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## Article

# Capital adequacy and corporate performance of non-financial firms: Empirical evidence from Nigeria

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Olubunmi Adewole Ogunode, Olaolu Ayodeji Awoniyi & Ayodeji Temitope Ajibade

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## ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

# Capital adequacy and corporate performance of non-financial firms: Empirical evidence from Nigeria

Olubunmi Adewole Ogunode<sup>1\*</sup>, Olaolu Ayodeji Awoniyi<sup>1</sup> and Ayodeji Temitope Ajibade<sup>1</sup>

**Abstract:** This research assesses the effect of capital adequacy on the corporate performance of quoted non-financial firms operating in Nigeria. Several studies on the influence of capital adequacy on corporate performance have been conducted without specific focus on non-financial entities despite their growing contribution to the country's gross domestic product (GDP). The study utilized the ex-post facto research design using secondary data obtained for the period 2011–2020. A sample of thirty-eight (38) out of sixty-three (63) listed non-financial firms were purposively selected while data obtained were analyzed using multivariate regression. The study found that while capital adequacy ratio, equity capital/total assets ratio and cost income ratio negatively affected corporate performance, debt equity ratio and firm size positively influenced corporate performance of quoted non-financial firms operating in Nigeria. It therefore concluded that firm size and profitable use of debt capital in the capital mix of non-financial firms are key factors that can positively drive their corporate performance. Consequently, it recommended that the management of non-financial firms should explore opportunities inherent in profitable use of debt capital to further improve their performance and hence returns to their respective stakeholders. Additionally, regulators of non-financial firms operating in Nigeria should strengthen the risk management monitoring framework to ensure market discipline and balanced growth and development of the firms.

**Subjects:** Economics; Finance; Business; Management and Accounting

### ABOUT THE AUTHORS



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**Keywords:** capital adequacy; corporate performance; CAR ratio; regression analysis; non-financial firms

## 1. Introduction

The sustenance of efficient corporate performance across various industry segments has consistently been a major concern for stakeholders both at micro and macro levels. This is because without it, the differing stakeholders' expectations including but not limited to returns on investments, sales growth, long-term value creation, social and environmental responsibility cannot be attained. Selvam et al. (2016) documented that effective corporate performance encompasses a range of nine possible dimensions especially in the areas of profitability performance, market value and growth performance. This approach links historical profitability with future growth potentials. This view is reinforced by Tangen (2003) who posits that firms need to harmonize different performance dimensions to arrive at an efficient corporate performance position for the entity. Efficient corporate performance when attained will stimulate improvements in production, employee productivity, innovation and improvement in brand image and reputation (Taouab & Issor, 2019). Without it, organizational deficiencies such as market share loss and high employee attrition would continue to hold sway which would have negative consequences for the long-standing endurance of the organization.

Surviving and thriving in the long term is one of the key desires of most business entities. However, business survival cannot be divorced from the maintenance of appropriate levels of capital for operational existence. In the absence of optimal capital levels, operational disruption is capable of negatively impacting corporate performance of entities. The determination of what constitutes appropriate or optimal levels of capital without the application of rigorous, scientific and/or industry approved benchmarks may lead to unwanted consequences (Torbira & Zaagha, 2016). Nevertheless, when successfully ascertained and deployed, it is capable of spurring improved organizational performance while serving as buffers that minimize business swings, losses or failures (Jamil & Said, 2018). For financial companies such as traditional commercial banks and other financial institutions, maintenance of adequate capital levels is fundamental for the safety of depositors' funds and sustainability of business operations and this position is heavily influenced via regulatory actions and pressures (Dao & Nguyen, 2020; Larojan, 2020). The situation is, however, less clear for non-financial firms such as the manufacturing, hospitality, oil and gas, telecommunication and agriculture sectors.

Corporate or business performance has been extensively studied with reference to several parameters such as risk and corporate governance (Ismail & Ahmed, 2022; Lagasio, 2021), ownership structure (El Ammari, 2021; Arora & Singh, 2021), board diversity and gender balance (Jaber, 2020), innovation (Höflinger et al., 2018), organizational culture (Edafetano, 2020; Kamau & Wanyoike, 2019), internationalization of operations (Lutz et al., 2020) and capital structure (Ajibola et al., 2018; Hussein, 2020) with varying results produced. However, there is a dearth of available works closely examining the linkage between capital adequacy and corporate performance of entities.

Furthermore, most related strand of literature on capital adequacy especially in developing economies has tended to concentrate on banks and other financial institutions (Torbira & Zaagha, 2016) with very limited studies concentrating on non-financial entities. We note that this may not be unconnected with the governance issues and relative unstructured nature of these entities when compared with their financial focused counterparts. However, this is particularly worrisome given that these entities on a sectoral basis contributed at least 52.36% to Nigeria's GDP as at 2020 (O'Neill, 2022). The focal point of this work is therefore aimed at addressing this observed gap with a view to extending the body of knowledge about the influence that capital adequacy has in driving the corporate performance of non-financial institutions operating in Nigeria. The study's goal is to highlight how strengthening of capital in the right proportion,

scale and volume can stimulate the performance of non-financial firms given their overriding importance in the GDP growth trajectory in Nigeria.

The rest of the paper was put together in this manner: In the second section, a review of extant literature is presented. Methodology and data results are shown in sections 3 and 4, respectively, while the last section provides the conclusion and recommendations emanating from the study.

## **2. Review of extant literature**

### **2.1. Corporate performance**

Corporate performance refers to the performance appraisal of business entities. This assessment of entities is often undertaken in economic terms in line with expectations of its various stakeholders. The purpose of the assessment is to gauge extent of productive utilization of organizational resources, effectiveness and efficiency of organizational decision making, the standing of the entity in the market place as well as its readiness for future growth expansion (Randhawa & Sethi, 2017). Samina and Ayub (2013) posit that corporate performance gauges the firms' ability to generate revenues and make profit using their assets as the principal means of business. Aondoakaa (2015) affirmed that various scholars while conducting research across different industries have given considerable attention to the concept of corporate performance. Leveraging corporate performance, business drivers are particular about the positive impact that the business yields for the benefit of investors and other key stakeholders (Oladele et al., 2021).

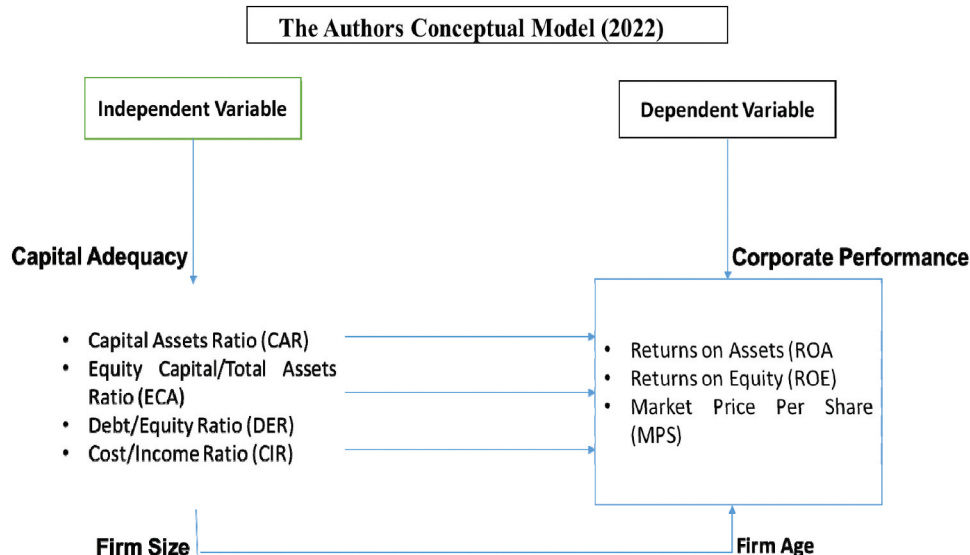
The value of the entity is a direct offshoot of its performance and this performance appraisal has a direct correlation with the reward system put in place for management, thus further underscoring its importance (Tulcanaza-Prieto et al., 2020). Corporate performance can be measured broadly using accounting and market value performance metrics. Accounting-related performance metrics in the form of ratio analysis can be extracted from firm's financial statement such as "Returns on Assets" (ROA) and "Returns on Equity" (ROE; Abebe, 2022), whereas market value performance metric can be measured using capital market valuation such as Market Value per Share (MPS; Rashid, 2019). For the purpose of this study, therefore, corporate performance shall be surrogated using these three metrics of ROA, ROE and MPS respectively.

### **2.2. Capital adequacy**

Capital adequacy refers to sufficiency of capital for operational existence. Capital adequacy is essential for the soundness and economic performance of any organization; however, the argument that is still open ended is determining how much capital is adequate to drive business success. (Lekaaso et al., 2020). Capital is needed in sufficient levels to aid absorption of operational or unanticipated losses, preserve confidence in the continued existence of a business entity and thus forestalling insolvency. This therefore implies that an essential area of any organization is the availability and adequacy of capital to run its business. Companies may run out of business if they fail to manage their capital effectively (Melani et al., 2019). A properly managed firm grows capitalization by holding more earnings as capital (Carvallo & Kasman, 2005). This has lent support to the importance of adequate capital for business operations. The business operating environment is becoming extremely difficult compared to the past, hence the need for a robust management of finance efficient enough to ensure operational and organizational sustainability.

Firms are expected to handle risks that are associated with inadequate capital to facilitate different stakeholders' confidence in the firms and consequently strengthen its balance sheet (Udom & Eze, 2018). For banks and other financial institutions, a commonly used framework for assessing bank's relative strength and financial soundness is the CAMEL framework which has capital adequacy as its pivotal element (Al-Najjar & Assous, 2021; Nguyen et al., 2020; Risal & Panta, 2019). However, for non-financial entities, assessment is done with reference to standard accounting benchmarks rather than regulatory induced measuring parameters (Al-Sharkas & Al-Sharkas, 2022). Consequently, capital adequacy in this study shall be proxied by four parameters,

**Figure 1. Conceptual model.**



namely: Capital Assets Ratio (CAR), Debt/Equity Ratio (DER), Cost/Income Ratio (CIR), i.e. Operating Expense/Operating Income, and Equity Capital/Total Assets Ratio (ECA), respectively. This is as reflected in Figure 1 below.

### 2.3. Theoretical framework

This study is anchored on the trade-off theory which was propounded by Kraus and Litzenberger (1973). The theory leans heavily on the postulations of the Modigliani & Miller (MM) theorem in the areas of agency costs, tax shields and bankruptcy costs (Khoa & Thai, 2021). The theory stipulates that value maximizing managers will always seek to maintain capital levels that optimize resources while minimizing associated costs of obtaining the capital (Serrasqueiro & Caetano, 2015). These associated costs are usually a delicate balancing act between costs savings from the deployment of debt capital on the one hand and the costs of possible insolvency on the other (Cerkezi, 2013; Ghazouani, 2013). The optimum level is reached when the tax savings from interest payments on debts more than compensate for the costs of debts. This is because most firms would usually be partly financed by debt and partly by equity. Securing the right balance between the two main capital components in appropriate levels and value is therefore the major thrust of the theory. Efficient firms should target that debt level in the capital mix which maximizes their profit-making potentials and firm value (Ahmad & Etudaiye-Muhtar, 2017; Brealey & Myers, 2003). Unlike the pecking order theory, this theory stresses that positive relation can be affirmed between the profitability of the firm and the leverage level in its capital mix (Andersson & Minnema, 2018).

The theory has been supported by the works of Butt (2019), Ai et al. (2020) and Yakubu et al. (2021) who established applicability of the theory in predicting stock price movements, corporate governance leanings, capital structure financing decisions and SME financing. However, it has been criticized by Miller (1977), Chirinko and Singha (2000) and Chang and Dasgupta (2009) who questioned the practicality of and the rationale for establishing a target debt ratio as well as the notion of optimality or balancing act between debt and equity. Myers (1984) criticism which bothered on his preference for the ranking of capital choices rather than their relative values and optimal quantities led to the development of the rival theory of the pecking order theory. Nevertheless, this current study is best clarified by the trade-off theory because of its strong emphasis on the deduction of a firm's optimal capital level which capital adequacy represents. Thus, this study examines to what extent the securing of capital in the right volume, scale and proportion is able to impact the corporate performance of listed non-financial firms in Nigeria.



#### 2.4. Empirical reviews

Almazari and Alamri (2017) using two competing Saudi Arabian banks as case studies found that profit performance as an index of corporate performance was significantly impacted by a rise in the levels of capitals maintained by the institutions. Ngui and Jagongo (2017) undertook a research in Kenya to confirm the influence that capital adequacy had on the corporate performance of selected thrift and co-operative societies operating in Kenya. The study found that institutional capital built up via retained earnings had a more sustainable impact on corporate performance of financial focused firms. It therefore recommended continued reinvestment of retained earnings as a way to ensuring sustenance of capital adequacy of financial institutions.

Amahalu et al. (2017) studied the influence of Capital Adequacy on the performance of some deposit money banks (DMB) quoted in Nigeria between 2010 and 2015 using secondary data. The statistical analysis tool applied for the study was multiple regression analysis. Following the conclusion of data analysis, the study confirmed that a positive significant correlation exists with respect to capital adequacy and the financial performance of DMBs. We note, however, that this finding is at variance with the works of Aruwa and Naburgi (2014) which revealed that the capital adequacy does not have any significant impact on financial performance.

Udom and Eze (2018) performed a test to confirm the relationship between capital adequacy and the corporate performance of Nigerian banks and established a correlation which shows the importance of capital adequacy in driving superior corporate performance for the affected financial institutions. The study adopted data obtained from regulators (CBN and NDIC) rather than the industry players to guarantee greater reliability of the research results. We note that this is consistent with the works of Olarewaju and Akande (2016) who found that capital adequacy measured by Equity to total assets significantly impacted profit performance of banks proxied by Return on Assets (ROA). Consistent with its findings, therefore, the study recommended that owners of deposit money banks should fashion out strategies to step up improvements in the levels of capitals maintained to ensure their long-run sustainability.

Ogbebor et al. (2019) evaluated the relationship subsisting between capital adequacy and profit performance measured by Return on Assets (ROA) of listed traditional banks in Nigeria. The researchers adopted the ex-post facto research methodology using data extracted from 14 Nigeria DMBs which were purposively selected while analysis was done using the instrumentality of the regression tool. The output result recognized that capital adequacy pointedly influenced the performance of the selected banks and it canvassed for improvements in regulatory oversights especially in the areas of regular review of capital levels required and resource monitoring. This study is, however, at variance with the findings of Alele et al. (2019) who documented that capital adequacy did not significantly influence the corporate performance of business entities.

Nguyen et al. (2020) empirically examined the effect that capital adequacy and associated variables had on the corporate performance of DMBs in Vietnam. The study covered the period of 2013–2018 and 31 commercial banks were purposively selected. While financial leverage coefficient and minimum capital adequacy ratios served as proxies for capital adequacy in the study, corporate performance was measured using returns on average total assets (ROTA), returns on equity (ROE) and net interest margin (NIM), respectively. Panel data obtained for the study were analyzed using multiple regression techniques, and findings from the study confirmed that capital adequacy had a positive effect on the corporate performance of the sampled financial firms. This research outcome even though mirrors the works of Abebe (2022) is, however, contradictory to the findings from the studies of Dao and Nguyen (2020) who using different test statistics determined that the association between capital adequacy and profitability is negative. Nevertheless, the study recommended a potpourri of strategies including increasing the quality of management and engaging in the systematic injection of equity capital as panacea for ensuring improvement in the corporate performance of firms.

Wassie (2021) examined the linkage between maintenance of optimal capital levels and the corporate performance of export firms operating in Ethiopia. The study adopted mainly the descriptive research design with 164 sampled firms selected using the stratified sampling technique. The collected data were subjected to analysis using the multiple regression technique. Conclusions from the study indicated that capital adequacy significantly impacted positively on the corporate performance of export firms. This is in alignment with the research outcome of Enitan (2019) and Aboussof and Belkaid (2021) who established that working capital measures positively impacted the corporate performance of firms. However, inventory conversion period as an index of the adequacy of capital for operational purposes exhibited a negative association with the performance of the firms. Consequently, the study recommended the adoption of more conservative measures to strengthen capital levels needed to support their performance.

Hassan et al. (2021) investigated the role that capital adequacy plays in driving performance of firms operating in the agricultural sector of Nigeria. Correlation and regression techniques were used to analyze data collected from the four quoted agricultural firms that formed the study sample while relevant post-estimation tests were carried out to validate the fitness of the models applied for the work. Findings from the study showed that while capital adequacy measured as liquidity structure significantly influenced corporate performance proxied by ROA, the introduction of firm size resulted in an insignificant effect on ROA. The study concluded by recommending that firms should design and implement deliberate strategies aimed at ensuring consistent build-up of capital and assets acquisition over time in order to enhance their performance.

### 3. Materials and methods

The study adopted the ex-post facto research design with secondary data obtained from the audited financial statements of the sampled firms for the period 2011–2020. The ex-post facto research methodology was adopted in view of its ability to facilitate establishment of cause and effect between the inquiry's variables without any manipulation by the researcher. This research period has been chosen based on data availability. A total of sixty-three (63) non-financial firms listed on the Nigerian Stock Exchange as at 31 December 2020 constituted the population out of which thirty-eight (38) were purposively selected per Table 1 as the sample of the study. It is to be noted that these firms constitute more than 60% of the total number of quoted firms existing within the study period.

Using quantitative means, the study examined closely the effect of capital adequacy on the corporate performance of listed non-financial firms operating in Nigeria with insights drawn from previous related studies (Ogbebor et al., 2019; Nguyen et al., 2020; Hassan, et al, 2021; Wassie, 2021). The resulting main model therefore is stated below:

$$CPP_{it} = f(CAD_{it}) \quad (1)$$

**Table 1. Distribution of non-financial firms**

S/N	Classification of companies	Total	Sample size
1	Oil and Gas	8	5
2	Natural Resources	4	2
3	Health Care	6	4
4	Agriculture	4	2
5	Consumer Goods	21	13
6	Industrial Goods	14	8
7	Conglomerates	6	4
	Total	63	38

Source: Authors Compilation (2022)



The linear expressions for the developed hypothesis for the study which included considerations for the introductions of firm size and firm age as control variables are as stated in the functional relationships below:

$$ROA = Y_1 = \beta_0 + \beta_1 CAR_{it} + \beta_2 ECA_{it} + \beta_3 DER_{it} + \beta_4 CIR_{it} + \beta_5 FSZ_{it} + \beta_6 FAG_{it} + \mu_{it} \quad (2)$$

$$ROE = Y_2 = \beta_0 + \beta_1 CAR_{it} + \beta_2 ECA_{it} + \beta_3 DER_{it} + \beta_4 CIR_{it} + \beta_5 FSZ_{it} + \beta_6 FAG_{it} + \mu_{it} \quad (3)$$

$$MPS = Y_3 = \beta_0 + \beta_1 CAR_{it} + \beta_2 ECA_{it} + \beta_3 DER_{it} + \beta_4 CIR_{it} + \beta_5 FSZ_{it} + \beta_6 FAG_{it} + \mu_{it} \quad (4)$$

where:

CPP = Corporate Performance

CAD = Capital Adequacy

ROA = Return on Assets

ROE = Return on Equity

MPS = Market Price Per Share

CAR = Capital Assets Ratio (TC/RWA)

ECA = Equity Capital/Total Assets Ratio

DER = Debt/Equity Ratio

CIR = Cost/Income Ratio, i.e. Operating Expense/Operating Income

FSZ = Firm Size

FAG = Firm Age

$\beta_0$  = Intercept

$\beta_1$ – $\beta_6$  = Coefficients

$\mu_{it}$  = error term

## 4. Results and discussion

### 4.1. Descriptive statistics

This section provides details of the descriptive statistics relating to the variables used for the study. There are 380 observations from 38 non-financial firms covering the 10 years represented in the study. Table 2 shows values of the mean, median, maximum, minimum, standard deviation, skewness and kurtosis for the respective variables in the study. As shown in Table 2, the average returns on assets (ROA) and returns on equity (ROE) of non-financial firms operating in Nigeria are 0.02 and 4.99, respectively. ROA ratio of above 1% is considered a good indication of modest returns; thus, the study's average return of 2% implies that on average, non-financial firms are able to generate returns from their operations in Nigeria. This also indicates that on an average, return on equity (ROE) is higher than return on assets (ROA) for non-financial firms in Nigeria. However, ROE appeared more volatile and unstable than ROA with a deviation of 81.91 from the mean (4.99), whereas ROA displayed better alignment with a deviation of 0.06 which compared

**Table 2. Descriptive statistics for the study variables**

	CAR	DER	ECA	CIR	MPS	ROA	ROE
Mean	20.55813	5.238070	0.516488	21.16667	16.69150	0.029290	4.99
Median	14.79490	5.759100	0.208200	21.00000	2.545000	0.032900	11.41
Maximum	51.70150	10.86390	2.884400	40.00000	182.0000	0.177300	334.3
Minimum	8.418900	0.934200	0.000000	2.000000	0.500000	-0.188600	-4.59
Std. Dev.	13.32548	2.363326	0.682331	9.697399	37.38681	0.064307	81.91
Skewness	1.594377	-0.420939	1.928849	-0.027073	3.175945	-1.108197	-2.076
Kurtosis	3.864581	2.809315	6.270409	2.279228	12.67257	6.230621	20.01
Observations	380	380	380	380	380	380	380

Source: Author's Computation (2022)

Table 3. Regression and diagnostic tests analysis for main model

Method	Pooled OLS			Fixed effects			Random effects		
	Coeff	t-stat	Prob	Coeff	t-stat	Prob	Coeff	z-stat	Prob
<b>Variables</b>									
C	0.311632	1.292941	0.1991	0.254635	0.476740	0.6347	0.304136	0.969362	0.3348
CAR	-0.1522	-1.30408	0.1953	-0.15108	-0.735388	0.4641	-0.16111	-1.0996	0.2743
ECA	-0.03732	-0.45403	0.6508	-0.01469	-0.126638	0.8995	-0.02563	-0.26575	0.7910
DER	0.042769	4.245414	0.0001	0.042237	4.582411	0.0000	0.042548	4.732997	0.0000
CIR	-2.90656	-0.62612	0.5327	9.118461	1.051917	0.2958	-2.57242	-0.47616	0.635
FSZ	-0.99161	-0.30332	0.7623	5.991221	1.223745	0.2244	0.170784	0.046258	0.9632
FAG	0.85434	2.13208	0.0356	1.08448	2.78859	0.0065	0.88323	2.34175	0.0213
<b>R-squared</b>		0.211434			0.443946			0.306144	
<b>Adj R<sup>2</sup></b>		0.186791			0.367249			0.281336	
<b>F-stat</b>		8.579980			5.788308			8.309593	
<b>Prob</b>		0.000042			0.000000			0.000057	
<b>Hausman Test:</b> $\chi^2_{(3)} = 0.0290$ (0.9987)									
<b>Breusch and Pagan LM test:</b> $\text{Chibar}_{(01)} = 22.856$ (0.0000)									
<b>Heteroskedasticity Test:</b> $\chi^2_{(3)} = 7.324$ (0.0623)									
<b>Serial Auto-Correlation Test:</b> $\chi^2_{(3)} = 35.950$ (0.0000)									
<b>Cross-sectional independence:</b> $F_{(4,5)} = 4.861$ (0.0000)									

DV (CPP); Obs: 380. \*Significant at 5%  
Source: Author's Computation 2022)

favorably with a mean of 0.02. Similarly, the minimum and maximum values of ROA are  $-0.18$  and  $0.17$  while that of ROE are  $-4.59$  and  $334.3$ , respectively. This suggests that there exists big gaps in profitability among non-financial firms in Nigeria. The variation is expected as the data were gathered across different industry segments, e.g. oil and gas, conglomerates and healthcare subsectors. This therefore does not pose any doubt on the reliability of the study's results and findings. For MPS, the descriptive result shows that the average price of stocks of the firms was  $16.69$  while the minimum and maximum prices stood at  $0.50$  (representing the nominal stock price) and  $182.00$  with a standard deviation of  $37.38$ . This suggests the existence of highly valued and lowly valued firms considered in the study.

In terms of skewness, the descriptive result shows that while CAR, ECA and MPS are positively skewed with values of  $1.59$ ,  $1.92$  and  $3.17$ , respectively, DER, CIR, ROA and ROE are negatively skewed with coefficients of  $-0.42$ ,  $-0.02$ ,  $-1.10$  and  $-2.07$ , respectively. While MPS had the longest tail to the right, DER had the longest tail to the left, implying that the dataset is not normally distributed. However, normal distribution of series is not a criterion for a panel data set such as the current study. Similarly, it can be observed from the table that the kurtosis for CAR, ECA, MPS, ROA and ROE is leptokurtic given that their coefficients are greater than 3 ( $3.86$ ,  $6.27$ ,  $12.67$ ,  $6.23$  and  $20.01$ , respectively). On the other hand, DER and CIR with the values of  $2.80$  and  $2.27$  are platykurtic, implying that they are of lower peaks and closest to normal distribution.

#### 4.2. Inferential statistics

Table 3 shows the outcome of the multiple regression analysis conducted as well as the series of diagnostic tests carried out to ascertain the fitness of the model. To establish the most appropriate estimation technique to employ, Hausman test was done. This test provided a basis for selecting one out of the pooled least squares, fixed effect and random effects options as the estimator for the study. Hausman test output indicates a value of  $0.0290$  with a probability of  $0.9987$  which exceeds the selected 5% level of significance adopted for the study. The import of this therefore is that the null hypothesis is accepted and the random effect option adopted accordingly. To further test for the validation of the use of the random effect estimation technique, the study conducted the Breusch–Pagan Lagrangian multiplier test. The result of this test was  $22.85$  with probability standing at  $0.000$ . This resulting probability is below the selected 5% level of significance, thus confirming the appropriateness of the random effect for the analysis.

Similarly, test for the presence of heteroskedasticity was carried out using the Breusch–Pagan test and the result revealed a probability value of  $0.0623$  which exceeds the 5% level of significance serving as benchmark for the study, thus implying an absence of heteroskedasticity. This means that variabilities in the values of the predicted variables are uneven when placed across the range of the predictor variables which therefore provides grounds for the acceptance of the null hypothesis by the study (Taiwo et al., 2021). Furthermore, in view of the panel nature of the study, a test of the cross-sectional dependence of the model was carried out using Pesaran's test. The outcome of the Pesaran's test of cross-sectional independence was  $4.861$  with a  $p$ -value of  $0.0000$  which is below the selected 5% level of significance benchmark for the work. This therefore affirms the existence of cross-sectional dependence in the study's model. To assess the level of serial correlation, the Breusch–Godfrey Serial Correlation LM test was adopted. The output result reported a value of  $35.951$  and an associated probability statistic of  $0.0000$  which is below the selected 5% level of significance benchmark for the work. This is therefore an affirmation of the existence of serial correlation problem in the model.

#### 5. Hypothesis validation

This study tests a null hypothesis that capital adequacy has no significant effect on corporate performance of non-financial firms operating in Nigeria. To validate or refute this claim, the value of the coefficient of the determination of the model and its associated overall  $f$ -test for the goodness of fit are used. From Table 3, the value of the R-squared (coefficient of determination) measures the percentage of variation in dependent variable accounted or captured by the independent variables.

The value is 0.281 (28%) and it implied that about 28% of total change in the measures of corporate performance (ROA, ROE, MPS) is explained by changes in the values of the included independent variables (capital assets ratio, equity capital to total assets ratio, debt equity ratio and cost to income ratio respectively). Also, the overall goodness of fit of the model (F-statistic) is 8.30 with P-value of 0.000. This indicates that the regression result is statistically significant because it is less than 0.05 (5%); therefore, the null hypothesis is rejected and the alternative hypothesis is accepted. By this, it is empirically established that the use of optimal levels of capital has significant effect on the corporate performance of listed non-financial firms operating in Nigeria.

With respect to the regression analysis conducted, the result revealed that Capital Adequacy (CAD) measured by the proxies of Capital Assets Ratio and Equity Capital/Total Assets Ratio (CAR & ECA) has a negative effect on Corporate Performance proxied by ROA, ROE and MPS while Debt Equity Ratio (DER) has positive impact on Corporate Performance. This output result is reflected in the signs of the coefficients which showed that  $\beta_1 = -0.161113 < 0$ ,  $\beta_2 = -0.025626 < 0$  and  $\beta_3 = 0.042548 > 0$ . The size of these coefficients shows that a unit increase in capital asset ratio by 1% would cause a 0.16% decrease in corporate performance. Also, an increase in equity capital to total asset ratio by 1% would cause a 0.025% decrease in corporate performance while an increase in debt to equity ratio by 1% would cause a 0.042% increase in corporate performance. However, CAR has a t-statistics of  $-1.099603$  and an associated p-value of 0.2743 which is greater than 0.05. The import of this is that effect is not significant. The second proxy, ECA, has a t-statistics of  $-0.265747$  and an associated p-value of 0.7910 which is greater than 0.05. The import of this is that effect is not significant. The third proxy, DER, has a t-statistics of 4.732997 and an associated p-value of 0.000 which is less than 0.05 which means that its effect on corporate performance is statistically significant.

Furthermore, the result of the regression analysis shows that when Capital Adequacy (CAD) is measured using the proxy of Cost to Income Ratio (CIR), it has negative effect on Corporate Performance (ROA, ROE and MPS). However, when Firm Size and Firm Age are introduced into the model, this has positive impact on corporate performance. This output result is reflected in the signs of the coefficients which showed that  $\beta_4 = -2.57 < 0$ ,  $\beta_5 = 0.171 > 0$  and  $\beta_6 = 0.88 > 0$ . The size of these coefficients shows that an increase in cost to income ratio by 1% would cause a 2.57% decrease in corporate performance. Conversely, a unit increase in total asset (firm size) by 1% would cause a 0.17% increase in corporate performance while a unit increase in firm age by 1 year would cause a 0.88% increase in corporate performance. Similarly, the p-value for firm age of 0.02 is less than 0.05 which means that its effect on corporate performance is statistically significant.

The Adjusted  $R^2$  stood at 0.281. This implies that within the context of the model used, the independent variables alongside their respective surrogates are responsible for 28% variations in corporate performance while the balance 72% is clarified by factors currently outside the model. In addition, the F-statistics of 8.30 with an associated probability value of 0.000057 implies that the model is statistically significant at 5%, thus the study concluded that capital adequacy has a significant impact on corporate performance of listed non-financial firms in Nigeria.

The findings of this study revealed that capital adequacy has significant impact on the corporate performance of listed non-financial firms operating in Nigeria and is in line with the theoretical consideration which stipulates that value maximizing managers will always seek to maintain capital levels that optimizes resources while minimizing associated costs of obtaining the capital. Furthermore, the research showed that while increases in equity capital to total assets ratio, capital adequacy ratio and cost to income ratios negatively affected corporate performance, increased positive use of debt in the capital mix of non-financial firms will have a positive effect on their respective corporate performance. This is in agreement with the works of Aboussof and Belkaid (2021) and Rashid (2020) who reported that capital adequacy positively related with firm's performance. However, the findings negate the report of Tulcanaza-Prieto et al. (2020) who opined that capital adequacy has no relationship with financial performance, and also the works of Aruwa

and Naburgi (2014), Alele et al. (2019) and Dao and Nguyen (2020) which revealed that the capital adequacy does not have any significant influence on financial corporate performance. Similarly, the study showed that firm size and firm age had a statistically significant positive impact in driving the corporate performance of quoted non-financial firms, implying that the bigger the firm and improved use of debt capital, the better the corporate performance of the firms. This implies that bigger non-financial firms will have easier access to debt capital with more competitive interest rates and are thus able to optimize their performance. This position is in line with the studies of Lekaaso et al. (2020) and Hassan et al (2021) and Melani et al. (2019) which reported that Capital Adequacy can have significant positive and negative effect on performance of non-financial firms depending on the size of affected companies.

## 6. Conclusion, implications and recommendations

This study sets out with the primary objective of empirically examining the effect of capital adequacy on the corporate performance of listed non-financial firms in Nigeria. Equity capital/total assets ratio, capital adequacy ratio, cost income ratio and debt equity ratios were employed as proxies for capital adequacy while returns on assets, return on equity and market price per share were used to measure corporate performance. The result of the regression analysis undertaken showed that while equity capital/total assets ratio, capital adequacy ratio and cost income ratio negatively affected corporate performance, debt equity ratio and firm size positively influenced the corporate performance of quoted non-financial firms operating in Nigeria. In particular, the study found that profitable use of debt capital in the capital mix of non-financial firms had a positive and statistically significant impact on their corporate performance.

Consequently, based on the outcome of the research, the study recommends that management and top executives of non-financial firms should explore opportunities inherent in profitable use of debt capital to further improve their performance and hence returns to their respective stakeholders. Secondly, regulators of non-financial firms operating in Nigerian should strengthen the risk management monitoring framework and overview their activities to ensure market discipline and balanced growth and development of the firms. Doing this will aid operational resilience of the affected firms. Furthermore, there should be continued reinvestment of retained earnings as a way to ensuring sustenance of capital adequacy of non-financial institutions. This will thus improve organizational buffer and minimize risk of corporate failure. Similarly, owners of non-financial companies should consider the deployment of other strategies to improve the level of capitals maintained with a view to ensuring their long run sustainability.

The results presented in this current study contributes to existing economic literature on the critical role of capital adequacy in driving both short-term and long-run sustainability of businesses with particular focus on non-financial entities. Non-financial entities by their nature often escape proper regulatory oversight in Nigeria and are therefore susceptible to defective corporate governance structures and poor business practices which ultimately culminates in weakened capital levels. The result of this inquiry indicates that business owners of non-financial firms must be willing to broaden the composition of their capital mix to include debt capital in the right proportion and volume as this will aid their overall business efficiency. Despite the contributions of the study to literature, the study has some limitations which can be explored and improved upon by future researchers. First, the study only considered listed non-financial business entities whereas there are a number of unlisted non-financial entities in Nigeria which also contribute significantly to its GDP. For example, players in the creative industry (music, arts and entertainment) may need to be given special attention in view of their rising importance. Secondly, other measuring proxies such as assets tangibility, retention ratio and sales growth can be incorporated to future models to validate and supplement the results of this investigation. Similarly, the enquiry can be extended to other African countries to provide insights as to their comparability or otherwise so as to aid national improvements.



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