Risk Based Capital and Performance of Insurance Companies in Nigeria

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ABSTRACT

The stability and financial performance of insurance companies are critical to economic development, one of the key regulatory tools used to ensure the soundness and solvency of insurance firms is Risk-Based Capital (RBC), which require insurers to hold capital proportionate to the specific risks they face. This study investigates the impact of RBC on the financial performance of insurance companies in Nigeria, with a focus on three core performance indicators: Return on Equity (ROE), Return on Assets (ROA), and Earnings per Share (EPS). The study adopted an ex-post facto research design and applied judgmental sampling to select five insurance companies operating in Nigeria. Panel data were extracted from the audited financial statements of these companies over a 14-year period (2010–2023). Using panel data regression techniques, the Random Effects Model was employed to estimate the relationship between RBC and firm performance across the selected indicators. The empirical results revealed that RBC has a positive and statistically significant effect on EPS at the 5% level of significance ($\beta = 5.5803$; $p = 0.0210$), implying that increased capital adequacy, when aligned with risk exposures, enhances shareholder value through improved earnings per share. However, the effect of RBC on ROE ($\beta = 0.2411$; $p = 0.6250$) and ROA ($\beta = 0.6003$; $p = 0.4411$) was found to be negative and statistically insignificant, suggesting that while RBC may contribute to capital stability, it does not necessarily lead to higher profitability or better asset utilization in the short term. The study concludes that RBC has differentiated effects across financial performance metrics and should not be viewed merely as a compliance requirement. Rather, insurance firms should strategically align capital adequacy practices with broader financial performance goals. The study recommends that insurance companies adopt risk-sensitive capital management practices as a tool for strengthening long-term value creation and investor confidence.

Keywords: Risk-Based Capital, Insurance Performance, Return on Equity, Return on Assets, Earnings per Share

INTRODUCTION

The financial performance of Nigerian insurance firms over the years has remained a growing concern, as many companies continue to exhibit weak profitability, under-reserving, and suboptimal asset utilization, despite decades of regulatory reforms and capital consolidation (Olaleye & Adeagbo, 2023; Kerim, Alaji, & Innocent, 2019). This persistent underperformance raises fundamental questions about the efficacy of traditional capital regulation and the sustainability of insurance operations within the Nigerian financial system. Although several studies have explored corporate performance and capital structure broadly (Sadiq & Jumoke, 2017), there remains a paucity of insurance-specific evidence in the Nigerian context. A critical element influencing the financial health of insurers is capital structure, the composition of funding sources that includes both equity and liabilities. For insurance firms, capital structure extends beyond the conventional debt-equity framework to encompass technical provisions, including policyholder claims, accruals, and reserves (Florio & Leoni, 2017; Eling & Marek, 2014). These provisions, particularly non-interest-bearing liabilities, carry significant opportunity costs, which, if improperly managed, may affect profitability and solvency (Dhaene et al., 2017). Hence, determining the optimal capital structure that balances operational risk, regulatory compliance, and profitability is crucial for insurers in developing economies.

To address these structural concerns, insurance regulators globally and in Nigeria have embraced Risk-Based Capital (RBC) models. Unlike static capital thresholds, RBC aligns capital requirements with the risk exposure of an insurer across underwriting, investment, operational, and market activities (Cheng & Weiss, 2012a). The goal is to enhance solvency protection for policyholders, promote better risk management, and ensure long-term financial resilience. While RBC has become an international benchmark for solvency regulation, its effectiveness in improving financial outcomes, particularly in emerging markets with evolving risk systems and low insurance penetration, remains underexplored (Ghimire & Thorburn, 2020).

Existing literature presents divergent views on the performance implications of capital structure. Some researchers find a positive relationship between leverage or capital adequacy and firm performance (Fosu, 2013; Cheng & Weiss, 2012b), while others identify negative or insignificant effects (Avci, 2016; Davydov, 2016; Chadha & Sharma, 2015). These inconsistencies may be attributed to variations in methodology, scope, and, more critically, inadequate proxies for capital structure that do not reflect the unique attributes of insurance firms. To bridge this gap, this study utilizes the Technical Provision Ratio (TPR) as a proxy for capital structure. TPR represents the ratio of total liabilities (including reserves, claims, and accruals) to total assets and is more reflective of insurers' capital realities (Shim, 2010; De Haan & Kakes, 2010). Furthermore, traditional performance metrics such as Return on Assets (ROA) and Return on Equity (ROE), though widely used, may not fully capture the strategic positioning and shareholder value of a firm. Earnings per Share (EPS), often underutilized in insurance research, offers a unique perspective on profitability and investor attractiveness. EPS is particularly useful in valuation, executive compensation, and mergers and acquisitions, critical factors in the strategic management of insurers (Berger & Patti, 2006; Margaritis & Psillaki, 2007).

This study therefore investigates the effect of Risk-Based Capital (RBC), as measured by TPR, on the financial performance of insurance companies in Nigeria, using ROE, ROA, and EPS as performance indicators. The data spans the period 2010 to 2023, chosen to reflect the post-consolidation phase in the Nigerian insurance industry, when firms had regularized their capital positions and financial reporting formats. This timeline captures key regulatory shifts, including IFRS adoption and NAICOM's intensified solvency monitoring. The study contributes to the literature by offering an industry-specific evaluation of capital structure under a risk-sensitive regulatory framework, and by integrating multiple performance dimensions often ignored in previous works. In doing so, it provides fresh insights for policymakers, investors, and scholars into how capital adequacy requirements influence the financial outcomes of insurers in developing markets. The remaining parts of the paper are discussed under literature review, data and methodology, results and discussion, and conclusion.

LITERATURE REVIEW

2.1 Risk-Based Capital (RBC)

Risk-Based Capital (RBC) refers to a dynamic capital adequacy framework designed to ensure that insurance companies maintain sufficient capital in proportion to the specific risks they assume. Unlike traditional fixed capital requirements, which prescribe a uniform minimum irrespective of risk exposure, RBC frameworks adjust capital thresholds based on the insurer's underwriting, market, credit, and operational risk profiles (Cheng & Weiss, 2012a; Florio & Leoni, 2017). The core objective is to safeguard policyholders by reducing the probability of insurer insolvency, especially during periods of financial stress (Falade & Oyedokun, 2022). RBC has gained prominence globally as a more robust solvency regulation tool, capable of promoting financial system stability through tailored risk assessment. Oyugi and Mutuli (2014) affirm that RBC requires higher capital buffers from riskier insurers, thereby enforcing discipline in risk management and encouraging prudent capital allocation. It replaces the "one-size-fits-all" approach of non-risk-based capital (NRBC) models with a responsive mechanism that internalizes firm-specific vulnerabilities. In the Nigerian context, RBC is being gradually implemented under the supervision of the National Insurance Commission (NAICOM). The regulatory shift emphasizes ongoing solvency assessment and introduces capital requirements that are responsive to the unique risk exposures of individual insurers rather than static benchmarks. This evolution is expected to align Nigerian insurers more closely with international best practices in solvency regulation and risk governance (Ghimire & Thorburn, 2020).

2.2 Technical Provisions and Capital Structure in Insurance Firms

In insurance finance, capital structure extends beyond the traditional debt-to-equity paradigm often applied in corporate finance literature. Unlike conventional firms, insurers rely on a dual-capital framework comprising owner's equity and technical provisions, the latter consisting of both interest-bearing and non-interest-bearing liabilities (Dhaene et al., 2017). These provisions include outstanding claims, insurance funds, policyholder reserves, and accruals, forming the core financial obligations through which insurers meet their commitments to policyholders and manage underwriting risk (Eling & Marek, 2014). For the purpose of this study, capital structure is operationalized through the Technical Provision Ratio (TPR), defined as the ratio of total technical provisions to total assets. TPR serves as a practical proxy for Risk-Based Capital (RBC), capturing the degree to which insurers' operations are supported by internally retained reserves and liabilities aligned with assumed risks (Shim, 2010; De Haan & Kakes, 2010). As RBC frameworks emphasize the alignment of capital with risk exposure, TPR offers a nuanced reflection of capital adequacy under varying financial and operational stress conditions.

From a performance perspective, technical provisions, especially non-interest-bearing liabilities such as outstanding claims and accrued expenses, carry implicit opportunity costs, including limited liquidity, forgone investment returns, and diminished financial flexibility (Dhaene et al., 2015). While essential for solvency protection and regulatory compliance, overly conservative or misaligned technical provisions can erode capital efficiency and negatively impact key performance indicators such as Return on Assets (ROA), Return on Equity (ROE), and Earnings per Share (EPS). Florio and Leoni (2017) conclude that treating technical provisions as a central element of capital structure rather than a separate accounting obligation enables a more accurate and risk-sensitive assessment of an insurer's financial health. In this context, the present study employs TPR not merely as a regulatory compliance metric, but as a strategic indicator of how well capital structure supports operational performance in Nigeria's evolving insurance landscape.

2.3 Return on Assets (ROA)

Return on Assets (ROA) is a key indicator used in financial literature to assess a firm's efficiency in converting its total assets into net income. It is widely recognized in insurance performance analysis as it captures both underwriting outcomes and investment returns, two primary functions of insurers (Berger & Patti, 2006). ROA is calculated as the ratio of net income to total assets and is considered a holistic measure of managerial effectiveness in asset utilization (Florio & Leoni, 2017). Within the insurance context, scholars like Dhaene et al. (2017) and Eling and Marek (2014) argue that ROA is particularly important due to the capital-intensive nature of the business and the critical role of asset investment in overall profitability. In emerging markets, De Haan and Kakes (2010) observed that a firm's capital structure significantly affects ROA, particularly when insurers rely heavily on technical provisions as a source of internal funding. Empirical studies such as those by Cheng and Weiss (2012a) and Fosu (2013) found mixed results, with some suggesting a positive influence of capital structure on ROA, while others observed negative or insignificant relationships, depending on market conditions, regulatory frameworks, and asset allocation strategies.

2.4 Earnings Per Share (EPS)

Earnings per Share (EPS) represents the amount of earnings available to each unit of common stock and is a widely used metric in corporate finance to assess profitability and shareholder value. It is computed as net income minus preferred dividends, divided by the weighted average number of shares outstanding. While not as frequently employed as ROE or ROA in insurance-specific studies, EPS has gained scholarly attention for its strategic relevance in investment decisions and firm valuation (Berger & Patti, 2006; Margaritis & Psillaki, 2007). EPS is often used to evaluate the attractiveness of a company to investors and its ability to generate sustainable returns on a per-share basis. Sarfaraz et al. (2021) argue that in the context of capital adequacy frameworks, EPS may serve as a more precise indicator of how well capital is being converted into shareholder returns, especially under stringent regulatory environments like Risk-Based Capital regimes. Despite its limited use in traditional insurance performance literature, recent studies including Yaudil et al. (2023) and Akpan et al. (2020) have begun to incorporate EPS into performance models, recognizing its growing relevance for stakeholders, particularly in emerging insurance markets where market capitalization and share performance are gaining prominence.

2.5 Return on Equity (ROE)

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Return on Equity (ROE) is a foundational profitability measure that reflects how effectively a company is using shareholders' equity to generate profit. Defined as net income divided by equity, ROE is frequently used in insurance literature to evaluate firm performance, solvency resilience, and capital efficiency (Fosu, 2013). In capital structure theory, higher equity levels should support greater financial stability, yet the relationship between equity and profitability is not always linear. For instance, Modigliani and Miller's (1958) irrelevance theory suggests that under perfect market conditions, capital structure has no impact on firm value, but subsequent theories—such as the trade-off theory and pecking order theory—acknowledge that capital composition can influence firm performance depending on the cost of capital and information asymmetry (Jensen & Meckling, 1976; Myers & Majluf, 1984). Empirical findings on the impact of capital adequacy on ROE have been inconclusive. While Cheng and Weiss (2012b) and Lai (2011) reported a positive association between capital strength and ROE in developed markets, studies by Avci (2016), Chadha and Sharma (2015), and Akpan et al. (2017a) observed either a negative or non-significant impact in developing economies. These variations may be explained by firm-specific factors such as governance structure, investment strategy, and risk appetite, as well as market-level issues like regulatory rigidity and capital market depth.

2. 6 Theoretical Review

This study is anchored on four key theories that explain the relationship between capital structure, risk, and performance in insurance firms. The Dynamic Trade-Off Theory posits that insurers adjust their capital structure over time to balance solvency and profitability, a process influenced by risk exposure and adjustment costs under Risk-Based Capital (RBC) regimes (Dhaene et al., 2017; Eling & Marek, 2014). The Pecking Order Theory suggests a preference for internal funds, particularly retained earnings and technical provisions over external financing due to cost and information asymmetries (Myers & Majluf, 1984). The Risk Capital Theory frames capital as a buffer against adverse outcomes, aligning with RBC's requirement for capital adequacy proportional to risk, with empirical support for the performance benefits of strong Tier 1 capital (Perold, 2005; Iroh & Orobator, 2025). Finally, the Modigliani-Miller Theory (with taxes) underscores the trade-offs between tax advantages of debt and the cost of holding large technical reserves in insurance, especially under regulatory constraints like RBC (Dhaene et al., 2015; Fier et al., 2013). Together, these theories provide a comprehensive lens for evaluating capital-performance dynamics in Nigeria's insurance sector.

2.7 Empirical Review

Empirical studies on the relationship between Risk-Based Capital (RBC) and the performance of insurance companies have produced mixed results across jurisdictions. While some studies support a positive link between RBC and firm performance, others find no significant relationship or even negative effects, depending on the measurement techniques, market dynamics, and institutional maturity of the regulatory framework. In the United States, Devieux, Kovalerchik, and Ragusa (2021) observed that insurers adjusted their portfolios towards more capital-efficient instruments following bond factor changes introduced by the National Association of Insurance Commissioners (NAIC). Van Bragt (2021) similarly found that RBC implementation promoted conservative investment strategies by encouraging insurers to focus on high-quality assets. Grace, Klein, and Phillips (2004) demonstrated that RBC ratios were useful predictors of solvency risk, thereby enhancing regulatory supervision.

Findings from macro-level assessments also highlight the conditional effectiveness of RBC frameworks. For instance, the International Monetary Fund (2020) conducted stress tests during the COVID-19 pandemic, which revealed that while RBC ratios initially held firm, they deteriorated under extreme economic stress, indicating that capital adequacy may require dynamic adjustments during crises. In Canada and Europe, Soumaré and Tafolong (2016) applied a dynamic RBC model that accounted for business cycle fluctuations and found that adjusting capital in line with macroeconomic conditions improved insurer stability. Heinrich, Sabuco, and Farmer (2019) cautioned that uniform internal modeling under Solvency II could exacerbate systemic risk. Ágoston and Varga (2024) theorized that overly stringent RBC thresholds in oligopolistic markets could reduce competition and distort pricing.

In the Nigerian context, Falade and Oyedokun (2022) found that net claims, premium income, and RBC were significantly associated with profitability. Abiola and Akanbi (2022), using a Data Envelopment Analysis (DEA) model, reported that RBC implementation enhanced operational efficiency by lowering underwriting losses and

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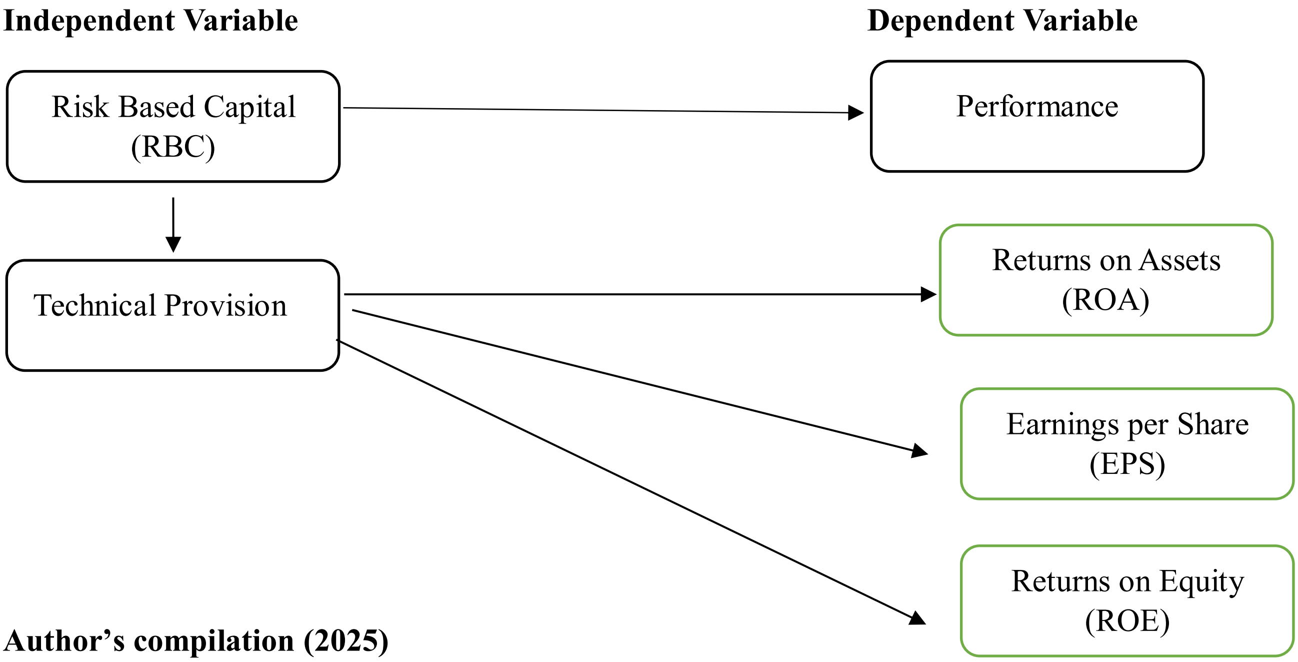
improving cost management. Adegbite and Ogunyomi (2020) confirmed a significant positive association between RBC compliance and return on assets (ROA), while Okafor and Onwumere (2018) linked strong capital structures to improved underwriting outcomes. However, other studies present contrasting views. Ezekwesili and Ojo (2021) found no statistically significant relationship between RBC and profitability metrics such as ROE and net profit margin, which they attributed to weak regulatory enforcement and inconsistent industry adaptation. Akpan et al. (2017a) noted that while the equity ratio had an insignificant negative impact on performance, technical provision ratios had a significant positive effect, highlighting the relevance of alternative capital structure metrics in insurance research.

Further contributions by Akpan and Etukafia (2019) demonstrated that capital structure, when moderated by risk-taking behavior, significantly influenced ROA but not EPS, implying that behavioral and governance factors may mediate capital-performance outcomes. Chukwuma and Uche (2019) also underscored the importance of institutional quality, noting that the benefits of RBC are more likely to manifest where strong corporate governance frameworks exist. Internationally, Putra (2017) found that RBC and claims ratio significantly influenced profitability among Indonesian life insurers, though the effects of asset size and revenue growth were marginal. Bishnu (2016), analyzing Nepalese manufacturing firms, reported that leverage had a negative effect on profitability, while Amraoui, Jianmu, and Bouarara (2018) identified similar adverse effects of liquidity and debt on Moroccan firms' returns. Dincer et al. (2011) compared RBC with the CAMELS rating system and concluded that while RBC captured solvency, it failed to reflect liquidity and management quality. Studies from Malaysia by Jaaman, Ismail, and Majid (2007), as well as Lazam et al. (2012), reported instances of capital surpluses under RBC, warning that idle capital could lower efficiency. In Ghana, Anafo, Amponteng, and Yin (2015) found a positive relationship between capital structure and profitability, affirming that industry-specific conditions affect capital dynamics.

2.8 Conceptual Framework



Author's compilation (2025)

Data and Methodology

This study adopted an ex-post facto research design, which is appropriate for analyzing historical data where the variables of interest cannot be manipulated. This design allows for the empirical evaluation of relationships between existing financial indicators, making it suitable for assessing the effect of Risk-Based Capital (RBC), proxied by the Technical Provision Ratio (TPR), on the financial performance of Nigerian insurance firms. The study builds on the econometric model employed by Akpan et al. (2017) to explore the link between RBC and key performance metrics in the insurance sector. The adapted model facilitates the examination of how variations in capital adequacy influence firm-level outcomes over time. The model was specified as:

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$Perf_{i,t} = \alpha_0 + \beta_1 TPR_{i,t} + \varepsilon_{i,t}$

Where

Perf=	performance
TPR=	technical provision ratio
α_0=	Constant Term
β_1=	Parameters of the Model
ε=	Error term
t	time period under study (2010 -2023)

The model was modified in order to determine how risk-based capital impacts on performance of insurance companies in Nigeria. Technical provision ratio (TPR) was used as proxy for risk-based capital while Return on Asset, Earnings per Share and Returns on Equity were used as proxies for performance. Flowing from the above model, the first model for this study using ROA as a proxy for performance would be specified mathematically as:

ROA = f(TPR)

However, the model is further stated in its econometric form as given below:

$ROA_t = \alpha_0 + \beta_1 TPR_t + \varepsilon_t$ - - - - - - - - - - - - - **1**

Where

ROA=	Return on Asset
TPR=	Technical provision ratio
β_1=	Parameters of the Model
ε=	Error term
t=	time period under study (2010 -2023)

The second model for this study using EPS as a proxy for performance was specified mathematically as:

EPS = f(TPR)

However, the model was further stated in its econometric form as given below:

$EPS_t = \alpha_0 + \beta_1 TPR_t + \varepsilon_t$ - - - - - - - - - - - - - **2**

Where

EPS=	Earnings per Share
TPR=	Technical provision ratio
β_1=	Parameters of the Model
ε=	Error term

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t= time period under study (2010 -2023)

The last model for this study using ROE as a proxy for performance would be specified mathematically as:

ROE = f(TPR)

However, the model is further stated in its econometric form as given below:

$ROE_t = \alpha_0 + \beta_1 TPR_t + \varepsilon_t$ - - - - - - - - - - - - - **3**

Where

ROE = Returns on Equity

TPR= Technical provision ratio

β_1= Parameters of the Model

ε= Error term

t= time period under study (2014 -2023)

RESULT AND PRESENTATION

4.1 Descriptive Statistics

The descriptive statistics reveal the data characteristics

Table 4.1: Descriptive statistics

	ROE	ROA	EPS	RBC
Mean	0.107150	0.061574	0.928929	0.683916
Median	0.104371	0.037000	0.114070	0.549302
Maximum	0.426000	0.503000	4.371781	5.922258
Minimum	-0.547589	-0.196445	-0.034771	0.123889
Std. Dev.	0.136902	0.100159	1.224119	0.937009
Skewness	-1.617309	2.399774	1.050481	5.068544
Kurtosis	10.13391	12.20746	2.753320	28.74723
Jarque-Bera	178.9531	314.4547	13.05176	2233.234
Probability	0.000000	0.000000	0.001465	0.000000
Sum	7.500517	4.310165	65.02505	47.87414

Sum Sq. Dev.	1.293202	0.692190	103.3943	60.58099
Observations	70	70	70	70

Source: Author's Compilation (2025)

Table 4.1 presents the descriptive statistics for the variables, highlighting their central tendencies, dispersion, and normality. The mean ROE is 0.107 with a standard deviation of 0.137, ranging from -0.548 to 0.426; it is negatively skewed with a peaked distribution, and the Jarque-Bera (JB) test confirms normality ($p > 0.05$). ROA has a mean of 0.062 and standard deviation of 0.100, with values ranging from -0.196 to 0.503. It is positively skewed with leptokurtic distribution, and the JB test also confirms normality. EPS averages 0.929 with higher variability (SD = 1.224), ranging from -0.035 to 4.372, and shows positive skewness with platykurtic tendencies; the JB statistic again supports normality. RBC (proxied by TPR) has a mean of 0.684 and standard deviation of 0.937, with values between 0.124 and 5.922. It is positively skewed and leptokurtic, and the JB test indicates normal distribution across the sample ($p > 0.05$).

Table 4.2: Correlation statistics

	ROE	ROA	RBC	EPS
ROE	1	0.6409	-0.0094	-0.0949
ROA	0.64090	1	-0.0656	-0.1257
RBC	-0.0094	-0.0656	1	0.1655
EPS	-0.0949	-0.1257	0.1655	1

Source: Author's Compilation (2025)

Table 4.2 presents the correlation matrix for the study variables, with particular attention to the relationship between Risk-Based Capital (RBC) and performance indicators. **ROE** is positively correlated with **ROA** (r = 0.6409) but shows weak negative correlations with **RBC** (r = –0.0094) and **EPS** (r = –0.0940). **ROA** also has negative correlations with **RBC** (r = –0.0656) and **EPS** (r = –0.1257). Conversely, **EPS** is positively correlated with **RBC** (r = 0.1655). While these correlations offer initial insights into the direction and strength of associations, they are not indicative of causality. Therefore, regression analysis is employed to explore the causal relationships between the variables more rigorously.

4.3 Unit root test

To ensure the reliability of data used for regression analysis, the Augmented Dickey-Fuller (ADF) test was employed to examine the stationarity of the variables. A variable is considered stationary if its ADF test statistic exceeds the 5% critical value in absolute terms and has a p-value less than 0.05.

Table 4.3 Augmented Dickey Fuller (ADF) Test at Levels

Variables	**ADF test statistics**	**p-value**	**Remark**
ROE	26.2570	0.0034	STATIONARY

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ROA	18.5842	0.0459	STATIONARY
EPS	21.5223	0.0177	STATIONARY

Source: Researcher's Compilation (2025) using E-views.

From the unit root presentation in Table 4.3, it was observed that ROE ROA EPS were stationary at level while RBC was non-stationary at level.

Table 4.4 Augmented Dickey Fuller (ADF) Test at First Difference

Variables	ADF test statistics	p-value	Remark
RBC	26.7867	0.0028	STATIONARY
ROE	26.2570	0.0034	STATIONARY
ROA	18.5842	0.0459	STATIONARY
EPS	21.5223	0.0177	STATIONARY

Source: Researcher's Compilation (2025) using E-views

From the unit root presentation in Table 4.4, it was observed that RBC is stationary at first difference.

4.4 Hausman Test

The Hausman test was conducted to determine the appropriate model between fixed and random effects. For all three models, the p-values exceeded 0.05, indicating a preference for the random effects model. The pooled, cross sectional fixed and random effects panel data results were presented and discussed as follows.

Table 4.5 Hausman Test for Model 1

Correlated Random Effects - Hausman Test				
Equation: Untitled				
Test cross-section random effects				
Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random		0.818085	1	0.3657
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var(Diff.)	Prob.
RBC	-0.010064	-0.008144	0.000005	0.3657

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Source: Researcher's Compilation (2025) using E-views

From Table 4.5, the Hausman test evidenced that the random effects model should be selected to test for hypothesis 1. This was based on the chi-square statistic probability of 0.3657 which suggested that the corresponding effect was not statistically significant, hence the null hypothesis was accepted by the data and the random effects model was preferred to analyse the model.

Table 4.6 Hausman Test for Model 2

Correlated Random Effects - Hausman Test				
Equation: Untitled				
Test cross-section random effects				
Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random		0.334681	1	0.5629
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var(Diff.)	Prob.
RBC	-0.010727	-0.009673	0.000003	0.5629
Source: Researcher's Compilation (2025)				

Source: Researcher's Compilation (2025) using E-views

From Table 4.6, the Hausman test evidenced that the random effects model should be selected to test for hypothesis 2. This was based on the chi-square statistic probability of 0.5629 which suggested that the

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corresponding effect was not statistically significant, hence the null hypothesis was accepted by the data and the random effects model was preferred to analyse the model.

Table 4.7 Hausman Test for Model 3

Correlated Random Effects - Hausman Test				
Equation: Untitled				
Test cross-section random effects				
Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random		0.003340	1	0.9539
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var(Diff.)	Prob.
RBC	0.206314	0.206506	0.000011	0.9539

Source: Researcher's Compilation (2025) using E-views

From Table 4.7, the Hausman test evidenced that the random effects model should be selected to test for hypothesis 3. This was based on the chi-square statistic probability of 0.9539 which suggested that the corresponding effect was not statistically significant, hence the null hypothesis was accepted by the data and the random effects model was preferred to analyse the model.

4.5 Inferential Test

Based on the results from the Hausman test performed the random effect will be used to test the three models formulated for the study

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Model 1: $ROE_t = \alpha_0 + \beta_1 TPR_t + \varepsilon_t$ - - - - - - - - - - - - - 1

Model 2: $ROA_t = \alpha_0 + \beta_1 TPR_t + \varepsilon_t$ - - - - - - - - - - - - - 2

Model 3: $EPS_t = \alpha_0 + \beta_1 TPR_t + \varepsilon_t$ - - - - - - - - - - - - -- 3

Table 4.8 Random Effect for Model 1

Dependent Variable: ROE				
Method: Panel EGLS (Cross-section random effects)				
Date: 06/05/25 Time: 13:17				
Sample: 2010 2023				
Periods included: 14				
Cross-sections included: 5				
Total panel (balanced) observations: 70				
Swamy and Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.112720	0.034776	3.241282	0.0018
RBC	-0.008144	0.016609	-0.490324	0.6255
	Effects Specification			
			S.D.	Rho
Cross-section random			0.065398	0.2136
Idiosyncratic random			0.125493	0.7864

	Weighted Statistics			
R-squared	0.003533	Mean dependent var		0.048897
Adjusted R-squared	-0.011121	S.D. dependent var		0.124634
S.E. of regression	0.125325	Sum squared resid		1.068036
F-statistic	0.241062	Durbin-Watson stat		2.296383
Prob(F-statistic)	0.625021			
	Unweighted Statistics			
R-squared	-0.002059	Mean dependent var		0.107150
Sum squared resid	1.295864	Durbin-Watson stat		1.892652

Source: Researcher's Compilation (2025) using E-views

The regression results show that RBC explains only 0.4% of the variation in ROE ($R^2 = 0.0035$), indicating minimal explanatory power. The Durbin-Watson statistic (1.89) suggests no first-order serial correlation. RBC has a negative but statistically insignificant effect on ROE (coefficient = -0.0081; p = 0.6255). The F-statistic (0.2411; p = 0.6250) confirms the model is not statistically significant at the 5% level.

Table 4.9 Random Effect for Model 2

Dependent Variable: ROA		
Method: Panel EGLS (Cross-section random effects)		
Date: 06/05/25 Time: 13:38		
Sample: 2010 2023		
Periods included: 14		

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Cross-sections included: 5				
Total panel (balanced) observations: 70				
Swamy and Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.068189	0.023525	2.898614	0.0050
RBC	-0.009673	0.012546	-0.771019	0.4434
	Effects Specification			
			S.D.	Rho
Cross-section random			0.041882	0.1627
Idiosyncratic random			0.095017	0.8373
	Weighted Statistics			
R-squared	0.008751	Mean dependent var		0.031924
Adjusted R-squared	-0.005826	S.D. dependent var		0.094277
S.E. of regression	0.094551	Sum squared resid		0.607916
F-statistic	0.600345	Durbin-Watson stat		1.449735
Prob(F-statistic)	0.441133			

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	Unweighted Statistics			
R-squared	0.003688	Mean dependent var		0.061574
Sum squared resid	0.689637	Durbin-Watson stat		1.277943

Source: Researcher's Compilation (2025) using E-views

The regression analysis indicates that RBC explains only 0.8% of the variation in ROA ($R^2 = 0.0088$), with the Durbin-Watson statistic (1.45) suggesting no first-order serial correlation. RBC has a negative but statistically insignificant effect on ROA (coefficient = -0.0097; p = 0.4434). The model's F-statistic (0.6003; p = 0.4411) confirms it lacks statistical significance at the 5% level.

Table 4.10 Random Effect for Model 3

Dependent Variable: EPS				
Method: Panel EGLS (Cross-section random effects)				
Date: 06/05/25 Time: 13:42				
Sample: 2010 2023				
Periods included: 14				
Cross-sections included: 5				
Total panel (balanced) observations: 70				
Swamy and Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.787697	0.590917	1.333008	0.1870

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RBC	0.206506	0.088066	2.344890	0.0220
	Effects Specification			
			S.D.	Rho
Cross-section random			1.302541	0.7955
Idiosyncratic random			0.660513	0.2045
	Weighted Statistics			
R-squared	0.075840	Mean dependent var		0.124755
Adjusted R-squared	0.062249	S.D. dependent var		0.677067
S.E. of regression	0.655655	Sum squared resid		29.23204
F-statistic	5.580299	Durbin-Watson stat		0.979631
Prob(F-statistic)	0.021032			
	Unweighted Statistics			
R-squared	0.027326	Mean dependent var		0.928929
Sum squared resid	100.5690	Durbin-Watson stat		0.284746

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Source: Researcher's Compilation (2025) using E-views

The analysis shows that RBC accounts for 8% of the variation in EPS ($R^2 = 0.0758$), with no evidence of first-order serial correlation (Durbin-Watson = 0.98). RBC has a positive and statistically significant impact on EPS (coefficient = 0.2065; p = 0.0220), indicating that a unit increase in RBC leads to a 21% rise in EPS. The model is statistically significant overall, with an F-statistic of 5.58 (p = 0.0210).

DISCUSSION ON FINDINGS

This study examined the effect of Risk-Based Capital (RBC), proxied by the Technical Provision Ratio (TPR), on the financial performance of insurance companies in Nigeria using three performance indicators: Return on Equity (ROE), Return on Assets (ROA), and Earnings per Share (EPS). The first hypothesis tested whether RBC has a significant effect on ROE. The regression analysis showed a negative coefficient (-0.0081), indicating an inverse relationship between RBC and ROE. However, this relationship was not statistically significant at the 5% level (p = 0.6255). Thus, the study concludes that there is **no significant effect of RBC on ROE**. This result contrasts with the findings of Akpan et al. (2020) and Falade & Oyedokun (2022), who reported a significant positive relationship between RBC and ROE. The inconsistency may be attributed to differences in sample composition, capital structure dynamics, or macroeconomic conditions over time.

The second hypothesis tested the effect of RBC on ROA. Similarly, the regression coefficient was negative (-0.0097), suggesting that increases in RBC are associated with marginal declines in asset profitability. Yet, this effect was also statistically insignificant (p = 0.4434), leading to the conclusion that **RBC does not significantly influence ROA** of Nigerian insurers. This finding aligns with Putra (2017), who found a negative association between RBC and profitability in the Indonesian insurance market. It suggests that while capital buffers are essential for solvency, they may also reduce operational efficiency if not matched with proportionate revenue-generating activities. Conversely, Akpan (2021) argued that RBC contributes positively to ROA when prudently managed, indicating that firm-specific governance and risk appetite may moderate the relationship.

The third hypothesis examined the effect of RBC on EPS. The regression revealed a positive coefficient (0.2065) and a statistically significant p-value (0.0220), indicating that **RBC has a significant and positive effect on EPS**. This implies that higher technical provisions relative to total assets enhance shareholder returns per unit of stock, possibly due to increased investor confidence or better claims management. The finding supports Akpan et al. (2020), Falade & Oyedokun (2022), and Yaudil et al. (2023), who observed similar positive impacts of RBC on performance metrics. In conclusion, while RBC does not significantly affect ROE and ROA in this study, it significantly improves EPS, suggesting that its value may be better reflected in shareholder-oriented performance indicators than in operational metrics.

CONCLUSION AND RECOMMENDATIONS

The Nigerian insurance industry continues to face persistent structural challenges including inadequate capitalization, suboptimal performance, and limited operational efficiency, despite regulatory efforts aimed at strengthening financial soundness. This study investigated the effect of Risk-Based Capital (RBC), measured through the Technical Provision Ratio (TPR), on the performance of insurance companies in Nigeria between 2010 and 2023, using Return on Equity (ROE), Return on Assets (ROA), and Earnings per Share (EPS) as performance indicators. The findings revealed a significant and positive impact of RBC on EPS, indicating that well-capitalized insurers tend to generate stronger shareholder returns, likely due to improved solvency confidence and earnings sustainability. However, RBC had no significant effect on ROE and ROA, with both coefficients being negative and statistically insignificant. This suggests that capital adequacy alone does not guarantee operational efficiency or optimal asset utilization, especially when firms are burdened with under-leveraged capital or inefficient deployment strategies. These outcomes highlight the need for capital regulation to be complemented by reforms in governance, investment planning, and underwriting discipline. Accordingly, NAICOM is advised to adopt a flexible, risk-tiered RBC framework that aligns capital thresholds with insurers' size, risk exposure, and business models, rather than a one-size-fits-all approach. Insurance firms should also reframe capital requirements as strategic levers for growth and profitability, embedding them within enterprise-wide risk management, claims optimization, and dynamic asset allocation. In addition, coordinated efforts by regulators, industry stakeholders, and government are essential to stimulate insurance penetration, enhance capital productivity, and strengthen the macroeconomic conditions that underpin performance. Future research could explore the mediating role of firm-specific variables like reinsurance strategies, corporate governance, and market maturity, as well as undertake comparative studies across African or emerging markets to deepen understanding of how RBC frameworks influence sectoral resilience and long-term financial performance.

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