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Risk Management and the Financial Performance of Listed Real Estate/Construction Companies in Nigeria: The Moderating Role of Board Structure

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Abstract

Purpose: The study explored the moderating effect of board structure (board size and gender diversity) on the nexus of operational risk, market risk and financial performance of listed real estate and construction companies in Nigeria.

Design/Methodology/Approach: The study implemented ex-post facto research design to analyze the variables on a panel data of audited annual reports of selected companies. The sample size was the population size consisting using the census sampling method. The study used the secondary data retrieved from corporate annual reports and corporate websites of the companies listed on Nigeria exchange group between 2014 and 2023. The data was analyzed using panel least square method.

Findings: Market risk exhibited a positive significance with ROA, while the negative relationship with Tobin's Q was statistically insignificant. Operational risk exerts an insignificant negative and positive effect on ROA and Tobin's Q, respectively. Board structure has a favourable but insignificant moderating effect on the connection between market risk and ROA. However, board structure showed a significantly negative moderating effect on the link between market risk and Tobin's Q. Lastly, board structure showed positive but insignificant moderating effect on the relationship between operational risk and financial performance.

Practical Implications:
Companies should invest in more reliable risk management systems to effectively detect, evaluate, and reduce operational and market risks. This can lessen the detrimental effects of these risks on financial performance indicators like Tobin's Q and ROA. It is important to improve board governance procedures because board structure has a major moderating effect on the link between market risk and Tobin's Q.

Originality/Value: Firstly, the study examined the influence of operational and market risks on financial performance. The study further explored the moderating effect of board structure (board size and gender diversity) on the nexus of operational risk, market risk and financial performance in the context of real estate and construction companies in Nigeria.

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INTRODUCTION

This study explored how board structure moderates the influence of risk management on the financial performance of listed construction and real estate companies in Nigeria. Financial performance is crucial to corporate efficiency, and business plan efficacy influences stakeholder trust and sustainability. Financial statements, which show the company's capacity to develop and maintain stakeholder interest, are commonly used to evaluate performance (Osevwe-Okoroyibo and Emeka-Nwokeji 2021; Harken and Taurgurt 2023). Financial performance depends on risk management, which tackles issues including but not limited to credit, market, liquidity, and operational risks. However, ineffective information sharing and openness hampered the need to improve effective risk management strategies (Malahim 2023).

Businesses require more capacity to implement risk management strategies due to the detrimental impact on business operations caused by ineffective control of the openness of an entity's information disclosure (Mesrawati et al. 2022). By concentrating on liquidity, market, and operational risks, risk management might lead to enough reserves, allowing companies to survive future economic distress (Tan et al. 2019). Effective risk management strategies are often associated with better financial outcomes. Proactive risk management is linked to better cash flow, higher profitability, and improved company financial health (Muhammad et al. 2022). The agency model states that effective risk management reduces information asymmetry and aligns the interests of managers and shareholders, which leads to better business outcomes (Ali et al. 2024). Similarly, the contingency hypothesis asserts that the organisational setting affects how successful risk management techniques are. In order to maximise financial success, businesses must modify their risk management plans to match their unique environment and set of circumstances (El-Chaarani and Abraham 2022).

Corporate performance is greatly influenced by corporate governance, which is evident in the composition and duties of the board of directors. Directors supervise performance appraisals, offer advisory assistance, and distribute required resources to guarantee operational effectiveness. Effective corporate governance increases transparency, accountability, and stakeholder trust, reducing financial misstatements and promoting confidence (Guizani and Abdalkrim 2022). The Nigerian Securities and Exchange Commission has implemented rules to enhance risk management systems in various sectors, such as real estate and construction. This research also underscores the impact of market risk, which refers to financial losses resulting from price fluctuations in commodities, equities, interest rates, and foreign exchange. Both anticipated and unexpected risks can majorly impact financial results, especially in uncertain economic conditions. Thus, it is crucial for the sustainability and performance of construction companies on the stock exchange to manage operational and market risks effectively (Najat and Elsadig 2022; Yousef et al. 2023).

Financial factors frequently result in operational challenges and poor outcomes for real estate and construction companies in Nigeria, significantly impacting their performance (Ayininuola et al. 2018). The financial aspects mentioned are a lack of liquid project funds, excessive debts, ineffective asset handling, and poor profit margins (Akapan et al. 2024). Increased competition in the sector worsens these difficulties even more. Although risk management failures have been extensively documented in various industries, such as the financial sector, these failures are frequently a result of deficiencies in corporate governance. Boards often need to acknowledge or deal with companies' risks, indicating a need for more efficient risk oversight and management mechanisms (Judith et al. 2022; Eni-Egwu et al. 2022).

Additionally, past research (Olaniyan and Adegoroye 2024; Oladokun et al. 2020; Okoye et al. 2022; Martin and Marcel 2020; Widhaistuti et al. 2019) has pointed out the effects of financial elements on the underperformance of construction companies, yet they offer minimal understanding of how risk management and board structure interact to affect financial results. The financial performance is significantly impacted by operational and market risks, with governance factors like board size and gender diversity potentially reducing these effects. This study assesses how the board structure affects the link between risk management and financial performance in Nigerian listed real estate and construction companies. The study aims to uncover how governance can improve financial outcomes, enhance risk mitigation strategies, and promote long-term sustainability by analysing the moderating roles of board size and gender diversity.

Therefore, the study examined the influence of operational and market risks on financial performance. The study further explored the moderating effect of board structure (board size and gender diversity) on the nexus of operational risk, market risk and financial performance of listed real estate and construction companies in Nigeria between 2014 and 2023. The choice of 2014 as the foundational year is based on the economic and regulatory environment of Nigeria's real estate and construction industries. 2014, the Nigerian government introduced important policies and reforms to enhance the financial and construction industries. These changes were intended to tackle systemic risks, strengthen corporate governance, and boost the financial stability of publicly traded firms.

This study has important academic, practical, and policy implications as it explores a vital gap in understanding how board structure influences the relationship between risk management and financial performance in publicly listed construction and real estate firms in Nigeria. This research enhances the existing understanding of corporate governance by examining how board characteristics, particularly board size and gender diversity, can moderate the impact of operational and market risks on financial performance. This research analyzes the impact of board structure on the effectiveness of risk management, offering practical guidance for boards and executives to create governance frameworks that strengthen risk supervision, reduce operational difficulties, and boost financial results. For the construction and real estate industries that are especially susceptible to financial difficulties like insufficient liquidity, low profit margins, and significant market fluctuations (Buzaubayeva et al. 2024). This research presents tailored strategies for different sectors to bolster governance systems, guaranteeing resilience to risks and improving competitiveness. The results will guide regulators, including the Nigerian Securities and Exchange Commission, regarding the significance of board structure in advancing transparency, accountability, and sustainable risk management approaches. By highlighting the importance of gender diversity and the size of boards, the research aligns with international corporate governance trends and offers evidence-backed suggestions to enhance governance structures in Nigeria.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Theoretical Background

The study is established on agency and stakeholder theories. Agency theory highlights the distinction between ownership (principals) and management (agents), noting that conflicts emerge since agents frequently prioritise their interests over those of shareholders, leading to heightened expenses like monitoring, control, and losses stemming from unfavourable choices (Jensen and Meckling 1976; Fama and Jensen 1983; Berle and Means 2017). The board of directors acts as a governance tool to address agency issues by monitoring managerial behaviour, lowering agency expenses, and improving organisational effectiveness. The board's composition, such as its size and gender diversity, enhances its effectiveness in overseeing and ensuring that managers' actions align with the interests of shareholders (Eisenhardt 2018). According to the theory, smaller and more diverse boards can enhance oversight and decision-making, ensuring that risk management strategies successfully improve financial performance. Through establishing distinct performance standards and implementing accountability via governance frameworks, boards function as "cost-effective tools" to synchronise risk management with the organisation's profitability (Dong et al. 2022).

Stakeholder theory expands agency theory by shifting the focus from just shareholders to encompass all parties impacted by organisational decisions, including employees, customers, suppliers, and the community (Freeman, 1983). Efficient governance frameworks, like properly formed boards, are essential for reconciling varied stakeholder interests while meeting financial objectives. Gender diversity on boards brings in different viewpoints. It improves decision-making by considering the issues of a broader range of stakeholders, while the ideal board size facilitates efficient teamwork without making decisions overly complex (Wirawan and Willim 2024; Zaid et al. 2020). A varied and suitably sized board tackles operational and market risks, aiding in managing stakeholder expectations and reducing adverse effects, thereby enhancing financial performance (Judita et al. 2022). This underscores the board's balancing function in ensuring that risk management strategies correspond with maximising shareholder wealth and addressing stakeholder interests.

In general, the theoretical framework suggests that the composition of the board (size and diversity in gender) influences the connection between risk management (operational and market risks) and financial performance by improving oversight and decision-making. Agency theory highlights the board's function in minimising agency issues and enhancing performance. In contrast, stakeholder theory focuses on its capacity to balance and meet the demands of various stakeholders, thereby establishing a comprehensive approach to governance and risk management. Collectively, these theories establish a basis for comprehending how board structure can enhance the relationship between risk management and financial performance in dynamic, risk-sensitive sectors.

Risk Management and Financial Performance

Risk is an intrinsic element in every organisation; variability in returns is a key indicator. Although risks can lead to adverse results, they can also be handled, embraced, or allocated to others. In financial management, risk is vital in maximising shareholder wealth by navigating the risk-return tradeoff, as increased risks frequently align with greater possible returns (Abdic et al. 2024). Businesses encounter various kinds of risks, such as credit, market, operational, and liquidity risks, making risk management an expert field. Efficient risk management necessitates skilled individuals overseen by impartial managers,

rendering it essential for organisational achievement. The capital asset pricing model (CAPM) and arbitrage pricing theory (APT) claim a positive correlation between risk and anticipated returns, establishing the basis of financial economics in investment evaluation (Ajagbe et al. 2024; Ali et al. 2024).

This research thus concentrates on operational risk and market risk due to their influence on financial performance. Operational risk refers to losses arising from insufficient or failed internal processes, individuals, systems, or external occurrences, encompassing legal risks while omitting strategic or reputational threats (Ayodele and Onyekachi 2020). The Basel Committee on Banking Supervision classifies operational risk into three types: nominal risk- which involves frequent, repetitive losses related to regular activities; ordinary risk- which results in less frequent but significant losses that are not critical for financial institutions; and exceptional risk- characterised by rare, large-scale threats that jeopardise the institution's existence. Operational risk is becoming more important because of the growing complexity of financial services, stressing the necessity for strong governance and efficient risk management (Yousef et al. 2023; Yusuf and Adeoye 2020).

Market risk involves possible financial or non-financial losses resulting from fluctuations in market elements, such as interest rates, currency exchange rates, stock prices, and commodity prices. The African Development Bank recognises four categories of market risks: currency risk- associated with changes in exchange rates; interest rate risk- impacts companies' capital expenses and operations; liquidity risk- emerges from liquidity shortages caused by inadequate management; counterparty credit risk- connected to the handling of assets and liabilities (Asaba 2024). Shifts in market elements like interest rates and stock prices directly impact company performance and profits. As per arbitrage pricing theory, market risk factors such as interest rates, inflation, and currency fluctuations impact stock returns by changing expected cash flows and discount rates. This theory highlights a strong connection between risk and return, consistent with the primary principle of finance, which states that investors demand more reward for accepting increased risks (Chitta and Soni 2023; Buzaubayeya et al. 2024).

Risk Management and Financial Performance: Moderating Role of Board structure

This study focuses board size and gender diversity, as essential board structure variables. In an organisational setting, the board operates as a team working together to reach strategic objectives, with normative and prescriptive roles (Hasan & Mohammed 2023). Researchers have discussed the influence of board size on company performance. Lipton and Lorsch (1992) claimed that smaller boards are more efficient since larger boards may need help in decision-making and coordination. Conversely, Hermalin and Weisbach (2018) proposed that bigger boards could improve alignment and decrease agency costs. However, they might also restrict involvement in decision-making. Than (2018) observed that boards with an average size of seven enhance monitoring capacity and positively affect earnings per share.

Moreover, Dalton et al. (2018) highlighted that the link between board size and company performance differs based on unique firm characteristics and national institutional settings. Gender diversity is viewed as a way to enhance board efficiency and financial outcomes. Adebobola (2023) highlighted that varied boards prevent the dominance of any individual or faction, ensuring equitable representation of stakeholders and improving resource reliance. Researchers such as (Safieddine and Daouk 2021; Burke 2021; Van der Walt and Ingley 2021) analysed the impact of gender diversity on the lack of women on boards, the factors contributing to this underrepresentation, and the experiences and views of women directors. In general, scientists concur that greater diversity enhances governance by utilising a wider range of talent and viewpoints, resulting in improved decision-making and organisational performance.

Research on operational risk indicates that weak internal controls, low employee morale, or external disruptions can result in inefficiencies, higher expenses, and loss of revenue, adversely affecting financial results (Malahim 2023). Concerning market risks, variations in interest rates, exchange rates, and commodity prices greatly influence profitability, as elevated volatility creates difficulties for companies to maintain consistent financial results (Muhammad et al. 2022). Smaller boards tend to be more nimble and effective in making decisions. In contrast, larger boards can offer varied viewpoints and enhanced supervision. An ideal board size balances the intricacy of risk management and the capacity to make prompt and effective decisions. Bigger boards can enhance financial performance by strongly supervising risk management measures (Lipton and Lorsch 1992; Hermalin and Weisbach 2018).

Varied boards boost creativity, problem-solving, and decision-making by integrating different viewpoints, experiences, and skills. Gender-diverse boards question management assumptions more often, enhancing the effectiveness of risk identification, assessment, and mitigation tactics. This subsequently improves financial performance by lessening vulnerability to unmonitored risks (Biggins 2021; Adebobola 2023). Kafidipe et al. (2021) looked at risk management in deposit money banks, corporate governance, and the extent to which operational issues in Nigerian banks have been repressed. The outcome indicates that the bank's financial results have been adversely affected, however significantly. A good business governance framework, on the other hand, improves bank sustainability and loan competitiveness. The number of board

committees has a favourable influence on Tobin Q, while the size, independence, directors' shareholdings, and meetings of the board were all negative. In contrast, the ROE (Return on Equity) is positively connected with board size, executive autonomy, and board committees.

Igbinosa et al. (2024) explored board diversity in Nigerian firms and analyses whether the effect of board structure on financial performance (return on equity and return on capital employed). The Ordinary Least Squares (OLS) regression was adopted and findings revealed that there is strong positive association between board size and corporate financial performance. There is a positive association between external executives and corporate financial performance. However, a negative association was observed between directors' ownership and firm performance. The study reveals a negative association between ROE and CEO duality, while a strong positive association was observed between ROCE and CEO duality.

Hassan (2023) examined corporate governance across Asian nations through secondary data, finding that it correlates with the prevailing culture of the area. Udoh (2022) examined market risk in Nigerian deposit money banks, finding that interest rates positively impact profitability. In contrast, exchange rates and commodity prices exhibit negative correlations. Fenty Chandra and Hanifah (2023) investigated credit risk, liquidity risk, and operational risk in public commercial banks of Indonesia, emphasising that corporate governance was ineffective in moderating these risks, while profitability was more affected by external influences. Likewise, Allen et al. (2020) discovered that operational risk adversely affects return on assets (ROA) and return on equity (ROE) in banks operating in Tanzania. Peter et al. (2021) investigated market risk within Kenyan microfinance institutions, discovering that interest rates and financial leverage enhance financial performance, whereas foreign exchange risk adversely impacts it. Finally, Martin and Marcel (2020) showed that better corporate governance practices significantly improve financial performance in non-financial publicly traded companies in the United Kingdom.

Arising from the discussions made above, the study formulates the following hypotheses:

$H_0$1: Market risk has no significant effect on financial performance.
$H_0$2: Operational risk has no significant influence on financial performance.
$H_0$3: Board structure does not moderate the interaction between market risk and financial performance.
$H_0$4: Board structure has no moderating effect on the interaction between operational risk and financial performance.

Research Gap

There has been considerable research on corporate governance, risk management, and financial performance. However, a notable knowledge gap remains about how board structure affects the relationship between risk management and financial performance in Nigeria's real estate and construction industry. Previous research has concentrated on different areas, sectors, or overall governance structures without tackling the unique risks and governance issues encountered by companies in Nigeria. For instance, Hassan (2023) and Fenty et al. (2023) investigated corporate governance in Asia and Indonesia yet overlooked the analysis of particular industries or the moderating effect of board structure. Udoh (2022), Allen et al. (2020), and Peter et al. (2021) examined operational and market risks but restricted their study to financial institutions, omitting non-financial sectors such as real estate and construction. Martin and Marcel (2020) examined corporate governance, yet they still need to consider industry-specific dynamics and types of risk. This research addresses this gap by examining how board size and gender diversity influence the connection between operational and market risks and financial performance, offering insights specific to the distinct governance and risk management issues in Nigeria's real estate and construction industry.

METHODS

This study used an ex-post facto research design to analyse the dependent, moderating and independent variables on panel data of audited annual reports of selected companies. The study population comprised nine listed real estate and construction companies in Nigeria. The sample was the population size, and the census sampling method was used. The study used secondary data retrieved from annual corporate reports and corporate websites of the companies listed in the Nigerian exchange group between 2014 and 2023. The data was analysed using the panel least square method. The study conducted the Hausman specification test to specify whether the fixed effect and random effect models were appropriate for analysing the panel data (Creswell & Creswell 2018).

Empirical Model

The mathematical model stated below was to examine the moderating effect of board structure on risk management and financial performance.

$$Y = f(OR, MR, BS, BGD) \quad (1)$$

Where Y = financial performance, OR = operational risk, MR = market risk, BS= board size and BGD= board gender diversity

Regarding financial performance, some studies have used accounting-based measures, such as return on assets (Willey et al., 2023; Martin & Marcel 2020) or market-based measures, such as Tobin's Q (Mesrawati et al. 2022). Based on this variation, this study adopts ROA and Tobin's Q. The justification for combining ROA and Tobin's Q was to ensure a comprehensive assessment by integrating internal operational efficiency and external market valuation. ROA is less sensitive to market volatility, while Tobin's Q captures market dynamics and growth potential. Both reduce bias and provide a more balanced performance evaluation (Nguyen & Tran 2023). Risk management indicators were operational and market risks because operational and market risks capture critical internal and external uncertainties affecting financial stability and success (Patrick, 2024). Their inclusion in the empirical model aligns with studies (Suratman et al. 2024; Pervetica and Ahmeti 2023), emphasising the importance of managing risks in achieving financial goals. Operational risk represents the ratio of total cost to income of firms in a financial year. In contrast, market risk is measured as the rate of change in equity price, commodity price, interest rate and foreign exchange rate in a financial year (Musa & Tahir 2024). Board size and gender diversity were used as a proxy for board structure. Both board size and gender diversity are central components of corporate governance, influencing strategic decisions, oversight functions, and firm performance (Mustapha et al., 2024). Board size was measured as the total number of board members (Obaje and Ogirima, 2022) while gender diversity was spelt as the ratio of female directors to the number of directors (Slama et al., 2019).

As a result, the multivariate models were specified as follows:

$$ROA_{it} = \partial_0 + \partial_1 OR_{it} + \partial_2 MR_{it} + \partial_3 BSIZE*BGEND*OR_{it} + \partial_4 BSIZE*BGEND*MR + \mu_{it} \quad (2)$$

$$QT_{it} = \partial_0 + \partial_1 OR_{it} + \partial_2 MR_{it} + \partial_3 BSIZE*BGEND*OR_{it} + \partial_4 BSIZE*BGEND*MR + \mu_{i} \quad (3)$$

Where:
ROA= Return on Asset for firm i in year t
QT= Tobin's Q for firm i in year t
OR= Operational Risk for firm i in year t
MR= Market Risk for firm i in year t
BSIZE= Board Size for firm i in year t
BGEND= Board Gender Diversity for firm i in year t
μ = Error term.

Table 1. Description of Variables

Variables	Type	Measurements	Source
Tobin's Q	Endogenous	This is the ratio of (Price Market value of shares + Book value of liabilities) to the book value of asset of.	Mesrawati et al. (2022)
Return on Assets	Endogenous	The ratio of net income to total assets in a financial year.	Martin and Marcel (2020)
Operational risk	Exogenous	The cost to income ratio of firms in a financial year.	Ajagbe et al. (2024)
Market risk	Exogenous	Rate of change in equity price, commodity price, interest rate and foreign exchange rate	Ajagbe et al. (2024)
Board Size	Moderator	The total number of directors on the corporate board	Obaje and Ogirima (2022)
Gender diversity	Moderator	The percentage of female directors on a corporate board.	Slama et al. (2019)

Source: Author's Compilation (2025)

RESULTS AND DISCUSSION

Descriptive Analysis

Table 2. Results from Descriptive Statistics

	BGEND	BSIZE	MKR	OPR	ROA	QT
Mean	0.193611	9.875000	1.059292	0.172500	0.105000	0.094444
Median	0.180000	8.000000	1.021000	0.190000	0.070000	0.050000
Maximum	0.600000	17.00000	1.460000	0.350000	1.090000	1.070000
Minimum	0.000000	4.000000	0.550000	0.000000	-1.800000	0.000000
Observations	90	90	90	90	90	90

Source: Research Output, 20245

The average Tobin's Q for publicly traded real estate and construction companies throughout the research period is -0.555. A Tobin's Q value under 1 suggests that the market assesses the firms' assets at a lower value than their replacement cost. In this instance, a value of 0.09 indicates that the market perceives the conglomerate's assets as valued at merely 9.4% of their replacement cost. Investors may interpret the average Tobin's Q value of 0.09 as an indication that the valuation of the company's assets is low. A low Tobin's Q may suggest that the company's management could use its assets more efficiently to create value. This may result from inadequate operational effectiveness, unfruitful investments, or management shortcomings.

The average ROA value of 0.105 indicates that, on average, the evaluated companies or assets are producing a return of 10.5 per cent on their overall assets. A 10.5 per cent ROA indicates that the company makes 10.5 cents in profit for every dollar of assets. This is a positive return, reflecting efficient management and utilisation of resources. This figure can act as a standard for evaluating the performance of various firms in the same sector. Companies with a notably above 10.5% ROA may demonstrate greater efficiency, whereas those with a lower ROA might exhibit reduced efficiency.

Gender diversity showed an average of 0.19, indicating that women comprise 19% of the board. The figure indicates a significant gender disparity and a lack of gender diversity. The low average value suggests a potential area for enhancement. Companies that lack significant gender diversity might consider implementing measures and policies designed to enhance gender equality and inclusiveness. As a result, an average value of 0.19 could suggest an opportunity to more effectively leverage the benefits of gender diversity in enhancing creativity and business success.

The typical count of members on the boards of directors for the companies being examined is approximately 10, as shown by the average board size of 9.8. A board with ten or more members is considered a good size. It is perfectly sized, facilitating a balance among various perspectives and effective decision-making. This board size might function properly. Typically, they are sufficiently large to provide a range of viewpoints and areas of knowledge yet compact enough to make decisions swiftly. Having ten members allows for directors with diverse backgrounds, experiences, and skill sets. This diversity may enhance the board's ability to tackle complex issues and make sound decisions.

An average market risk value (beta) of 1.059 offers perspectives on these firms' comparative volatility and risk characteristics about the general market. A beta of 1.059 suggests that, on average, real estate and construction firms are 5.9% more unstable than the general market. If the market index shifts by 1%, the stock prices of these firms are anticipated to alter by around 1.059%. This beta level indicates that real estate and construction firms face a greater market risk than the typical company. This implies that the stock prices of these companies will typically change in line with the market but with increased volatility.

With a mean operational risk of 0.172500, these businesses could be more efficient at generating profit because expenses only account for 17.25% of their revenue. In general, this indicates effective cost control. Businesses that have a lower operational risk ratio are more resilient to changes in revenue or expense increases. A higher number indicates that businesses are more susceptible to changes in revenue or cost increases. The comparatively low operational risk ratio could result from reasonable governance procedures, such as cost-cutting initiatives, proper use of resources, or the executives' strategic monitoring. Outcomes also revealed that all the parameters have 90 observations, which can be ascribed to data accessibility on the study variables.

Correlation Analysis

Table 3. Correlation matrix of real estate and construction firms

Correlation	BGEND	BSIZE	MKR	OPR	ROA	QT
BGEND	1.000000					
BSIZE	0.157897	1.000000				
MKR	0.253003	0.331240	1.000000			
OPR	0.135573	-0.144167	-0.288506	1.000000		
ROA	0.088406	-0.035874	0.201784	-0.051539	1.000000	
QT	-0.002616	0.254287	0.072338	0.038746	0.026260	1.000000

Source: Research Output, 2025

Table 3 provides a concise overview of the interrelationship among the variables. Tobin's Q shows a positive correlation with board size (0.254), market risk (0.072), and operational risk (0.039). This indicates that modifying the explanatory variables will lead to an equivalent rise in Tobin's Q by 25 per cent, 7 per cent, and 4 per cent, respectively. Only board gender diversity exhibits a negative correlation (0.0026) with Tobin's Q, suggesting that an alteration in gender diversity results in a 0.2 per cent decrease in firm value. In addition, ROA has a positive correlation with gender diversity (0.089) and market risk (0.201). This indicates that an alteration in the explanatory variables will lead to a corresponding rise in ROA by 9 per cent and 20 per cent, respectively. The board size (-0.036) and operational risk (-0.05) exhibit a negative relationship with ROA, indicating that alterations in board size and operational risk reduce ROA by 4 per cent and 5 per cent, respectively. The table thus indicates that the correlations among independent variables could be stronger, suggesting a lack of multi-collinearity typically linked to time series data.

Unit Root Test

The Levin, Lin and Chu T unit root test was conducted on each of the series under study.

Table 4. Results of Unit Root Test

Variables	Levin, Lin and Chu T		
	Intercept	**Intercept and Trend**	**None**
BGEND	0.2637	0.0000**	0.1609
BSIZE	0.7216	0.0001**	0.3257
MKR	0.9964	0.0000**	1.0000
OPR	0.0003**	0.2643	0.3399
ROA	0.2538	0.0000**	0.0274**
QT	0.0003**	0.7315	0.2173

**5% level of significance

Source: Research Output, (2025)

Table 5. Summary of Unit Root Test Results

	Levin, Lin and Chu T	
Variables	**Level**	**I(*d*)**
BGEND	0.0000**	I(0)
BSIZE	0.0001**	I(0)
MKR	0.0029**	I(0)
OPR	0.0062**	I(0)
ROA	0.0000**	I(0)
QT	0.0003**	I(0)

Source: Extract from Table 4

The study used the Levin, Lin and Chu T-test to test the unit root among the series. The null theory was 'presence of unit root test (i.e. no non-stationarity) against the alternative proposition 'series is stationary'. If the computed p-value exceeds the benchmark p-value (0.05), then the null hypothesis is accepted, and it is concluded that data variables are non-stationary and vice-versa. Results from Tables 4 and 5 showed that all the parameters are stationary at their level form indicated as I (0). This implies that there is no form of co-integration relationship among the variables.

Analysis of Hausman Specification Test

Table 6. Results of Hausman Specification Test

Correlated Random Effects - Hausman Test			
Test Summary (Panel A)	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	3.485252	6	0.7459
Test Summary (Panel B)	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	6.455354	6	0.3742

Source: Research Output, (2025)

Panel A's results revealed a probability value of 0.7459, below the standard 0.05 significance level, indicating that the null hypothesis was accepted and the result was insignificant. Consequently, the outcome indicated that the random effect model was suitable and was used to analyse the research data. Because Panel B's statistical analysis resulted in a probability value of 0.3742, below the standard 0.05 level of significance, the null hypothesis was accepted, and the result was deemed inconsequential. Consequently, the outcome indicated that the random effect model was suitable and was used to analyse the research data.

Regression Analysis

Table 7. Regression Results

Dependent Variable: ROA				
Method: Panel EGLS (Period random effects)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
MKR	0.578955	0.202693	2.856313	0.0057
OPR	-0.406877	0.497689	-0.817532	0.4166
MKR*BGEND*BOARD_SIZE	-0.095102	0.060727	-1.566064	0.1222
OPR*BGEND*BOARD_SIZE	0.216195	0.247078	0.875008	0.3848
C	-0.449244	0.239139	-1.878593	0.0648
Dependent Variable: QT				
Method: Panel EGLS (Period random effects)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
MKR	0.075458	0.115201	0.655012	0.5148
OPR	0.095661	0.303493	0.315200	0.7536
MKR*BGEND*BOARD_SIZE	-0.044474	0.020633	-2.155453	0.0348
OPR*BGEND*BOARD_SIZE	0.038798	0.095454	0.406456	0.6857
C	-0.144857	0.128402	-1.128150	0.2634

Source: Research Output (2025)

Market Risk and Financial Performance

The regression analysis on market risk and financial performance showed varied outcomes; market risk exhibited a positive significance with ROA, while the negative relationship with Tobin's Q was determined to be statistically insignificant. These results contradict the findings of Najat and Elsadig (2022) and Peter et al. (2021); however, the outcome is consistent with those of Akpan et al. (2024), Ajagbe et al. (2024), Udoh (2022). In financial management, a common principle is that increased risk is linked to the possibility of greater returns. Real estate and construction firms that embrace greater market risk might implement more assertive growth tactics or allocate resources to risky, high-reward ventures. Companies with strong risk management strategies may be more capable of taking advantage of such high-risk scenarios, transforming potential dangers into lucrative opportunities. Under specific market conditions, increased market volatility may present opportunities for these companies to achieve greater returns if they can effectively manage the associated risks.

Conversely, the association with Tobin's Q suggests that fluctuations in market risk do not significantly influence Tobin's Q, and any detected correlation is weak. As a result, investors in real estate and construction companies in Nigeria may need to respond more vigorously to fluctuations in market risk when assessing the company's value of its assets. This may be due to their perception that the company's inherent value remains consistent regardless of market changes.

Operational Risk and Financial Performance

The regression results indicated that operational risk exerts a negative and insignificant positive effect on ROA and Tobin's Q, respectively. The negative insignificant indicates that ROA generally declines slightly as operational risk rises; this connection lacks statistical significance. The results align with (Abdic et al. 2024; Jagirani et al. 2023; Abebe et al. 2022; Mesrawati et al. 2022). This suggests that the influence of operational risk on ROA is minimal for real estate and construction firms in Nigeria, possibly resulting from

random fluctuations rather than a genuine underlying effect. Certain real estate firms may concentrate more on risks affecting ROA and other important performance metrics. Regardless, companies should continually manage operational risk to avert major losses, and resources may be directed more towards managing risks that critically affect financial performance.

Moreover, the outcome of Tobin's Q indicated that with a rise in operational risk, Tobin's Q appears to increase marginally. Nonetheless, this connection does not possess sufficient strength to be considered statistically significant. Like the ROA situation, firms could invest resources to handle operational risks efficiently, but they must also consider additional elements that demonstrably influence Tobin's Q.

Market Risk, Board Structure and Financial Performance

Board structure has a favourable but insignificant moderating effect on the connection between market risk and ROA. This indicates that although there could be likelihood for board structure to affect the link between market risk and ROA positively, the noted effect is insufficient to form significant conclusions. However, board structure has a significantly negative moderating effect on the link between market risk and Tobin's Q. This negative influence indicates that specific features of board structure, including board size and gender diversity, lessen the impact of market risk on Tobin's Q. Furthermore, this effect is statistically significant, implying it is improbable to occur by random chance. The notable moderating effect suggests that the connection between market risk and Tobin's Q varies across different board structures. This emphasizes the significance of governance practices in influencing how businesses manage and react to market uncertainties.

Operational Risk, Board Structure and Financial Performance

In this regard, board structure showed positive but insignificant moderating effect on the relationship between operational risk and financial performance. The influence is positively oriented, suggesting that a specific type or arrangement of board structure correlates with a distinct outcome related to operational risk and financial performance. Nonetheless, this impact is statistically negligible, indicating it cannot be reliably ascribed to an actual relationship because of randomness or other variables. The minor, positive moderating effect indicates that although board structure may influence the relationship between operational risk and financial performance, the impact seen is not substantial enough to be deemed significant statistically. Various board structures can exhibit different levels of efficiency in addressing or alleviating operational risks, which subsequently may affect financial results.

CONCLUSION

The results demonstrate the importance of board structure in determining how businesses handle market risks and how those decisions affect their bottom line. Although it is still unclear how board structure affects operational risk, its substantial impact on market risk and Tobin's Q highlights the importance of good corporate governance in boosting company valuation in the face of market uncertainty. In order to reduce financial risks and enhance performance, the study emphasises the necessity of strong risk management systems and efficient corporate governance procedures. It also implies that further research may shed more light on other board traits that improve risk management and financial results for construction and real estate firms in Nigeria.

Based on the conclusion drawn from the study, the study made the following recommendations:

In order to effectively detect, evaluate, and reduce operational and market risks, real estate and construction companies should invest in more reliable risk management systems. This can lessen the detrimental effects of these risks on financial performance indicators like Tobin's Q and ROA. It is important to improve board governance procedures because board structure has a major moderating effect on the link between market risk and Tobin's Q. This entails boosting the board's diversity and experience, maintaining independence, and encouraging efficient leadership frameworks to control market risks better.

Boards must be regularly educated and trained on risk management procedures and their sector's particular hazards. This will enable board members to properly supervise the company's risk management plans and make better-informed judgements.

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