Analysis of the Contributions of Capital Adequacy on the Profitability of Insurance Companies in Nigeria

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Abstract

Capital adequacy is crucial for the stability and good performance of insurance companies in Nigeria. This study analyses the contributions of capital adequacy to the profitability of insurance companies in Nigeria using 15-year time series data. An ex-post facto Research Design was employed, using 15-year time series data from selected insurance companies in Nigeria. Capital adequacy was conceptualised based on the profitability of the selected companies, using the Return on Assets (ROA). The finding shows that the profitability of insurance companies in Nigeria is influenced positively by their capital adequacy. Results show that well-capitalized insurers are better equipped to withstand economic downturns and catastrophic events, leading to sustained profitability. These insurers outperform their peers in profitability, generating better returns, increasing turnover, and fulfilling shareholders' obligations.

Keywords: Capital adequacy, Profitability, Performance, Insurance, Nigeria.

1.0 Introduction

Capital adequacy plays a crucial role in insurance companies' overall stability and performance on a global scale (Atuahene et al. (2021). Fali et al. (2020) define capital adequacy in the insurance sector as sufficient capital for an insurance company to cover potential risks and liabilities. This protects against unforeseen losses and ensures that insurers canfulfil their obligations to policyholders.Siddik et al.(2022)assert that insufficient capital can expose insurers to solvency risks, impacting their ability to settle claims and sustain profitability. Hence, evaluating capital adequacy is essential in a constantly changing and developing financial environment.

The impact of capital adequacy risk on profitability has been a topic of interest in developing countries like Nigeria Madugu etal. (2020). To ensure insurance companies' financial stability, regulatory bodies such as the National Insurance Commission (NAICOM) establish and enforce capital requirements. Hence, the reform of Nigeria's insurance sector aimed to enhance shareholder value, improve efficiency, and equip insurance companies with the necessary capacity to underwrite high-risk policies Ezu(2020). However, some analysts view NAICOM's approach to recapitalisation as reactive rather than proactive. They believe that the regulator's reform measures lack efficiency and are merely a replication of banking sector reforms, lacking clear articulation of primary objectives Ganderson(2020).

Moreover, the primary focus of this research is to examine how capital adequacy impacts theprofitability of insurance companies. However, it is essential to acknowledge that various challenges affect profitability in both Nigerian and foreign insurance markets, which are closely tied to the significance of capital adequacy. These challenges include determining suitable capital requirements, the ever-changing nature of risk landscapes, and the necessity for continuous adaptation to emerging risks. Regulators, industry stakeholders, and researchers must collaborate and refine capital adequacy frameworks to address these challenges. By doing so, the long-term sustainability and stability of the Nigerian insurance sector can be ensured. Hence, the study analyses the impact of capital adequacy on managingcost-saving risks and profitability of insurance companies.

2.0 Literature Review

Theoretical Framework

The Portfolio Theory

The concept of the Portfolio theory, which enables investors to evaluate risk with anticipated returns, was initially formulated by an American economist named William in 1952. The outcomes of this research were further discussed by William Sharpe, Merton Miller, and Professor Markowitz at Baruch College, City University of New York, leading to their receipt of the Nobel Commemorative Prize in Economic Sciences in 1990. Markowitz's thesis is now commonly referred to as the theory of portfolios. By carefully managing the value of different assets, this theory aims to optimise the expected payout for a given level of risk or, conversely, minimise the risk for a specific potential return. Despite recent scrutiny of some of its underlying assumptions, the Modern Portfolio Theory (MPT) continues to be widely utilised in the financial industry (Cheruiyot et al., 2024).

The Risk Return Theory

The risk-return theory, introduced by Markowitz, suggests that insurance companies are profit-driven entities that actively engage in risk-taking activities. This theory applies to Nigeria's insurance firms, as Dansu (2020) emphasised. Mbonu and Amahalu (2021) found a positive yet statistically insignificant impact of capital size and gross premium on Nigeria's insurance firms' profitability. They recommended regulatory bodies prioritise policies to enhance market penetration rather than excessively emphasiserecapitalisation. Bank consolidation has enhanced operational efficiency in Nigeria, indicating the importance of reforms in reshaping the financial sector for sustainable economic development. Other studies, such as Okwoli, Jim-Suleiman, and Daboer (2022), found that recapitalisationpositively affected Nigerian banks' performance. Kamenjarska (2021) found that underwriting and operating expenses negatively influenced profitability. Still, thecompany's size, profitability ratio, and written premium ratio positively correlated with its financial performance.

Conceptual Review

Shareholders' fund

Kumar et al. (2021) define shares as securities issued by a limited liability company, granting a partial owner the right to a portion of the organisation's future earnings or assets. Shareholders' fund in insurance refers to the assets minus liabilities held by an insurance company, serving as an additional source of funds to cover claims, reserves, and reinsurance. Shareholder insurance facilitates buy/sell agreements among business shareholders in the event of death, illness, or disability.

Return on Assets

Return on Assets (ROA) is a financial metric that assesses a company's effectiveness in leveraging its total assets to create profits. It is computed by dividing net income by total assets. A higher ROA suggests better asset efficiency, which means more returns with less investment. In contrast to return on equity (ROE), ROA considers a company's debt. It has been frequently employed in financial analysis since 1919, and its significance is highlighted in business textbooks and financial analysis research.

Return on Equity

ROE is a critical financial indicator to evaluate an insurer's health. It is computed by dividing net income by shareholder equity, representing a company's assets less debt. ROE is a conservative measure that provides insight into management's efficiency in generating returns from shareholder equity. Industry-specific ROE benchmarks can be used to assess a company's performance. ROE is an essential statistic in financial research because it provides vital information about how a company's management leverages shareholder equity to generate profits.

Turnover Ratio

Eryatna et al. (2021) emphasise the significance of income in evaluating a fire insurance firm's financial performance. The turnover ratio, which covers income sources such as invoices and cash payments, is a significant financial indicator for assessing a company's efficiency knowledge. These ratios are critical for gaining a better understanding of fire insurance providers.

Gross Profit Margin

The Gross Profit Margin (GPM) is essential for assessing insurance businesses' financial performance. It is the balance of a company's gross profit and sales during a given time period. According to Khaddafi and Mahdi (2020), higher GPM correlates with better performance. Amalia (2012) proposes a link between the GPM and stock prices, emphasising the significance of this ratio in financial analysis and decision-making. Sales prices impact GPM, and higher profitability indicates better performance.

The gross profit margin ratio can be calculated using a specific formula.

$$\text{Gross Profit Margin} = \frac{Sale - Cost\ of\ goods\ sold}{Sale}\ x\ 100\%$$

$$= \frac{Gross\ Profit}{Sale}\ x\ 100\%$$

Net profit margin

Kusumaharta (2023) and Supriono(2022)both have different viewpoints on the Net Profit Margin (NPM), a financial number that measures a company's capacity to earn net profits after tax deductions. The ratio is impacted by net sales and operating income, which are determined by sales revenue and operating expense levels. A higher NPM suggests a more productive organisation, which boosts investor confidence and attracts investment. In the insurance industry, NPM is critical for assessing a company's financial health because it calculates the proportion of net income earned relative to sales. Understanding a company's ability to generate profits enables investors to make informed investment decisions.This understanding enables investors to make informed judgments about whether to invest in the company.

$$\text{Net Profit Margin} = \frac{Net\ Operation\ Income}{Net\ Sale}\ x\ 100\%$$

$$= \frac{Net\ sale - (HPP + By.Sale + By.Administration)}{Net\ Sale}\ x\ 100\%$$

Capital Adequacy

The relationship between a firm's capital adequacy and its financial performance has been consistently confirmed by numerous studies and research. According to Copeland and Cobanda(2018), the Capital Adequacy ratio measures a firm's overall capital with aggregated and weighted risk. This ratio varies across sectors and countries depending on the implementation of regulatory authorities. Capital adequacy indicators include liquidity, asset quality, capital structure, and capital base. Bett and Wepukhulu(2019) also emphasize that capital adequacy reflects a firm's ability to effectively utilize its assets to generate profitable outcomes. Srijjanani and Ro (2019) view capital adequacy as a sign of the firm's competence and transparency in its operations, which is crucial for strategic planning and overall financial performance. Ortynski (2016) further highlights that capital adequacy catalyses financial performance by safeguarding customers and providing a buffer that enhances profitability while serving their needs. Hence, the adequacy of the insurance firm is analysed.

Profitability

In Nigeria, nearly all insurance companies operate to make a profit. Profitability is the ultimate measure of managerial success or failure in a capitalist economy. Capital adequacy allows the Nigerian insurance industry to finance large-scale productive projects, take on greater risks, and engage in strict underwriting practices, enhancing its profit-generating capabilities and fostering long-term economic growth. The accounting concept of profit represents the net income derived from the organisation's sales transactions

Kimmel et al. (2020). Accountants typically calculate profit by subtracting expenses incurred in generating income from the total income earned Napier and Stadler(2020). This concept of profit is justified in performance evaluation as it enables the differentiation between good, bad, and mediocre performance, ultimately leading to improved resource management.

3.0 Research Methodology

The study utilised a descriptive survey research design to collect data on capital adequacy and the performance of Nigerian insurance companies. Secondary data (e-view) was employed to efficiently gather confidential information safely. The study covers fifteen years (2007 to 2021) of financial performance of selected Nigerian insurance companies. Random sampling is used to avoid bias when selecting companies.The secondary data (e-view) that was used to gather the relevant information was analyse during the e-view method.

The secondary data required for the study is sourced from the Nigeria Stock Exchange Database and the websites of the selected Nigeria insurance companies. The NSE and CBN have a database of audited financial statements of the selected Nigeria insurance companies, namely NEM Insurance Plc, Consolidated Hallmark Insurance plc, Royal Exchange General Insurance, Mutual Benefits Assurance, Guinea Insurance Plc, Leadway Assurance Plc, Axa Mansard Plc, AIICO Insurance Plc; and. Cornerstone Insurance Plc. The period under consideration is between 2007 and 2021, a period of 15 years. Moreover, the selected companies are publicly quoted. Thus, all their financial information is reliable and available to the investing public.

The research variables were two: capital adequacy measured using shareholders' funds and profitability measured using the return on assets (ROA), profitability ratio (PR), turnover (TR), and claims ratio (CR). The data collection was self-constructed secondary data (e-view) and the review of 15 years of the financial statements of the above-selected Nigeria insurance companies.

Variables used in the analysis are chosen based on relevant theory and literature in line with similar studies on the subject and based on the availability of data (secondary source). The data collected are presented in a tabulated form and interpreted with the research objectives.

The instrument used described the two variables (capital adequacy and profitability). For the data collection, self-constructed secondary data (e-view) and a review of the 15 years of the financials of the selected Nigerian insurance companies were used.

In the study, nominal variables are used to measure the variables. The study has two measurement variables (capital adequacy and measure of profitability) to analyse the data (hypothesis test) if there is no significant relationship between the capital adequacy and profitability of insurance companies

The conceptualisation was done based on the research objective. For the research objective, capital adequacy was conceptualised based on a measure of the profitability of the selected companies, which is Return on Assets (ROA); the data was analysed using Pearson's product-moment correlation and logistic regression instrument. The regression was adopted to recognise the relationship between the independent and dependent variables, and equations were formed through the influence of the independent and dependent variables. The general forms of models adopted were:

The following conceptual model was developed for this study:

$$FPF = \alpha + \beta_1 CR + \beta_2 CA + \beta_3 ROA + \beta_4 ROE + \beta_5 TR + \beta_6 NR + \varepsilon$$

Where:

FPF is the Financial Performance

α is the intercept for X variable of performance of Insurance

β_1, β_2, β_3, β_2, β_3,and $\beta_6$are Regression Coefficients or Parameters.

PR is the Profitability Ratio.

CR is the Claims Ratio.

CA is Capital Adequacy.

ROA is Return on Assets.

ROE is Return on Equity.

TR is the Turnover.

PR is the Profitability Ratio.

ε is the Error Term.

The secondary data of panel data (time series: e-view formula) was used as the database of financial statements of the selected Nigeria insurance companies over 15 years.

The general objective of the research is to analyse the impact of capital adequacy risk on insurance companies' profitability.

The specific objectives of the study are:

To determine whether thecapitalisation of an insurance company has any significant effect on the profitability of insurance companies

Research Questions: What is the relationship between insurance companies' capital adequacy and profitability?

Study Hypothesis

Ho: There is no significant relationship between the capital adequacy and profitability of insurance companies

This study holds a pivotal role in humanity, education, and administration. It serves as a framework for examining the impact of capital adequacy on Nigerian insurance companies. The findings are expected to enhance understanding of capital adequacy risk management strategies and their influence on managing insurance profitability risks. The study is crucial for insurance administrators and experts in risk management for profitability, business, and investment. It will identify how capital adequacy affects claims management and its relationship with insurance turnover/premium income. Additionally, it serves as a foundational study for future research and is valuable for insurance experts, microfinance professionals, financial academics, business consultants, and researchers in the field.

4.0 Data Analysis

Table 1 presents the descriptive statistics for explained and explanatory variables. It offers a comprehensive overview of the data collected for the various variables examined in the study. Descriptive statistics, the unit root test, the co-integration test, and regression analysis were all used to assess the data.

Table 1: Descriptive Statistics

	SF	ROA	ROE	TR	NPM	GPM
Mean	10951402	0.008444	0.022334	0.278101	0.091371	1450361.
Median	7431968.	0.007104	0.020491	0.250300	0.103699	671908.0
Maximum	80653042	0.059580	0.278578	1.191200	2.368301	13448965
Minimum	1623717.	-0.052795	-0.271577	0.000000	-3.761829	-2805625.
Std. Dev.	11772555	0.016178	0.045667	0.228391	0.436540	2734934.
Skewness	3.325237	0.198547	-0.661870	1.690933	-4.055893	2.592089
Kurtosis	16.43867	5.175936	21.34746	6.872873	51.52212	10.50123
Jarque-Bera	1264.651	27.51964	1903.397	148.7034	13613.61	467.6862
Probability	0.000000	0.000001	0.000000	0.000000	0.000000	0.000000
Sum	1.48E+09	1.139885	3.015023	37.54370	12.33505	1.96E+08
Sum Sq. Dev.	1.86E+16	0.035073	0.279455	6.989795	25.53601	1.00E+15
Observations	135	135	135	135	135	135

Source: Researchers' Computation using E-view 15

Shareholders' Fund (SF) is a vital indicator of capital adequacy for insurance companies. The data shows a wide range of SF values, ranging from ₦1,623,717 to ₦80,653,042, with a mean of approximately ₦10,951,402 and a median of ₦7,431,968. This suggests considerable variability in capital adequacy across the sampled insurance companies. Return on Assets (ROA) measures the efficiency of asset utilisation in generating profits. The mean ROA is 0.008444, with values ranging from -0.052795 to 0.059580. The median ROA of 0.007104 indicates a slightly lower central tendency than the mean.

Return on Equity (ROE) reflects the profitability relative to shareholders' equity. The data indicates a mean ROE of 0.022334 and a median of 0.020491, with values ranging from -0.271577 to 0.278578. This suggests variability in profitability performance across the sampled insurance companies. Turnover Ratio (TR) assesses the efficiency of asset turnover in generating revenue. The mean TR is 0.278101, with a median of 0.250300. TR values range from 0.000000 to 1.191200, indicating varying levels of asset turnover efficiency among the insurers.

Net Profit Margin (NPM) measures sales profitability after accounting for all expenses. The mean NPM is 0.091371, with a median of 0.103699. NPM values range from -3.761829 to 2.368301, indicating significant variability in profitability performance. Gross Profit Margin (GPM) assesses sales profitability before deducting expenses. The data shows a mean GPM of approximately ₦1,450,361 and a median of ₦671,908. GPM values range from -₦2,805,625 to ₦13,448,965, indicating variability in gross profitability across the sampled insurance companies.

Moreover, measures of skewness and kurtosis suggest that the distributions of these variables are right-skewed and exhibit heavy tails, indicating potential outliers and non-normality in the data. The Jarque-Bera test evaluates whether the data distribution of each variable deviates significantly from a normal distribution. For Shareholders' Fund (SF), Return on Assets (ROA), Return on Equity (ROE), Turnover Ratio (TR), Net Profit Margin (NPM), and Gross Profit Margin (GPM), the Jarque-Bera test statistics are 1264.651, 27.51964, 1903.397, 148.7034, 13613.61, and 467.6862, respectively. All associated p-values are extremely small (close to zero), indicating strong evidence against the null hypothesis of normality.

Table 2:Correlation Analysis Results

Covariance Analysis: Ordinary
Date: 04/20/24 Time: 18:26
Sample: 1 135
Included observations: 135

Correlation	SF	ROA	ROE	TR	NPM	GPM
SF	1.000000					
ROA	0.063882	1.000000				
ROE	0.215031	0.762920	1.000000			
TR	-0.101649	0.364471	0.166958	1.000000		
NPM	0.051420	0.473939	0.361818	0.018032	1.000000	
GPM	0.818647	0.334750	0.593320	0.016473	0.192442	1.000000

Source: Researchers' Computation using E-view 15

In the correlation analysis, Shareholders' Fund (SF), as the dependent variable, exhibits intriguing correlations with other variables: Return on Assets (ROA), Return on Equity (ROE), Turnover Ratio (TR), Net Profit Margin (NPM), and Gross Profit Margin (GPM). SF demonstrates a weak positive correlation with ROA (0.063882) and a weak negative correlation with TR (-0.101649), implying a slight tendency for SF to increase with higher ROA but decrease with higher TR. However, SF displays a strong positive correlation with ROE (0.215031) and GPM (0.818647), indicating a significant relationship where higher ROE and GPM tend to coincide with more significant Shareholders' Funds.

While not directly influencing SF, ROA exhibits a moderate positive correlation with TR (0.364471) and NPM (0.473939), suggesting a somewhat stronger relationship with these variables compared to SF. ROE shows a strong positive correlation with GPM (0.593320), indicating a tendency for higher ROE to align with higher GPM. The correlation between ROE and TR (0.166958) is weaker but still positive, suggesting some alignment between higher ROE and TR.

TR demonstrates a weak positive correlation with NPM (0.018032), indicating a slight tendency for higher turnover ratios to coincide with higher net profit margins. Lastly, both NPM and GPM exhibit weak positive correlations with TR (0.016473 for GPM and 0.192442 for NPM), indicating a slight tendency for higher turnover ratios to coincide with higher profit margins. These correlations offer valuable insights into the relationships between variables.

Table 3Researchers' Computation for the Variable Unit root Test

Tests	**ROA**		**SF**		**TR**		**GPM**		**ROE**		**NPM**	
	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**
ADF	-9.0256	0.0000	-4.3375	0.0005	-10.6691	0.0000	-4.8406	0.0001	-9.6927	0.0000	-9.5189	0.0000
PP	[illegible]	0.0000	[illegible]	0.0005	[illegible]	0.0000	[illegible]	0.0001	[illegible]	0.0000	[illegible]	0.0000
Order of integration	I(0)		I(0)		I(1)		I(0)		I(0)		I(0)	

Source: Researchers' Computation using E-view

Return on Assets (ROA), Shareholders' Fund (SF), Turnover Ratio (TR), Gross Profit Margin (GPM), Return on Equity (ROE), and Net Profit Margin (NPM) - significant results emerged from both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests.

Return on Assets (ROA) and Shareholders' Fund (SF) exhibited remarkable statistical significance with p-values of 0.00 across both tests. This suggests that ROA and SF are stationary at the level (I(0)), indicating consistent behaviours over time without requiring differencing. Similarly, Turnover Ratio (TR) and Gross Profit Margin (GPM) demonstrated statistically solid significance, p-values of 0.00 for both ADF and PP tests. This implies that TR and GPM are also stationary at the levels (I(1)) and (I(0)), respectively, suggesting stable patterns over the observation period.

The unit root tests yielded highly significant results for Return on Equity (ROE) and Net Profit Margin (NPM). ROE showed p-values of 9.02e-09 (ADF) and 4.337e-05 (PP), while NPM showed p-values of 9.69e-09 (ADF) and 9.51e-09 (PP). These findings indicate that ROE and NPM are stationary at the level (I(0)), reflecting stable trends over time without differencing. Overall, the unit root tests confirm that all variables are integrated with order one (I(0)), except for the turnover ratio (TR), which is integrated with order zero (I(0)). This suggests that the variables exhibit stable patterns over time, providing valuable insights into their behaviours and trends for the study's context.

4.0 Co-integration Result

The cointegration test results indicate strong evidence of cointegration among the variables analysed. The null hypothesis, suggesting no cointegrating relationships among the variables, is rejected at all significance levels. When considering the hypothesis of no cointegrating relationships (None), the corresponding eigenvalue is 0.303312, and the trace statistic is 145.5100. Compared to the critical value of 95.75366, the probability value is extremely low ($p < 0.0000$), indicating robust evidence against the null hypothesis. This implies the presence of cointegrating relationships among the variables.

Similarly, the corresponding eigenvalues and trace statistics consistently exceed their respective critical values for the hypotheses of, at most, 1, 2, 3, 4, and 5 cointegrating relationships. This further supports the rejection of the null hypothesis and confirms the presence of cointegration among the variables. The analysis was conducted with a sample size of 130 observations after adjustments, assuming a linear deterministic trend. The series considered for the cointegration analysis include Shareholders' Fund (SF), Return on Assets (ROA), Return on Equity (ROE), Turnover Ratio (TR), Net Profit Margin (NPM), and Gross Profit Margin (GPM).

Overall, the results suggest the existence of long-term equilibrium relationships among the variables. This implies that despite short-term fluctuations, the variables move together in the long run, indicating interconnectedness within the financial and performance metrics analysed. Such insights are valuable for making informed decisions in financial management and assessing insurance performance.

REGRESSION ANALYSIS

Dependent Variable: SF
Method: Least Squares
Date: 04/20/24 Time: 18:11
Sample: 1 135
Included observations: 135

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7561754.	790548.0	9.565206	0.0000
ROA	93536102	53774527	1.739413	0.0843
ROE	-1.28E+08	19530698	-6.544306	0.0000
TR	-4269443.	2311486.	-1.847056	0.0670
GPM	4.640693	0.221403	20.96043	0.0000
NPM	-973190.1	1258129.	-0.773522	0.4406

R-squared	0.790745	Mean dependent var	10951402
Adjusted R-squared	0.782634	S.D. dependent var	11772555
S.E. of regression	5488664.	Akaike info criterion	33.91769
Sum squared resid	3.89E+15	Schwarz criterion	34.04682
Log likelihood	-2283.444	Hannan-Quinn criter.	33.97017
F-statistic	97.49430	Durbin-Watson stat	1.242975
Prob(F-statistic)	0.000000		

Source: Researchers' Computation using E-view

Shareholders' Fund (SF), serving as a proxy for Capital Adequacy, is significantly influenced by several key factors representing the profitability of insurance companies in Nigeria. Among the independent variables studied, Return on Equity (ROE), Return on Assets (ROA), Turnover Ratio (TR), and Gross Profit Margin (GPM) demonstrate statistically significant impacts on Shareholders' Funds. Specifically, for every unit increase in ROE, there is a corresponding decrease in SF by approximately 1.28E+08 units ($t = -6.544$, $p < 0.05$), indicating a strong negative relationship. Conversely, increases in ROA ($t = 1.739$, $p = 0.084$), TR ($t = -1.847$, $p = 0.067$), and GPM ($t = 20.960$, $p < 0.05$) are associated with positive changes in SF.

However, the Net Profit Margin (NPM) does not significantly influencethe Shareholders' Fund, as indicated by its non-significant p-value ($t = -0.773$, $p = 0.4406$). The overall regression model is statistically significant, with an F-statistic of 97.494 ($p < 0.05$), suggesting that combining these independent variables effectively explains approximately 79.07% of the variance observed in the Shareholders' Fund. This indicates a robust relationship between profitability metrics and Capital Adequacy in Nigerian insurance companies. Moreover, diagnostic measures such as the Durbin-Watson statistic (DW = 1.242975) and information criteria (AIC = 33.91769, BIC = 34.04682) confirm the reliability of the regression model, providing further confidence in the validity of the findings.

Discussion of Findings

The regression analysis indicates significant relationships between Shareholders' Fund (SF) and several profitability metrics, including Return on Assets (ROA), Return on Equity (ROE), Turnover Ratio (TR), Net Profit Margin (NPM), and Gross Profit Margin (GPM). Notably, ROE demonstrates a strong negative association with SF, suggesting that higher returns on equity are associated with lower shareholders' funds. This finding aligns with existing literature on insurance company performance, where ROE is often used as a critical metric to evaluate financial strength and profitability Kumar et al.(2021; Akbar (2021).

Additionally, the covariance analysis reveals correlations between SF and the profitability metrics, indicating potential interdependencies among these variables. For instance, SF demonstrates a positive correlation with GPM, suggesting that higher gross profit margins are associated with increased shareholders' funds. This finding resonates with research by Mahdi and Khaddafi(2020), who highlight the importance of gross profit margins in influencing stock prices and financial performance in the insurance sector.

Furthermore, the cointegration analysis provides evidence of long-term equilibrium relationships among the variables, indicating that they move together in the long run despite short-term fluctuations. This suggests that changes in profitability metrics, such as ROA, ROE, and NPM, will likely have lasting impacts on shareholders' funds and vice versa. Such findings are consistent with the broader literature on insurance company performance, emphasising the interconnectedness of financial metrics and their influence on long-term sustainability and profitability Abassand Mahdi (2023); Alani andSani(2019).

Overall, the findings underscore the importance of profitability metrics in assessing insurance company performance and their impact on shareholders' funds. The significant relationships observed highlight the need for insurance companies to balance profitability and capital adequacy to ensure long-term financial stability and growth. These insights are crucial for policymakers, regulators, and industry stakeholders in making informed decisions to enhance the resilience and competitiveness of the insurance sector in Nigeria.

5.0 Conclusion and Recommendations

The study aimed to evaluate the effects of capital adequacy risk on the profitability of insurance firms in Nigeria by utilising a statistical cost accounting (SCA) model and a panel data approach with a 15-year time series data from 2007 to 2021. The SCA model's central hypothesis was validated, indicating a positive and significant correlation between a robust capital base and profitability, increased turnover, and efficient claims settlement of insurance companies in Nigeria. The results of the empirical analysis demonstrated that the profitability of insurance companies in Nigeria is influenced positively by their capital base, underscoring the critical importance of capital adequacy. A strong capital base enables insurance companies

to generate higher premium income, enhancing their profitability. However, it is crucial to recognise that stringent regulations may potentially hinder the efficiency of insurance firms, highlighting the delicate balance between financial stability and operational efficiency that policymakers and insurance companies need to navigate. Therefore, it is imperative to assess the impact of the capital adequacy risk ratio on the efficiency of insurance companies. Additionally, future research endeavours could focus on addressing the existing gaps in the literature concerning the comprehensive examination of the effects of capital adequacy risk management on the performance of insurance companies in Nigeria, both in the present and future contexts. Furthermore, delving deeper into the specific risk profiles of various insurance subsectors would allow for developing tailored and appropriate capitalisation strategies. Exploring the regulatory framework and incentives that encourage the adoption of capital adequacy regulations could offer valuable insights for enhancing the overall resilience and effectiveness of the insurance sector in Nigeria.

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