study is conducted to minimize this gab in literature.

### **METHODOLOGY**

The researcher adopted *quasi experimental* research design approach. *Quasi experimental* study or after-the-fact research is a category of research design in which the investigation starts after the fact has occurred without interference from the researcher. Data for the study was time series secondary data obtained from NDIC 2022 Annual statistical report and CBN from 2004 - 2022. The data for this study were total qualifying capital, adjusted shareholders fund (tier 1 capital) and capital-to risk weighted average ratio as independent variables while profit before tax of deposit money banks formed the dependent variable of the study. The study adopted Ordinary Least Squares (OLS) analysis using the multiple regression method for a period of 18years, annual data covering 2004 – 2022 as the main tool of analysis. Statistical evaluation of the global utility of the analytical model, the coefficient of multiple determination ( $R^2$ ), the student T-test and F-test. Hypotheses of the study were tested with multiple linear regression model. This is because the objectives and hypotheses of the study have a common dependent

variable with more than one independent variables. In order to empirically analysis the effect of capital adequacy on profit after tax of deposit money banks in Nigeria, the study modified and adapt the model of Oloruntobi (2021). In this study, there is need to determine the long-run relationship between variables as it enables the understanding of the effect that one has against the other. However, each endogenous variable was explained by its lagged, or past values and the lagged values of all other endogenous variables in the model; which eliminates the use of any exogenous variables in the model (Gujarati, 2004). Since the methodology allowed comprehensive information about the dynamics of the interactions, long-term trends are easily explained. This enables shocks within the regressions and the system to be easily seen. The study models are specified as follows: total qualifying capital, adjusted shareholders fund (tier 1 capital) and capital-to risk weighted average ratio

$$PBT = f(TQC, ASF, CRW) \dots \dots \dots (1)$$

Transforming equation 3.1 to 3.2 to *econometrics model*

$$PBT = \alpha + \beta_1 TQC + \beta_2 ASF + \beta_3 CRW + \mu t \dots \dots \dots (2)$$

Where;

$\alpha_0$  = Constant;  $\beta_1 - \beta_3$  = Co-efficient of independent variables;  $\mu t$  = Error term

PBT = Profit before tax (₦), TQC = Total qualifying capital (₦)

ASF = Adjusted shareholders fund (tier 1 capital) (₦)

CRW = Capital-to risk weighted average ratio (%)

$\beta_1 > 0, \beta_2 > 0, \beta_3 > 0$  apriority expectations

### ANALYSIS AND DISCUSSION OF FINDINGS

**Table 1: Presentation of Augmented Dickey-Fuller unit root test**

Variables	ADF- statistics	Prob.	Order of integration
Total qualifying capital	-4.606324	0.0027	stationary at level $I(1)$
Tier 1 capital	-4.741123	0.0021	stationary at level $I(1)$
Capital to risk-weighted asset ratio	-3.363817	0.0278	stationary at level $I(0)$
Profit before tax	-3.673246	0.0145	Stationary at level $I(0)$

Source: Compiled by Researcher from Appendix E-View 12

The study adopted the augmented Dickey-Fuller unit root test to examine whether the data collected are stationary. The unit root test was conducted based on secondary data used for study and to test whether the variables are integrated. The results on the augmented Dickey-Fuller unit root test as shown in Table 2 indicates that all the logged variables of Total qualifying capital, adjusted shareholders fund (tier 1 capital), with high negative t-statistic coefficients are statistically significant at 1 percent and integrated at ordinary level and first difference respectively. Also, t-statistic coefficients of capital to risk-weighted asset ratio and profit before tax also have high negative coefficient and significant at 5% level of significance. The variables are all integrated and stationary at ordinary level with probability values of less than 5% level of significance. The variables are therefore co-integrated. As such, they all accepted the null hypothesis of stationary.

**Table 2: Presentation of causation and forecasting test result**

The result of the pair-wise Granger Causality tests between the capital adequacy and profitability of deposit money banks are presented in Table 3

Pairwise Granger Causality Tests

Date: 09/25/23 Time: 16:41



Sample: 2004 2022  
 Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
ASF does not Granger Cause TQC	17	1.54786	0.2523
TQC does not Granger Cause ASF		2.39849	0.1330
CRW does not Granger Cause TQC	17	1.34435	0.2973
TQC does not Granger Cause CRW		2.08674	0.1668
PBT does not Granger Cause TQC	17	1.39234	0.2859
TQC does not Granger Cause PBT		0.91972	0.4250
CRW does not Granger Cause ASF	17	1.30626	0.3067
ASF does not Granger Cause CRW		2.03050	0.1740
PBT does not Granger Cause ASF	17	2.99265	0.0882
ASF does not Granger Cause PBT		1.23298	0.3258
PBT does not Granger Cause CRW	17	4.73158	0.0305
CRW does not Granger Cause PBT		1.48231	0.2659

**Source: E-view computation result**

From the result of the pair wise Granger causality reported above, it can be seen that; There is no causality running from TQC, ASF and CRW to PBT to because their respective prob (F-statistic) of 0.4250, 0.3258 and 0.2659 were greater than 0.05 probability level. However, there was unidirectional causality running from TQC, ASF and CRW to Profit before Tax. This implies that there was no causality running from any of the capital adequacy components to profit before tax. The result of the causation and forecasting test shows that all-time series do not share mutual stochastic trend as there exist no casualty equation judging by their probability value and the ranking order. This therefore implies that there exists no long run relationship amongst the employed variables. Having established the non-existence of long run relationship and causality between the variables.

**Autoregressive distributed lag co-integration analysis**

Under the autoregressive distributed lag co-integration test, co-integration exists when the Trace Statistic and Max-Eigen values are greater than the 0.05 critical values. The results obtained from the autoregressive distributed lag approach to co-integration were captured in Table 3.

**Table 3: Autoregressive distributed lag co-integration analysis**

Dependent Variable: PBT  
 Selected Model: ARDL(1, 2, 2, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
PBT(-1)	-0.107663	0.153542	-0.701195	0.5094
TQC	-0.805084	0.270279	-2.978721	0.0247
TQC(-1)	-0.696511	0.276001	-2.523577	0.0451
TQC(-2)	1.274350	0.260174	4.898078	0.0027
ASF	2.045999	0.816734	2.505043	0.0455
ASF(-1)	1.281946	0.940725	1.362721	0.2219
ASF(-2)	-1.566308	0.743317	-2.107187	0.0797

CRW	-0.921259	0.888597	-1.036757	0.3398
CRW(-1)	-0.818059	0.974868	-0.839148	0.4335
CRW(-2)	0.866237	0.637179	1.359487	0.2229
C	-1.097336	0.868654	-1.263260	0.2534
R-squared	0.984776	Mean dependent var		2.672893
Adjusted R-squared	0.959403	S.D. dependent var		0.512686
S.E. of regression	0.103300	Akaike info criterion		-1.449694
Sum squared resid	0.064025	Schwarz criterion		-0.910556
Log likelihood	23.32240	Hannan-Quinn criter.		-1.396102
F-statistic	88.31142	Durbin-Watson stat		2.316866
Prob(F-statistic)	0.000118			

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

**Source: E-Views 12 computations (2023).**

Since, the result of the unit root/test established that the data are stationary of the order 1(0) and 1(1), the researcher proceed to apply the ARDL model /technique to verify the existence of both short-run and long-run co-integrating relationship between the indicators of capital adequacy variables and the bank financial performance measures. This test is aimed at investigating whether the variables share mutual stochastic trend and are linked in a common long-run equilibrium. The ARDL Bound test for Co-integration compares the F-statistic value to the upper I(1) and lower I(0) critical bound values as shown in Table 2 above to determine the existence of cointegration among the variables. Table 2 shows the result of the ARDL model which allows the simultaneous estimation of the short-run and long-run coefficients of the model. With the discovery of a long-run relationship among the variables, the study proceeds with estimating the ARDL model to investigate the long-run relationship and short-run dynamics among performance of banks (profit before tax) and its focus variables which are total qualifying capital (TQC), adjusted shareholders fund and capital to risk-weighted ratio (CRW). The estimation results indicated that the coefficient value of total qualifying capital is -0.805084 with its associated p-value being 0.0247, which implies that total qualifying capital has a negative and significant effect on profit before tax of deposit money banks in Nigeria in the short-run. More so, the coefficient value of adjusted shareholders fund is 2.045999 while its p-value is 0.0455. The result indicates that adjusted shareholders fund has a positive and significant effect on profit before tax of deposit money banks in Nigeria also in the short-run. In addition, the coefficient value of capital to risk-weighted ratio is -0.921259 with its associated p-value being 0.3398, which implies that capital to risk-weighted ratio has a negative and insignificant effect on profit before tax of deposit money banks in Nigeria in the short-run. This result contradicted buffer theory.

Furthermore, the coefficient value of total qualifying capital is 1.274350 with its p-value being 0.0027, which implies that the total qualifying capital has a positive and significant effect on profit before tax of deposit money banks in Nigeria in the long-run. The estimation results indicated that the coefficient value of adjusted shareholders fund is -1.566308 with its associated p-value being 0.0797, which implies that adjusted shareholders fund has a negative and insignificant effect on profit before tax of deposit money banks in Nigeria in the long-run.

The estimation results indicated that the coefficient value of capital to risk-weighted ratio is 0.866237 with its associated p-value being 0.2229, which implies that capital to risk-weighted ratio has a positive and insignificant effect on profit before tax of deposit money banks in Nigeria in the long-run. The adjusted R-Square revealed that 95.9403% variation in the profit before tax of deposit money banks in Nigeria is accounted for by the variations in total qualifying capital, adjusted shareholders fund and capital to risk-weighted ratio. The F-statistic value of 88.31142 with a p-value of 0.0001 revealed the significance and adequacy of the ARDL model. Hence, total qualifying capital has a negative and significant effect on profit before tax of deposit money banks in Nigeria, adjusted shareholders fund has a positive and significant effect on profit before tax of deposit money banks in Nigeria.

### Summary of findings

This study empirically examined the effect of capital adequacy on profit after tax of deposit money banks in Nigeria (2004 – 2022). The result revealed that, Augmented Dickey-Fuller unit root test result shows that all the logged variables of Total qualifying capital, adjusted shareholders fund (tier 1 capital), with high negative t-statistic coefficients are statistically significant at 1 percent and integrated at ordinary level and first difference respectively. Also, t-statistic coefficients of capital to risk-weighted asset ratio and profit before tax also have high negative coefficient and significant at 5% level of significance. From the result of the pair wise Granger causality reported above, it can be seen that; there is no causality running from TQC, ASF and CRW to PBT to because their respective prob (F-statistic) of 0.4250, 0.3258 and 0.2659 were greater than 0.05 probability level. However, there was unidirectional causality running from TQC, ASF and CRW to Profit before Tax. The ARDL model estimation results indicated that the coefficient value of total qualifying capital is -0.805084 with its associated p-value being 0.0247, which implies that total qualifying capital has a negative and significant effect on profit before tax of deposit money banks in Nigeria in the short-run. But, the coefficient value of total qualifying capital is 1.274350 with its p-value being 0.0027, which implies that the total qualifying capital has a positive and significant effect on profit before tax of deposit money banks in Nigeria in the long-run. More so, the coefficient value of adjusted shareholders fund is 2.045999 while its p-value is 0.0455. The result indicates that adjusted shareholders fund has a positive and significant effect on profit before tax of deposit money banks in Nigeria also in the short-run. The estimation results indicated that the coefficient value of adjusted shareholders fund is -1.566308 with its associated p-value being 0.0797, which implies that adjusted shareholders fund has a negative and insignificant effect on profit before tax of deposit money banks in Nigeria in the long-run. In addition, the coefficient value of capital to risk-weighted ratio is -0.921259 with its associated p-value being 0.3398, which implies that capital to risk-weighted ratio has a negative and insignificant effect on profit before tax of deposit money banks in Nigeria in the short-run. The estimation results indicated that the coefficient value of capital to risk-weighted ratio is 0.866237 with its associated p-value being 0.2229, which implies that capital to risk-weighted ratio has a positive and insignificant effect on profit before tax of deposit money banks in Nigeria in the long-run. This result contradicted buffer theory.

## Conclusion

Based on the findings and discussions above, the researcher concludes therefore that for the period under study, total qualifying capital (LOGTQC), adjusted shareholders fund (tier 1 capital) (LOGASF), capital to risk-weighted asset ratio (CRW) of deposit money banks in Nigeria. Also, the study concludes that there is an existence of equilibrium relationship between capital adequacy and profit before tax of deposit money banks in Nigeria. Hence, capital adequacy necessary for banks, as it determine and assume the banks financial health and soundness. Capital adequacy helps to measure of the solvency of a bank, tells whether a bank has enough capital to support the risks in its balance sheet.

## Recommendations

In line with the findings of this study, the researcher recommended the following:

- i. It is advisable for deposit money banks to perform more agility of their capital through improving their adjusted shareholders fund (tier-1-capital) in order to absorb customers' financial request without unnecessary delay.
- ii. Supervisors should encourage banks to increase capital ratios by raising equity (through new issuance or retained earnings) and maintain total qualifying capital, rather than shrinking assets, so as to avoid reduced credit availability.
- iii. Level of loan disbursement should dully monitored in the deposit money in order to avert high risk level. This will help to maintain equilibrium level of capital to risk-weighted asset ratio of loans to protect a bank from insolvency.

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