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A panel regression analysis of corporate governance mechanism and financial performance of listed cement industries in Nigeria

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Abstract

Purpose: Inquire into the significant correlation allying corporate governance mechanisms (CGMs) with financial performance (FP) of the prominent quoted cement firms in Nigeria.

Methodology/approach: The study use panel data statistical modelling to investigate the time-dependent effects across different firms. The data analysis is based on a purely numerical dataset obtained through desk research, which was then scrutinized using the STATA 14.0 software package along with suitable statistical and econometric tools.

Results/findings: The findings indicate a positive correlation between board structures and the FP of the selected cement companies in Nigeria. While the size of the board does not significantly influence performance, the presence of independent directors on the board positively affects financial performance. Conversely, there is a negative correlation between directors' compensation and the financial performance of these firms, suggesting that an increase in directors' compensation may lead to a decline in financial FP.

Conclusion: The study concludes that there is a positive relationship between board structures and the financial performance, though board size is not a critical factor but the presence of independent directors on the board positively impacts financial performance.

Limitations: The analysis is confined to five years Annual report and financial statements of three major firms in the Nigerian cement industry, covering a period from 2019 to 2023 using Panel-Corrected Standard Errors Regression model.

Contribution: This comprehensive study evaluates the current state of corporate governance practices (CGPs) in Nigeria, aiming to identify improvements for CG policies.

Keywords: *Board Structure, Board Independence, Directors' Compensation, Performance, Return on Asset*

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1. Introduction

Robust Corporate Governance (CG) principles and frameworks serve as the cornerstone for building lenders and investors' confidence in a firm's performance. To safeguard the individual and collective interests of all stakeholders involved with a firm, it is essential to implement effective mechanisms and philosophies that encompass the processes and structures necessary for generating shareholder value and improving the firm's financial performance (FP) through managing the firm's affairs. CG refers to the system of rules, practices, and processes by which firms' affairs are directed and controlled. CG is instrumental in influencing the financial outcomes of firms (Sima, 2024). Corporate Governance

Mechanisms (CGMs) are instruments employed by firms to ensure the alignment of stakeholder interests. The five fundamental principles of CG are accountability, fairness, independence, responsiveness, and transparency (Bui & Krajcsák, 2024).

Most recent studies have indicated that the underlying cause of financial scandals and corporate malfeasance can often be traced back to inadequate Corporate Governance Systems (CGS) (Abu & Bamidele, 2022; El Idrissi & Alami, 2021; Mappadang, Wijaya, & Mappadang, 2021; Oranefo & Egbunike, 2022). Sima (2024) noted that the issues leading to poor financial performance in firms stem from ineffective CG systems and the lack of rigorous enforcement of CG standards by boards of directors. Furthermore, these challenges are exacerbated by incompetence, detrimental organizational culture, and leadership approaches that prioritize short-term profits, excessive risk-taking, and self-serving behavior by managers. Consequently, CGMs are primarily designed to safeguard the interests of the firm's capital owners against opportunistic actions. Consequently, Corporate Governance Mechanisms (CGMs) have attracted significant global attention because of their potential to improve financial performance and enhance stakeholder wealth. This interest is one of the reasons why CG is regarded as one of the most extensively researched topics aimed at alleviating conflicts of interest between managers and investors.

Financial performance (FP) represents a significant achievement for management, reflecting its ability to effectively manage a company's wealth over a specified timeframe (Olayinka & Mustapha, 2022). Essentially, FP evaluates a company's business operations and outcomes in financial terms (Abu, Okpeh, & Okpe, 2016). A recent investigation by Tosin and Otonne (2019) suggested that a firm's performance can be assessed using various metrics, including absolute asset growth, earnings per share, profit, return on assets, return on capital employed, return on equity, and sales growth. The term performance is often used interchangeably with profitability, firm performance, corporate performance and financial performance (Tosin & Otonne, 2019). According to Abu and Bamidele (2022), FP is defined as a firm's capacity to achieve its financial goals and objectives. Recent developments in the field of CG have led to renewed interest in investigating how CG influences FP. This study aims to address the contextual, conceptual, and geographical gaps in the study of CG and FP.

1.1 Problem statements

In the new global economy, CG has become a central issue and received considerable critical attention. CG is fashioned in distinct procedures, globally, pivoting upon the relative power of the proprietors and agents. However, there is still a contextual gap in understanding how CG practices vary across different market segments within emerging economies and their influence on firm performance. Recent structured literature reviews have revealed that many studies have extensively explored the impact of board diversity and executive compensation structures on financial performance (Sima, 2024). However, there is a conceptual gap in understanding the combined effects of various factors on financial performance (FP). CGMs thought to influence FP have been explored in several studies focusing on developed countries such as the USA, UK, and other European countries; however, there is a scarcity of quantitative analyses focusing on sub-Saharan African nations, particularly Nigeria. Moreover, despite several studies concentrating on developed economies, there remains a geographical gap regarding other regions, including Africa and the Middle East, which are characterized as developing economies. The applicability of existing research on this topic is limited, highlighting the need to explore CG practices and their effects on FP in these regions to provide a more globally inclusive understanding of the subject.

Annuar and Abdul Rashid (2015) identify several critical elements of CG practices, including board structure, independence of audit committees, regular meeting attendance, power and effectiveness of various committees, and presence of independent and competent external directors. In view of that, this study aims to address a gap in the literature by shedding light on the significant relationship between CGMs and the financial performance of listed cement firms in Nigeria. This study specifically examines board independence, audit committee independence, directors' compensation, and board size as proxies for corporate governance, while utilizing return on assets (ROA) as the FP metric.

1.2 Research objectives.

The broad objective of this study is to examine the significant relationship between CGMs and the financial performance of cement firms listed in Nigeria. However, in more specific terms, this study seeks to accomplish the following objectives:

1. To analyse the significant relationship between board structures (including board size and board independence) and the FP of listed cement firms in Nigeria.
2. To examine the significant relationship between audit committee independence and FP of the listed cement firms in Nigeria.
3. To examine the significant relationship between directors' compensation and FP of the listed cement firms in Nigeria.

1.3 Research questions.

The research questions of this study were as follows:

1. Does a significant relationship exist between board structure (board size and board independence) and the FP of the listed cement firms in Nigeria?
2. Is there a significant relationship between audit committee independence and the FP of listed cement firms in Nigeria?
3. Does a significant relationship exist between directors' compensation and FP of the listed cement firms in Nigeria?

1.4 Scope of the Study

This study examined the significant relationship between CGMs and FP of the listed cement firms in Nigeria. The analysis will be based on the annual reports published by the three giant firms in the industry (Dangote Cement Plc (DANGCE.NG), Lafarge Africa Plc (WAPCO.NG), and Cement Company of Northern Nigeria Plc (CCNN.NG), now BUA Cement Plc (BUAC.NG), between the years 2019 to 2023.

1.5 Significance of the study

It is essential to periodically evaluate the impact of CGPs on FP, particularly in light of the newly enacted rules and regulations that have introduced new challenges for businesses and investors. Currently, there is a scarcity of research addressing these matters in Nigeria, resulting in limited information. Therefore, conducting a comprehensive study to analyse the current state of CG practices is crucial for developing improved corporate governance policies. The results of this study will not only enhance the existing body of literature on CG and financial performance but also provide a valuable resource for future research endeavours.

2. Literature Review

2.1 Historical background of the case study and corporate governance (CG)

The Nigerian cement industry is a growing sector of the Nigerian economy, largely linked to the productivity and performance of the construction sector and increasing activities in the real estate sector. Therefore, the increase in the performance of the Nigerian cement industry will have a remarkable impact on the economic value that the sector provides to Nigeria's economy as a whole. Given its substantial impact, periodic analyses of the relationship between CGMs and FP within the industry are essential to develop more effective CG policies. Olayinka and Mustapha (2022) highlighted that the prominent cement manufacturing firms in Nigeria are Dangote Cement Plc, Lafarge Africa Plc, and Cement Company of Northern Nigeria Plc, now known as BUA Cement Plc. These companies were established in Nigeria in 2010, 1959, and 1962, respectively, and BUA Cement Plc was founded in 2000. In addition, the three companies were listed on the Nigerian Stock Exchange in 2010, 1979, and 1993, respectively, with BUA Cement Plc joining the exchange in 2020, following the merger of its two cement subsidiaries, CCNN Plc and Obu Cement Company.

Historically, there has been no universally accepted definition of corporate governance, nor is there a consensus among countries regarding its interpretation (Aminu & Murtala, 2018). Consequently, corporate governance can be defined and executed based on various principles globally, shaped by the power dynamics among owners, managers, and capital providers (Aminu & Murtala, 2018). Generally, corporate governance includes the processes, customs, laws, policies, and institutions that determine how a company is directed, managed, or controlled. According to Ejuvbekpokpo and Esuike (2013) and Miko and Kamardin (2016), CG is a relatively new concept in Nigeria. Although the Companies and Allied Matters Act of 2004 (CAMA), the Banks and Other Financial Institutions Act of 2002 (BOFIA, 2002), the Investments and Securities Act of 1999 (placng.org, 1999), and the Securities and Exchange Commission Act of 1988 (SEC, 1988) include several provisions related to CGPs, these laws are often inadequately enforced, with enforcement being particularly weak in Nigeria, where disputes are commonly settled through quasi-legal means (Ejuvbekpokpo & Esuike, 2013).

In Nigeria, the responsibility for enforcing compliance with CG codes does not rest with a single institution. The Central Bank of Nigeria (CBN) oversees financial institutions to ensure adherence to these guidelines. The Nigerian Stock Exchange (NSE), the exchange also plays a role in governance for banks listed on the NSE. Recently, the Federal Inland Revenue Service (FIRS) became involved following Nigeria's adoption of International Financial Reporting Standards (IFRS). The Financial Reporting Council now asserts its position as the primary enforcer of these codes, citing Sections 11c and 51c of the Financial Reporting Council of Nigeria Act, which grants it the authority to promote sound corporate governance practices in both the public and private sectors, as well as to issue the Nigerian Code of Corporate Governance (NCCG) 2018 and enforce compliance among firms. This has led to considerable confusion regarding the institutions to which companies should report.

A substantial and expanding body of research has explored the relationship between corporate governance mechanisms (CGMs) and firm performance (FP) in both formal and informal contexts. Formal corporate, according to Tachizawa and Wong (2015) and Gallego-Álvarez and Pucheta-Martínez (2020), encompasses a firm's organizational framework, including its command structure, incentive systems, standard operating procedures, and documented dispute resolution processes. Conversely, informal corporate governance is defined by social control and trust (Chi, 2021). Social scientists generally agree that corporate governance (CG) significantly impacts enhancing firm financial performance (FP), minimizing agency costs, and shaping corporate policies. Corporate governance mechanisms (CGMs) serve as a framework for fostering transparency, accountability, and trust (E-Vahdati, Zulkifli, & Zakaria, 2019). Managers' interests often conflict with those of shareholders, highlighting the principal-agent dilemma that arises in the governance and management of firms (Lungu, Mititean, Caraiani, & Constantinescu, 2020). Corporate governance provides a structure to address these agent conflicts, assuring investors and other stakeholders that agents are capable of managing resources effectively to maximize the firm's value (Ahmed, Ali, & Hágen, 2023). A firm is deemed compliant with CG principles when it operates with diligence, transparency, accountability, and commitment to enhancing shareholder wealth (Pandy, 2018).

2.2 Financial Performance (FP)
Historically, firm financial performance (FP) has been defined as the effective utilization of assets in daily operations to generate revenue. Olayinka and Mustapha (2022) describe FP as a measure of management success in efficiently controlling a firm's wealth over a specified period. FP is regarded as an indicator of a firm's financial health, necessitating ongoing assessment (Abu, 2024). Firm FP is typically evaluated based on secondary data obtained from financial statements, which include the balance sheet, profit and loss accounts, cash flow statement, and statement of changes in ownership equity. These documents provide a clear representation of a firm's profitability and financial condition. Additionally, financial ratios are commonly used to assess a firm's FP, encompassing aspects such as profitability, leverage, liquidity and efficiency (Olayinka, 2022). Key profitability ratios include Return on Assets (ROA), Return on Investment (ROI), and Return on Equity (ROE). The ratios mentioned above illustrate an organization's effectiveness in generating profits through the utilization of its available resources. In this analysis, Return on Assets (ROA) was selected as a metric to evaluate the financial performance of the firms under consideration. ROA represents a firm's net income as a percentage of its total assets. This metric implies that companies with a larger asset base should be capable of achieving higher income levels. ROA serves as an indicator of management's ability to yield returns on the firm's resources (Bhagat & Bolton, 2008).

2.3 Corporate Governance Theories

Theories and models explaining corporate governance (CG) are widely acknowledged in the fields of accounting and finance. The structure of the board is considered a crucial component of CG, significantly impacting the interests of shareholders and the organization as a whole (Roundtable 2016). Consequently, over the past few decades, both scholars and practitioners have rigorously examined the question, "What are the characteristics of board structures, and how do they affect a firm's financial performance?" This inquiry has been approached using various theoretical frameworks, including agency theory, resource dependency theory, and stakeholder theory.

2.3.1 Agency Theory

Agency theory aims to elucidate the dynamics between principals and agents within a corporate setting, particularly concerning issues that may lead to conflicts of interest, such as the increase in directors' compensation, board size, independence, and the maintenance of favorable relationships with regulatory authorities (El Idrissi & Alami, 2021). Agency problems in corporate finance often arise from conflicting interests between a company's shareholders and management. In large corporations with a diverse shareholder base, management decisions can frequently diverge from the goal of serving shareholders' interests, as they may prioritize their own benefits instead (Aminu & Murtala, 2018).

2.3.2 Stakeholder Theory

Stakeholder theory posits that a firm has responsibilities to various stakeholder groups beyond its shareholders. Stakeholders include individuals or entities with an interest in a firm's operations.
The following fundamental principles of stakeholder theory were outlined by Sima (2024):

- Corporations engage with various constituent groups affected by their decisions.
- The theory focuses on the nature of these relationships, considering both the outcomes and processes for the corporation and its stakeholders.
- Stakeholders' interests possess intrinsic value, with no single interest taking precedence over others.
- Emphasis is placed on managerial decision making.

2.3.3 Resource Dependency Theory

This theory posits that a company's reliance on resources significantly influences its performance by enhancing the connection between its structure and external factors, reducing transaction costs, and avoiding uncertainty. The concept of resource dependence is crucial for examining the relationship between board structure and financial performance. A corporation's dependency on its resources impacts its performance by fortifying the link with external events, minimizing transaction costs, and steering clear of ambiguous circumstances (Bui and Krajcsák, 2024).

2.3.4 Stewardship Theory

This theory elucidates a relationship grounded in psychological and sociological principles that align the interests of the management with those of shareholders. Conflicts of interest may arise between organizations and individuals as managers aim to maximize utility. According to stewardship theory, when a conflict occurs between the principal and the agent, the executive prioritizes the organization's collective interests over personal incentives to deviate (Bui & Krajcsák, 2024).

2.4 Corporate Governance Mechanism and Financial Performance

2.4.1 Board Size and Financial Performance

Board size refers to the total number of directors on a firm's board who oversee the company's operations and make strategic financial decisions (Olayinka, 2018). Herdjiono and Sari (2017) assert that the board of directors serves as the central control mechanism within a firm, holding ultimate authority. According to Dabor, Isiavwe, Ajagbe, and Oke (2015), researchers have expressed different views regarding the ideal size of a board of directors. Some argue that smaller boards are more effective because they facilitate quicker decision-making and are less susceptible to management manipulation. There is no definitive rule governing the size of a company's board, leading to variations in board composition depending on the perspective. For example, in Nigeria, sec.gov.ng (2014) mandates a minimum of five members for all listed companies, while the Nigerian Code of Corporate Governance (pwcnigeria.typepad.com, 2018) suggests that boards should be adequately sized to effectively manage and oversee the company's operations, considering the scale and complexity of its activities. Thus, the appropriate board size is contingent on the nature of the services provided and the complexity of the firm's operations. The ongoing debate regarding the effectiveness of larger versus smaller boards in fulfilling their oversight responsibilities continues (Edwin & Victor, 2019).

Previous studies examining the relationship between CGMs and FP use have yielded inconsistent and contradictory results. Akinleye, Olarewaju, and Fajuyagbe (2019) and Urhoghide and Omolaye (2017) indicate that board size has a significant negative effect on ROA. Conversely, Herdjiono and Sari (2017), Ademola et al. (2016), and Dabor et al. (2015) found that board size positively influences financial performance. Stakeholder theory suggests that a greater number of constituent groups can enhance firm performance, leading to the following hypothesis:
H1: There is a significant positive relationship between board size and FP.

2.4.2 Board Independence and Financial Performance

Board independence is another aspect that has attracted considerable attention from researchers and policymakers. Board independence indicates that most members of a company's board of directors are non-executives. According to sec.gov.ng (2014), a board is composed of both executive and nonexecutive directors. For a board to be deemed independent, the majority of its directors must be non-executive or independent directors. Board independence is quantified by the proportion of non-executive directors to the total number of directors. Akinleye et al. (2019) describe non-executive directors as external members who maintain independence from the company and lack both personal and business ties to it. Dabor et al. (2015) argue that executive directors possess a deeper understanding of a company's operations, which positions them favorably to oversee top management. Conversely, non-executive directors are suggested to function as "professional referees," promoting competition among insiders to ensure that actions align with the goal of maximizing shareholder value. Asien (2024) highlighted that strong board independence (BDIND) significantly increases corporate financial performance.

Enilolobo et al. (2019) investigated the relationship between CG and FP in listed firms in Nigeria, specifically comparing the food and petroleum sectors. Their study utilized secondary data from ten listed firms in these industries over a seven-year period (2011-2017). The findings indicate that the CGM of board independence positively influences the FP of food and petroleum companies in Nigeria. Similarly, Akingunola, Olaniyan, and Soyemi (2018) analysed CGMs and FP among quoted manufacturing firms in Nigeria using a sample of 50 listed companies on the Nigerian Stock Exchange. Their results revealed a direct correlation between the number of non-executive directors and return on assets (ROA). Dabor et al. (2015) explored the effects of CG on the performance of selected quoted companies. A sample of 248 companies was selected using a simple random sampling method. The findings indicate a significant negative correlation between board independence and firm performance, suggesting that board independence does not significantly affect performance. Agency theory suggests that a higher proportion of independent directors on the board should positively influence firm performance. Therefore, this study proposes the following hypothesis:
H2: There is a significant positive relationship between board independence and FP.

2.4.3 Audit Committee Independence and Financial Performance

Audit committee independence refers to the committee's ability to perform its duties without interference from auditors or management (Salawu, Okpanachi, Yahaya, & Dikki, 2017). Oji and Ofoegbu (2017) define an independent audit committee member as someone who is neither employed by nor provides services to an organization beyond their role as a committee member. They emphasize that independent audit committee members are expected to be more objective and less likely to overlook potential deficiencies related to financial reporting misappropriations and manipulations. Kibiya, Che-Ahmad, and Amran (2016) further explain that the audit committee should consist of three non-executive board members and three shareholders elected during each annual general meeting. However, the board is responsible for appointing audit committee representatives, who are then presented to shareholders for approval at the annual general meeting (Kibiya et al., 2016). The rationale for having an equal number of representatives on the audit committee is to ensure its independence, thereby

fostering greater confidence in the board's activities, enhancing financial control, and increasing the credibility of the committee's work and the company's financial reporting process (Kibiya et al., 2016). Alqatamin (2018) argues that the audit committee's independence from management enables it to adopt an impartial perspective on the company's financial reporting process, thereby preventing managerial dominance and potentially enhancing FP. Various studies have investigated the link between audit committee characteristics and FP, yielding contradictory findings. For instance, Al-Jalahma (2022) identified an insignificant relationship, whereas Okolie and Ogbaragu (2022) reported a positive and significant correlation. Conversely, S. E. Abu (2024) found an insignificant negative relationship. Stewardship Theory suggests that independent stakeholders prioritize the collective interests of the organization over personal gains; thus, this study proposes the following hypothesis:
H3: There is a significant positive relationship between Audit Committee Independence and FP.

2.4.4 Directors' Compensation and Financial Performance
The relationship between directors' compensation and FP has been the subject of research for several years; however, the findings have varied across different contexts. No definitive conclusion can be drawn regarding the relationship between directors' compensation and FP in Nigerian firms. A study conducted by Abu and Bamidele (2022) found a positive and significant association between executive remuneration and return on assets (ROA), indicating that increased executive pay correlates with improved firm performance. In contrast, Junarsin (2011) found a negative and significant relationship between executive remuneration and ROA, suggesting that higher executive compensation may adversely affect firm performance. Resource Dependency Theory posits that elevated transaction and administrative costs negatively impact FP; therefore, this study hypothesizes that:
H4: There is a significant negative relationship between director' compensation and FP.

3. Research Methodology
This study investigates the connection between corporate governance mechanisms and the financial performance of publicly listed cement companies in Nigeria over a five-year period from 2019 to 2023. The three giant firms selected are the only firms in the cement industry that were listed, and the data were collected from the annual reports published by the giant firms in the industry. A panel data regression analysis was employed to analyze the time variance effects across firms. This study utilized a purely quantitative set of secondary data, which was examined using the STATA 14.0 software package along with appropriate statistical and econometric tools.

3.1 Structural Framework
This study posits that Financial Performance (FP) is influenced by corporate governance mechanisms (CGMs). The following structural framework illustrates the relationship between FP and CGMs, with FP as the dependent variable and CGMs as the independent variables. The CGM proxies include board size, board independence, audit committee independence, and directors' compensation. In terms of FP, the Return on Assets (ROA) ratio was selected as the primary measure to assess FP from an organizational standpoint. In this study, ROA is defined as the ratio of profit after tax to total assets.

Model Specification: This study adapted the econometric model proposed by Alimi, Adegun, and Agboola (2023) with minor modifications, expressed as follows: ROAt = f(BNEDt, BDZt, CPSt, EQt, ADCt, NLTAt, BDt).

Model: The relationship between board structure, directors' compensation, audit committee independence, and FP (ROA) of listed cement companies in Nigeria.

$$ROA_{it}=\beta_0+\beta_1 BS_{it}+\beta_2 BI_{it}+\beta_3 ACI_{it}+\beta_4 DC_{it}+ +\varepsilon$$

Where: Dependent variables $ROA = Return\ on\ assets$, BS=Board Size BI = Independent, ACI=Audit committee Independent, DC=Directors' compensation, e,=error Term, β0–β4= regression parameters, i=individual firms, and t=time

Table 1. Variables definition and measurement

Theories	Variables			Code	Measurement	Reference
Agency Theory	**Financial Performance**	Return on Asset		ROA	Profit after tax / Total Asset	Ahmadi, Nakaa, and Bouri (2018), Yang, Riepe, Moser, Pull, and Terjesen (2019), Đặng, Houanti, Reddy, and Simioni (2020), Alimi et al. (2023)
Stakeholder theory	**Corporate governance mechanisms**	Board Structures	Board size	BS	The number of directors on the firm board.	Shafana (2016), Haque, Deegan, and Inglis (2016), Alimi et al. (2023)
Agency theory			Board Independence	BI	Summation of independent and non-executive directors divided by total number of board of directors	sec.gov.ng (2014). Sec 4/3, Alagathurai (2013), Alimi et al. (2023)
Stewardship Theory			Audit Committee Independent	ACI	Ratio of executive director on the audit committee	Iheyen (2021), . Abu (2024)
Resources Dependency Theory			Directors’ Compensation	DC	Expressed in natural logarithm of Directors’ remuneration	Kong (2017), Alimi et al. (2023)

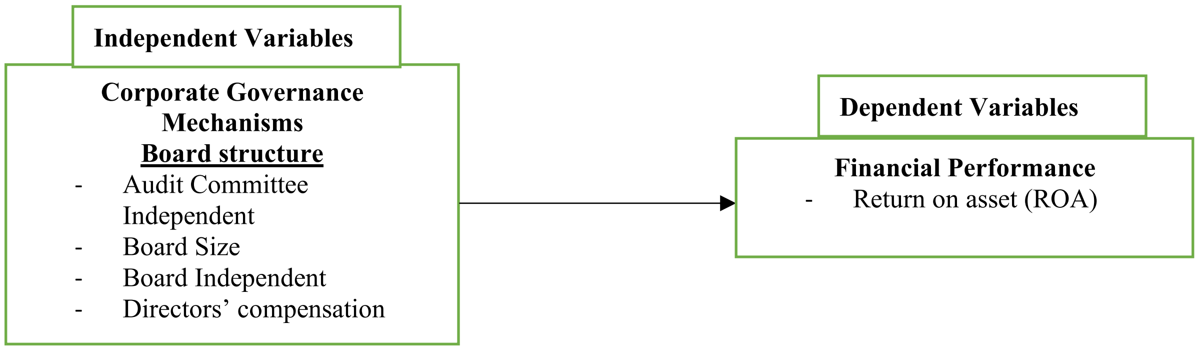

Figure 1. Structural Framework

4. Result and Discussion

This section presents the empirical results with descriptive statistics, correlation matrix, and regression analyses, and interpretation of the results of the data recorded in this study. It begins with a discussion of the descriptive analysis related to the Return on Assets (ROA), which serves as the dependent variable, alongside the independent variable of corporate governance (CG). Subsequently, a correlation matrix was provided to illustrate the relationships among the variables, which is a common method for assessing correlations. These analyses were conducted to evaluate the previously established hypotheses regarding the relationships among the expressed variables.

4.1 Descriptive Statistics

Descriptive statistics were used to outline the trends of the variables used in the study. The table shows the mean, median, minimum, maximum, standard deviation, curve, and kurtosis for both the dependent and independent variables. According to Julie Pallant (2007), Griffin and Steinbrecher (2013), and Olayinka (2018), outliers are identified as variables with skewness values exceeding ±3.3 and kurtosis values beyond ±10. The results shown in Table 2 indicate that all variables fall within the acceptable limits for skewness and kurtosis.

Table 2. Descriptive analysis for the variables (2012-2016)

Variable	Mean	Median	Min	Max	Std deviation	Skewness	Kurtosis
ROA	0.12	0.12	0.04	0.18	0.04	-0.21	1.94
BS	12.0	14.00	8.00	17.00	3.27	-0.24	1.48
BI	0.89	0.89	0.85	0.92	0.03	-0.14	1.50
ACI	0.57	0.60	0.50	0.60	0.50	-1.06	2.11
DC	8.52	8.38	7.91	9.39	0.53	0.43	1.63

Table 2 highlights some important findings from the descriptive statistics for the dependent and explanatory variables. The data indicate that, on average, the cement industry exhibits a high return on assets (ROA) of 12%, with an average of 12 board members. Additionally, the board's independence stands at 89%, and the audit committee's independence is 57%. Furthermore, the natural logarithm of directors' compensation is 8.52.

4.2 Correlation Matrix

The correlation matrix illustrates the extent of the correlation among the variables. Table 3 presents the correlation results for the variables used in this study. According to J. Pallant (2005); Julie Pallant (20 indicated7), a high correlation between independent variable when the value was is equal to or greater than suggested the presence of multicollinearity. All independent variables in this study remained below the 0.90 threshold recommended by Pallant (2007). However, as noted by Gujarati (2014) and Studenmund (2014), the most effective approach to address multicollinearity is often to present the results of the fitted model without alteration, as collinearity frequently stems from data limitations, and researchers may have limited control over the data available for the analysis. Consequently, the results are presented as they were.

Table 3. Correlation matrix of dependent and independent variables

	ROA	BS	BI	ACI	DC
ROA	1.0000				
BS	0.1862	1.0000			
BI	0.8661	0.2005	1.0000		
ACI	0.4465	0.1241	0.3548	1.0000	
DC	0.7515	0.4494	0.9020	0.4541	1.0000

It is important to understand that correlations are measured on a scale ranging from ±0 to ±1. A correlation value close to 0 indicates a weak relationship, whereas a value approaching 1 indicates a stronger relationship. Olayinka (2018) finds that a zero (0) correlation does not indicate a linear relationship between variables, while one correlation explains a perfect linear relationship. It is important to note that no correlation values exceed 1. Furthermore, positive (+) and negative (-) indicators reflect the directions of the relationships between the two variables. Positive signs indicate movement in the same direction, whereas negative signs indicate movement in the opposite direction. It is important to note that the indications of correlation do not reflect the strength of this relationship. The correlation matrix shown in Table 3 shows a positive relationship between the dependent variables and all explanatory variables.

According to Hoechle (2007), Stata calculated these variances and correlations from the data and set them using the "xtpcse" command. Reed and Webb (2010) confirmed that PCSEs improve the accuracy of standard error estimation without sacrificing efficiency. This perspective is further supported by Bailey and Katz (2011) and Olayinka (2018), who argue that the standard error estimates provided by PCSEs are robust against potential contemporaneous correlation issues. Consequently, a model with panel-corrected standard errors was used in this study.

4.3 Regression Results

Regression analysis is a crucial statistical method that aids in predicting and assessing the strength and direction of relationships (Olayinka 2018). The results are summarized in Table 4, which employs the PCSEs model.

Table 4. Summary of Regression result for ROA using PCSEs

ROA	**Coef.**	**Std. Err.**	**z value**	**P value**	**Significant**
BS	.0020055	0 .002004	1.00	0.317	Not sig
BI	1.794686	0.3069875	5.85	0.000***	+ve sig
ACI	.2181215	0.3069875	1.63	0.103	Not sig
DC	-.0445141	0.0197083	2.26	0.024**	-ve sig
_cons	-1.244921	0.1585827	7.85	0.000	
Prob > chi2		=	0.0000		
R-squared		=	0.8010		
Wald chil2 (4)		=	120.68		

*** (1% sig level), ** (5% sig level), *(10%sig level).

The results presented in Table 4 reveal that while the coefficients for board structure (including board size and board independence) and Audit Committee Independence are positive, only board independence shows a significant correlation with ROA at the 1% significance level. Conversely, the coefficient for directors' compensation is negatively correlated and significantly related to ROA.

4.4 Hypothesis Testing

Several hypotheses were formulated to predict the potential outcomes regarding the relationship between the independent variables of this study and the dependent variable, ROA (debt ratio). Each hypothesis was evaluated based on the findings of this study.

Table 5. Hypothesis Testing

Hypothesis	Statement	Findings	Conclusion	Statement
1	There is a significant positive relationship between board size and financial performance.	Insignificant positive	Not-Supported	There is a significant positive relationship between board size and financial performance.
2	There is a significant positive relationship between board independence and financial performance.	Significant positive	Supported	There is a significant positive relationship between board independence and financial performance.
3	There is a significant positive relationship between Audit Committee Independence and Financial Performance	Insignificant positive	Not-Supported	There is a significant positive relationship between Audit Committee Independence and Financial Performance
4	There is a significant negative relationship between Directors' compensations and Financial Performance.	Significant negative	Supported	There is a significant negative relationship between Directors' compensations and Financial Performance.

1. This study investigates the significant relationship between board structure (board size and board independence) and the financial performance of listed cement firms in Nigeria.
2. To analyze the significant relationship between audit committee independence and the financial performance of listed cement firms in Nigeria.
3. To assess the significant relationship between directors' compensation and the financial performance of listed cement firms in Nigeria.

4.5 Connecting Findings to Study Objectives

The goals of this study were clearly outlined. At this stage, the focus is on correlating the stated objectives with the findings to evaluate whether they were achieved. The first objective was to investigate the strength of the relationship between board structure (specifically board size and board independence) and the financial performance of listed cement firms in Nigeria. The results in Table 4 indicate that board structure, namely board size and board independence, positively influences financial performance. However, only board independence shows strong positive and significant relationships, suggesting that greater board independence correlates with improved financial performance for the firms.

The second objective was to analyze the significant relationship between audit committee independence and the financial performance of the listed cement firms in Nigeria. According to the results in Table 4, audit committee independence shows an insignificant positive relationship, indicating that it does not significantly impact firms' financial performance.

The third objective is to explore the significant relationship between directors' compensation and the financial performance of the listed cement firms in Nigeria. The findings in Table 4 reveal a significant negative relationship, suggesting that an increase in directors' compensation is associated with a decrease in the financial performance.

5. Conclusion

5.1 Conclusion

The study concludes that there is a positive relationship between board structure and the financial performance of listed cement firms in Nigeria. Although board size is not a critical factor, the presence of independent directors on the board positively impacts financial performance. To enhance financial performance, it is recommended that the board maintain a level of independence that allows shareholders to effectively monitor the actions of management and executive directors; this is consistent with stakeholder theory, which places emphasis on managerial decision-making. The independence of the audit committee, despite not passing a significant evaluation, still maintains a positive correlation with financial performance (FP), highlighting its importance in enhancing firms' FP. The study also found a negative correlation between directors' compensation and the financial performance of listed cement companies in Nigeria, indicating that this factor adversely affects FP. This suggests that increased directors' compensation is likely associated with diminished firm performance in these companies, which is in line with the Resource Dependency Theory that elevated transaction and administrative costs negatively impact financial performance.

5.2 Recommendations

The following recommendations are proposed: (i) the composition of the board of directors should reflect the complexities and scale of each firm's operations; (ii) the independence of the board must be preserved to ensure effective oversight of management, thereby improving performance; (iii) the integrity of the audit committee's independence should be maintained if organizations aim to enhance their FP; and (iv) caution should be exercised in determining directors' compensation, as it negatively influences FP.

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